

# STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

For forty-eight years—IRON TRADE REVIEW

## Contents . . . February 22, 1937



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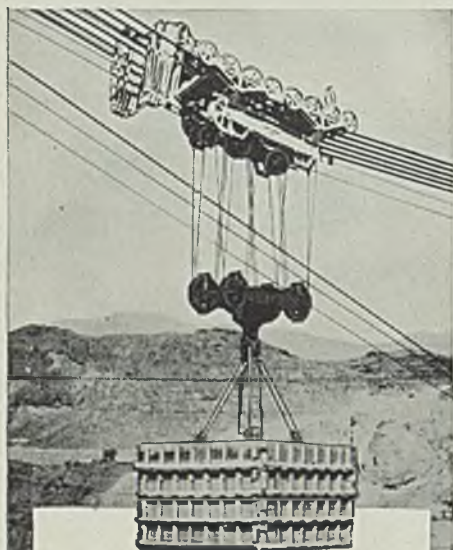
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# STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

## As the Editor Views the News

**W**HILE many persons will find fault with the report on steel's labor and price policies, presented last Monday under the sponsorship of the Brookings institution and the Falk foundation (p. 17) it contains a sentence which holds the key of solution to many of the nation's most vexing problems. The sentence reads: "A necessary prelude to intelligent social control or even any rational policy must be knowledge." Full appreciation of this fact by those who want to remake our established institutions overnight would help tremendously in ironing out present difficulties. Progress will be surer if we act upon the basis of facts instead of emotions.

Many persons who think that the ultimate solution of the labor problem in the United States lies in thorough unionization probably arrived at that conclusion because England (p. 35) and a few other of the older industrial nations have adopted unionization more generally than we have. Are we ready to say that that is the best solution? A serious factual study comparing the 15-year record of men working under employe representation plans against that of men working under professional labor union auspices probably would show that the former were much more fortunate in many respects than the latter. Do we fear to be guided by facts?

The rapid growth of population and development of industry on the Pacific coast has intensified the problem of distribution in that territory. Speaking at the recent conference of the Iron, Steel and Allied Industries of California at Del Monte, an eastern manufacturer declared that the per capita purchasing power of the population west of the Rockies is more than 30 per cent above the country's average. "We have failed," he said (p. 20), "to use research in sales

and distribution to the extent we must if we desire to put goods in the economic reach of more and yet more people." This statement goes to the root of one of industry's most difficult problems. Broadening consumption—that is, extending the distribution of industry's products into new and more diversified channels—is necessary to justify industry's mounting investment in organization and equipment.

In spite of recent progress in the mechanical testing of steel, a speaker at the annual meeting of the American Petroleum institute presented a strong argument (p. 38) that there still remains too wide a margin between the results of tests and the actual performance of steel. He cites numerous details of information regarding the behavior of steel—not commonly available today—which would be invaluable to users and designers. Closer harmony between the data of tests and actual performance can be promoted by improvement in testing technique and by refinements in the production and treatment which will insure greater uniformity of quality. Steelmakers, as well as users, are deeply interested in the subject and are working toward this dual objective.

After making due allowances for engineering, social, technical and economic influences, engineers have prepared forecasts (p. 15) of the production of certain fuels, ores and ferrous and nonferrous metals in 1954. They predict that the output of steel in the United States in that year will range between 59,000,000 and 65,000,000 tons. Pig iron production will be between 39,000,000 and 44,000,000 tons. Consumption of coal will be from 540,000,000 to 610,000,000 tons; of petroleum, 1,380,000,000 to 1,520,000,000 barrels; of copper, 930,000 to 1,040,000 tons; and of zinc, 650,000 to 730,000 tons. . . . Development of New York and New Jersey iron ores (p. 42), coupled with existing high reserves of the Lake Superior region, would give the United States a reserve of 2,500,000,000 tons of 57 per cent ore—enough for 50 years.

*E. L. Shaner*



An illustration at the top of the page shows a train with several freight cars moving along tracks. To the right of the train, a large crane is shown in operation, lifting a heavy load. The background is a simple landscape with some trees and a distant building.

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# Engineers Forecast Long-Range in Metals;

## Steel, 59 to 65 Million Tons, 1954

**W**ORLD production of steel by 1954 should fall between 135,000,000 and 150,000,000 gross tons, and output in the United States by that time should amount to 59,000,000 to 65,000,000 tons, or about 44 per cent of world production. As to pig iron, world production in 1954 should be between 98,000,000 and 110,000,000 gross tons,



Erskine Ramsay

Awarded William Lawrence Saunders medal of American Institute of Mining and Metallurgical Engineers. (See STEEL, Feb. 15, p. 26)

and United States production between 39,000,000 and 44,000,000 tons, or about 40 per cent of the total.

These predictions were made at the 147th meeting of the American Institute of Mining and Metallurgical Engineers in New York, Feb. 15-18, by A. B. Parsons, secretary of the institute, and Stuart St. Clair, consulting geologist. Per capita production of steel in the United States 17 years hence should be between 907 and 1000 pounds, compared with 829 pounds for 1936, these authorities estimated. Indicated per capita consumption of pig iron in this country for 1954 should range be-

tween 605 and 672 pounds, compared with 560 pounds in 1936.

The institute meeting attracted more than 2000 members and guests, the largest number in recent years, thus reflecting scientific advancement along all fronts. Steel and metalworking engineers found much of special interest at sessions arranged by the Iron and Steel and Institute of Metals divisions to discuss such subjects as ingot solidification, oxides in steel and crystallization.

Officers for the coming year were elected as shown on the following page. Presentation of medals and awards, the recipients of which were named in last week's issue of STEEL, was a feature at the banquet at the Waldorf-Astoria hotel on Feb. 17.

### Consumption Records Studied

In making their predictions of metals and fuels production in 1954, Dr. Parsons and Mr. St. Clair compiled records of consumption during the past 50 years as one guide. They then proceeded to make as many allowances as possible for the forces—engineering, social, technical and economic—which should have a tendency to expand or to contract consumption. They listed 10 major forces, six on the expansion side and four on the contraction side, that, in general, were applicable to each of the seven commodities listed. In addition to steel and pig iron, these commodities were lead, zinc, copper, coal and petroleum.

One significant difference may be noted in the trends of pig iron and steel. The latter in recent years, they said, has had, and for some years probably will continue to have, a higher rate of increase than pig iron, largely because of the increased use of scrap in steel manufacture.

Aside from this divergence, they said, the following comments apply in general to both:

(1) It is improbable that the rela-

tive costs of producing either pig iron or steel will decline enough to stimulate consumption to any great extent.

(2) It is generally agreed that a substantial part of the record consumption of steel outside of the United States (23 per cent greater in 1936 than in 1929) was used for armaments—war ships, motor trucks,



R. C. Allen

Elected president, American Institute of Mining and Metallurgical Engineers

ordnance, ammunition and other requirements for modern warfare. No relaxation is in sight; but it seems unlikely that this pace will continue definitely.

(3) Increased tonnages of steel will be required for heavy construction, including bridges, dams, industrial plants and other large structures; for the oil industry, in part to keep pace with deeper drilling; for use in residential buildings that promises to develop into an important industry.

(4) Perhaps the most potent influence on trend of steel consumption is the phenomenal development of alloy steels having superior properties because of admixtures of nickel,



chromium, copper, molybdenum and other metals. These have a dual influence. In the first place, greater strength, toughness, and other physical properties make it impossible to reduce greatly the tonnage required to form a specified task so that a substantial economy of steel in original construction is attained. Secondly, because of superior resistance to corrosion, the life of structures is lengthened and a given quantity of steel accordingly gives greater service.

(5) Competition from lighter ma-

## New Officers

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\*Re-elected

terials, principally alloys of aluminum and magnesium should be a factor of growing moment. Particularly in moving structures, such as transportation equipment, the advantage of ultimate light weight will tend to offset greater per-pound costs of competing materials.

Commenting on the outlook in lead, they asserted that world production for 1954 should fall between 1,900,000 and 2,100,000 net tons and the United States consumption of primary lead between 500,000 and 580,000 tons or about 27 per cent of the world production.

Commenting on factors entering  
(Please turn to Page 42)

## Two Carnegie Mills To Be Improved

**E**FFECTIVE March 1 Carnegie-Illinois Steel Corp. will assume control of the Pencoyd plant of the American Bridge Co., Philadelphia. American Bridge will retain only the bridge shop and erection tool house. Both companies are subsidiaries of United States Steel Corp.

The Carnegie-Illinois Pencoyd plant will consist of the 11 open-hearth furnaces, a 36-inch blooming mill, a 12-inch bar mill, a 20-inch structural mill, and a 23-28-inch structural mill, a large machine shop and steel, iron and brass foundries. Certain improvements are planned.

Approximately 1000 persons are employed at Pencoyd, which had its beginning in 1855 in a small plant for the manufacture of anvils.

William S. Unger, now assistant general superintendent of the Homestead steel works will become general superintendent at Pencoyd. A. H. Wartman, who has been acting manager at Pencoyd since Jan. 1 will be assistant general superintendent.

Carnegie-Illinois last week also announced that its Mercer works at Farrell, Pa., will be reconditioned at a cost of \$100,000 and reopened within four weeks. It employs approximately 450. C. A. Ferguson, general superintendent of the Farrell tin mill, will have charge at Mercer.

Four roughing and five finishing mills will be recommissioned with weekly capacity of approximately 1000 tons. Products are hot rolled annealed and single pickled sheets. This program was decided because of overflow business at Vandergrift, Pa., Cambridge, O., and Gary, Ind. mills.

## CIO Busy on Coal; Delays Steel Meet

**A**LTHOUGH it was reported that March 10 had been decided upon for a convention of the CIO in Pittsburgh to draft demands on the steel industry, its leaders said last week that the meeting probably will not be held until three or four weeks later.

Their attention was centered in New York where coal mine workers and operators were trying to negotiate a contract to replace that which expires March 31. Coal production

has been going forward at a high rate in anticipation of the possibilities of a strike.

Employee representatives in 18 Carnegie-Illinois Steel Corp. plants in the Pittsburgh district had before them a recommendation of the joint council of management and employee representatives for a wage increase which would bring the daily pay for labor to \$5 and give all other workers an increase of 80 cents a day. At the Aliquippa works of Jones & Laughlin Steel Corp. employee representatives voted to ask a \$1 a day increase for all employees.

Forty-three men employed at the Vandergrift plant machine shop of Carnegie-Illinois will receive higher pay as a result of an agreement last week. The men, in the higher brackets, received only 4.86 per cent increase last November when a general raise of 10 per cent was granted.

## President Sees Navy Steel Action

**T**HE government "must do something" in the next few weeks about getting steel for the navy, President Roosevelt said at a press conference last week, but he did not indicate what it will do. He stated he still favors the labor provisions in the Walsh-Healey law, which the navy recently asked Secretary Perkins to suspend.

He denied rumors the government intends to reopen the armor plate plant at Charleston, W. Va., used during the war, but he remarked that the government still owns it, it is in good location for making steel, armor machinery is there, though considerable retooling would be necessary.

Subsequent to the conference it was rumored that the government has contacted two steel producers, asking that they each "segregate" a plant for a week to manufacture navy steel. One of the objections to the Walsh-Healey act was that it forced labor changes at all plants of any company selling to the government.

Senator Walsh, chairman, senate naval affairs committee, absolved the steel industry from interfering with the government. He said the matter could be settled in conference with representatives of steel, navy, labor and the President.

The President said he would like to see the Walsh-Healey labor standards applied to all industry in the United States.

(See also "Windows of Washington," p. 33.)



# How Four Professors Would Solve Steel's Labor Problem

ORGANIZATION of steelworkers on a vertical rather than a craft basis; collective bargaining on a national basis; and safeguards for industrial democracy, "under which the workers are accorded the unrestrained exercise of the liberties of self-expression and participation in measures affecting their welfare"—such are the findings of a survey of the economics of the iron and steel industry financed by the Falk Foundation, Pittsburgh, the Rockefeller Foundation, New York, and the Brookings Institution, Washington.

Although the authors of the survey specifically disclaim any endorsement of a specific labor program, claiming to have arrived at their conclusions eight months ago, these findings coincide in almost all details with the present organization motif of John L. Lewis and his Committee for Industrial Organization.

The machinery whereby the survey was made is attracting as much attention as the conclusions themselves, for the reason the condemnation of the steel industry's labor policies—as also some of its pricing

methods—has been financed by money made in the iron and steel, oil, and hardware businesses.

Shortly after NRA was inaugurated, the Rockefeller Foundation approached the Brookings Institution on the matter of making a survey of "key" industries, iron and steel being one. Financial assistance was obtained from the Falk Foundation, created by Maurice and Laura Falk, the former having long been associated with the Weirton Steel Co., Blaw-Knox Co., and the Federated Metals Corp.

The actual work of conducting the survey was done by one representative each from the University of Pittsburgh, University of Virginia, and Harvard university, under the direction of Dr. Ralph J. Watkins, director, bureau of business research, University of Pittsburgh.

In presenting a summary of the survey at a dinner in Pittsburgh, Feb. 15, the Falk Foundation made it plain that while it determines whether the study warrants financial support, it in no wise controls the manner of its making nor does it endorse or assume responsibility

for the conclusions reached. Subsequently Dr. Watkins stated:

"In my talk I made it abundantly clear that neither the Falk Foundation nor the Brookings Institution had any responsibility whatsoever for the analysis made or the conclusions reached. The responsibility rests on the three authors, each in his own field, and on myself."

On the labor issue, the following general principles are laid down:

"It is not the function of this discussion to outline ways and means of organizing steelworkers or to indicate under whose auspices they would be organized, but it is in point to state some general principles.

## Principles Are Outlined

"First, steelworkers should be organized. Effective administration of personnel relations in plants employing hundreds and even thousands of workers and in companies employing tens of thousands of workers is dependent on organization that extends to the lower reaches. Moreover, only through organization can the workers protect their interest.

"Second, the logic of the industry's operation is such that vertical rather than craft organization is called for. Integrated operations extending from blast furnace to the finished rolled steel product constitute the economic unit, and a form of organization that would encourage jurisdiction disputes would be socially inefficient.

"Furthermore, since management is organized on a vertical basis, any approach to equality of bargaining power would require a similar vertical organization of the workers.

"Third, collective bargaining should be on a national basis and not on a plant basis. The plant is little more than a cell in the iron and steel industry, and the economic factors bearing on wage rates and hours proceed from and in turn affect the national market.

"It has been emphasized in other parts of this work that the economic conditions obtaining in the iron and steel industry dictate united action on the part of management.

"Wages constitute a significant part of costs, and management must consider them in a national setting. In short, management will bring to a wage discussion a national point of view backed by the industry's united front, formed on the advice of both 'inside' and 'outside' experts. Should not the workers do likewise?

"Fourth, organization of steelworkers should be in accord with the principles of industrial democracy, under which the workers are accorded the unrestrained exercise of the liberties of self-expression and participation in measure affecting their welfare.

"Anything short of these liberties, whether by employer coercion or by

## Four Men on a Peel



ANYONE who has seen Midvale furnacemen charge the Heroult electric furnace has been charmed with the beauty and rhythm of the operation . . . intensely dramatic," writes John P. Mudd, the Midvale Co.'s personnel supervisor, who made this photographic study. "Here are men trained in mind and muscle balancing fragments of metal on a long peel, thrusting them rapidly into the charging door, placing them each time on a definite spot on the hearth . . . a fine example of muscular effort . . ."



autocratic union methods and leadership would be country to the ideals attainable in a democratic society."

In the same study, the effect of the steel code and the price problems of the tonnage steel industry were considered. The checks imposed upon the steel code authority were found to be "entirely inadequate to secure proper protection and control" for the public interest.

### Calls Steel Monopolistic

"The tonnage steel industry represents a problem in monopoly and monopolistic competition—not merely a so-called 'trust' to be scattered by the courts or the federal trade commission but an economic structure inherently monopolistic," says the report.

Upholding the basing point system, the investigators reached this conclusion:

"It is a temptation to cut the Gordian knot of discriminations and conflicting interests represented in the existing price structure for steel by enforcing an f.o.b. mill system of pricing with quoted prices at the mill uniform for all buyers under like conditions. This is the position taken by the federal trade commission.

"The logic of this attitude is either (1) that pure competition can be attained in the industry even under its present organization if collusion is prevented by law or (2) that it can be attained by the dissolution of existing corporate entities. This study demonstrates that there is no economic justification for either of these contentions.

"Our analysis indicates that any standard of fair price defined in terms of equality in the mill net violates the economics of production and distribution of tonnage steel.

"We conclude, then, that the traditional attitude of the government, as it has been expressed in the anti-trust laws and by the federal trade commission, is inconsistent with the economics of the steel industry and therefore is in the long run doomed to futility.

"Some form of basing-point system with the right to absorb transportation to meet competition is required for most tonnage-steel products.

"It is, however, not possible on the basis of the analysis contained in this study to formulate a definite program of public policy toward the iron and steel industry.

"We have recommended, therefore, that a federal impartial and nonpolitical fact-finding commission be established, staffed with men qualified by economic, statistical, accounting, and engineering training and versed in the complexities of the industry; that it be vested with authority to prescribe and collect the type of information required; that it be authorized to make public the information collected in any form that will not explicitly identify a given establishment; that it be directed to hold public hearings and summon thereto representatives of all affected groups; and, finally, that it be

charged with the responsibility of preparing, on the basis of its examination of the problem, a report to congress with detailed and summary recommendations concerning an effective public policy toward the price problem."

Dr. Harold G. Moulton, president of the Brookings Institution, at the same dinner discussed "The Recovery Problem in the United States," epitomizing a study also financed through a grant by the Falk Foundation. An integrated program was recommended as follows:

Re-establishment of a balanced federal budget; continuance of the present policy of maintaining a fixed price of gold and the establishment of a system of stable foreign exchanges; extension of the program of reciprocal trade agreements; preservation of the generally favorable ratio of prices and wage rates; maintenance of prevailing hours of labor; elimination of industrial practices and policies which restrict output or prevent increased efficiency.

### Steel Corp. River Steamer Rescued Many from Flood

Reminiscent of its ancient namesake whose voyage among the papyrus reeds of the Nile made history, the steamer THOMAS MOSES of the Carnegie-Illinois Steel Corp.,

under command of Capt. Henry C. Adams, navigated the edges of the swollen Ohio river for two weeks at the height of the flood, on a mission of mercy.

The log of the MOSES tells of nosing here and there far from the river channel to rescue marooned residents from their homes, picking up cattle, hogs, horses, mules, carrying them to higher land and feeding and clothing refugees.

Most of the craft's travels were from one to three miles away from the usual river channel, threading its course among trees, touching the sides of houses and barns and moving warily to avoid obstacles hidden beneath the water. On its return to its home port of Clairton, Pa., last Friday, the crew of the MOSES was given a reception by the Clairton chamber of commerce.

### Bantam Changes Name

Bantam Ball Bearing Co., South Bend, Ind., has changed its name to Bantam Bearings Corp. When the original company was organized 40 years ago the entire business was devoted to ball bearings. Later Bantam pioneered in roller bearings. Now over 90 per cent of its business is in taper roller and straight roller bearings. The corporation is a subsidiary of the Torrington Co., Torrington, Conn.

### Welding for Women? "Most Fascinating," She Says



*THE lady is Mrs. Anne McNally, co-partner with her husband in the Metal Fusion Co., Cleveland, and an expert welder. When demand for welders at the shop increased recently beyond the available supply she started a school, hired instructors, and in four months enrolled 50 young men as students. "Working with steel is the most fascinating business in the world—and it offers a great future for women," she says*



# Production

**S**TEEL ingot production advanced 2 points last week to a new high of 83 per cent, as a result of heavier operating schedules in practically all steelmaking centers.

**Cleveland-Lorain**—Gained 3 points to 79½ per cent, as National Tube Co. at Lorain added an additional open hearth to operate 11. Otis Steel Co. and Corrigan, McKinney division were on steady schedule, with 8 and 12 melting, respectively.

**Central eastern seaboard** — Advanced 1½ points to 56 per cent, with still higher operations indicated.

**Youngstown** — Unchanged at 80 cent.

**Detroit**—Moved up to 94 per cent, from 86 week before last, as two idle furnaces resumed production, one in the middle of the week. This rate should hold for the current week.

**Chicago**—Increased ½ point to 80½ per cent, a new peak for recent years. Mills will have no difficulty maintaining this rate for the balance of the quarter, with April schedules also well accommodated by current backlogs. An additional merchant furnace has been lighted, giving the district a total of 29 active stacks out of 39.

**Pittsburgh**—Gained 2 points to 86 per cent. The leading interest started off the week at 86 per cent and the leading independent at 83. Forty-five blast furnace stacks are operating.

**Wheeling**—Unchanged at 80 per cent. It is probable that within a very short time all open hearths affected by the flood will be in operation.

**Cincinnati**—Increased 30 points to 60 per cent, with firing of seven open hearths at the Ashland plant of American Rolling Mill Co.

**New England**—Off 2 points to 86 per cent. Tentative schedules for this week call for two steelworks operating at 100 per cent, with indications the rate will reach at least 90 per cent.

**Birmingham**—Up 1 point to 77 per cent, with indications of the rate holding around this level the remainder of this quarter.

**Buffalo**—With the lighting of a fifth new unit of the No. 3 battery of open hearths at Bethlehem Steel Co.'s Lackawanna plant there are now 36 furnaces producing ingots, representing 86 per cent.

**St. Louis**—Held at 82 per cent for the third consecutive week. One mill is contemplating lighting two additional open hearths.

## District Steel Rates

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts				
	Week ended Feb. 20	Change	Same week 1936 1935	
Pittsburgh ...	86	+ 2	39	37
Chicago .....	80½	+ ½	59	53
Eastern Pa....	56	+ 1½	37	31
Youngstown...	80	None	65	58
Wheeling ....	80	None	84	85
Cleveland ...	79½	+ 3	66½	79
Buffalo .....	86	+ 1	35	45
Birmingham..	77	+ 1	66	55½
New England..	86	— 2	75	63
Detroit .....	94	+ 8	94	100
Cincinnati ...	60	+30	72	†
St. Louis.....	82	None	†	†
Average....	83	+ 2	54½	50

†Not reported.

was the best since 1930 when profit on the common was equal to \$4.17 a share.

## ALLEGHENY GAINS

Allegheny Steel Co., Brackenridge, Pa., in a preliminary report has net profits of \$1,829,137 for 1936, including provision for undistributed profits surtax. This net income equals \$2.12 a common share, and compares with \$1,151,454 or \$1.50 a common share in 1935.

## SUPERIOR'S NET UP SHARPLY

Superior Steel Corp., Pittsburgh, reports net profit of \$454,943 for 1936, after all charges. This is equal to \$3.98 on each of the 114,276 shares outstanding and compares with \$46,691, or 41 cents a share, in 1935.

## Mills Awarded

**I**NLAND STEEL CO. has contracted with Mesta Machine Co., Pittsburgh, for the building of a 44-inch hot strip mill, to be installed at Indiana Harbor, Ind.

Contract for a new cold rolling mill has been awarded by the Thomas Steel Co., Warren, O., maker of strip steel, to the United Engineering & Foundry Co. The mill will be a 4-high, single stand, 24-inch reversing unit.

## Financial

### SHEET & TUBE CALLS IN \$3,000,000 DEBENTURES

The board of directors of the Youngstown Sheet & Tube Co. has called for redemption on March 25, the aggregate sum of \$3,000,000 principal amount of convertible 3½ per cent debentures at par and accrued interest, with a premium of 4 per cent on the principal amount. The numbers of debentures to be redeemed will be determined by lot by the Guaranty Trust Co. of New York. The debentures may be converted on or before March 25 on the basis of 16 common shares for each \$1000 principal amount. The board also declared the regular quarterly dividend of \$1.37½ per share on preferred, payable April 1, to record of March 20.

### CRUCIBLE STEEL REPORTS \$3,120,356 PROFIT

Crucible Steel Co. of America, New York, reported net profit of \$3,120,356 for 1936, equal to \$3.04 a share on the 450,000 shares of common stock. In 1935 a net profit of \$1,268,176 was reported, equivalent to \$5.07 a share on the preferred and a deficit of \$1.07 a share on the common. The 1936 showing

## Wheeler Reintroduces Antibasing Point Bill

Senator Wheeler, Montana, chairman of the senate committee on interstate commerce, last week reintroduced his antibasing point bill of the last session. The bill has been referred to his committee. No date has been set for hearings.

## Foundry Equipment Orders Index Drops in January

Index of foundry equipment orders for January dropped to 190.9 from 283.3 in December. In January, 1936, the index stood at 127. Shipments last month were 177.2, compared to 187.1 in December and 110.4 in January, 1936. Unfilled orders for January were 333.3; for December, 319.6; for January, 1936, 107.5.

Indexes are based on the averages in 1922-23-24 as 100.

## Machine Tool Sales Index Well Above 1936 Level

Index of machine tool orders for January, compiled by the National Machine Tool Builders' association, Cleveland, stands at 156.1 for domestic, 44.2 for foreign and 200.3 for combined orders. This is well above any previous month, except December. More than a third of the reporting companies have more than twice the volume of business they handled in 1926.

The flood of new business in December carried over sufficiently into January to bring expectation of continued heavy buying on a higher level than during 1936. The index for January is slightly above the average for 1929 and well above that for 1928.



# West's Growth in Steel Use Shown at Del Monte Meeting

DEL MONTE, CALIF.

**M**ORE than 300 attended the thirteenth annual conference of the Iron, Steel and Allied Industries of California, held under auspices of the California state chamber of commerce, in Del Monte, Feb. 11-13. This attendance was near the all-time record for the conference.

Discussions ranged broadly from trade and labor problems to governmental policies. Group meetings were held by representatives of merchant steel, structural shops, foundries, tubular products, general manufacturing, purchasing agents, traffic and other interests.

The conference recommended that congress vote down the bill to reduce hours for railway employees from eight, as at present, to six without reduction in pay. A similar law has been proposed by Senator Black, Alabama, applying to all industries. The conference in the same resolution also opposed this.

## Would Restrict Consumption

It was pointed out in the resolution that "much additional expense for industry would undoubtedly lead to higher prices and higher freight rates, which would in turn result in reduced consumption of the products of industry and reduced use of railways for shipping, which factors would defeat any benefits hoped for by proponents of such legislation, as the earnings of the individual would not be increased but the cost of living would rise."

Another recommendation was in favor of an amendment to the California state sales tax act to permit vessels to be built for operation in interstate or foreign commerce and

not be subject to the 3 per cent sales tax.

Telegrams of congratulation and commendation were received from W. A. Irvin, president, United States Steel Corp., and Eugene G. Grace, president, Bethlehem Steel Co.

E. H. McGinnis, Union Hardware & Metal Co., Los Angeles, was unanimously elected chairman of the conference, succeeding W. W. Glosser, Hubbard & Co., Emeryville, Calif. B. J. Osborne, Moore Drydock Co., Oakland, was elected vice-chairman, and C. S. Knight, California state chamber of commerce, San Francisco, secretary for the thirteenth time.

## Plate Group Is Formed

The conference added a new group, namely the steel plate fabricators, and it was requested that a chairman and a vice-chairman be appointed from the group to represent both the northern and southern sections of California on the executive committee.

In opening the conference Mr. Glosser reviewed the organization's progress.

"Our standard of business ethics was placed on a higher level; material savings were made by many of our industries through application of simplified practice and elimination of waste; and, through a general application of sound purchasing policy in support of domestic products, the seriousness of foreign competition was minimized.

"In my opinion, there has never been a time since we first met at these yearly sessions when the need for well ordered co-operative effort was greater than now."

In addressing the conference on "Western Expansion of National

Manufacturers on the Pacific Coast," E. O. Shreve, vice president, General Electric Co., Schenectady, N. Y., traced the rapid development of the movement, pointing out that the last decade had witnessed a population growth on the Pacific coast of 46 per cent, practically three times the rate of increase in the nation as a whole, and that the per capita purchasing power of the population is more than 30 per cent above the country's average.

These factors, with lower distributing costs of merchandise produced in the Far West, he stated, were instrumental in establishing more branch factories each year.

"Our greatest opportunity, as well as responsibility, lies in finding new and better methods," he stated. "We have failed to use research in sales and distribution to the extent we must if we desire to put goods in economic reach of more and yet more people."

W. S. Doxsey, executive secretary, American Steel Warehouse Association Inc., Cleveland, outlined to the group of merchant steel distributors what co-operation has accomplished for steel jobbers, and the results that have already been obtained in increasing sales and tonnage, securing better understanding among the distributors and in improving the relationship between mills and jobbers. Doxsey also discussed the effect of recent legislation on distributors.

## Condemns Price Chisellers

Robert T. Brooks, executive vice presented, American Institute of Steel Construction, New York, spoke on "Unfair Trade Practices."

"The basic cause of most of our troubles is price-chiseling, I mean the seller who knowingly and intentionally fails to include all the elements of cost in his selling price," he said. "The time will come when we shall understand that just as water cannot rise higher than its source, neither can the unit rise higher than the industry of which it is a part."

Mr. Brooks illustrated by simple arithmetic how much increased busi-

*Conferees of the Iron, Steel and Allied Industries of California, in Del Monte*





# Officers and Executive Committee Elected at Del Monte

Chairman..... E. H. McGinnis, Union Hardware & Metal Co., Los Angeles  
Vice-Chairman..... B. J. Osborne, Moore Drydock Co., Oakland  
Secretary..... C. S. Knight, California State Chamber of Commerce

## EXECUTIVE COMMITTEE

### Southern California

C. B. Tibbetts, Los Angeles,  
Steel Casting Co., Los Angeles.  
Martin Madsen, Madsen Iron Works,  
Los Angeles.

William W. Mathews,  
Lacey Mfg. Co., Los Angeles.  
A. E. Hiltcher, Westinghouse Electric  
& Mfg. Co., Los Angeles.

Harold E. Howard, Ducommun Metals  
& Supply Co., Los Angeles.  
Donald Priest, Los Angeles Heavy  
Hardware Co., Los Angeles.

E. F. Watkins, Southern California  
Edison Co., Los Angeles.  
Vice-Chairman to be selected.

### FOUNDRY GROUP

Charles P. Hoehn, Enterprise  
Foundry Co., San Francisco.  
E. M. Welch, American Manganese  
Steel Co., Oakland.

### MANUFACTURER GROUP

M. Rhine, General Electric Co.,  
San Francisco.  
J. M. Culverwell, Kortlek Mfg. Co.,  
San Francisco.

### MERCHANT STEEL

H. M. Tayler, Tayler & Spotswood Co.,  
San Francisco.  
Charles C. Connors, Kyle & Co.,  
Fresno, Calif.

### PURCHASING AGENTS

F. F. Hansen, Pacific Gas & Electric  
Co., San Francisco.  
A. J. Maclean, Utah Copper Co.,  
San Francisco.

### REINFORCING STEEL

William A. Godshall, Blue Diamond  
Corp. Ltd., Los Angeles.  
N. E. Dawson, Soule Steel Co.,  
Los Angeles.

R. C. Falk, W. C. Hauck & Co.,  
San Francisco.  
C. M. Gunn, Gunn, Carle & Co.,  
San Francisco.

### STEEL MILLS

P. W. Cotton, Bethlehem Steel  
Co., San Francisco.

William A. Ross, Columbla Steel  
Co., San Francisco.

### STRUCTURAL SHOPS

A. Neuffer, Bethlehem Steel Co.,  
Los Angeles.  
J. A. McCone, Consolidated Steel  
Corp., Los Angeles.

Paul F. Gillespie, Judson-Pacific  
Co., San Francisco.  
Charles E. Spencer, Bethlehem  
Steel Co., Alameda.

### TRAFFIC

T. A. L. Loretz, Pacific Coast Fabricat-  
ing association, Los Angeles.

T. E. Banning, Columbla Steel Co.,  
San Francisco.

### TUBULAR

Howard C. Fletcher, Fretz-Moon  
Tube Co., Los Angeles.  
T. W. Bell, Jones & Laughlin  
Steel Corp., Los Angeles.

F. F. Elliott, Crane Co.,  
San Francisco.  
Fred J. Chittenden, Walworth Cali-  
fornia Co., San Francisco.

ness must be secured to offset the loss sustained by cutting a price.

"A merchant or manufacturer realizes that he must make, let's say, 25 per cent gross profit on his sales; therefore he adds 33 1/3 per selling price: Selling price \$10, cost of material \$75, gross profit \$25.00.

"If, under pressure he weakens and thinks that added volume and quicker turn over will compensate for a price cut of 5 per cent, the result is: Selling price \$95, cost of material \$75, gross profit \$20.

"The cost of material remains the same, but \$5 gross profit has been sacrificed. To regain the \$5 gross

profit, 25 per cent additional business must be obtained, which in this case amounts to \$23.75. This also means a 25 per cent increase in handling merchandise and in accounts receivable."

"It is recognized, as never before, the mortality this practice is inflicting on our smaller business units. Shall it be controlled through self-regulation or through compulsion by government."

Dr. Paul F. Cadman, consulting economist, San Francisco, in speaking on labor relations pointed out that unless there is co-operation between employers, employees and

government there will be disaster.

"The government," he said, "demands cash for its taxes, which can be realized either through forced liquidation or through the sale of securities which are instruments that evidence corporate wealth. Industrial enterprise must meet the cost of production and produce a surplus, or securities are worthless."

He stated that there is not one of the four factors — government, savers, managers or laborers—who is in a position to play hog.

"We are not only doomed to produce, but we are doomed to produce a surplus and that surplus must, in the last analysis, be the result of capable and enterprising management, willing and effective labor, confident and unselfish savers, and a restrained and solvent government."

E. F. Watkins, Southern California Edison Co., Los Angeles, speaking on the purchasing policy on domestic products, stressed the high wages paid in America to workers in the steel industry. He said that the prevailing price was 67 cents an hour as compared with 25 cents in England and Germany.

## Steel Payroll Is High

Mr. Watkins said that on the Pacific coast about 10,000 men are employed in the steel industry, with a payroll of approximately \$11,000,000 annually, and the industry each year purchases over \$8,000,000 of raw material and machinery.

In connection with the conference the Pacific Coast Steel Fabricators association held its annual meeting Thursday evening and re-elected its officers: President, Reese H. Taylor, president, Consolidated Steel Corp., Los Angeles; vice-presidents, Paul Pigott, vice-president, Pacific Car & Foundry Co., Seattle; Charles McGonigle, vice-president, Poole & McGonigle, Portland, Ore.; George H. Raitt, vice-president, Steel Tank & Pipe Co. of California, Berkeley; secretary-treasurer, Paul F. Gillespie, secretary-treasurer, Judson-Pacific Co., San Francisco.

This group is composed of 22 California, Oregon and Washington plate and structural fabricators.





# Highest Gains in Heavy Products

**S**TEEL products made for sale showed substantial gains in all lines in 1936, according to figures released last week by the American Iron and Steel Institute and reproduced below. Total in 1936 was 36,297,284 gross tons, compared with 27,379,755 tons in 1935, an increase of about 32 per cent. The 1936 production represented 67.7 per cent of ca-

capacity, that of the preceding year 48.5 per cent. During fourth quarter of 1936 production rose to 76.4 per cent.

Sheets manufactured in 1936 totaled 7,008,312 tons, at 78.5 per cent of capacity, compared with 5,537,867 tons in 1935, at 70.4 per cent. In the final quarter of 1936 response to heavy demand carried sheet production to 94.2 per cent. Hot-rolled strip was made in 1936 at 62.4 per cent and cold-rolled at 61.7 per cent, compared with 54.8 and 48.7 per cent respectively in 1935, and with 71.4 and 80.7 in the final quarter of 1936.

Heavier products made a relative-

ly larger gain between the two years than did the light materials. Compared with an increase of 8.1 points for sheets, 8.4 points for hot-rolled and 13 points for cold-rolled strip in 1936 over 1935, rails gained 11.8 points, shapes 18.4, plates 14 and bars 15 points.

Comparing fourth quarter of 1936 with the record for all of 1935 the growing impetus of production is shown. In this comparison shapes gained 18.8, plates 18.7, bars 21.2, and rails 4.7 points. In the same interval sheets registered a gain of 23.8 points, hot-rolled strip 16.6 and cold-rolled strip 32 points.

AMERICAN IRON AND STEEL INSTITUTE										Fourth Quarter - 1936				
Capacity and Production for Sale of Iron and Steel Products														
	Number of companies	Items	Annual Capacity Gross tons	PRODUCTION FOR SALE—GROSS TONS										
				Current Quarter				To Date (12 Months 1936)						
				Total	Per cent of capacity	Shipments Export	To members of the industry for conversion into further finished products	Total	Per Cent of capacity	Shipments Export	To members of the industry for conversion into further finished products			
STEEL PRODUCTS	Ingot, blooms, billets, slabs, sheet bars, etc.	33	1	xxxxxxx	1,068,639	xxx	6,060	686,504	4,433,970	xxx	21,714	3,360,779		
	Heavy structural shapes	9	2	5,220,720	563,206	43.2	19,722	-	2,233,216	42.8	61,858	xxxxxxx		
	Steel piling	4	3	265,000	28,640	43.2	553	-	109,649	41.4	2,790	xxxxxxx		
	Plates—Sheared and Universal	23	4	6,413,549	655,664	40.9	45,912	4,604	2,321,201	34.2	99,604	18,931		
	Skelp	8	5	xxxxxxx	168,345	xxx	31,128	96,998	620,286	xxx	66,534	373,795		
	Rails—Standard (over 60 lbs.)	4	6	3,975,000	194,893	19.6	3,735	-	1,062,882	26.7	13,033	xxxxxxx		
	Light (60 lbs. and under)	7	7	805,820	25,923	12.9	545	-	92,189	11.4	8,451	xxxxxxx		
	All other (Incl. girder, guard, etc.)	2	8	140,000	6,545	18.7	1,153	-	42,574	30.4	5,351	xxxxxxx		
	Splice bar and tie plates	15	9	1,608,793	89,871	22.3	1,345	-	410,540	25.5	3,362	xxxxxxx		
	Bars—Merchant	42	10	xxxxxxx	1,123,074	xxx	12,928	148,736	3,810,436	xxx	41,095	462,552		
	Concrete reinforcing	30	11	xxxxxxx	205,875	xxx	4,708	-	937,827	xxx	15,127	xxxxxxx		
	Cold finished—Carbon	18	12	xxxxxxx	183,154	xxx	932	-	620,423	xxx	4,788	xxxxxxx		
	Alloy—Hot rolled	14	13	xxxxxxx	201,375	xxx	964	10,785	680,557	xxx	4,178	41,407		
	—Cold finished	12	14	xxxxxxx	19,291	xxx	184	-	68,825	xxx	455	xxxxxxx		
	Hoops and baling bands	3	15	xxxxxxx	16,035	xxx	117	-	68,699	xxx	1,337	xxxxxxx		
	TOTAL BARS	61	16	12,978,600	1,748,804	53.9	19,833	159,521	6,186,767	47.7	66,980	503,959		
	Tool steel bars (rolled and forged)	16	17	101,323	10,646	42.0	33	-	36,330	35.9	133	xxxxxxx		
	Pipe and tube—B. W.	16	18	1,833,999	206,083	44.9	6,869	-	756,770	41.3	18,291	xxxxxxx		
	L. W.	11	19	1,739,534	154,975	35.6	7,232	-	577,411	33.2	16,201	xxxxxxx		
	Electric weld	3	20	813,571	31,940	15.7	297	-	141,424	17.4	534	xxxxxxx		
	Seamless	15	21	2,655,978	365,252	55.0	12,109	-	1,337,937	50.4	31,492	xxxxxxx		
	Conduit	6	22	142,350	20,413	57.4	432	-	66,420	46.7	1,486	xxxxxxx		
	Mechanical Tubing	5	23	226,900	32,256	56.9	1,300	-	109,214	46.1	3,598	xxxxxxx		
	Wire rods	19	24	xxxxxxx	219,068	xxx	6,332	72,771	720,503	xxx	33,021	267,761		
	Wire—Drawn	39	25	1,767,402	353,254	79.9	12,918	8,066	1,180,029	66.8	48,224	24,212		
	Nails and staples	20	26	1,102,093	162,722	59.1	2,897	-	544,510	49.4	11,816	xxxxxxx		
	Barbed wire and fence	17	27	1,169,735	94,843	32.4	10,791	-	386,691	33.1	37,003	xxxxxxx		
	Bale ties	11	28	114,069	12,102	42.4	87	-	51,177	44.9	196	xxxxxxx		
	All other wire products	7	29	112,800	8,707	30.9	26	-	43,265	38.4	158	xxxxxxx		
	Fence posts	16	30	149,550	18,541	49.6	109	-	63,833	42.7	533	xxxxxxx		
	Black plate	13	31	493,079	112,201	91.0	2,007	31,423	375,359	76.1	7,347	120,272		
	Tin plate	15	32	2,656,660	538,124	81.0	67,157	-	2,108,916	79.4	289,678	xxxxxxx		
	Sheets—Hot rolled	20	33	xxxxxxx	447,128	xxx	4,861	4,634	1,576,594	xxx	25,371	87,801		
	Hot rolled annealed	22	34	xxxxxxx	565,091	xxx	16,365	341	1,856,909	xxx	52,186	2,840		
	Galvanized	16	35	xxxxxxx	310,539	xxx	19,641	-	1,048,891	xxx	53,566	xxxxxxx		
	Cold rolled	17	36	xxxxxxx	625,928	xxx	16,770	-	2,025,823	xxx	71,320	xxxxxxx		
	All other	16	37	xxxxxxx	153,390	xxx	2,576	-	500,295	xxx	10,335	xxxxxxx		
	TOTAL SHEETS	30	38	8,923,849	2,102,076	94.2	60,213	4,975	7,008,312	78.5	222,778	90,641		
	Strip—Hot rolled	29	39	3,550,031	633,250	71.4	11,096	106,748	2,214,595	62.4	41,722	352,545		
	Cold rolled	39	40	1,151,013	232,236	80.7	2,758	-	710,363	61.7	11,454	xxxxxxx		
	Wheels (car, rolled steel)	5	41	398,264	32,659	32.8	120	-	131,252	33.0	1,256	xxxxxxx		
	Axles	5	42	425,900	18,968	17.8	52	-	67,072	15.7	418	xxxxxxx		
	Track spikes	11	43	350,260	28,285	32.3	216	-	102,345	29.2	1,056	xxxxxxx		
	All other	6	44	-	25,764	-	1,752	-	50,274	-	7,095	xxxxxxx		
	TOTAL STEEL PRODUCTS	150	45	xxxxxxx	9,964,895	xxx	336,789	1,171,610	36,297,284	xxx	1,135,167	5,112,895		
Estimated total steel finishing capacity based on a yield from ingots of 68.2%				46	46,034,000	xxxxxxx	76.4	xxxxx	xxxxxxx	xxxxxxx	67.7	xxxxxxx	xxxxxxx	
IRON PRODUCTS	Pig iron, ferro manganese and spiegel	31	47	xxxxxxx	1,613,162	xxx	4,822	581,043	5,466,377	xxx	6,983	1,863,761		
	Ingot moulds	5	48	xxxxxxx	106,679	xxx	714	-	362,340	xxx	3,534	xxxxxxx		
	Bars	13	49	234,019	17,680	30.2	8	303	62,284	26.6	57	1,177		
	Pipe and tubes	4	50	185,457	13,206	28.5	425	-	52,973	28.6	868	xxxxxxx		
	All other	5	51	151,960	11,697	30.8	345	550	49,018	32.3	843	3,902		
TOTAL IRON PRODUCTS (ITEMS 49 to 51)				17	52	513,476	42,583	33.2	778	853	164,275	32.0	1,768	5,079

Total steel products produced for sale, less shipments to members of the industry for conversion into further finished products: Current quarter 8,792,285 G.T.: 76.4 % of Finishing Capacity.  
To date 31,184,389 G.T.: 67.7 % of Finishing Capacity.  
The above tonnages represent 68.2 % of the ingots produced by companies whose products are included above.

Total Companies Included - 175



# Meetings

## STEEL ENGINEERS ANNOUNCE PAPERS FOR OHIO MEETING

**A**SSOCIATION of Iron and Steel Engineers has announced the following papers for presentation at its national meeting at Ohio hotel, Youngstown, O., Feb. 25: "Industrial Furnace Design," by M. H. Mawhinney, consulting engineer; "Ward Leonard Control for Blooming Mill Auxiliary Drives," W. B. Snyder, General Electric Co., Schenectady, N. Y.; and "Continuous Rolling of Hot Strip Steel," A. Giese, Gary, Ind. These will be read at a morning session.

In the afternoon members and guests of the association will visit the hot and cold strip mills at the Campbell works of Youngstown Sheet & Tube Co.

C. J. Duby, chief engineer, Republic Steel Corp., Warren, O., and C. H. Williams, assistant chief engineer, Carnegie-Illinois Steel Corp., Youngstown, O., will preside at the meeting.

## BRITISH METALS INSTITUTE TO HOLD ANNUAL MEETING

British Institute of Metals will hold its twenty-ninth annual meeting at the Institution of Mechanical Engineers, London, March 10-11. Two of the papers included in the program are the following: "The Theory of Age-Hardening," by Dr. Marie L. V. Gayler; and "Modern Metal Spraying: Processes and Some Characteristics of the Deposits," by E. C. Rollason, G. Shaw Scott, 36 Victoria street, Westminster, London, S.W.1, is institute secretary.

## WASTE MATERIAL DEALERS WILL MEET IN CHICAGO

National Association of Waste Material Dealers Inc. will hold its annual convention at the Sherman hotel, Chicago, March 15-17. Louis Lippa, Apex Smelting Co., Chicago, heads the convention and banquet committee. Charles M. Haskins, 1109 Times building, New York, is secretary of the association.

## PURCHASING AGENTS PICK CONVENTION CHAIRMEN

Purchasing Agents Association of Pittsburgh has announced the following committee chairmen for the 1937 convention of the National Association of Purchasing Agents, which will be held in Pittsburgh, May 23 to 27:

General chairman, Irvin E. Walton, Heppenstall Co.; vice chairman, G. Walter Sanborn, United Engineering & Foundry Co.; program, Thomas D. Jolly, Aluminum Co. of America; publicity, Walter Brubach, Gulf Oil Corp.; exhibit, W. E. Bitt-

ner, Diamond Alkali Co.; transportation, J. H. James, Pittsburgh & Lake Erie railroad; purchasing agent, C. E. Briner, McKay Co.; entertainment, Royce D. King, The Koppers Co.; treasurer, E. C. Buerkle, National Bearing Metals Co.; hotels, C. H. Rindfuss, Pittsburgh Screw & Bolt Corp.; secretary, J. H. Phillips, Pittsburgh Steel Co.; registration, H. Voight Natcher, M. B. Suydam Co.; reception, Frank H. MacKnight, Westinghouse Airbrake Co.; plant visitation, R. W. Mackensen, Pittsburgh Coal Co.; automobiles, John T. Bryant, Mellon National bank; and service, A. N. Johnston, Jones & Laughlin Steel Corp.

## U. S. CHAMBER TO CELEBRATE TWENTY-FIFTH ANNIVERSARY

Chamber of Commerce of the United States announces its twenty-fifth annual meeting to be held in Washington, April 26-29. In celebrating the twenty-fifth anniversary of its formation, the organization has chosen "Business Looks Ahead" as its convention theme. The national council will meet on April 26 and the opening session of the meeting will take place the following morning. D. A. Skinner, 1615 H street, N. W., Washington, is secretary.

## WILL HOLD NEW ENGLAND REGIONAL FOUNDRY MEETING

A New England regional foundry conference arranged under auspices

of the New England Foundrymen's association and Massachusetts Institute of Technology will be held at the Institute in Cambridge, Mass., April 9-10. The program will include discussions of casting design, foundry sand, and cupola control. R. F. Harrington, Hunt-Spiller Mfg. Corp., Boston, is chairman of the committee arranging the meeting.

## CHEMICAL SOCIETY MEETING WILL CONSIDER RESEARCH

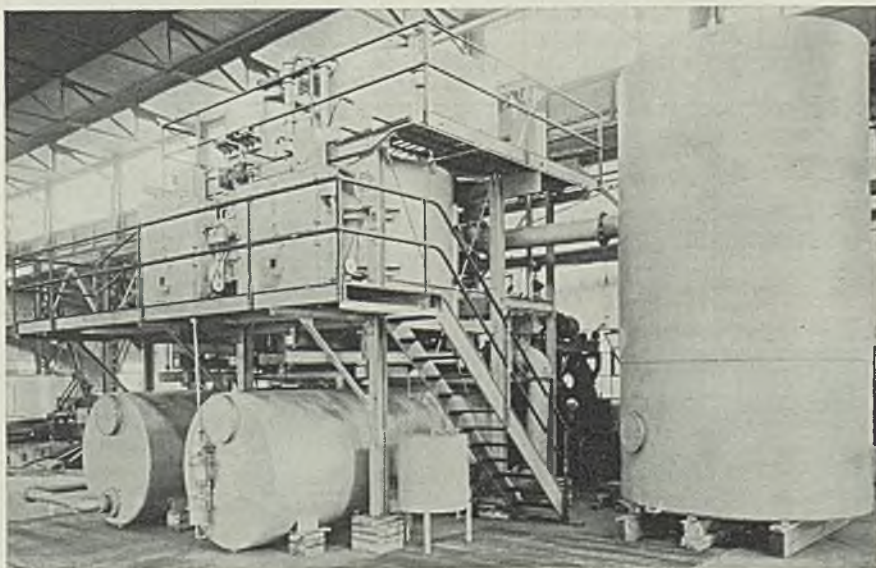
American Chemical society will conduct its ninety-third meeting at the University of North Carolina, Chapel Hill, N. C., April 12-15. Of the more than 40 sessions scheduled, 25 will be devoted to chemical investigations directly fostering industrial progress. Dr. E. R. Weidlein, director, Mellon Institute of Industrial Research, Pittsburgh, is president of the society, and Dr. Charles L. Parsons, 728 Mills building, Washington, is secretary.

## ANNOUNCES SECOND FORUM ON TOOL ELECTRIFICATION

Westinghouse Electric & Mfg Co. will sponsor a second machine tool electrification forum at its East Pittsburgh works, April 19-22, to discuss "New Methods and Designs for Machine Tool Electrification."

Papers dealing with special and difficult problems will be presented by representatives of machine tool builders. Talks will be given also by Westinghouse works, application and design engineers.

## Scale Weighs Tons of Oil Every Minute



**T**HIS automatic liquid weighing scale composed largely of steel parts, "world's largest," regularly weighs 27,500 pounds of gasoline or oil per minute. Built recently for the Cuban government by Richardson Scale Mfg. Co., Clifton, N. J., it registered an error of less than 1/900 of 1 per cent. Use of a flexible, oil proof synthetic rubber for the 12-inch hose leading to the two weighing tanks and for valve seat disks insures prompt stoppage of the liquid flow at the proper moment, synthetic rubber parts were produced by the company's Manhattan rubber manufacturing division



# Men of Industry

**A**LFRED E. GIBSON, for several years executive vice president, Wellman Engineering Co., Cleveland, has been elected president. He succeeds George W. Burrell, who has been made chairman of the board. Mr. Burrell will continue to devote his time to the company. These changes follow the voluntary retirement of John A. Penton, formerly chairman of the board and treasurer.

John C. Hopkins has been re-elected vice president, and C. C. Clayton, heretofore secretary, has been elected secretary and treasurer.

Following graduation from Ohio State university in 1909, Mr. Gibson joined the company in its operating department, later becoming superintendent of the Cleveland plant, then general superintendent in charge of the Cleveland and Akron, O., plants. In 1926 he left Wellman to become associated with Fulton Foundry & Machine Co., Cleveland, as vice president, later being elected president. In 1928 he returned to Wellman as works manager; in 1930 was elected vice president; in 1931, vice president and assistant general manager in charge of engineering and shop production, and in 1935, executive vice president. He is president, American Welding society; a member, American Society of Mechanical Engineers, Association of Iron and Steel Engineers, American Society for Metals and International Acetylene association.

J. Harry Warriner has been appointed works manager. He has a record of 32 years' continuous service with the company, beginning as a toolroom boy.

W. E. Bullock has been appointed vice president in charge of sales, AP Parts Corp., Toledo, O. He has been connected with sales work in



Frank J. Reynolds

the automotive parts business for 12 years.

W. Herbert Bretzlaff, in charge of the Detroit office, Defiance Pressed Steel Co., Marion, O., has been named a vice president of the company.

Otto Harer, former president, Light Alloys Co., Painesville, O., has been appointed aluminum castings sales manager, Wellman Bronze & Aluminum Co., Cleveland.

P. F. Kohlhaas, formerly chief engineer, Perin Engineering Co., New York, for many years, is now associated with the Tata Iron & Steel Co. Ltd., Jamshedpur, India, in a similar capacity.

M. J. McCarthy, associated with Penn Metal Co. Inc., Boston, as a sales engineer the past ten years, has been appointed district manager of the newly opened Philadelphia

sales office of the company, with headquarters at 2402 Market street.

Frank J. Reynolds has been appointed manager of the agricultural extension department, American Steel & Wire Co., with headquarters at Chicago. He was born in Clarksburg, W. Va., and was graduated from Iowa State college of agriculture. Until Feb. 1 he had been county agent of Polk county farm bureau, Des Moines, Iowa.

B. M. Livezey, formerly assistant general superintendent, Clairton works and coke plant, Carnegie-Illinois Steel Corp., Clairton, Pa., has been appointed assistant to the manager of operations, Chicago district. He has been identified with the company since 1916.

Howell C. Cunningham, secretary, Crucible Steel Casting Co., Lansdowne, Pa., since 1912, has been elected vice president and treasurer. H. L. McClees, who has been connected with the company since 1918 in accounting and sales capacities, has been elected secretary.

R. B. Renner, associated with the Jeffrey Mfg. Co., Columbus, O., for 30 years as mechanical engineer, for the last 20 years at 30 Church street, New York, has been made chairman, executive committee of the materials handling division, American Society of Mechanical Engineers.

Carl Brown, Boston district sales manager, United States Pipe & Foundry Co., Burlington, N. J., has been transferred to Chicago as assistant sales manager. R. E. Sweney, who has been in charge of western New York territory, with headquarters at Buffalo, is the new district sales representative for the company at Boston.

Franklin G. Smith, executive head of the Osborn Mfg. Co., Cleveland, was guest of honor at a luncheon Jan. 30 at the Union club, Cleveland, given by Osborn executives and employees with 20 years and more of service, in celebrating his 45 years of service with the company. Many of Mr. Smith's friends in industrial, financial, legal and educational fields also joined in honoring him.

Nathaniel B. Randolph, a native of Virginia, has been appointed vice president in charge of sales, Granite City Steel Co., Granite City, Ill., succeeding L. F. Miller, resigned. Early in his career he was a manufacturers' agent in St. Louis in the sale of iron and steel products. In 1917 he enlisted in the



George W. Burrell



Alfred E. Gibson



J. Harry Warriner



army and his first connection with Granite City Steel was in 1919 after his discharge from the army. In 1921 he was appointed district manager of sales in the St. Louis area and in 1933 was promoted to assistant general manager of sales.

Harry K. Clark, general sales manager, Norton Co., Worcester, Mass., maker of abrasive products, has been made a vice president of the company. W. LaCoste Neilson, vice president, director of sales and foreign plants, was re-named in that capacity.

Dr. Frederick G. Cottrell, who as noted in STEEL, Feb. 1, page 33, is the recipient of the Washington award for 1937, will be formally presented with the award at a dinner Feb. 23 at the Drake hotel, Chicago. The most widely known work of Dr. Cottrell is his process of electrical precipitation to collect suspended matter carried by gases.

H. B. Loxterman has been elected a vice president, and Albert L. Cuff, secretary, Blaw-Knox Co., Pittsburgh. The following officers have been elected to subsidiary companies:

W. H. Eisenbeis has been made vice president, and John Baker has been made sales manager, Union Steel Casting Co. P. M. Fleming has been named vice president and a director, Pittsburgh Rolls Corp.

James G. Marshall, general superintendent, Union Carbide & Electro Metallurgical Co., Niagara Falls, N. Y., will receive the Schoellkopf medal for distinguished service in engineering performed in the Niagara frontier during 1936. He will receive the honor, given annually through the western New York section, American Chemical society, for progress he has made in using electric furnaces for metal reduction.

Peter L. Conway has been assigned by Link-Belt Co., Chicago, to handle sales in the area immediately to the south of Chicago, including South Chicago and Gary, with headquarters in Chicago. Mike J. Parykaza has been assigned to handle sales in the north central territory, comprising portions of Wisconsin, Michigan, Minnesota and South Dakota, and all of North Dakota. His headquarters will be in Chicago.

George Furman, formerly associated with the Beardsley & Piper Co., Chicago, maker of sandslingers, sand conditioning machinery and foundry handling equipment, has returned to that organization as sales engineer and is handling a part of its eastern sales territory in Pennsylvania and New York state.

S. S. Swasey, a newcomer to the organization, augments the general



David O. Wolf

Who, as referred to in STEEL, Feb. 8, page 20, has been elected a director, and vice president in charge of sales, Apollo Steel Co., Apollo, Pa. He started with the company in 1914

sales engineering staff, and is available for consultation and engineering service in all territories. J. J. Walsch has been added to the company's staff as a demonstrator, and will spend most of his time installing equipment.

## Employees Celebrate His Forty-fourth Year in Steel



FORTY-FOUR years ago C. W. Heppenstall, 65, president and treasurer, Heppenstall Co., Pittsburgh, obtained his first regular job in a steel mill as an office boy. Employees of the company celebrated the anniversary at a dinner in the William Penn hotel, Feb. 15.

Mr. Heppenstall is of the fourth generation of Heppenstall steel men, whose name has been associated with the progress of steel in England and America for 145 years; five members of the fifth generation have already taken their places in the company.

In 1893 he started with the Trethewey Mfg. Co., which his father had helped to organize four years earlier. The name of Heppenstall replaced Trethewey as the company title a number of years ago, and in 1920 he became president. He is the originator of a machine with which one man can handle a block of red hot steel weighing as much as 30 tons.

## Died:

CHARLES P. PERIN, 75, prominent for many years in the field of iron and steelworks development in various countries, and head of Perin Engineering Co., New York, in that city, Feb. 16. His work in India led to the founding of the Tata Iron & Steel Co., Jamshedpur, and the Mysore Steel & Iron Works, and also was the builder of two industrial towns in Virginia. He was a member, American Iron and Steel institute, American Institute of Mining and Metallurgical Engineers, and past president, American Institute of Consulting Engineers, Harvard Engineering society, among various other organizations.

J. Dwight Wetz, 64, president, Hoosier Metal Products Inc., Columbus, Ind., in that city, recently.

Donald B. Rush, 50, president, Rush-Roberts Engineering Co., Chicago, in that city, Feb. 16.

Thomas F. Reilly, 54, president, Thomas F. Reilly Iron & Steel Works, New York, in that city, Feb. 11.

James M. Fagan, 43, an executive of the Bloomfield, N. J., plant of the Westinghouse Electric & Mfg. Co., in Maplewood, N. J., Feb. 13.

Harry Roblin, 64, president, Buffalo Housewrecking Salvage Co., Buffalo, dealer in scrap metals, in Miami, Fla., recently.

James Galloway, 77, retired engineer, Worthington Pump & Machinery Corp., Harrison, N. J., in Maplewood, N. J., Feb. 11.

Warren Howland Jones, 61, assistant treasurer and a director, Westinghouse Electric & Mfg. Co., with offices in New York, in Mt. Vernon, N. Y., recently.

Arthur L. Warner, 76, general superintendent, Illinois Iron & Bolt Co., Carpentersville, Ill., for the last 20 years, at St. Petersburg, Fla., Feb. 3.

Jacob Painter Jr., 88, in Santa Monica, Calif., Feb. 16. Mr. Painter was associated with his father in the old J. Painter & Sons iron mill which later was absorbed by the United States Steel Corp.

Amos Northrup, 48, chief designer, Murray Corp. of America, Detroit, in that city, Feb. 15. Active with Murray in design work for 10 years, he was credited with a prominent part in the development of the streamline type of automobile body.



## Expect 22% Gain In Ore Shipments

**L**AKE SUPERIOR iron ore producers anticipate a strong market in 1937, with early opening of the shipping season if weather conditions permit. Preliminary estimates generally center on 55,000,000 tons for the season, an increase of about 22 per cent over 1936, with some estimates as high as 59,000,000 tons.

This season's shipments probably will be the heaviest since 1929 when 66,157,359 tons were shipped; the 1928 total was 54,855,641 tons.

Final shipping figures for 1936, as compiled by the Lake Superior Iron Ore association, Cleveland, show a total of 45,203,672 tons, com-

pared with 28,503,501 tons in 1935.

Shipments of beneficiated iron ore amounted to 17,792,457 tons, 39 per cent of the total, a slightly higher proportion than in the past several years. In this were included 7,716,923 tons of concentrates. Remaining tonnage was crushed or screened. The 1936 total includes 375,767 tons shipped all-rail, compared with 144,692 tons in 1935.

## Doubles Shipments of Stainless Steel

Shipments of stainless steel by the American Rolling Mill Co. in 1936 were double those of 1935, W. W. Sebald, vice president, announced. Indications are that 1937 sales will be twice those of last year.

Mr. Sebald said the company had installed equipment in its Butler,

Pa., plant for polishing of stainless steel to augment that now in use in Middletown.

## Ford Orders Two Welded Diesel Barges for Lakes

Ford Motor Co. has given a contract to Great Lakes Engineering Works, Detroit, for two 300-foot diesel-powered barges for service on the Great Lakes and New York barge canal, similar to two other craft which have been in this service for several years. They will be all-welded, the largest vessels ever built on the Great Lakes by welding. They will be fabricated by the shielded arc process of electric welding with equipment supplied by Lincoln Electric Co., Cleveland.

This is the first ship order of importance to any shipyard on the lakes in several years.

## Lake Superior Iron Ore Shipments in 1936 and 1935

## Mesabi Range

	1936	1935		1936	1935		1936	1935		1936	1935
Adams-Spruce	1,491,846	1,719,511		52,000	65,522	Mace No. 2	73,659	106,359	St. Paul	213,205	263,375
Agnew	196,643	98,151	Godfrey-Burt	649,339	438,674	Magnetic Conc.	17,469	11,143	Sargent	199,472	130,720
Albany	252,609	252,588	Grant	646,891		Mahoning	2,521,824	778,560	Scranton	530,003	242,151
Alexandria	411,226	446,255	Halobee	353,431	403,151	Mahoning Rust	45,074	51,280	Sellers	2,019,746	2,309,152
Arcturus	416,614		Harold		42,998	Malta		30,442	Shenango	355,514	190,324
Bennett	507,574		Harrison Ann.	12,129	23,159	Mesabi Chief	875,409	837,402	Snyder	124,582	130,333
Blwabik	676,875	472,892	Hartley-Burt	1,018,667	2,107,643	Minnewas	1,652,952		S. Uno G. N.	23,089	6,228
Bruce	199,975	169,406	Hawkins	299,363	203,272	Minroca		61,640	S. Uno N. P.	9,150	18,016
Bruce Annex.		23,664	Hill Annex.	2,174,422	1,720,962	Missabe Mt.	1,067,067		Stevenson	129,700	188,822
Burt-Pool-Day	496,676	307,209	Hoadley	8,687	54,346	Mississippi No. 2	114,786	73,275	Susquehanna	506,810	403,369
Canlister	1,009,880	605,095	Hull Rust	4,112,530	213,790	Monroe-Tener	140,185		Wacotah	338,617	259,721
Commodore	66,467	66,024	Julia	54,589	13,644	Morris	1,118,373	180,237	Webb	460,491	288,381
Corsica	151,194		Kinney	185,703	241,243	Morrison	993,293	725,763	Wheeling		138,224
Cyprus	13,951		Langdon	154,365	230,412	N. Harrison	9,008	46,195	York	60,829	68,333
Dale	50,139	72,400	LaRue	246,764	238,068	N. Harrison Ann.	166,944				
Danube	221,343		Leetonla	73,445		Orwell	778,987		Total	31,411,851	18,877,537
Day	7,862		Leonidas	368,092	820,019	Patrick-Ann	76,268	135,578			
Dunwoody	60,143	22,615	Lincoln	100,999	105,112	Quinn	38,043	24,689			

## Menominee Range

	1936	1935		1936	1935		1936	1935		1936	1935
Balkin-Judson		63,682	Fogarty	30,510	25,232	James	142,755	175,014	Tobin	113,293	86,297
Bates	154,385	193,351	Forbes	164,054	122,884	Millie	13,417		Virgil	121,255	64,792
Bengal		16,923	Genesee		27,286	Odgers		65,332	West Chapin	20,729	29,183
Berkshire	87,935		Hlawatha No. 1	203,649	284,228	Penn Mines	307,981	125,538	Zimmerman	67,724	52,073
Buck	123,134	21,538	Hlawatha No. 2	163,302	424	Quinnesec		7,179			
Caspian	106,401	20,695	Hlawatha No. 3	4,200		Riverton	109,698	60,113	Total	2,163,679	1,634,022
Cornell	5,435	20,616	Homer	55,006	13,638	Rogers	12,885	20,775			
Davidson Group	149,572	96,336	Loretto	5,067	40,893	Sherwood	1,292				

## Marquette Range

	1936	1935		1936	1935		1936	1935		1936	1935
Archibald .....	10,335	26,828	Gardner-Mack-			Maas .....	582,931	331,998	Stevenson .....	8,995	14,458
Athens .....	338,694	261,840	Inaw .....	152,017	144,467	Morris .....	300,886	275,786	Tilden .....	291,341	190,511
Blueberry .....	401,547	353,719	Greenwood .....	35,502	68,308	Negaunee .....	548,884	362,525	Volunteer .....	231,972	121,498
Cambria .....	265,368	147,117	Jackson .....	2,324		Princeton .....	883	101			
Cliffs Shaft .....	538,663	398,502	L. Sup.-Holmes .....	287,981	193,490	Richmond .....	219,152	121,926	Total .....	4,627,889	3,265,537
Francis .....	57,308	44,917	Lloyd .....	353,106	180,208	Rolling Mill .....		25,338			

## Gogebic Range

	1936	1935		1936	1935		1936	1935		1936	1935
Anvll .....	30,203	8,081	Keweenaw .....	27,663	82,874	Plymouth .....	606,900	.....	Wakefield .....	249,880	231,933
Cary .....	213,398	55,860	Montreal .....	706,475	672,980	Puritan .....	331,786	204,341	West Davis .....	329,214	.....
Eureka-Asteroid	365,174	323,291	Newport .....	670,813	519,160	Sunday Lake .....	477,936	120,176			
Geneva .....	62,923		Norrie-Aurora .....		357,817	Tilden .....		79,562	Total .....	4,630,341	3,070,825
Ironton .....	494,235	344,577	Palms .....	831	14,477	Townsite .....	62,910	55,696			

## Cuyuna Range

	1936	1935		1936	1935
Alstead-Hillcrest	253,723	77,931	Felgh Stock....	56,197	.....
Alstead Stock..	16,460	.....	Louise .....	65,530	55,655
Armour No. 1..	8,370	.....	Merritt .....	47,796	.....
Evergreen .....	126,330	129,220	Mahomen .....	239,616	151,286

## Vermillion Range

	1936	1935		1936	1935
Portsmouth . . .	140,007	71,005	Pioneer . . . . .	543,954	465,731
Sagamore . . . .	265,397	229,340	Sibley . . . . .	128,695	109,054
Wearne . . . . .	86,013	4,086	Soudan . . . . .	148,876	108,319
Wearne Stock..		79,958	Zenith . . . . .	242,948	273,995

Total	1,305,439	798,481	Total	1,064,473	857,099
GRAND TOTAL				45,203,672	28,503,501



# New Marion Plant Starts Production

**D**EFIANCE PRESSED STEEL CO. is rapidly getting into production in its new plant in Marion, O., to which it has transferred its operations following the destruction of its former plant in Defiance, O., by fire in June, 1936.

Already it is fabricating inserts for automobile steering wheels, and other metal specialties. It is setting up equipment for the production of its principal line—automobile hot water heaters—on which the season begins about June 15.

Metal spring covers, bushings, spiders for high tension lines, automobile water jacket covers, steel beverage cases, and other important lines, are actually being made again or shortly will be made.

Following the fire, the Defiance company received many offers to relocate, the most attractive of which was that of Marion, which raised \$50,000 for the purchase of an idle manufacturing plant, contributed \$15,000 toward the erection of an office building, and agreed to deed the property over to the company if its payrolls aggregated \$800,000 in three and one-half years.

For moving and re-equipping, the company has spent \$100,000. All machinery was torn down and reconditioned, and all bushings were replaced. The company's new plant includes a main building, 82 feet wide x 590 feet long, served by a 5-ton and a 10-ton crane, an L 85 x 290 feet, an auxiliary building 40 x 90 feet, and an office building 60 x 80 feet.

Its annual consumption of steel is

7000 to 12,000 tons, chiefly wire and sheets. By mid-summer, when it attains production on heaters, it will employ 600 to 800 persons and the payroll will increase to an annual rate of \$750,000.

E. L. Herbolsheimer is president and general manager; H. F. Hadley and W. Herbert Bretzlaff are vice presidents; O. P. Bereit is secretary and treasurer; J. E. Goerlich is a director and sales manager; H. J. Smith is purchasing agent; and L. W. Draur is auditor.

## Activities of Steel Users and Makers

**S**IMMONS MACHINE TOOL CO., Albany, N. Y., has purchased the plant of Capital District Foundry & Machine Corp., Green Island, N. Y., and will install new equipment for the increased manufacture of machine tools.

Arcade Mfg. Co., Freeport, Ill., has added a new line of home workshop power tools in a low price range.

Taft-Peirce Mfg. Co., Woonsocket, R. I., has been appointed exclusive distributor of Webber gage blocks, developed by George Webber, Cleveland.

Crerar, Adams & Co., Chicago, has been appointed distributor by the New York Belting & Packing Co., Passaic, N. J., for its mechanical rubber goods.

Crane Packing Co., Chicago, has moved its Houston, Tex., office from 911 Electric building to 1303 Capitol

street where it has established a new factory branch and warehouse. This move to larger quarters was necessitated by increased demand for the company's products. Roy Blackbird is in charge of the new branch warehouse.

New Process Plow Welding Co., Perry, Iowa, recently moved into a new plant at 1507 Bateman street, that city, in which it has more than eight times as much floor space as hitherto.

Lloyd B. Edwards Co., 840 Lumber Exchange building, Minneapolis, has recently been appointed agent for the Harnischfeger Corp. to sell overhead cranes, hoists and motors in Minnesota, North and South Dakota.

Harnischfeger Corp., Milwaukee, has appointed Fred M. Viles Co., Great Falls, Mont., as its distributor in that territory, to handle both sales and service of P & H excavators, cranes, draglines and Hansen arc welders.

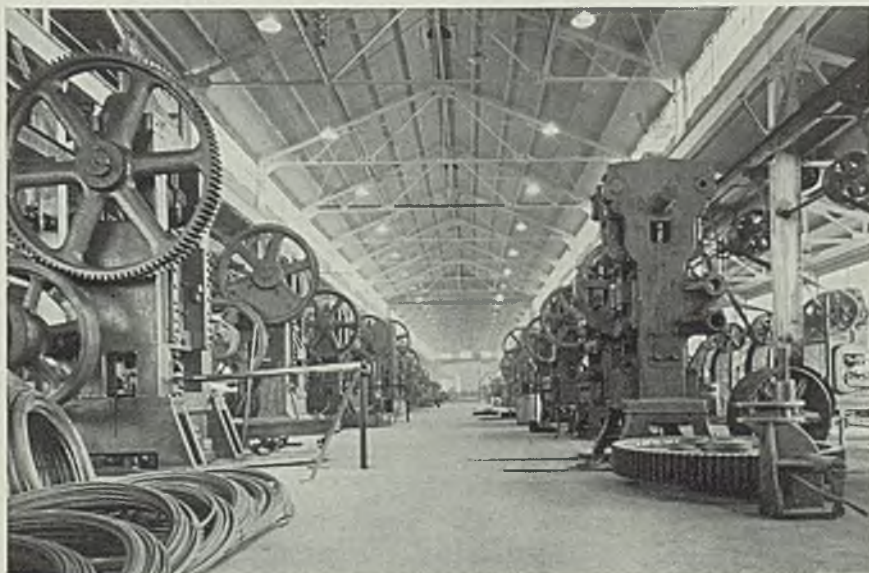
General Foundry & Mfg. Co., Flint, Mich., recently became a licensee of the Meehanite Metal Corp., Pittsburgh, and now is producing general engineering castings and heat, corrosion and wear resistant castings by the Meehanite process.

Westinghouse Electric & Mfg. Co. will move its Pittsburgh office and some of the general offices now located at East Pittsburgh to the Union National Bank building in Pittsburgh, occupying from the fifth to the thirteenth floors, about May 1.

Clyde Iron Works Co., Duluth, manufacturer of hoists, hoisting engines, and derricks, has appointed Hall-Perry Machinery Co., Butte, Mont., as its distributor for the entire state of Montana, with the exception of one county near the Wyoming line.

Wellman Bronze & Aluminum Co., Cleveland, has appointed Ellcon Co., 50 Church street, New York, exclusive representative for the sale of Ellcon-Wellman products in the eastern district, under the direction of William M. Wampler, president, Ellcon company.

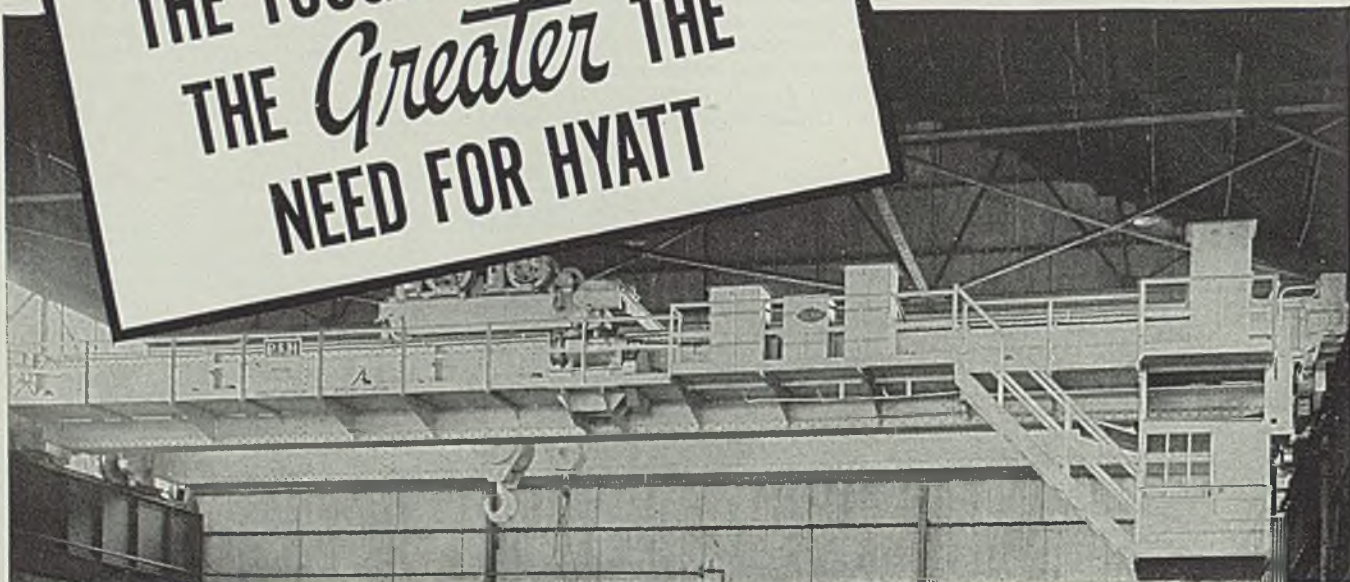
Ideal Commutator Dresser Co., Sycamore, Ill., manufacturer of electrical products, has acquired the Marshall Electric Co., Elkhart, Ind., manufacturer of automatic regulators for voltage, current and speed control of electrical equipment. Operations of the acquired company will be transferred to Sycamore.



Main building of Defiance Pressed Steel Co.'s new plant for manufacturing metal specialties is 82 x 590 feet



THE TOUGHER THE LOAD  
THE *Greater* THE  
NEED FOR HYATT



The Hyatt equipped P. & H. Crane and the train of Ingot Cars illustrated, as well as the tables and other Hyattized units at the GRANITE CITY STEEL PLANT, typify the widespread usage of these better bearings.

In steel mill operation today the greater shocks, strains, and speeds throw a much greater burden on the bearings that carry the load. For this reason Hyatt Roller Bearings are extensively used.

Their greater strength, their endurance, their freedom from wear and care, their power-saving operation—combine to make Hyatts the most efficient and economical bearings for such hard and exacting service. Build in Hyatts and you build in satisfaction. Hyatt Bearings Division, General Motors Corporation, P. O. Box 476, Newark, New Jersey.

# HYATT

*Roller Bearings*





# MIRRORS OF MOTORDOM

DETROIT

**A** STIFF northeast wind, carrying with it a flock of pay raises, served further to clear the air in this district last week, as thousands returned to their jobs at General Motors and Kelvinator plants. Increases in wage rates, started by Chrysler and General Motors, spread through Packard, Budd Wheel, Briggs, Murray Corp., Ainsworth Mfg., Kelvinator and others, with the likelihood the increase shortly will become universal in automotive and automotive parts plants.

Base rate of pay in most cases has been boosted to 75 cents an hour, although at Kelvinator, for instance, exceptions were made to this, involving a hiring rate of 65 cents an hour. A 15-day sitdown strike at the latter's Plymouth road plant was settled after a 9-hour conference by wage adjustments and an agreement to negotiate with MESA union members.

## Union Snipes at Anderson

Some significance is attached to the fact one of the union attorneys in the conference was Maurice Sugar who the week before had been active in the conferences between General Motors and the UAW. Later Sugar was to be dispatched to Anderson, Ind., to give legal counsel to a few UAW members who created a disturbance by wrecking a tavern in attempting to seize a nonunion worker at one of the GM plants there. Sugar incidentally is known to have made several financial contributions to certain divisions of the communist party in the past.

Now that most plants are falling in line with wage increases, the question many ask is: What will Ford do? Regarded by many as always a step or two ahead of the rest of the industry from the standpoint of wages and hours, Ford probably will make an announcement shortly which will make the front pages all over the country. Ford has no fear of union agitation in his plants; Harry Bennett and

his efficient service department see to it that disturbers or inciters are either transferred to other departments or silenced.

Reports were current of reinforcements being made to the Ford gates at the Rouge plant in anticipation of possible union trouble, but regular callers at the plant were able to discern no such change. As a matter of fact, if any labor disturbances should occur at Ford, the plant might be closed down tight until the difficulty blew over. Ford has been down before for a long period, without any great inconvenience, and is in no mood now to quibble with agitators.

W. J. Cameron, in a recent Sunday radio address, pointed out Ford had no public relations department and no public relations counsel, believing the best public relations could be maintained by wise management of "materials, money and men." However, the mere recitation of these management beliefs to a large radio audience appears to constitute a job of public relations. Furthermore, it is no wonder Ford needs no public relations counsel, for since time immemorial anything Ford has done has been considered front-page stuff for nearly all newspapers.

Large tonnages of semifinished steel continue to move into River Rouge for the continuous mill, official estimates indicating a minimum of 20,000 tons per month of this material being required at present production levels. One of the two idle open hearths at the steel plant was back in production Wednesday, making eight out of nine now in operation, which is virtually 100 per cent capacity, since at least one furnace is always down for repairs.

**N**EGOTIATIONS between GM officials and union representatives opened in the General Motors building Tuesday. The union is asking abolition of piecework pay, a 30-hour week, time and a half for overtime, minimum pay rates "com-

mensurate with the American standard of living" (which are probably now in force), reinstatement of employees unjustly discharged, seniority rights and agreement on speed of production lines.

One of the first points to be determined in the negotiations will be: Which points shall be referred to local plant managers and which shall be a part of general corporate policy. Five GM officials headed by William F. Knudsen, executive vice president, are examining demands and conferring with six UAW representatives. Knudsen, by the way, is being touted as the next GM president, in view of his intimate knowledge of manufacturing and personnel problems, not to mention his part in bringing an end to the sitdown affair. This probably would mean elevation of Mr. Sloan to some higher position such as chairman of the board.

## Governor Won't Talk

Gov. Frank Murphy is still receiving plaudits for his efforts in bringing GM and the union to an agreement. The governor, who years ago kissed the Blarney stone twice "so it would take", was given a plug by Vice President Garner the other night at the Farley dinner in Washington, but when called upon for a few remarks, made no reference to his Detroit achievement. Despite all Murphy accomplished, it is still a fact that technically he over-rode due processes of law and order in Flint. But perhaps "due processes of law and order" do not mean so much these days.

Transfer of several Fisher Body plant managers at the two Flint plants reflects what some observers detect as dissatisfaction on the part of the management with their handling of the labor relations problem. New manager of the No. 1 plant is from Lansing; new head of the No. 2 plant is from Baltimore. In both these cities, Fisher Body labor has been quiescent. Assistant manager at the No. 1 plant is from the Atlanta, Ga., division. Former resident managers at Flint have





## MIRRORS OF MOTORDOM

been transferred to other duties with the corporation.

There is said to be some substantiation for the belief certain resident managers reported to Detroit headquarters only what the latter wanted or expected to hear, rather than relaying all details of happenings in the various outlying divisions, especially as far as labor developments were concerned. Of course this is no particular reflection upon personalities, but is merely one of the many difficulties which beset large, far-flung corporations.

Some interesting tales are being told of events during the 40-odd day GM strike. One sidelight was to the effect that more than one GM executive, living in Birmingham, fashionable suburb of Detroit, refused to allow any member of his family to ride in a taxicab, for fear of possible violence. Another concerned the move to recall Gov. Murphy which, as any visitor to the coffee shop or cafeteria in the General Motors building could overhear, was taken with utmost seriousness by large numbers of office workers in the vicinity. Observed dispassionately, the movement bordered on the ridiculous — and is now forgotten.

CIO organizers in recent weeks have been reported active in trying to organize steelworkers in Ecorse and Wyandotte. Temporary headquarters were erected in both these cities, but were wrecked by unknown groups of men who opposed the organization movement. It is felt locally John L. Lewis will have a considerably more difficult task on his hands in disrupting steel production than he did in stalling automobile assemblies. For one thing, steelmaking is not so highly integrated, and for another thing it is possible to imagine more comfortable situations than a sitdown strike in a blast furnace.

**T**OOL and die shops are becoming somewhat more active as the season progresses. Preliminary specifications having been drawn up on a few 1938 models, subject to extensive revisions of course, inquiries are coming out and the die shops are as usual among the first to start in motion.

One small die shop is currently

working three shifts on material for Chrysler, although this is not work for next year's models. Activity in Fisher plant 23 here, center of Fisher Body's diemaking, is increasing. Another shop specializing on large body dies has been busy for the last two weeks on duplicate and replacement dies, and has been taking in an above-average amount of pig iron for its foundry.

One company here is experimenting with a body design which would permit mounting the engine at either end of the car, without necessitating any radical changes in body contours. One of the deterrents to rear-engine cars has been the uncertainty of public acceptance and the concurrent expense in dies and tooling. With the above dual design, such difficulties would be minimized.

**P**RODUCTION veered upward sharply last week, as GM divisions started whittling at a huge backlog of orders. It will take several weeks for the corporation to co-ordinate its mechanism again and gear it up to former speed, but last week about 23,100 units rolled from assembly lines. Chrysler divisions went ahead steadily, ac-

counting for 27,900 while Ford held close to the level of recent weeks at 29,775. Total production for all makes for the week ending Saturday was 95,698, and this figure should climb rapidly, especially as the spring season approaches.

Although General Motors has started pressing for steel in rapidly mounting tonnages, it is not believed any undue strain will be placed on mills which are prepared to release some stocked material, and divert other business back to automotive channels. Surprising feature of the GM tie-up has been the complete absence of any effect on the national steel operating rate. As estimated previously here, the corporation accounts for about 4 per cent of the present steel output, and suspensions apparently amounted to little more than a breathing spell for suppliers.

**I**NTRODUCTION of 0.12 per cent tellurium into babbitt metal as a means of refining the grain, improving casting properties and bettering physical properties at high temperature is a development sponsored by Cleveland Graphite Bronze Co., and now used on all babbitt metal this company supplies. It represents one of the first significant improvements made in babbitt metal, widely used in automotive bearings, for a good many years. . . In an election at Spicer Mfg. Corp. at Toledo, the UAW emerged victors over the MESA, by a count of 1082 to 810. The UAW thus is granted exclusive bargaining rights for all groups, which may presage the next phase of labor troubles — interunion warfare. . . . January retail sales of Pontiac, despite the interruption to production, were the highest for any January on record — 13,602. . . . Monday, Feb. 15, Studebaker marked the eighty-fifth year of its corporate existence and at a formal luncheon harked back to the day in 1852 when Henry and Clem Studebaker opened their blacksmith and wagon shop in South Bend, Ind. . . . F. F. Kishline, chief engineer of Graham, sees the day when all cars will be equipped with supercharged power plants. Graham, of course, features its supercharger. . . . Oldsmobile expected to be at full production by Friday. . . . Taking their cue from the steel industry's continuous mills, officials of Libbey-Owens-Ford Glass Co. announce acquisition for \$610,000 of rights to the Pilkington flow process for continuous casting of plate glass, an English development. By the process, glass is flowed in a 130-inch wide ribbon through a 350-foot lehr and then is cut to proper size. . . . Oldsmobile has let contracts for a new 85 x 250-foot retail drive-away building, at Lansing.

## Automobile Production

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

	1935	1936	1937
Jan. ....	300,335	377,306	*344,000
Feb. ....	350,346	300,874	.....
March ....	447,894	438,992	.....
April ....	477,059	527,726	.....
May ....	381,809	480,571	.....
June ....	372,085	469,355	.....
July ....	345,297	451,474	.....
Aug. ....	245,075	275,951	.....
Sept. ....	92,728	139,785	.....
Oct. ....	280,316	229,989	.....
Nov. ....	408,550	405,702	.....
Dec. ....	418,317	519,132	.....
Year ....	4,119,811	4,616,857	.....

\*Estimated.

Calculated by Cram's Reports

Week ended:

Jan. 23. ....	81,395
Jan. 30. ....	74,148
Feb. 6. ....	72,295
Feb. 13. ....	72,850
Feb. 20. ....	95,698





# WINDOWS OF WASHINGTON

**WASHINGTON**

**T**HE conference which Assistant Secretary of Labor Edward F. McGrady called here last week to discuss navy steel buying under the Walsh-Healey act was more or less of a fiasco, inasmuch as it developed nothing that the labor department did not already know, namely, that the unions were against granting any exemptions under the law even for steel for the navy. The only thing that was of special interest was the fact that representatives of the CIO and the A. F. of L. both of whom were present, agreed on this principle.

When advised of the situation Senator Walsh of Massachusetts, co-author of the contract law and chairman of the senate naval affairs committee, forecast modification of the act if the navy fails ultimately to obtain the bids sought. The senator was somewhat peeved at the labor department for its way of administering the act in this instance. He said in his opinion the law allows such an exemption and it should have been made with no attempt to modify the law.

## Labor Asks Collusion Inquiry

Among those attending the McGrady conference were Lewis Compton, assistant to Assistant Secretary of the Navy Edison; Louis M. Walling, administrator of the Walsh-Healey act; Gerald Riley, assistant solicitor of the labor department, and Frank Healy of the procurement division of the treasury department. The labor representatives included John P. Frey, president of the A. F. of L. metal trades department, and A. D. Lewis, brother of John Lewis, representing the CIO.

The conference, of course, was in executive session but it was stated that the labor leaders asked immediate inquiry into collusion on the part of steel companies for failing to submit bids to the navy. They asked that this investigation be made by either the labor or justice departments. Mr. Lewis fol-

lowing the conference said: "We made this suggestion to Mr. McGrady. From the information given us there is evidence of a possibility of collusion on the part of the steel companies and in our opinion an investigation should be made either by the labor or justice departments, or both."

Secretary McGrady stated that both groups opposed any suspension of the act. Of course the same groups have suggested that before. They contended that no exemptions have been allowed to small companies and therefore they should not be granted to large steel companies. McGrady stated that Mr. Compton suggested that the exemption be allowed now in view of the shortage of steel for the navy.

## Will Consult Institute

Lewis pointed out, it is said, that the steel industry is not now operating on a 40-hour week schedule as would be necessary to bid under the act. He said, "it would be a very simple matter to employ additional workmen and stagger shifts, thus continuing on a 48-hour schedule."

It is understood that Mr. McGrady has taken the matter up with Secretary Perkins and that he intends to consult the American Iron & Steel institute. No further conferences are scheduled with either the labor group or with steel manufacturers.

In connection with all the fuss over this matter, the President was asked again early last week at the press conference if he had had a report yet on the Walsh-Healey act from either labor or navy departments. He stated that he had not received such a report to that time.

Senator Walsh was much exercised about the whole matter.

"My information," he said, following the labor conference, "is that there is likely to be some delay in the construction of nine vessels, three submarines and six destroyers, due to the inability of the navy to purchase steel for their construction. To build the nine ships, the

navy needs 25,000,000 pounds of steel. Bids were opened recently but the bids covered only 7,000,000 pounds. This amount was rejected by the navy because before construction of a naval vessel can be begun, all steel must be in sight. Thus 7,000,000 pounds of steel would be useless, it is claimed, as not all the different kinds of steel needed for construction of these vessels, were included.

"The reason for the lack of bidders," the senator continued, "for the 25,000,000 pounds of steel required is that the department of labor, proceeding under the authority contained in the provisions of the so-called Walsh-Healey act, known also as public contracts act, imposed terms for a 40-hour work week in the manufacture of this steel. The steel industry has been operating under a 44-hour work week and claims to be unable to readjust its operations to a 40-hour week at this time. The real difficulty, therefore, is not the terms of the public contracts act, but the administration of the act, the labor department being in conflict with the steel industry as to the working hours per week. The public contracts act gives ample discretionary power to the department of labor in regard to fixing hours of labor in the various industries.

"I understand the navy department now contemplates asking the department of labor to exempt bidders from complying with the provisions of the public contracts law, which it is claimed is responsible for the lack of bidders.

"Unless some satisfactory adjustment is reached, congress will, undoubtedly, take steps to remove or modify the operations of this law insofar as purchasing supplies for national defense is concerned."

## WANTS NAVY TO BUILD NAVY

Another bill has been introduced in congress providing that naval ships be built in navy yards and other government establishments. This time the bill comes from Sen-



ator Bone, of Washington, who recently made an effort to have an amendment providing this same thing inserted in one of the appropriation bills, without success. Also Representative Magnuson, of Washington, has a similar bill in the house. It is not believed that these bills will get to first base.

#### **TRADE AGREEMENT ACT CHANGES RECOMMENDED**

Capitol Hill is still discussing extension of the trade agreement act, as requested by the President. This has already passed the house and the senate finance committee has been holding hearings. Doubtless it will soon pass the senate. The only real opposition encountered to this time is that some have suggested that an amendment be added whereby the senate would have to ratify these treaties. The house voted that down and the senate will do the same.

During the course of the hearings before the finance committee last week, Frank R. Wheeler, appeared on behalf of the tariff committee of the national association of manufacturers.

He advocated that the act should be amended to include the following provisions: At least three months advance notice to, and opportunity for hearing by, interested industries, workers, and agriculturalists; senate ratification to be essential where the foreign nation provides for legislative ratification; agreements shall make no restriction as to our internal tax rates; each agreement shall contain a provision providing protection against substantial currency changes; definite divorcement of unconditional most favored nation clauses from reciprocal agreements.

#### **JAPAN'S PIG IRON NEEDS REACHING ACUTE STAGE**

There has been a rumor here for some days that owing to the great shortage of pig iron in Japan the import duty would be withdrawn during the period of the emergency. Up to this time neither the state nor commerce departments has had confirmation of the report.

Meanwhile, the commerce department has a comprehensive report from Trade Commissioner Paul P. Steintorf at Tokyo stating that the pig iron shortage "has now become quite acute and there are probabilities that a number of plants will have to curtail or suspend operations soon unless there is a marked increase in imports. It is now reported that an attempt will be made to purchase pig iron from the United States and Europe, a new departure since ordinarily imports have come almost entirely from Manchuria, British India, and Soviet Russia. The press is filled with reports of the

problem, and there is considerable criticism of the government's iron and steel policy, which is held to be responsible for the present situation."

In summarizing reasons for the shortage the trade commissioner says: "The acute pig iron famine has been caused by a combination of factors which may be briefly enumerated as follows: The delay in putting into effect the pig iron production schedule previously worked out, and the inadequacy of this program to meet the increasing demand; the marked advance in prices of scrap iron throughout the world, due to increased demand as a result of improved economic conditions, and particularly the armament race. Formerly a number of Japanese steel mills were using scrap iron up to 70 per cent, but since the price of pig iron has been controlled it has become relatively much cheaper, with the result that mills have been cutting down on scrap and using a much larger percentage of pig iron, the relative position of the two materials being particularly reversed. A considerable portion of Japan's pig iron requirements have been coming from Soviet Russia, but these supplies have been severely curtailed for various reasons which cannot be discussed here. Furthermore, arrivals from Manchuria have been reduced to some extent owing to the growth of the domestic industry in that area, and it is reported to be impracticable to materially increase purchases from British India."

#### **THINK STEEL SHOULD ABANDON PLANT UNIONS**

While the steel industry may not be aware of the fact, a good many government officials are watching the industry very closely and, though it seems impossible, some of them have considerable sympathy for the industry and its problems.

It is some of the latter who have been thinking of the industry and its present and future union problems. One official, who for obvious reasons refuses to be quoted, expressed the opinion the other day that the best thing the industry can do now is to absolutely divorce itself from company unions. By this is meant that the industry generally should go to company union officers, tell them that the companies will no longer give money to the union nor allow it to use company property for meetings.

The opinion is being freely expressed here in some high quarters that the industry, generally, is going to have to face the music of the unions and the sooner they take some action the better they will be able to save their face when the time comes. A good deal of thinking

has been done here on this subject for some weeks but government officials, of course, will not discuss the matter for publication.

#### **SLAP ON WRIST FOR HUGH**

President William F. Green of the A. F. of L. last week took violent issue with General Hugh S. Johnson, erstwhile leader of the dead blue eagle, in connection with the attitude shown by the latter to the A. F. of L. in comparison with John Lewis, indicating that the general thinks Lewis is O.K. and the A. F. of L. a back number in the labor situation.

The Green letter was sent "as the considered judgment of the executive council of the A. F. of L. and by its direction." In it President Green calls the general's attention to the fact that he found no fault with the organization when NRA needed help from the labor unions. Green says that "we can only conceive that such conduct on your part (writings in his daily newspaper column) is designed to lessen the confidence and leadership as exemplified by the A. F. of L. and its affiliated national and international unions, regardless of whether your conduct was inspired by motives of malice, of good will or whether of indifference."

#### **SUSPEND NEW SKELP RATE**

An order has been issued by the interstate commerce commission suspending until August 24 operation of certain railroad schedules which propose to increase the carload ratings on iron or steel skelp to class B (32.5 per cent of first class), from class C (22.5 per cent of first class) in western classification territory and from class C (27.5 per cent of first class) in Illinois classification territory, and to reduce the carload minimum weight from 50,000 pounds to 40,000 pounds applicable in all classification territories.

#### **Beer Can More Popular**

Two surveys by Psychological Corp., New York, for American Can Co., one in May, 1936 and the other in December, indicate growing favor for beer in cans for home use. In the first survey 18.9 per cent of those interrogated bought beer in cans. In the December survey 22.6 per cent of those questioned bought beer in metal containers for home use.

In each survey 10,000 persons in 72 cities and towns were asked in what containers they last bought beer for home use. The figures indicate an increase of 20.9 per cent in the few months between the two investigations.



## Form of Organization Will Be Chosen by Employees

IN APPRAISING the report on labor policies of the iron and steel industry conducted by the bureau of business research of the University of Pittsburgh under the sponsorship of the Brookings institution and the Falk foundation, industrial employers should consider the circumstances under which this study was made and its findings made public.

It is important to know that this report is objective in character. The conclusions in it were drafted seven or eight months ago. Those who conducted the study and those who sponsored the work could not have known at that time what the developments in the labor situation would be on the date the report would be revealed to the public. Even at the time the dinner meeting was definitely scheduled for Monday, Feb. 15, the principals of the Falk and Brookings organization could not have known that their report was destined to be made public when the nation was thinking of the terms of settlement of the General Motors-CIO controversy, consummated only a few days previously. Therefore the conclusions should be considered as being applicable to the broad problem of labor policy in the steel industry and not to the peculiar conditions which existed last Monday.

### Report Favors Vertical Type of Organization; Terms Employee Representation "Inadequate"

A second circumstance to be weighed carefully is the competency of the agencies responsible for the report. The Brookings institution and its financial supporter, the Falk foundation, enjoy an enviable reputation for independence and for the absence of bias in the economic studies they have conducted or sponsored in the past. The University of Pittsburgh at times has been attacked by liberals because of its alleged reactionary tendencies.

Therefore, on these three counts—the objective character of the study, the independent background of the sponsors and the reputations for conservatism enjoyed by the university—employers should give respectful attention to the findings in the report.

As we view this situation, it boils down to this: Dr. Ralph J. Watkins and three other professors, in the report, state that in their opinion (1) steel company employees should be organized; (2) the character of the industry's operations is such that vertical, or industrial, rather than craft organization is called for; (3) collective bargaining should be on a national basis and not on a plant basis; and (4) organization of em-

ployes should be in accord with the principles of industrial democracy.

The authors declare that "it is not the function of this discussion to outline ways and means of organizing steel workers or to indicate under whose auspices they should be organized." Yet in another passage of the report they infer that the employee representation plans do not measure up to the "democratic ideal" and do not "function as adequate agencies for collective bargaining . . . ."

This reference to the alleged shortcomings of employee representation plans, coupled with their endorsement of the principle of the vertical type of union, apparently prompted many newspapers to characterize the report as advocating that an organization such as CIO be adopted in the steel industry.

### Labor Developments in United States Need Not Follow Pattern of England's Experience

Perhaps the authors of the report, in common with many others who look at the labor question from an academic standpoint, are influenced too much by the thought that the United States is destined to follow England's experience in the development of labor policies. Far too many persons not closely identified with the actual responsibilities of an employer seem resigned to the idea that complete unionization in this country is inevitable.

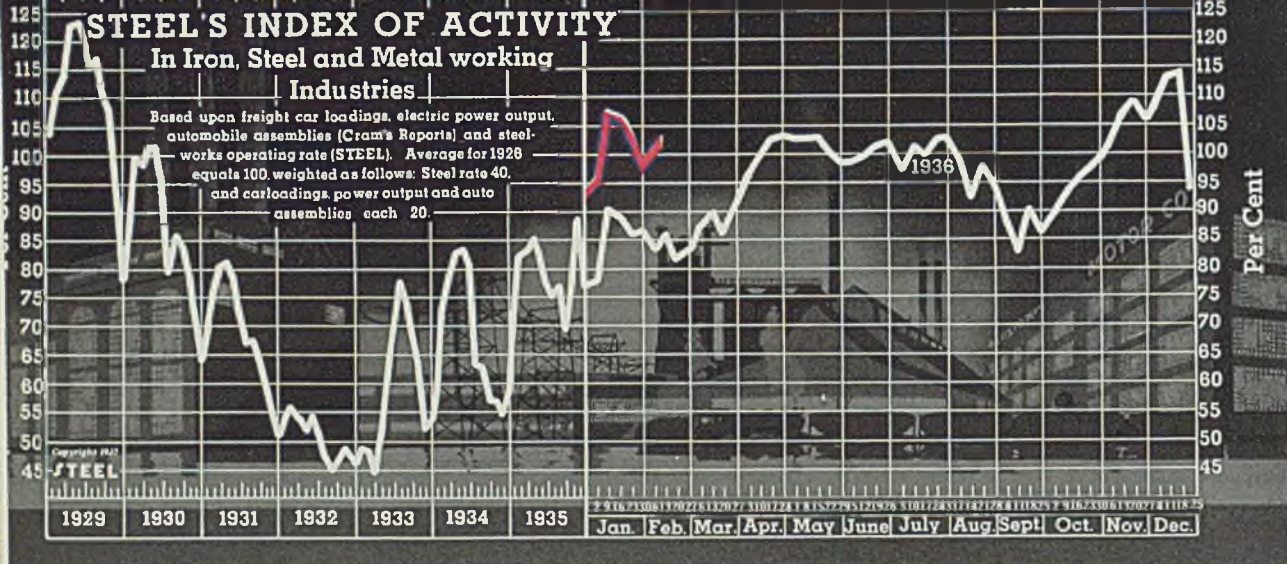
Conditions surrounding industrial employment in the United States are considerably different from those obtaining in England or in other countries where the majority of employees are members of unions. It is probable that the ultimate solution of the collective bargaining problem here will differ in many important respects from the solution that has been evolved in the other countries.

In the final analysis, the decision as to method will be made by the employees. If a sufficient number of them become convinced that a vertical union offers them more advantages than are afforded by a crafts union, an employee representation plan, or no organization at all, then the vertical union will be adopted.

On the other hand, employers have an opportunity to influence the decision of employees through the manner in which they conduct their relations with employees. It is conceivable that some form of relationship can be developed which will prove to be so advantageous to employees that they will prefer it to anything that could be offered by a vertical labor organization.

The Falk report expresses opinions which will be received with mixed feelings by the majority of industrial employers. It should not be ignored. But rather than put too much weight upon its findings, employers should check its conclusions with the honest convictions of their employees.





STEEL'S index of activity gained 1.4 point to 102.2 in the week ending Feb. 6:

Week ending	1937	1936	1935	1934	1933	1932	1931	1930
Jan. 2	96.6	78.2	65.4	53.6	45.3	48.8	58.5	74.3
Jan. 9	107.8	90.2	73.8	58.1	48.6	55.8	69.2	88.1
Jan. 16	106.7	89.3	78.1	60.9	49.8	56.2	72.1	91.8
Jan. 23	104.7	86.0	79.5	62.3	50.8	55.8	72.0	96.3
Jan. 30	99.6	86.6	81.8	66.9	49.9	56.2	72.9	97.4
Feb. 6	100.8†	83.8	82.7	70.7	48.7	56.0	74.9	100.8
Feb. 13	102.2*	85.9	82.8	72.4	48.3	55.5	75.4	100.9

†Revised. \*Preliminary.

## Rate of Activity Resumes Climb after Setbacks

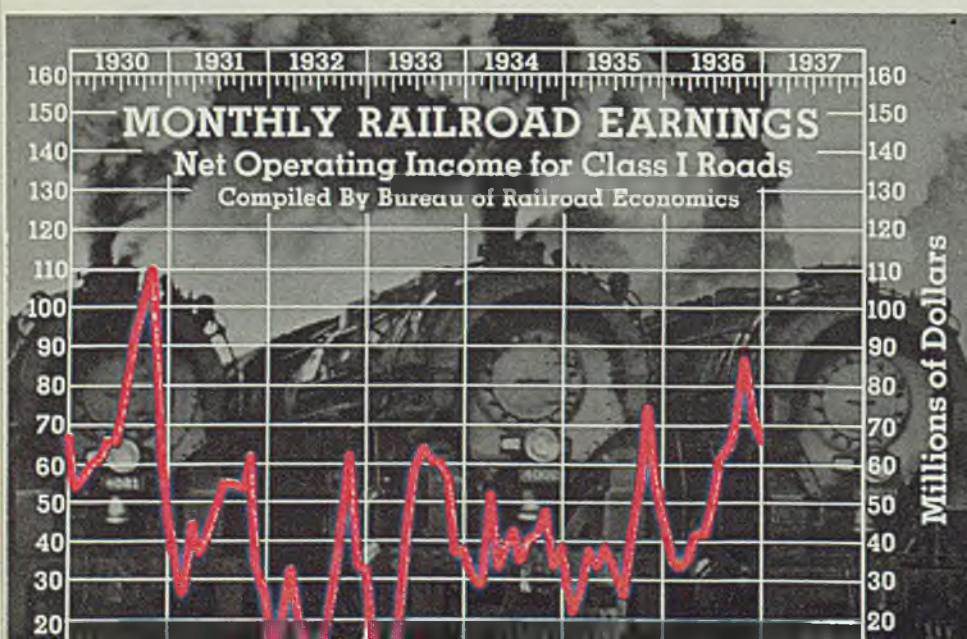
AT THE rate industry has been accelerating the pace of its activity during the past week or ten days, it will have regained most or possibly all of the ground lost due to floods and strikes by the end of February. STEEL'S index of activity in the iron, steel and metalworking industries stood at 102.2 for the week ending Feb. 13, an increase of 1.4 point over the figure for the preceding week.

Further gains are practically assured for the weeks ending Feb. 20 and Feb. 27. With this in mind, and

looking back to the early part of January when the index stood at 107.8, we can note the influence of the flood and strike interruptions in terms of the fluctuations of the index.

During this period, the swing from the high of 107.8 to a low of 99.6 represents a loss of 8.2 points or 7.6 per cent, which decline—due to the influence of both floods and labor difficulties—is only slightly greater than the loss suffered by the index in mid-March, 1936, on account of the floods in Pennsylvania and New England. The comparison seems to indicate that industry thus far in 1937 has demonstrated a remarkable resistance to depressing influences.

If, as predicted previously in this discussion, the index gains in the weeks ending Feb. 20 and Feb. 27, the curve for the entire month of February will show



	1936	1935	1934
Jan.	\$35,764,748	\$21,348,557	\$31,058,275
Feb.	33,594,718	25,719,919	29,420,772
March	35,205,513	37,850,965	52,217,083
April	41,547,644	45,625,786	32,433,939
May	41,842,147	39,505,069	39,699,194
June	50,312,580	34,102,703	42,037,757
July	61,773,765	26,919,343	35,441,265
Aug.	64,680,717	42,156,706	40,564,071
Sept.	70,166,026	57,359,339	41,713,425
Oct.	89,851,409	75,425,092	49,336,307
Nov.	72,410,571	54,234,305	32,540,502
Dec.	68,742,291	46,040,165	38,738,295



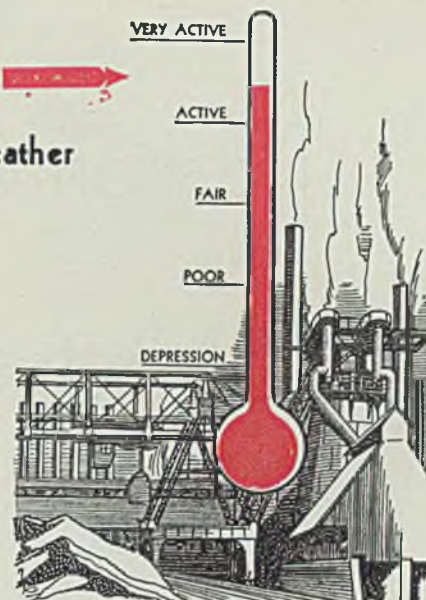
# BUSINESS TREND

a steady rise instead of the sawtooth gains and losses registered in February, 1936. It is possible that this steady upward march in the current month has the same significance as the steady, positive upward trend line which started in the week ending March 20, 1936. If this reasoning is correct, the spring spurt of indus-

## Industrial Weather

### TREND:

Upward



## Where Business Stands

Monthly Averages, 1936 = 100

	Jan., 1937	Dec., 1936	Jan., 1936
Steel Ingot Output .....	119.1	111.7	76.6
Pig Iron Output .....	123.9	120.2	78.1
Freight Movement .....	95.6	100.0	84.8
Building Construction .....		98.5	79.2
Automobile Production .....	89.4	134.9	98.9
Wholesale Prices .....	111.3	110.3	99.3

try is developing about six weeks earlier this year than it did last year.

Each of the four indicators in STEEL's index reflect

stronger tendencies. Freight car loadings have recovered to slightly above the 700,000 mark. Electric power output remains below the record heights of December, 1936, but continues to hold steady at the levels prevailing in January. Steelworks operations, at 81 per cent of capacity in the week ending Feb. 13, are pointed toward higher levels. Automobile output, gaining negligibly in that week, probably will not reflect the effect of resumption of operations by General Motors until the last week of February.

## The Barometer of Business

### Industrial Indicators

	Jan., 1937	Dec., 1936	Jan., 1936
Pig iron output (daily average, tons) .....	103,863	100,813	65,461
Machine tool index .....	201.7	180.4	102.6
Finished steel shipments..	1,149,918	1,067,365	721,414
Ingot output (weekly average, tons) .....	1,069,232	1,002,625	687,572
Dodge building awards in 37 states (sq. ft.) .....		33,632,600	27,053,300
Automobile output .....	*344,000	519,132	380,554
Coal output, tons .....	39,610,000	44,487,000	39,330,000
Business failures; number .....	811	692	1,077
Business failures; liabilities .....	\$8,661,000	\$12,288,000	\$18,104,000
Cement production, bbls. ....		8,971,000	3,630,000
Cotton consumption, bales .....		692,921	591,000
Car loadings (weekly av.) .....	663,377	693,905	588,278

\* Estimated.

### Financial Indicators

	Jan., 1937	Dec., 1936	Jan., 1936
25 Industrial stocks .....	\$235.41	\$231.61	\$196.26
25 Rail stocks .....	\$43.56	\$41.92	\$34.22
40 Bonds .....	\$90.31	\$90.19	\$85.76
Bank clearings (000 omitted) .....		\$31,153,000	\$25,262,000
Commercial paper rate, New York (per cent) .....	%	%	%
* Commercial loans (000 omitted) .....	\$8,943,000	\$9,189,000	\$7,999,000
Federal Reserve ratio, per cent .....	80.4	80.2	78.2
Railroad earnings .....	†\$68,742,291	\$72,410,571	\$44,378,661
Stock sales, New York stock exchange .....		48,605,047	67,211,035
Bond sales, par value .....		\$355,062,700	\$472,543,300

\* Leading member banks Federal Reserve System.

† December, November and December, respectively.

### Foreign Trade

	Jan., 1937	Dec., 1936	Jan., 1936
Exports .....	\$229,739,000	\$197,950,000	
Imports .....	\$244,321,000	\$187,440,000	
Gold exports .....	\$99,000	\$388,000	
Gold imports .....	\$57,070,000	\$45,981,000	

### Commodity Prices

	Jan., 1937	Dec., 1936	Jan., 1936
STEEL's composite average of 25 iron and steel prices .....	\$36.55	\$35.15	\$33.34
Bradstreet's Index .....	\$11.23	\$11.13	\$10.02
Wheat, cash (bushel) .....	\$1.49	\$1.49	\$1.19
Corn, cash (bushel) .....	\$1.26	\$1.22	83c
Petroleum, crude (bbl.) .....	\$1.08	\$1.08	\$1.08



# Relation of Mechanical Testing To Actual Performance of Steel

**I**S THERE a best steel to use for a given service? Is there a best steel for elevator links or drill pipe or sucker rods? If so, are there any ways of determining this steel other than the expensive and time-consuming one of trial and error? To what extent are the results of mechanical testing an index of performance? These questions have an importance today which was little realized a few years ago. Oil wells are spudded in today to tap sands some two miles below the surface.

\*From a paper presented at the seventeenth annual meeting, American Petroleum Institute, Chicago.

BY W. H. CLAPP\*

California Institute of Technology,  
Pasadena, Calif.

Soon it may be necessary to pump from these depths. In spite of the improvement in engineering steels, equipment is being forced closer and closer to the limits of performance. For uses where the service is especially severe there is a wide diversity of opinion as to the best type of

steel to be used. Steel users are confused by the rival claims of enthusiastic steel salesmen and by the contradictory conclusions arrived at by different operators. If a steel is being worked close to the limits of its performance, a dozen steel salesmen are at hand to assure you that they have a steel "made especially to meet this particular situation" and to talk learnedly of "improved physicals" and "proper proportioning of alloying elements."

Sometimes a change to a different type of steel results in improved performance; frequently a change to a more expensive steel results in even poorer performance. Why this is so nobody seems to know; but the new steel gets a black eye and the general confusion deepens. We need a clearer picture of the relative importance of those factors upon which the selection of a steel is usually based. If our present knowledge of the mechanical properties of a steel gives us an incomplete picture of its performance, it will be worth something to know that. This paper is an attempt to contribute something toward a clearer view of the problem of steel selection.

## Assembled Data Is Irregular

Recently the writer assembled the data of every reliable mechanical test which he could find in the literature of the last 10 years, tests made by careful investigators not connected with any steel manufacturer. No tests were included unless the chemical composition of the steel and the heat treatment were given. The data from these tests were plotted against the tensile strength of the steel, putting on separate charts such quantities as proportional limit, yield point, elongation, endurance limit, impact strength, and using a separate designation for each type of steel. It was anticipated that these charts would bring out the superiority of certain steels in one or more

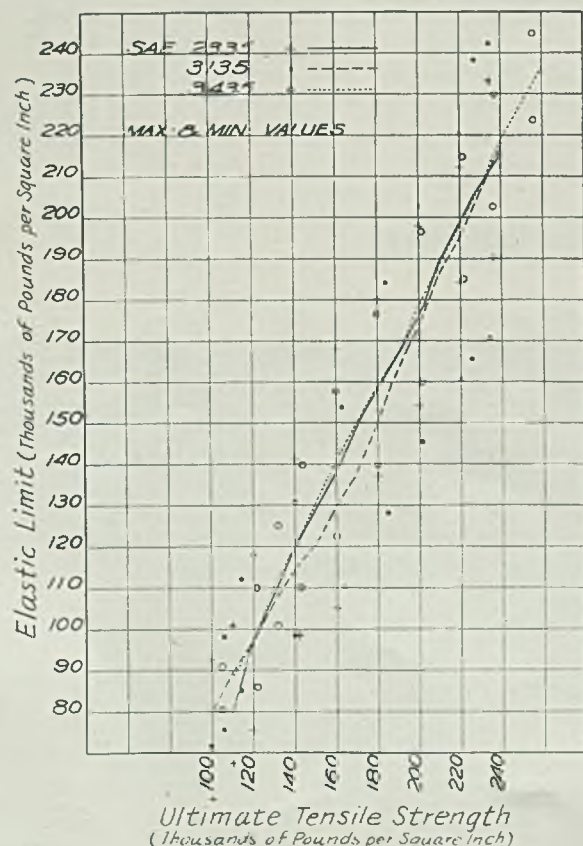


Chart furnished by a steelmaker showing that the variation in tensile strength and yield point in any one steel may be much greater than the variation in the average values for different steels



of these respects. The results of many hundreds of tests gave little indication of any such superiority. If, for example, one of these steels showed many tests with superior yield points at a given tensile strength, there were other tests in which the yield point was distinctly inferior. One could only conclude that while, on the average, some one steel would be superior in some respect, there was a distinct possibility that it might be inferior.

We do not need to go beyond the data furnished by the steel manufacturers themselves to see why this should be so. For example, one corporation publishes an instructive booklet which furnishes curves of mechanical properties of nickel and nickel-chromium steels. They also give maximum and minimum values of these properties which may be expected to occur when a standard test specimen, turned down from a rolled bar about 1 inch in diameter, is carefully heat treated and tested.

The mechanical properties are plotted against the tempering temperature which is convenient for the user although it does not give a proper basis for comparison of different steels. Elastic limits of S. A. E. 3135, 3435, and 2335 steels are plotted against corresponding tensile strengths and are shown as curves on chart. The unconnected points represent maximum and minimum values which are plotted against the mean value in each case. It is apparent that the variation in any one steel may be much greater than the variation in the average values for the three steels.

#### Varying Properties Shown

In Table 1 are given values for three properties: yield-point strength, elongation in 2 inches and Brinell hardness number for 10 different S. A. E. 0.40-carbon steels. The data are taken from a catalogue published by a large steel company. Each steel has been oil quenched from the

temperatures given at the bottom of its column; the tempering temperatures range from 800 to 1300 degrees Fahr. in each case. For this range of tempering the various steels have different ranges of tensile strength and some of them have wider ranges than others. Still, if a comparison is made on the basis of any one tensile strength, the range of these three properties is quite small.

Can the designer say that a steel which has a slightly higher yield point and a slightly lower elongation than another is superior to the other in which these relations are reversed? We must admit that, while these two properties are important indicators of steel behavior, we do not know what relative importance to attach to either one of them. A high elastic limit probably would be considered more important for steady load conditions, while good elongation is one of the toughness factors that is valuable in combating

Table I  
Yield-Point Strength, Elongation in 2 Inches and Brinell Hardness vs. Ultimate Tensile Strength of Machinery Steels

SAE Numbers.....	1940	2340	T-1340	3140	6140	5140	3240	4640	4340	4140
Tensile Strength, Lbs. per Sq. In.	(averaged)									
90,000.....	.....									
95,000.....	64,500									
	27.0									
	194									
100,000.....	69,500									
	25.0									
	205									
105,000.....	74,000	85,000								
	22.0	25.0								
	216	207								
110,000.....	78,500	90,000	92,000	92,500	92,000					
	18.5	24.5	28.0	24.5	24.0					
	227	218	216	224	224					
115,000.....	.....	95,500	96,500	97,500	97,000	92,000	94,000			
		24.0	22.5	23.5	23.5	23.0	23.0			
		232	232	235	235	230	235			
120,000.....	.....	101,000	101,500	102,000	103,000	96,000	99,000			
		23.5	22.0	22.5	23.0	22.5	23.0			
		244	239	244	247	236	247			
125,000.....	.....	105,000	106,000	106,500	108,500	102,000	104,000	109,000		
		23.0	21.5	22.0	22.0	22.0	22.5	24.5		
		254	250	255	258	244	258	250		
130,000.....	.....	110,000	110,500	111,000	114,000	107,000	109,000	114,000	103,000	108,000
		22.5	20.5	21.0	20.5	21.5	22.0	23.5	21.5	21.0
		263	260	267	270	255	271	269	274	255
140,000.....	.....	120,000	119,000	120,500	125,000	116,000	119,000	124,000	118,000	119,500
		21.5	18.0	19.5	18.5	19.5	21.0	22.5	20.0	17.5
		281	282	288	291	276	288	291	288	277
150,000.....	.....	130,000	127,500	130,000	135,000	127,500	129,000	135,000	130,000	129,500
		20.0	15.5	17.5	17.0	18.0	19.5	20.0	19.0	15.5
		302	304	302	311	299	302	310	302	300
160,000.....	.....	140,000	136,000	139,500	145,000	138,000	139,000	145,000	141,000	140,000
		18.0	14.0	16.5	16.0	17.0	18.5	17.0	18.0	14.0
		320	328	324	331	325	323	335	318	327
170,000.....	.....	149,000	144,000	148,000	154,000	148,000	149,000	155,000	152,000	152,000
		16.0	12.5	15.5	15.0	16.0	17.5	15.0	17.0	13.0
		340	345	345	350	352	348	363	340	343
180,000.....	.....	.....	.....	156,000	163,500	158,000	159,500	165,000	162,000	163,000
				14.5	14.5	14.0	17.0	13.5	16.0	12.5
				366	363	385	369	377	366	353
190,000.....	.....	.....	.....	.....	173,000	169,000	170,000	175,000	172,000	173,500
					13.5	12.5	16.5	13.0	15.0	12.0
					388	375	386	388	389	367
200,000.....	.....	.....	.....	.....	.....	.....	180,000	.....	182,000	182,500
							15.5	.....	13.5	13.0
							401	.....	406	397
210,000.....	.....	.....	.....	.....	.....	.....	.....	.....	192,000	191,500
									12.0	10.0
									424	426
Quenched from (deg. F.)	1550	1475	1500	1500	1600	1550	1500	1500	1550	1575



occasional overload. But service conditions vary widely and designers can only guess as to the relative importance of these two factors.

The chief reason why we cannot definitely select any one steel for a given service on the basis of mechanical testing is that we do not as yet know why metals fail for any condition of service; we do not know with exactness the physical factors which determine the limits of performance of a steel for any kind of loading. This statement may seem a heresy to many who have been led to believe that the results of mechanical testing furnish an absolute index of performance. It would lessen the general confusion that exists on the question of steel selection if this fact were more generally understood and appreciated. Four different types of steel failure are recognized: The ductile type of failure, brought about by an overload; the brittle type of failure, which takes place because of sudden shock (impact); the progressive type of failure, which occurs when material is subjected to variations in stress and usually after a large number of repetitions of stress (fatigue); the exceedingly slow but continuous stretch of steel under load at high temperatures (creep).

Each of these types of failure is distinctly different from the others. Each of them occurs as a result of exceeding some certain physical limitations in the steel. Each of them may be hastened by corrosive attack. All research work in mechanical testing is directed toward a better understanding of these physical factors of the metal. Why does steel fail? What are the real limits of its performance?

#### Tension Test Gives Best Data

In the ductile type of failure the rupture of the metal in tension is preceded by stretching and "necking down" at the point of break. The appearance of the fracture is similar to that of the broken tensile test specimen and the data from the tension test furnish the most reliable index of performance. Consider a tension test specimen of heat treated alloy steel. We will assume that the modulus of elasticity of the steel is 30,000,000 pounds per square inch, that the torsional modulus is 11,530,000 pounds per square inch and that the elastic limit of the steel as

determined in the tensile test is 120,000 pounds per square inch. Let us assume that in using this steel no yielding of the metal shall be permitted. This first measurable permanent set occurs when the elastic limit is reached in the tensile test.

Why does permanent set occur when the elastic limit is reached in the tensile test? The answer to this question we do not know. We write here five different quantities which may be calculated from the above test and each of these has been used by designers as a "determinant of failure": The elastic limit strength, 120,000 pounds per square inch; the limiting strain, 0.004-inch per inch; the maximum induced shear stress, 60,000 pounds per square inch; the resilience or total strain energy, 240 inch pounds per cubic inch; the strain energy of distortion, 208 inch-pounds per cubic inch.

#### Cause of Permanent Set

These five different standards of measurement are calculated from the data of the preceding paragraph, and the five quantities are arrived at simultaneously in the test. Now why does the metal take a permanent set at this limit? Is it because the tensile stress reaches a critical value of 120,000 pounds per square inch or because the strain reaches a critical value of 0.004 inch per inch, or because one of the other three factors set a limit to elastic cohesion, or because of some other more involved condition? One might imagine that it would not make any difference to the designer, since all five values are reached simultaneously in the test. While this is true for the simple tension test, however, it is not true for more complicated conditions of loading.

Suppose the designer is asked to determine the limiting hydrostatic pressure and the hoop stress at which the first yielding will occur in a seamless steel tube heat treated to meet the specifications given above. We will say that the internal diameter of the tube is 4 inches, and the wall thickness 0.10-inch. The tube is closed at the ends, and the pressure is to be gradually applied until a first permanent set occurs. Then, under the five assumptions of failure given above, we may calculate the quantities as in Table 2.

The particular order shown here is

peculiar to this particular problem. It would vary if the proportions of the tube varied, or if the material tested differently. A different kind of loading might completely change the relative order. It is for this reason that it is necessary to devise a "theory of strengths." The results given above must be taken on faith by those not acquainted with this subject. It is introduced here for the purpose of pointing out our great uncertainty as to why metals fail even under steady load conditions. This is one of the unknowns in design which must make our factor of safety something of a factor of ignorance.

The writer has attempted to show that the tensile properties of the standard S. A. E. steels do not differ widely from each other when these properties are compared on a basis of similar tensile strengths; that the variation in these properties for any one type of steel and a given heat treatment may exceed the variation in the average value of such properties as exhibited by the different members of the group; that under steady load conditions, for which the designer assumes that the limiting load is determined by a permanent set, there is an uncertainty with regard to the physical factors of the metal that determine yielding. This uncertainty results in a difference of opinion as to the limiting load which may be applied. For example, the limiting load as calculated by the maximum shear theory may be only 85 per cent of the limiting load as determined by the more recent maximum energy of distortion theory.

#### Uncertainties Face Designers

This uncertainty should not disparage the work of the designer who is called upon to proceed boldly into unknown situations and to proportion parts which must stand up. Always there are these factors of uncertainty: uncertainty with regard to the material; uncertainty with regard to the actual load conditions; uncertainty with regard to why material fails. These and many others, such as the effect of size upon mechanical strength, the effect of residual internal stresses of the material, the effect of stress concentration caused by abrupt changes in cross section or by curvatures such as occur in crane hooks and elevator links, all must be considered by the designer in producing a part for an untried position.

As to impact failure caused by sudden shock, steady load conditions almost never are found in oil field service. At the other extreme of loading is the failure brought about by abrupt applications of load. A steel which fails in a ductile manner under steady load may be as brittle as a brick under sudden shock. In

TABLE II  
Specimen-Tube Test

	Pressure (lb. per sq. in.)	Hoop Stress (lb. per sq. in.)	Relative Order of Failure
a. By the maximum-stress theory .....	6000	120,000	3
b. By the maximum-strain theory .....	6667	133,340	5
c. By the maximum-shear theory .....	5714	114,280	1
d. By the maximum-energy theory .....	5916	118,320	2
e. By the maximum-energy-of-deformation theory .....	6595	131,900	4



the first case the fractured surface is fine grained and silky, in the second coarse and granular. The two types of failure are distinctly different. Different physical factors set the limits of performance in the two cases. If there is an uncertainty with regard to why steels fail under steady load conditions, certainly our understanding of shock failure is much more vague. What measure do the standard laboratory tests give us of the performance of steel under shock?

#### **Tensile Test Shows Effect**

We learn something from the standard tensile test. When a bar is tested in tension the stresses set up in the bar are independent of its length. Increasing the length will not affect the elastic limit or the yield point or the elongation in 2 inches or the breaking strength. If the bar is broken in tension by a sudden blow, tension impact, the longer bar will withstand a heavier blow. This is because it will stretch more. The capacity to elongate under shock is one of the important qualities of a steel for resisting impact.

Very important also is the effect of the character of the surface of the specimen. If fine threads are cut on the tensile test piece, its elongation will be greatly reduced, although its static strength may even be increased. The capacity of such a bar to absorb the energy of tension impact has been reduced almost to zero in spite of its high static strength.

Under any shock loading, abrupt changes in cross section, grooves, notches, and other irregularities of shape act to restrict the volume of metal which can be deformed, so that the capacity to withstand shock is greatly diminished. These considerations are general and apply to all types of steel. The effect of the notch, in preventing plastic flow and reducing the volume of deformable metal, has led to the general use of the standard notched-bar tests of the Charpy and Izod types. The effects of the shape of the test bar and the shape of the notch upon the impact strength of the bar are so considerable that comparison of different steels must always be made with similarly shaped bars. When this is done, it is found that there is a variation in the behavior of different steels which is out of all proportion to their relative behavior in the tensile test. Some steels have high "notch toughness." They deform considerably before breaking and have a high impact value. Other steels are "notch sensitive" and break easily with little deformation. Both steels may have equally good tensile properties, even to the elongation.

It is evident that there is some property of a steel which has an im-

portant bearing on shock resistance and which is not brought out by the tension test. Experience confirms this, as all of us have seen bars of steel which broke into fragments when dropped to the floor or crane hooks, and other curved members which fractured brittly under sudden impact. The same steels when tested in tension had good elongations and yield point strengths. But it is not possible to say that one type of S. A. E. alloy steel is superior and another type inferior in notch toughness. The difference is rather in the structure of the steel as determined by manufacture or by heat treatment. A word should be said about low temperature brittleness. There is a critical temperature at which the impact strength, as measured on the standard Charpy or Izod bars, drops rather abruptly to perhaps one-quarter of its former value. Most steels become notch sensitive at some temperature above -75 degrees Cent. The temperature at which most steels are used falls within the critical range, and marked variations in impact value may occur which would not appear at a slightly higher temperature.

#### **Test Value Questioned**

There is a wide difference of opinion among designers as to the value of the impact test. Many designers believe that, since machine members do not ordinarily have sharp notches and receive blows as in the impact test, the test furnishes no information suited to general conditions. One can hardly say that a piece which had good tensile properties failed because it lacked notch toughness. Others believe that the notched-bar test furnishes the only assurance against the occasional brittle break of steel. It is probable that many other failures, especially in fatigue, are hastened because of the effect of occasional shock; but we have no information as to the part that notch brittleness plays in such failures. The notched-bar test gives us no absolute measure of steel performance. It sets up no yardstick which the designer can use in a quantitative way. Tests are now being made looking toward the establishment of a new physical unit, "cleavage strength," in which high cleavage strength combined with fairly low yield strength would be a measure of notch toughness. Until we learn much more about why steels fail, the designer is warranted in demanding good impact values in steel which must withstand shock loading.

Failure by progressive fracture or fatigue, is the abrupt rupture of a part which has withstood a large number of repeated changes of load. It is now known that this type of failure starts as a microscopic crack, usually at the surface

of the metal. The first, or progressive, portion of the break is a brittle one; the final rupture shows the plastic deformation of ductile breaks with the softer steels or the shatter type of brittle break with harder steels.

For the design of machine members against fatigue, the designer uses the so-called "endurance limit" of the metal. Since the steel salesman will not fail to point out the high endurance limit of his steel, the steel user should know to what extent the endurance limit may be considered a reliable index of performance.

#### **Cracks Lower Fatigue Resistance**

We know that a smoothly polished test specimen of sound steel will not fail by fatigue, under the conditions of the test, so long as the endurance limit of the metal is not exceeded. Cracks will not form in this specimen, even after hundreds of millions of repetitions, provided the stress does not exceed this endurance limit. If the stresses are higher than the endurance limit, cracks eventually will appear in the specimen. Once a crack is formed, it will spread at stresses much lower than the endurance limit. The reduction in stress at which the crack will still spread may be as much as 50 per cent. It should be emphasized that this knowledge applies only to the behavior of a sound steel test bar, smoothly polished, as tested by the rotating beam test.

In applying the endurance limit to service conditions it is necessary to consider certain limitations. Steel as received may have cracks such as seams, cold shuts, flakes and forging bursts. There are the grinding cracks and quenching cracks of machining and heat treatment. These cracks readily are spread at low loads to cause fatigue failure. Again cracks may form in an otherwise sound steel because of stress concentration. These stress raisers may be internal, resulting from inclusions, forging strains, etc.; or they may be produced at the surface from notch effects, such as scratches, tool marks, hammer dents, screw threads, inadequate fillets, poorly placed holes. Some of these defects can be avoided by the designer, some of them may be prevented in the shop, the others must be referred to the metallurgist.

There is another surface condition, resulting in fatigue cracks at low stress, which is different in character. This is the condition resulting in corrosion fatigue. Corrosion causes tiny pits to form at the surface of the metal. These pits act as sharp notches. There is a stress concentration at the bottom of each pit which acts mechanically to form a crack. At the same time high stress

*(Please turn to Page 74)*



# Sights 59 to 65 Million Ton Steel Output in United States by 1954

(Continued from Page 16)

into the use of zinc, they said that galvanizing of steel sheets always has accounted for the largest consumption in zinc. If the coating of zinc is too thin, the sheet exposed to the elements, has a shorter life. Ultimate economy can be gained by applying twice as much zinc a square foot, thereby multiplying the effective life many times. The tendency has been and is to apply the thicker coat.

Production of zinc of extremely high grade has made possible the development of zinc-base alloys which are almost ideal for die casting, they continued. Such die castings have gained wide popularity and the use of zinc in this way will doubtless expand greatly. Incidentally, these die castings will be salvaged to a considerable extent, and consequently, the secondary-metal factor will presumably become more important.

The prediction with respect to world production was that by 1954 output would be between 1,850,000 and 2,100,000 tons, and United States consumption, 650,000 to 730,000 tons, or about 35 per cent of the world production. Indicated per-capita production of primary zinc in this country in 1954 will be 9.0 to 10.0 pounds, against 8.2 pounds in 1936.

Copper, they said, is in an intermediate position so far as post-depression recovery is concerned: better than lead, but not so good as zinc, on the basis of 1936 data. Significantly, it lies between the other two in respect to secondary metals supply.

## Copper Up About 41 Per Cent

Indicated world production of copper in 1954 will be between 2,250,000 and 2,500,000 tons, and United States consumption between 930,000 and 1,040,000 tons, or about 41 per cent of the world production. The indicated per capita consumption of primary copper in the United States is 12.8 to 14.2 pounds for 1954 against 9.8 pounds for 1936.

World production of coal by 1954 should be between 1,630,000,000 and 1,830,000,000 tons; and United States consumption between 540,000,000 and 610,000,000 tons, or about 33 per cent of the world production. Indicated per-capita consumption in the United States in 1954 is between 3.71 and 4.19 tons, against 3.63 tons in 1936.

World production of petroleum by 1954 should reach a figure between 2,300,000,000 and 2,600,000,000 barrels

of 42 gallons; and United States consumption 1,380,000,000 to 1,520,000,000 barrels, or about 59 per cent of the world production. This would be a drop in the percentage from 61 in 1936 and 67 in 1925. The indicated per-capita consumption of the United States in 1954 is between 9.48 and 10.44 barrels, an increase from 8.36 in 1936, a peak to date.

Development of iron deposits in New Jersey and New York was strongly urged as a measure of profit both metallurgically and economically to the steel industry by H. M. Roche, consulting engineer, Dover, N. J. He declared that the reserves of these two states amounted to as much as 1,500,000,000 tons, which would yield after concentrating by means of the magnetic separator 1,000,000,000 tons of 76 per cent concentrate and that this tonnage of high grade ore if combined with the 1,500,000 tons of high grade reserve ore of the Lake Superior region give the United States a reserve tonnage of 2,500,000,000 tons of 57 per cent ore.

He estimated that if consumption is at the rate of 50,000,000 tons annu-

ally the life of this reserve is 50 years, and said that before the depletion of this reserve, the low grade reserves of 72,000,000,000 tons of lake ore would become available through low-cost high-recovery beneficiation processes.

## Would Mix with Lake Ore

Mr. Roche urged that New Jersey ore which is low in silica and phosphorus be mixed with lake ore at Pittsburgh so as to bring it up to 57 per cent ore iron content. New Jersey ore can be delivered at Pittsburgh at a cost comparable to that of lake ore. He also submitted a series of tables to show that the cost of shipping Jersey ore to Pittsburgh and other industrial centers was far cheaper than that of importing European ores, and asserted that except for a few instances the Jersey ore was superior in quality to foreign ore.

Considering the reserve of iron ore and also coal in the United States, the speaker declared that there appears to be no good reason why domestic ores should be conserved or that coal should not be exported. On the other hand, instead of conserving iron ore and depending upon supplies from foreign mines, which would be cut off in the event of war abroad, domestic reserves should be developed as a part of a program for national defense.

## Iron and Steel Division Conducts Session on Ingot Solidification

STRUCTURE of rimmed-steel ingots was discussed by T. S. Washburn, metallurgist, Inland Steel Co., Indiana Harbor, Ind., and J. H. Mead, chief metallurgist of that company, at a session of the Iron and Steel division devoted to ingot solidification. They asserted that the grades of commercial steel produced in large quantities could be divided into two general types from the standpoint of ingot structure—killed and rimmed. The killed steel covers a wide variety with carbon contents throughout the rim of the steel portion of the iron-carbon diagram and is the kind generally used in production of alloy steels. Rimmed steel, they explained, is normally associated with carbon ranges under 0.30 per cent and is not yet used to a large extent in alloy practice, except for copper-bearing steels.

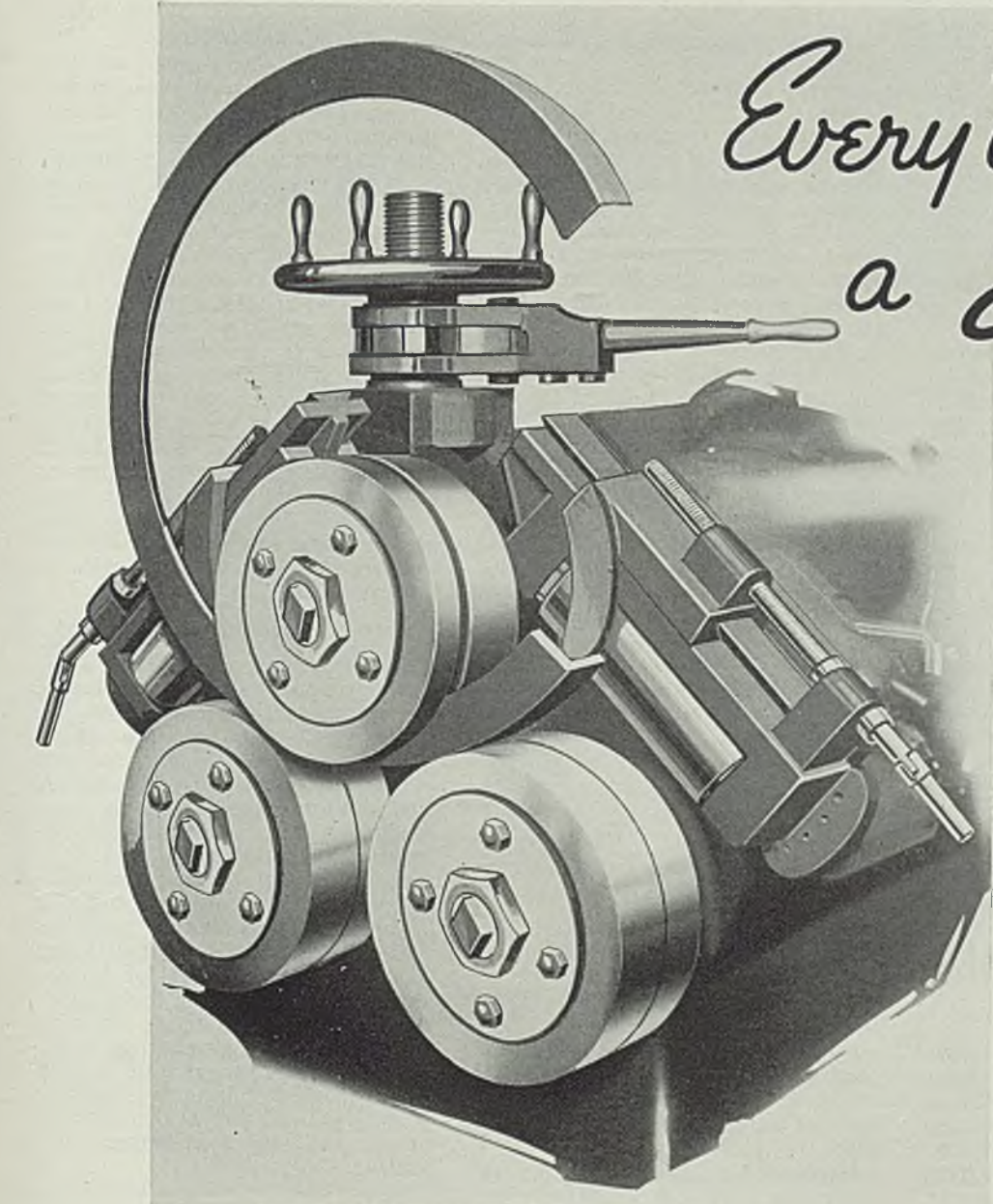
They presented results of a group of experimental heats which had been made to demonstrate the dif-

ferent types of ingot structures and the effects of some of the variables in the furnace and pouring practice on these structures. Their experiments indicated that the effect of some variables, such as the relation between rimming time and the depth of the rimmed zone, are fairly definite. The effect of others, such as relation between the iron oxide and the slag and the type of primary blow hole zone, is indirect, and may be offset by other variables, so that it is often obscured in the individual heats. The effect of variables in this class can only be determined by studying a large number of heats and making corrections for the other variables, they said.

## Variables Are Considered

Certain other conclusions drawn were that the principal variables affecting the thickness of the skin are mold temperature, steel temperature and rate of pouring, and that size and distribution of primary





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blow holes are affected principally by the iron oxide in slag, type and amount of deoxidizers used in the ladle and molds, temperature of the steel, ingot dimensions, height of pour and composition of steel. The position and characteristics of secondary blow holes are affected, it was said, by the iron oxide in slag, pouring temperature, rate of solidification and rimming time and sulphur in the steel.

#### Looks Into Segregation Causes

Several factors influencing segregation and solidification in steel ingots were discussed by Leon H. Nelson, open hearth metallurgist, Republic Steel Corp., Buffalo. These factors were pouring temperature, volume in the hot top, taper in the ingot, pouring rate by varying the nozzle size, segregation of several elements and moving ingots before completely solidified.

In most of his discussion, segregation was measured in terms of carbon variation only. The data were based on experimentation with S.A.E. 1040 analysis of fully killed steel direct poured in hot-top molds giving 20-inch square inches and had to do with the rolled bloom

size, not the ingot itself. Moreover, the data represented results from plant-control work and not results of special research on ingot segregation.

The speaker observed from this study that normal pouring temperatures are best to avoid excessive segregation, and that the volume of metal in the hot top must be correct to keep segregation at a minimum. Volumes that are too small, he said, give segregation and pipe; volumes that are too large mean a waste of steel.

He further observed that the segregation may be influenced by the taper in the mold, and that the rate of pouring the ingot within the limits mentioned does not affect segregation. Excessively fast or excessively slow pouring, however, probably has an influence, he added.

He also said that it was important that killed ingots should not be removed before they are completely solidified and in conclusion suggested that in determining ways of preventing excessive positive segregation at the top of ingot the experimenter should not neglect to test the segregation and soundness lower down in the ingot.

for variations of the oxides in the iron was not determined.

Prof. Joseph also pointed out that a relation established between the carbon and total oxygen in 150 aluminum-killed samples showed that the FeO in the bath before deoxidation was primarily a function of the carbon in the bath. The temperature of molten-iron charge for individual heats varied, he said, depending upon the manner in which the iron was handled after it left the blast furnace. Metal moved to the open hearth in submarine ladles and transfer ladles was substantially higher in temperature than metal from a hot metal mixer. Variations in temperature of the iron at the open hearth, due to differences in methods of handling the iron after it left the blast furnace, were greater than the variations in the temperature of individual casts in uniform blast furnace practice.

#### Further Standardization Needed

Results of a co-operative study of methods for the determination of oxygen in steel were presented in a paper by J. G. Thompson, H. C. Bacher and H. A. Bright, national bureau of standards, Washington. The authors stated that in their study they were able to obtain valuable information with respect to the accuracy of the vacuum-fusion and aqueousiodine methods, but that for other methods for the determination of oxygen in steel they found there was obvious need for further standardization before their accuracy could be determined. They believed that the continuation or extension of this program of co-operative analyses apparently should be postponed until the various methods of analysis have been better standardized.

In a session on the subject of general ferrous metallurgy, fine-grained structural steels for low-temperature pressure vessel service were discussed by A. B. Kinzel, chief metallurgist, and Walter Crafts and John J. Egan, research metallurgists, Union Carbide & Carbon Research Laboratories Inc., New York. They pointed out that the demands of the petroleum and chemical industries for steels to be used in pressure vessels at artificially low temperatures are continually increasing, and that highly alloyed steels of the austenitic stainless type retain their properties even at very low temperatures and represent the best technological solution of the low temperature steel problem.

However, in many instances, they declared, less expensive carbon or low-alloy steels suitable for service within limited temperature ranges are available, with the problem thus becoming one of defining the various factors involved in the production

(Please turn to Page 67)

## Researches Investigate Effects of Oxygen and Other Gases on Steel

**I**N A PAPER, "Effect of Temperature Upon Interaction of Gases with Liquid Steel," presented at a session on gases in steel, John Chipman, American Rolling Mill Co., Middletown, O., and A. M. Samarim, Moscow Institute of Steel, Moscow, Russia, dealt chiefly in one case with the oxides of carbon and in another, steam and hydrogen, with iron oxide and carbon in the liquid metal.

Tables were presented to show the effect of iron oxide and carbon in the liquid metal on the composition of the equilibrium gas at several temperatures. The constant for the reaction of carbon with FeO in liquid steel was computed for several temperatures and a table was presented showing the product of percentage C by percentage FeO at atmospheric pressure and over a wide temperature range, as a function of carbon content.

Evolution of gases from rimming ingots also was discussed, it being pointed out that until mechanism of gas evolutions is more fully understood an exact thermodynamic treatment of the problem is impossible. Some features of a probable mechanism were suggested, including the postulate that the gases are evolved from an active film of liquid

metal adjacent to the solid-liquid interface. A rough estimate was made of the composition of gas evolved from a low carbon rimming ingot.

Report of a study on oxides in basic pig iron and in basic open hearth steel was submitted by T. L. Joseph, professor of metallurgy, University of Minnesota, Minneapolis. His study covered data on the oxides in several hundred casts produced in a 700-ton furnace operating on lake ores. The temperature of these casts was measured with noble-metal thermocouples to observe the effect of temperature upon the oxides in the iron.

#### Relationships Are Established

He found that a definite relation between silicon and sulphur could be established but that no relation could be found between the oxides in the iron and the temperature of the iron. He said that close control of the silicon and sulphur required that the average temperature of the iron be held within narrow limits; also that variations which were shown in sulphur, silicon and temperature were due largely to variations in the pattern of gas distribution in the furnace shaft. The cause



# MATERIALS HANDLING



## Large Plant Handles Its Material and Product with Minimum of Equipment

**M**OST articles dealing with efficient materials handling in metalworking plants entail description of co-ordination of cranes and hoists, conveyors of one sort or another, lift trucks, locomotive cranes and numerous other mechanical aids to operation economy. In Stamford, Conn., however, the Pitney-Bowes Postage Meter Co., manufacturer of postage meters which themselves are listed as efficiency or time-saving items, has a plant in which the materials handling system is extremely simple. The system is simple in spite of the fact that the company has recently occupied a new 3-story steel, concrete and brick building in which all manufacturing operations are being concentrated.

### Mostly Truck Equipment

A few days ago, shortly after the opening of a new portion of the plant, it was observed that one hand lift truck, a new large-sized industrial scale and a dozen or more floor trucks, chiefly of the box type, were caring for the bulk of the materials handling operations. Considering that the new plant contains approximately 156,000 square feet and replaces three old wooden buildings which together contained only 30,000 square feet, also the fact that the meters are being made at present in 14 different models entailing a total of approximately 15,000 separate parts, the visitor is perplexed by the simplicity of the system throughout the plant.

To explain the reason for this lack of the usual accompaniments of large plant operations, it is well to present a little background of the company and its products. The plan of metered mail was first presented to the United States government for approval by the founders of the

company in 1917. Walter H. Bowes, president, Universal Stamping Machine Co., had been manufacturing postmarking and canceling machines for use in United States post offices. In 1919, he consolidated his interests with those of Arthur H. Pitney, inventor and head of the American Postage Meter Co., Chicago, in what is now the Pitney-Bowes Postage Meter Co.

The system of metered mail was authorized by congress in 1920 and the company's meter was approved by the post office department Sept. 1 of that year. On Nov. 16, 1920, the first postage meter was set in Stamford for the company. From this beginning, the business grew, slowly at first, but in recent years at a much more rapid pace, and the resultant growth brought with it demand for additional manufacturing and office space. Over three billion pieces of mail bearing the "meter stamp" pass through the post offices annually. Today, the company is an

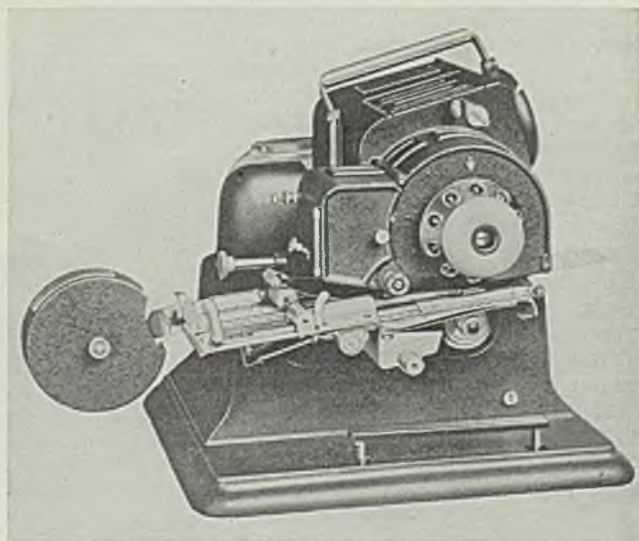
important buyer of sizable quantities of steel, the most important material in postage meters. One model of meter is shown in the accompanying illustration.

One good reason why the hand lift truck and floor trucks are found sufficient for the plant handling operations is that while die castings and drop forgings are used in making meters, the company has neither casting nor forging departments, buying both of these items from outside suppliers. Another explanation is best presented in the remarks of one of the department heads, who stated: "Our manufacture lies in the zone between an instrument maker and a production shop. It is fine work, and just now does not lend itself to mass production methods."

### Steel Stored in Racks

Methods, rather than equipment, constitute the most important part of the materials handling job. Steel stock storage was the biggest problem. This has been solved in a highly satisfactory manner by building in a large steel storage department a series of inverted V-shaped storage racks, 14 feet high. By means of cast-iron brackets, slipped over and fastened to iron pipe at-

**H**UNDREDS of steel parts and die castings go into one of these postage meters but handling operations incidental to manufacture and assembly are extremely simple





# MATERIALS HANDLING



tached at top and bottom to flanges, these racks serve not only as efficient storage units for short sizes of flat steel stock, but also make neat and handy stacking of drill rod, long stainless steel bars and other long length material a simple task for the storekeeper.

The racks are made of both wood and steel. Along the crosspieces at convenient points are driven carriage bolts, which serve as spacers for the different classifications of stock. To each of these bolts is tied a tag on which is inscribed the description of the steel in that particular section of the rack, for example, one tag has on it the notation, "Drill Rod ½-inch"; another, "Duraluminum 3/16-inch"; a third, "Chrome Vanadium ¼-inch"; while others denote stainless steels with the dimensions of the particular stock. Just what means will be utilized for reaching the upper tiers has not been decided. At present, stock not so frequently used is stored on the higher levels, and, when needed, is withdrawn through use of the storeroom ladder.

## Housekeeping Is Orderly

As this steel storage department is located adjacent to the receiving door, and as the incoming as well as outgoing materials arrive by motor truck or other vehicles — the plant location being some distance from the railroad — materials are handled by lift truck or floor trucks directly to the industrial scale, which is located on the floor immediately inside the receiving door. Die castings arrive in corrugated fiber boxes and are placed in a storage room adjacent to steel storage. Here also are stored felt washers, packing materials and incidental supplies, neat steel storage bins and shelves furnishing the medium for orderly housekeeping of all supplies.

In the manufacturing departments, several interesting innovations have been included which were not found in the former plant of the company. Some of these are different from common practice in most plants. For instance, in the engraving room, where the master type is produced for meters, two very interesting methods are used, machines for each having been

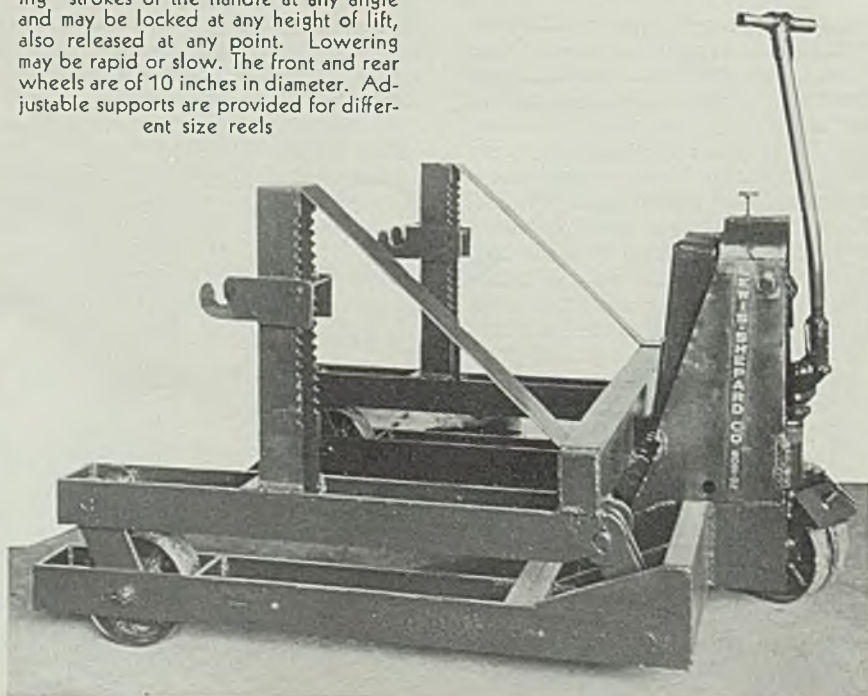
specially designed by the company. In one of these operations, the type is literally "kneaded" into the outer surface of the stainless steel by rocking; in the other, the type is rolled onto the metal.

Another unusual operation is in the machine shop department, where three hobbing machines are in constant use on precision gears. The normal operation is to broach "from the teeth," but here the usual process is reversed. The gears are broached before the hobbing operation is performed. A requirement is that the work must be kept within 0.001-inch alignment with the broached tooth.

## Gears Are Cold Swaged

Still another operation which is unusual and interesting is in the toolmaking department where the specialty is cold swaging. Gears are formed on both sides of a piece of steel and the dies are so made

ONE of the large shipbuilding plants in the East recently placed in service a new hydraulic cable reel lift truck as shown here. The machine has a safety lifting handle, which is free at any height of the load. The load is lifted by "inching" strokes of the handle at any angle and may be locked at any height of lift, also released at any point. Lowering may be rapid or slow. The front and rear wheels are of 10 inches in diameter. Adjustable supports are provided for different size reels



that any breakage means not over 10 minutes delay, the time required to replace the broken die with a new one.

One other change of importance was made in the new plant. Process steam has replaced resistance steam heaters in the heat treating department, paint shop and nickel plant. Operating data are not available as installation has been completed only recently.

In the paint shop, the cast-iron bases of the metering machines are given a stippled finish. While there is nothing essentially new in either equipment or layout in this department, the results appear uniformly attractive. The heart of the meter is a fine precision instrument, the attention to finish of outer case being for eye appeal, something that customers like to see in even such a utilitarian machine as a postage meter.

## 180 Handling Fatalities In New York Last Year

ACCIDENTS caused by overlifting and other activities incidental to materials handling were responsible for 180 fatalities in industrial establishments in the state of New York during 1936, according to Industrial Commissioner Elmer F. Andrews. In a report for that year, this class of accidents occupied third place among 11 classifications of causes of such deaths. Further subdivision of handling accidents shows that the greatest single cause was overlifting, or "strain in handling," no less than 117 workers out of the total of 180 being

(Please turn to Page 69)



# and Thousands of Miles of Wire are *at your Service*

**T**RANSPORTATION, communication and utility are but three ways in which wire enters the daily life of nearly every American. In hundreds of applications wire contributes to the comfort and convenience of all of us. Every time you wind your watch . . . drive your car . . . file a letter, you call upon the efficiency of wire. Even at night your comfort depends upon the quality of wire in bed springs and mattresses. From dawn to dawn, at work and at play, wherever you are and in whatever you do . . . you depend upon the ability of hundreds of different kinds of wire to serve you in a thousand ways.

Such general dependence upon wire and wire products is of importance to fabricators and workers in wire. It means that the products they make or the wires they install must do more than merely serve a purpose. It means that on the quality of the work they do depends the

convenience and the comfort of millions of people. And service from wire depends upon the quality of the wire itself.

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The quality of American Quality Wire has been recognized by generations of wire users. Our facilities for serving our customers have always anticipated their requirements. We will be glad for the opportunity to answer your questions involving wire and we are able to meet your needs with uniform wire made to the proper analyses by the most skillful men in the industry.

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# UNITED STATES STEEL





# POWER DRIVES



## Conditions Determining Machine Drive Requirements

**P**OWER drives are not independent either of equipment driven or functions of production. Many of the shortcomings of power drives, as installed, may be traced to failure to consider the drive as a part of the machine, even though the drive may service a number of machines, and the relation of the drive to problems of production.

An industrial plant is operated primarily to manufacture a product or products of specified quality at a minimum cost of production. Such low costs are possible only if the most suitable machines are arranged and driven to meet the particular requirements of production.

Often economies in first cost and operation of power drives may be sacrificed, if corresponding advantages are obtained in production and machine arrangement. However, the question as to whether these sacrifices are necessary or advantageous can be determined only after careful study of machines, layout, production and production requirements of speed, quantity and quality.

The old method of laying out an industrial plant was to group together all machines of a type, thus forming separate machining departments. Drive was commonly in groups from a lineshaft, generally in as large groups as possible.

Automotive plants and others manufacturing a single product found this layout uneconomical and devised the so-called unit product layout where most or all parts of some unit element of the automobile, or other device, are manufactured and assembled in a closely co-

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BY FRANK E. GOODING  
Editorial Representative

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ordinated department or division of the plant. This created an individual "shop within a shop." Individual motor drives were commonly used because the common belief at that time was that machines of different types could not be driven satisfactorily from a single lineshaft. This practice of unit product groups, with modification, has developed until it is the general practice in many plants engaged in continuous quantity production. The drives then must be arranged to operate under these conditions.

### Lineshafts Effect Savfing

Careful studies by transmission engineers have shown in many cases lineshaft drives may be installed for all or most of the equipment in these unit groups of similar or mixed machines, as satisfactorily, and more economically, than with all individual drives. Many plants which are on miscellaneous production have adopted the practice of shifting layout and machines, as the product changes. Such arrangements generally call for individually driven machines. However, in one plant provided with cast-in ceiling inserts and using special standard steel forms for stringers and superstructure the plant engineer has stated the lineshaft can be moved and erected as economically and quickly as making the necessary conduit runs for connecting up individual motors.

In planning power drives for any group of machines the following definite restrictions or limitations

on lineshaft and individual motor drives require consideration:

1. Do not make groups too large. Where possible it is usually better to divide a unit group into two or more groups, each capable of making the complete unit. With duplicate groups one may be shut down at periods of slack production. For example, one plant has all machines grouped in units of five to seven machines, each group capable of making one, or at most two complete independent units.

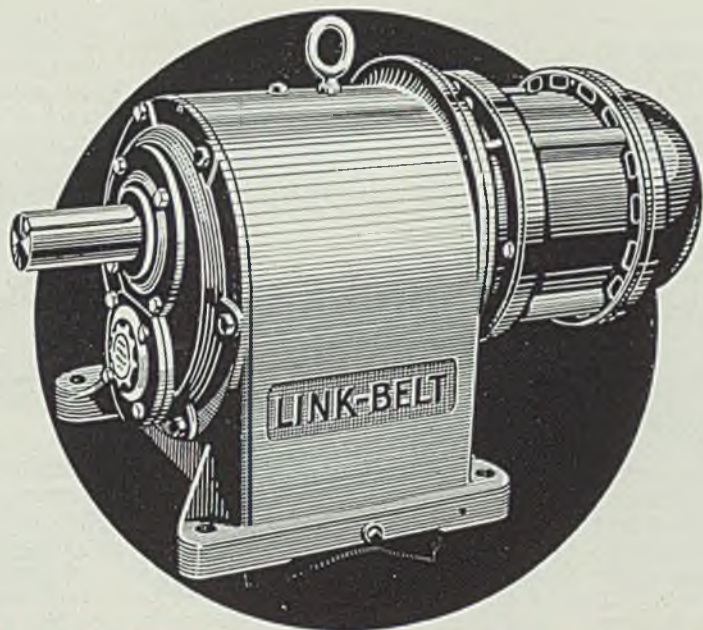
In contrast, another plant has large groups, divided according to type of machines. During the depression the entire plant was in operation although at times working less than 10 per cent of the normal force. About 80 per cent of the production was on ten standard items. If the plant had been subdivided into "shops within shops," each a unit in itself and, on the items with large requirements, laid out in two or more "shops within shops" the plant could have operated more economically through any cycle of production variation, either normal, overtime, two shifts, or during slack seasons.

2. Standardize, as far as practicable, on motor sizes, and speeds, lineshaft speeds, starting and control equipment, diameter of lineshaft, hangers and bearings. Standardization facilitates repairs and maintenance.

3. Do not attempt to force a machine not suitable to a group drive into a lineshaft hook-up. For example, isolated machines, units requiring more than a single power source (ordinarily having more than a single motor), machines of

Paper presented at the National Power conference on "Power and Its Application in Industrial Plants," held at Hotel LaSalle, Chicago, Feb. 16.





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in double and triple reductions, covering a wide range of ratios and horse powers. Send for Catalog No. 1515. Address Link-Belt Company, Philadelphia, Chicago, Indianapolis, Atlanta, San Francisco, Toronto, or any of our offices located in principal cities.



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high or low speeds ordinarily not obtainable from the lineshaft or countershaft, special machines with complicated operating cycles or control, or machines that operate or may operate independently of any group, are better individually driven.

4. If one machine in the unit group would create an exceptionally large proportion of the power demand for the group it would operate better if individually driven, particularly if the large machine has a widely fluctuating load cycle.

5. Like machines are especially adaptable to group drives with the occasional exception that groups of automatic machines of the same type and size on identical work, as automatic blanking presses with roll-strip feed, sometimes get in step and build up peaks and valleys in power requirements. Placing machines for second or third operations or other machines with a different operating cycle in these groups may overcome this difficulty.

6. Machines which require motors larger than 5 to 7½ horsepower, if individually driven, especially if operating at approximately constant power demand, do not show the economy of operation and installation as group driven units which is obtained from machines of smaller horsepower requirements with fluctuating cycles of power demand.

#### Handling Varying Power Needs

7. Machines with fluctuating power requirements varying from peaks to almost no load usually can be group driven more economically than if individually motored. This saving in operating expense is due to lower annual fixed charges, which are based on the lower first cost of installation, together with lower demand charge, improved power factor, decreased power consumption and, if amply and properly designed, decreased maintenance.

8. Lineshafts rigidly mounted and supported on antifriction bearings, positively driven from the motor and connected to the machines by first-quality belts or chains of ample capacity, are driving many machine groups satisfactorily and economically.

9. Power factor may be improved by properly loaded drives, thus decreasing the amount of corrective equipment necessary.

10. Check drives after installation to see that the motor is not over- or under-loaded and make periodic rechecks on motors for both group and individual drives to detect changes in load or improper operating conditions. Graphic meters permit making and filing a permanent record of

operation and power demand through several complete cycles of operation.

These are some of the principal operating conditions determining the selection of the type and method of drive for manufacturing equipment. Because of the importance of

layout and production requirements it may be necessary in some cases to compromise in the selection of type of drive. However, in view of the fact a machine cannot operate at full productive capacity if inefficiently driven, in no case should the compromise penalize production.

## Conference Reviews Mechanical and Electrical Applications of Power

**I**NCREASING interest by industrial men in the subject of power and its application was indicated by the close attention and active discussion at the three sessions of the National Power Conference held at La Salle Hotel, Chicago, Feb. 16. Power, likened to the "life blood of industrial operation," was discussed from the various phases of generation and its mechanical and electrical applications.

Prof. Victor L. Sherman, Lewis institute, Chicago, in discussing "What Determines Group or Individual Drive?" pointed out an objective to group drive in that because of its permanency the management is reluctant to change routing of work. "In planning the drive," he said, "consider how it contributes to the final product; that is, instead of planning the drive as related to the individual machines, study its relation as the prime mover of the unit of production, which unit may consist of one or a number of machines."

That friction losses are lower than is commonly assumed is shown in the operation of a group drive with antifriction bearings where the friction load of the lineshaft, driven by a well-loaded 20-horsepower motor, was only 2 horsepower. All machines were connected to the drive through roller bearing clutches.

In discussing the question "What Is Efficient Grouping?" Sidney I. Cole, president, Industrial Erectors Inc., Chicago, pointed out that power drives, like Topsy, "just grewed." His definition of an efficient group drive was "a co-ordinated and useful assembly of machines operated (driven) economically and efficiently. To establish efficient grouping requires consideration of four factors: Production cycle, load cycle, characteristics of the individual machines and the combination characteristics of the entire group.

From 25 to 35 per cent of industrial equipment does not permit combining efficiently and so must be eliminated from group drives. The

remaining 65 to 75 per cent of machines, according to Mr. Cole, may be driven either individually or in groups according to the limitations of the particular production cycles and requirements.

Mr. Cole related the experience of a large plant in regrouping. All machines were in two large groups on 200-foot lineshafts. The arrangement was changed to group machines according to unit production requirements instead of by type of machine with no motor larger than 25 horsepower. By using antifriction bearings the lineshaft speed was increased from 200 to 350 revolutions per minute. One unusual feature was the inclusion in the group drive of an air compressor supplying air for chucks as this was the only use of air in the plant.

#### Modern Group Drives Are Different

"With the improvement of mechanical elements of power drives, such as belts, clutches, loose pulleys, and bearings," said Mr. Cole, "group drives should operate more efficiently today than ever, that is, if the machine combination is suitable to grouping. Also, if properly laid out, the objections of obstruction to light and difficulties in illumination may be largely overcome."

The question "What Type Transmission?" was answered by H. E. Dralle, gear department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., by means of numerous slides showing some of the unusual applications of belts, silent and roller chains, gears, gear motors, variable-speed transmissions and speed reducers. Mr. Dralle emphasized the need of studying each installation before deciding on the drive. In general, the installations shown were fairly large power requirements and on these the speaker indicated preference for positive mechanical connections with proper safeguards. He also indicated the advantages of V-belts where noiseless operation is required, as on air conditioning equipment, and of chain

(Please turn to Page 68)



# MAKE SMALL PARTS

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SAVE  
METAL

SPEED  
WORK

CUT  
COSTS

**T**HE way to get the jump on your competitors is to make a product as good as his—and to make it cheaper. Manville Cold Forging helps you do just that. It effects economies all down the line—yet in most cases actually improves the quality of small parts.

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Some small parts can be cold forged; others cannot. But it will cost you nothing to send us samples of some of the parts you are now making. If they can't be made cold we'll tell you. And if they can be, you'll want the proper Manville Machinery to do the work. Sturdiness, speed and stamina characterize the Manville product. Why not write today.

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# PROGRESS IN STEELMAKING

## Employs Oxyacetylene Welding Process In Constructing By-Product Plant

**F**OUR years ago a new process for carbonizing local coals, known as the Curran-Knowles process, was developed by the Radiant Fuel Corp., St. Louis. It utilizes a sole flue oven, wherein the coal charge is spread in a relatively thin layer on a horizontal floor which is heated by flues beneath. The separation and purification of by-products, and screening and loading of the end-point are relatively standard. This end-product, known as carbonite, has a superficial resemblance to coke; its structure and combustion characteristics, however, limit its market principally to household uses.

Many coking plants now in use were built before 1920, when the structural welding procedure of today was not generally accepted. Rivets, bolts and flanges were the

order of the day. When the first unit of the Radiant Fuel Corp. was built in 1933, however, the strength and permanence of acetylene welding generally had become understood among engineers. Like most new enterprises the construction dollar was made to go to its uttermost limit. The lowest future maintenance cost also was planned and the cutting and welding torch was used wherever possible.

### Line Is Welded Throughout

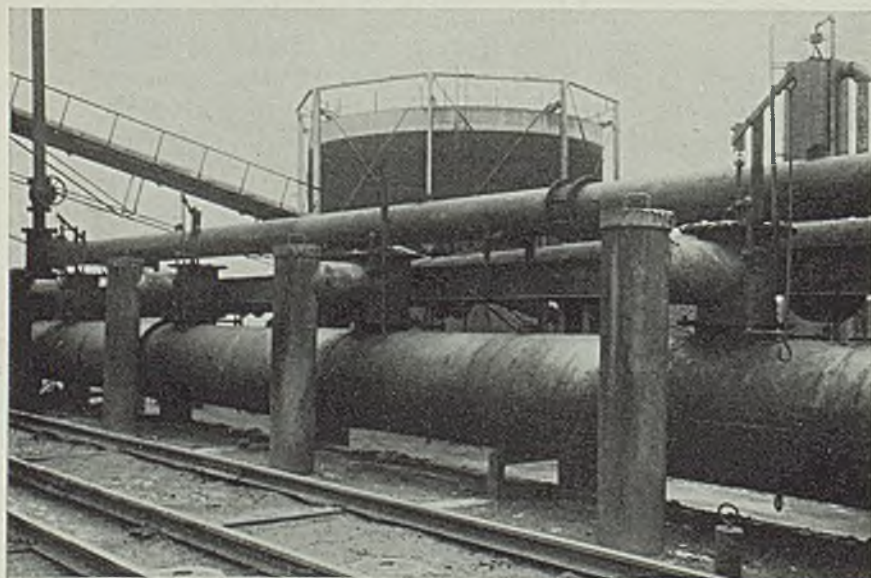
An 8000-foot pipe line, through which the gas was conveyed to the local gas company was welded throughout, including the headers and drip pipes. In this pipe line the operating pressure ranges up to 70 pounds. In the other gas and air lines throughout the plant the pressures are negligible. The by-

product recovery system is of welded construction. This starts with the oven headers which perhaps are the most conspicuous example of construction economy through welding in the plant. Standard cast-iron headers, which are designed specially for their particular need, usually cost \$300 to \$400 each. These headers were fabricated in place at a total cost of about \$20 each. The welding is intricate with two 90-degree insert welds. The headers feed into the collector main.

At the temperature of collection, all of the recovered products, water, coal tar and gas, are in gaseous form, and are pulled across the plant to the by-product section. There the cooled water and coal tar assume their natural liquid state and the gas is left. About half the total gas produced is used, unpurified, to heat the ovens. The balance is purified and pumped to the main. By the proper use of cutting and welding in the construction of this system, considerable economy was effected, both in the purchase of pipe and fittings, and in the speed of construction. The adaptability of the torch for fabrication saved time in layouts, and permitted slight changes on the ground at the time of erection without loss of time.

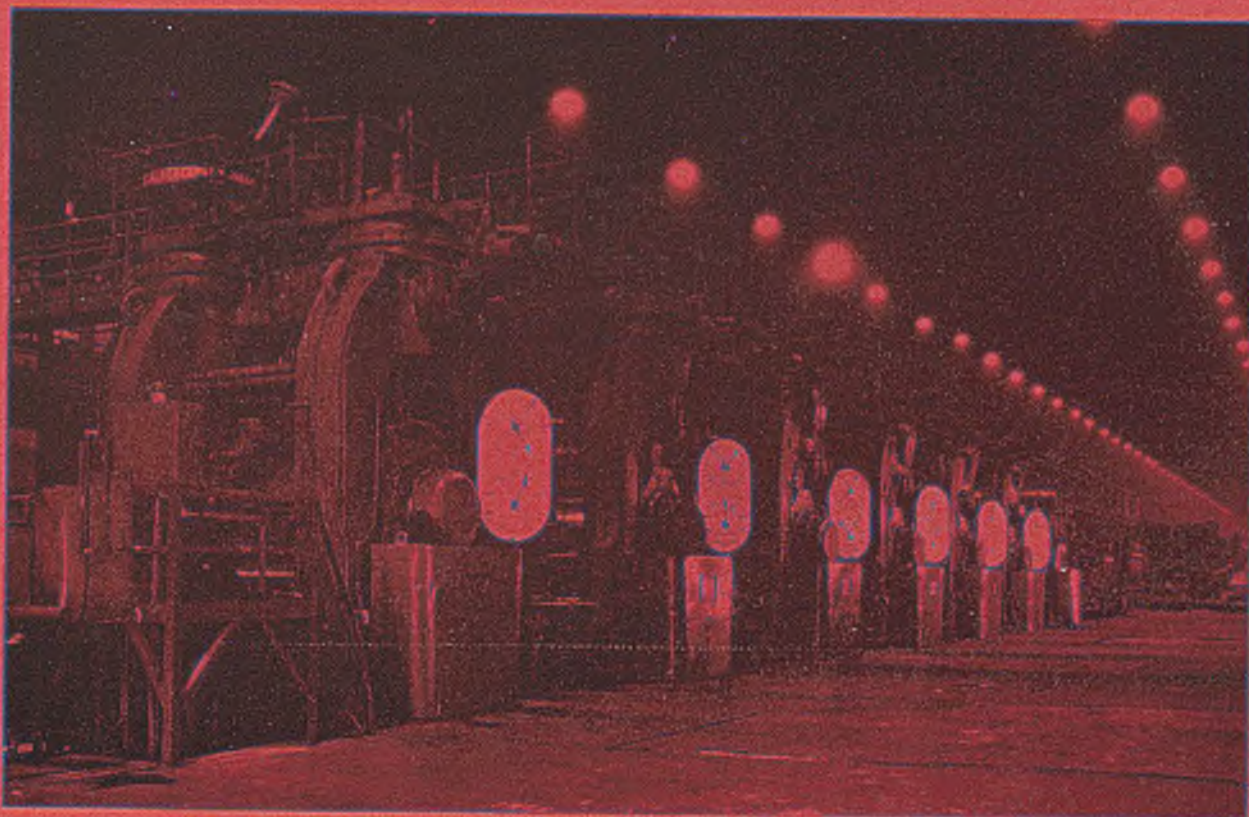
In heating the oven floors proper volumes of air and gas must be supplied over the entire area of the floor. This is done with brick flues and welded pipe lines. The illustration shows how far welding is carried. Only the 1-inch pipe is screw-connected.

The coal used in our process is No. 5 screenings. This is carried by the belt conveyor to the coal hopper, thence to the larry cars, then to the ovens. This system largely is welded, bolts being used in some places for convenience. The big pushing machine does two important jobs. To charge the oven about 5 tons of coal is dropped through eight charging holes from the larry cars in eight equal piles on the oven floor. Then the machine with a leveling head goes through the oven twice and levels



Oven headers with two 90-degree insert welds feed into the collector main





*Finishing Stands of 30" Four High Hot Strip Mill Built in 1936  
for Large Steel Company in Chicago District*

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**Rolling Mill Equipment—Steel and Alloy Steel Castings**

**Iron and Alloy Iron Rolls, Steel and Alloy Steel Rolls  
for All Hot and Cold Rolling Mill Requirements**

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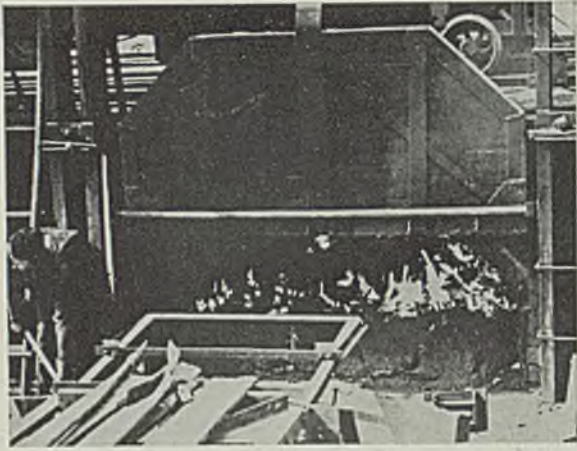
**Pittsburgh-Continental Annealing Covers**

# **CONTINENTAL ROLL & STEEL FOUNDRY CO.**

**Chicago—Pittsburgh**

**PLANTS AT CORADPOLIS, PA.—EAST CHICAGO, IND.—WHEELING, W. VA.**





CARBONITE is shoved from the oven by a ram head of an all-welded pusher

the charge evenly over the whole floor, which is 8 feet wide and 32 feet long.

When the coking period is completed a ram-head pushes the finished carbonite, about 3 tons, out in a mass. If this structure were riveted the gradual loosening of the rivets would tend to pull the 30-foot thrust of the ram out of line and endanger the oven. In the old time rivet pusher the whole machine is taken out of service periodically to have the rivets tightened. Our pusher is welded throughout, and the structure is one unit. It stays right on the job and has given no trouble.

#### Other Jobs Are Welded

The big quench car largely is welded, and the water system which supplies it is all-welded, the pressure being 40 pounds. The conveyor system and carbonite screen station is welded in big sections, only the sections themselves being bolted into place. On the screen station an eccentric drive is used. The single drive proved to be the cause of so much vibration that rapid crystallization took place. The single drive first was replaced, then redesigned with a double drive to reduce vibration. Both the replacement and the redesigned sections were fabricated and installed with the cutting and welding torch, with almost no loss of time.

After most of the water is separated from the coal tar, the tar is pumped to the storage. There a rather intricate system of steam pipes inside tanks dries out the remaining part of the water. The tanks and the piping are welded throughout.

Since the first unit was built three years ago the construction procedure has made maintenance easier and cheaper. Worn parts can be cut out and new parts fabricated and welded in with less time lost and less expense than with former practice.

Since the plant is located in the

country, a little over 100 miles from St. Louis, maintenance and repairs are sometimes apt to be delayed because of distance from a main market. To some extent this delay is minimized by keeping a supply of standard materials on hand, and then fabricating them on the ground for the particular need. Recently one of the main members in the crane boom failed; without the torch repairs would have been long-drawn out. With the torch the broken member was cut out, the new one shaped and welded in, and the job completed in a day.

Early in October the pusher machine was damaged slightly and some plates  $1\frac{1}{4}$  x 6 inches were bent. These were heated and straightened with a loss of only a couple of hours' time. Without the torch the whole plant would have been down for several days. The exhaust system, which pulls the hot gas from the ovens, became clogged at the exhaustor with muck dragged

along with the gases. A section of pipe was cut out, the point cleaned and a new piece welded in, with a total delay of about 20 minutes. These are, of course, routine procedures but emphasize the value of the acetylene torch in operation.

♦ ♦ ♦

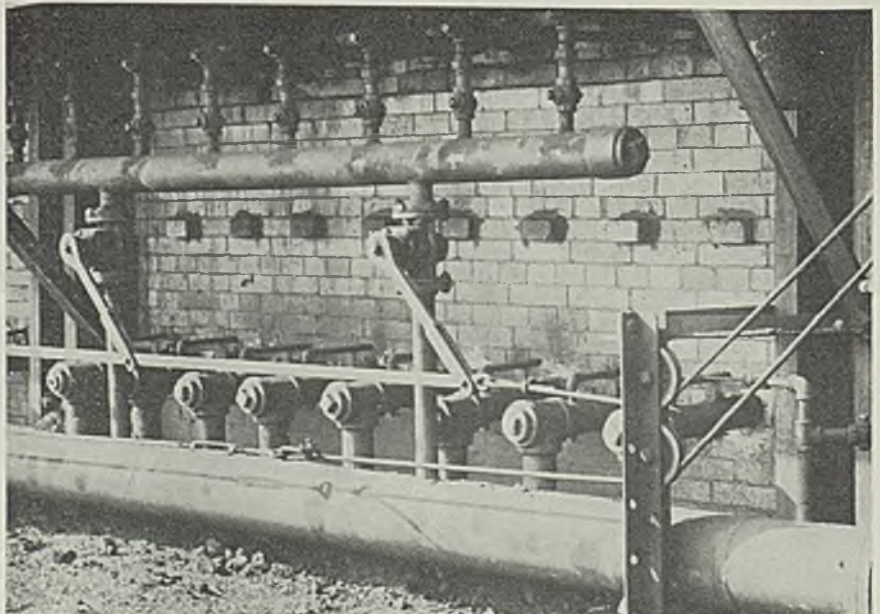
## Twist Test Reveals Seams

Inspection plays an important part in the manufacture of wire and cold heading steel. At a plant in Ohio each coil of rods while in transit on the hot conveyor is inspected for slivers, surface imperfections and proper diameter. Rods intended for cold heading or forging purposes are sampled on both ends. The test pieces are subjected to the twist test which consists of clamping one end of the sample and rotating the other end from 720 to 1440 degrees and then back to the starting position. This test, according to the metallurgical department of the company, will open up any seams or laps not discernible by visual inspection. In fact, it has proved to be even more severe than an upsetting operation.

♦ ♦ ♦

## Promotes Lacquer Finish

Plants coating straight sided molds with tar can obtain a lacquer finish by spraying the mold when its exterior temperature ranges between 250 and 375 degrees Fahr., according to the practice followed at a Valley open-hearth shop. The tar, which is maintained at a temperature of 150 degrees Fahr. or higher, should not be used for long periods.



Air and gas are conveyed to the oven hearth through welded pipe lines



Open gears  
need  
the protection  
of

**GULF LUBCOTE**

*... a heavy bodied  
lubricant with re-  
markable adhesiveness  
and lasting qualities*



**H**ERE is a special petroleum lubricant which is solving gear lubrication problems for many machine shop operators. Gulf Lubcote combines exceptionally high adhesiveness for metal surfaces with natural high viscosity and efficient lubricating qualities for specific requirements.

Gulf Lubcote effectively cushions gear teeth and resists the wiping action of gears in motion. It retains its original fluidity and high lubricating qualities to a remarkable degree, resisting heat and decomposition.

Use Gulf Lubcote to lengthen the life of your gear-trains and keep them operating without noise. You will be pleased with the results.

#### **FOUR REASONS...WHY GULF LUBCOTE IS THE LUBRICANT OF UNPARALLELED QUALITY FOR OPEN GEARS**

- 1** GULF LUBCOTES are heavy bodied products especially manufactured to have the requisite property of high adhesiveness for metal surfaces necessary in lubricants for open gears.
- 2** Due to selected crudes used and to the process of refinement employed, GULF LUBCOTES possess unusual lubricating qualities together with the essential property of flowing with the movement of the gear and pinion teeth.
- 3** The lubricating film provided by GULF LUBCOTES, in addition to being impervious to moisture, acid fumes and gases, withstand extreme temperature changes without deterioration.

- 4** Due to the tough and tenacious nature of GULF LUBCOTE, they will effectively reduce objectionable gear noise and at the same time will provide maximum protection against corrosion, pitting or excessive wear of the gear teeth.



**GULF OIL CORPORATION**  
**GULF REFINING COMPANY**







# ***SURFACE TREATMENT AND FINISHING OF METALS***

## **Cleaning and Pickling Tanks Heated By Simple, Economical Gas Method**

BY J. B. NEALEY  
American Gas Association

**H**OT SOLUTION tanks are employed throughout industry. Especially is this true in product cleaning for few products will take a finish unless the dirt, grease and foreign matter acquired in manufacture is first removed. Practically every metal product factory, such as the automobile plant, is equipped with one or more hot solution cleaning tanks and many have dozens. While most of these are used for dipping, many are part of automatic cleaning and drying machines equipped with traveling conveyors. These machines are so designed as to speeds and capacities that they become machine tools and are synchronized with the other machines in the production line. In any case the speed and flexibility of heating are most important. Pickling tanks and plating tanks come next in order of use.

### **Method Is Economical**

Gas immersion is the modern, economical way of heating hot solution tanks. It is new, ingenious, simple and efficient. Formerly steam or underfiring with gas were the most common methods. Gas immersion heating for the tanks is cheaper and faster to operate and more economical to install. It is a

decided improvement over gas underfiring, the next best, and formerly the most popular method of gas heating. In the first place, sediment deposition materially reduced heat transfer and subsequent overheating will cause the tank bottom to break down rapidly. The immersion tubes or coils are spaced above the bottom so as not to be effected by this factor. Secondly, the bottom can be insulated, as well as the sides, which cuts heat losses and fuel consumption and makes the operation much more comfortable for the operator.

### **Simpler Than Steam**

As compared with steam heat from a central power plant or heating system, higher overall efficiencies are obtained with gas immersion. Investment cost is much smaller than the installation of steam pipes, condensate returns, collecting tanks, steam traps, pressure controls, and other devices.

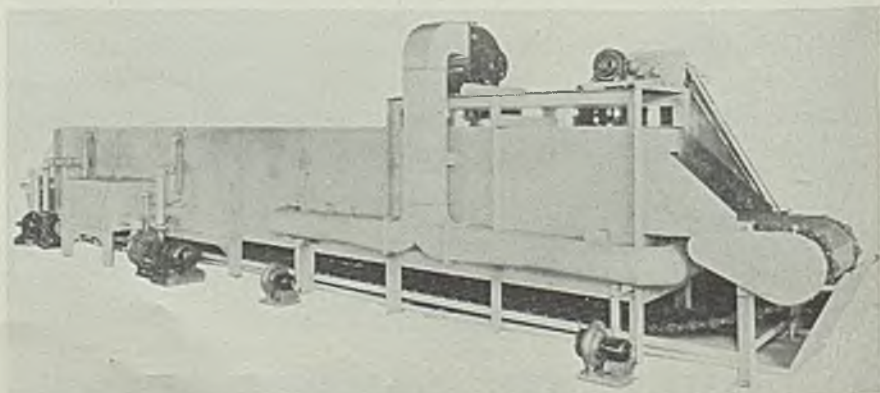
Flexibility is obtained with a battery of gas immersion units as the number in use can be quickly increased or decreased to meet fluctuating production schedules. Wooden tanks can be heated with gas immersion coils but not by underfiring. Common iron and steel pipes are satisfactory with ordinary cleaning solutions. Lead coils are used with acid tanks (pickling, electro plating, and the like).

Immersion coils are made up of lengths of standard pipe with standard fittings. They are laid horizontally and close to the bottom of the tank with one end welded to a hole in one side of the tank. A gas burner is clamped to the outside of the tank in such a position as to fire through this hole and into the coil. To the other end of the coil is attached an upright piece of pipe to act as a flue. Either atmospheric or pressure gas burners can be used.

### **Changeover Is Simple**

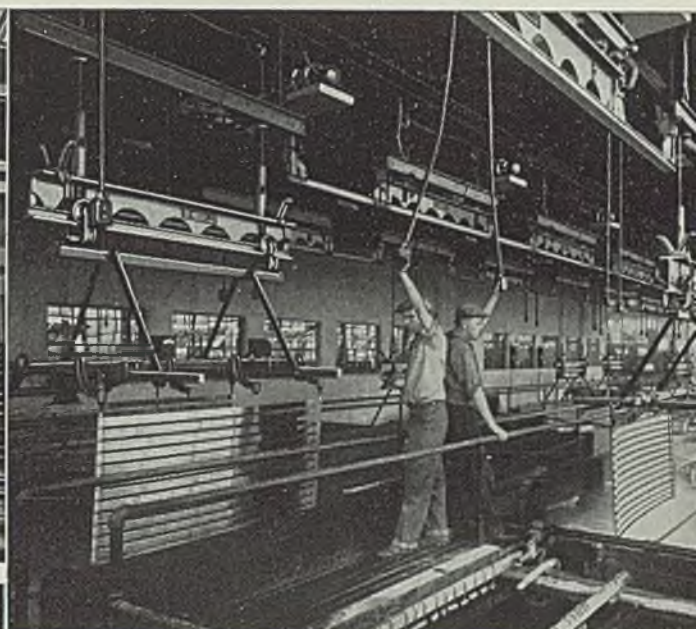
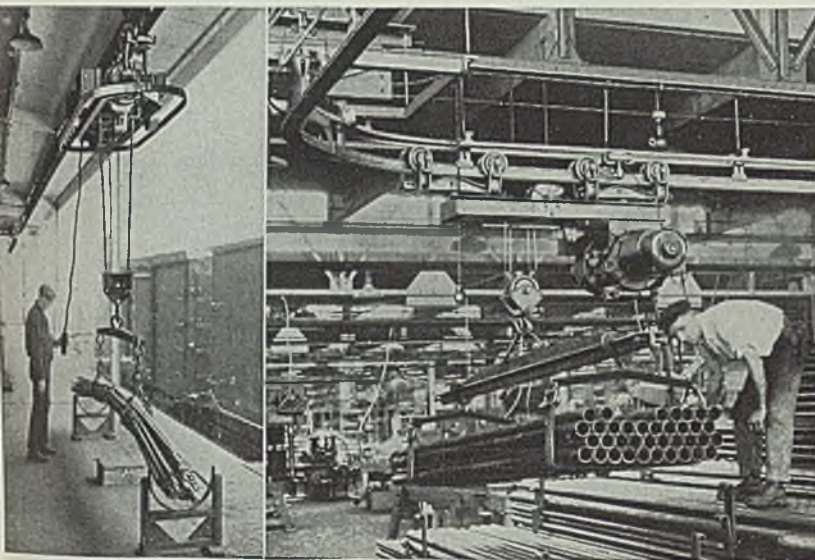
Almost any existing installation can be quickly and easily converted to this method of heating. A new unit can be made up and assembled with an atmospheric type gas burner by a local welder from relatively simple plans when this is necessary. However, stock sizes of liquid heating tanks equipped with immersion gas heating tubes are available from a number of manufacturers. When cutting holes in the tank is

**A**UTOMATIC and continuous unit, combining washing, rinsing and drying employs immersion gas burners to heat solutions and open burners for drying oven. Oven heat is conserved as far as possible by recirculation





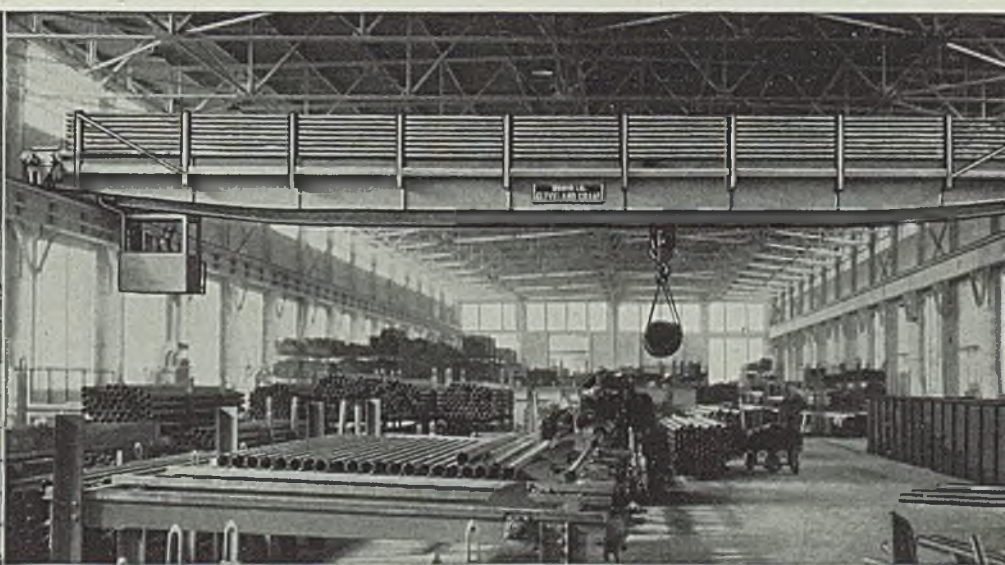
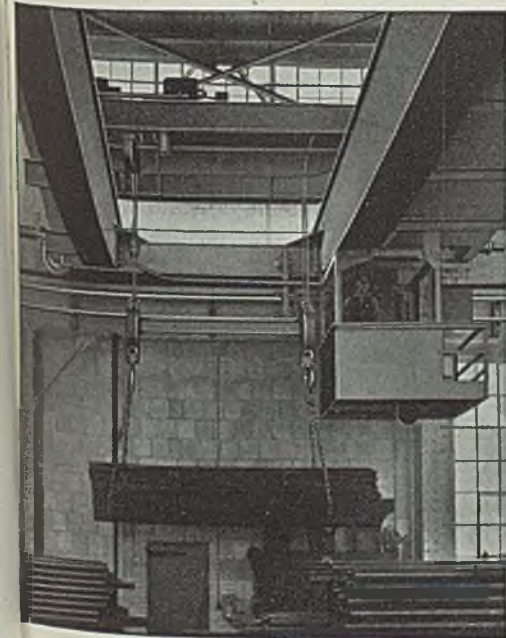
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inadvisable, a U tube can be used with the burner firing down one leg.

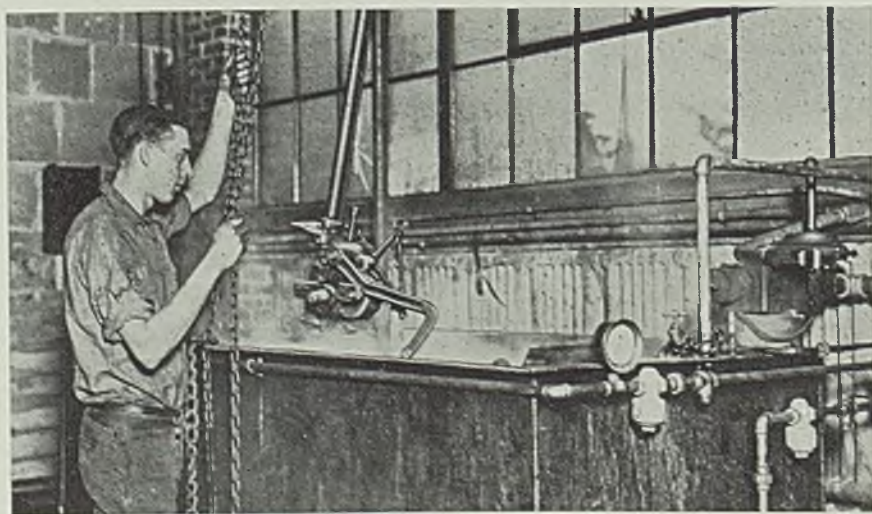
The tanks, for the most part, are 3 x 3 x 3 feet. Pipe sizes range well within 3 to 5 inches in diameter. Flue heights vary from 4 to 7 feet. The longer flues provide greater draft and the burning of larger volumes of gas which results in faster heating. There is considerable latitude as to design and heat input, all resulting in equal efficiencies. While increasing the heating up speed is at the sacrifice of efficiency when operating at holding heat, this efficiency can be restored by turning down the burner.

#### Insulation Not Necessary

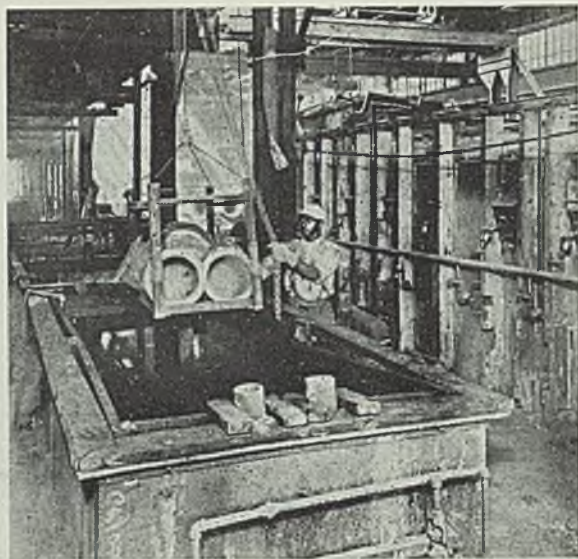
Insulation is desirable but not necessary. Uninsulated tanks operated at 150 degrees Fahr. lose about 180 B.t.u. of heat per hour per square foot of wall surface by radiation and convection. The heat loss from the surface of the liquid is at about the same rate, to which must be added the evaporation loss. Tank wall losses can be reduced by 90 per cent with three inches of insulation during the holding periods. The corresponding reduction in gas consumption would amount to approximately 35 per cent. This with a tank 7 x 4 x 3½ feet rockwool, magnesia or multiple ply asbestos is usually employed. A cover is recommended. Further economies can be obtained by using temperature controls and safety pilots.

When the cleaning process is mechanized, two or more tanks are usually incorporated. A hood covers all and pumps force the liquids, through jets or spray nozzles, against the work as it passes on the conveyor. The liquids run back into the tanks for reheating and reuse.

**G**AS immersion heaters are used in this garage cleaning tank. Gas burners are entirely enclosed so that no flame or spark can come in contact with gasoline vapors



**T**HIS pickling tank is heated by gas burners firing into lead coils submerged in the acid bath. Tank is of wood lined with lead



The first tank contains the cleaning solution and the second a rinse. To this setup is attached an enclosed sheet metal extension, with open gas flame burners, which acts as a drying oven. These units are so designed as to length of oven and temperature as to give a perfect drying job with the fastest conveyor speed commensurate with complete cleaning and rinsing. Waste heat from the flues can be utilized to a good effect here. Occasionally increased speed is effected by shortening the oven and applying gas-air torches manually to finish the drying of the work at the seams.

Immersion tube heating can be applied to pickling and plating tanks, either metal or wood, containing acid. Here lead tubes are employed. Ordinary lead waste pipe with walls ¼-inch thick and heavier have proved satisfactory. Very economical installations can be made in the case of 500 and 1000 gallon tanks and using reasonably priced automatic temperature controls with motorized valves, liquid temperature thermostats, safety pilots

and gas pressure controls. This procedure renders the installation entirely automatic.

One pickling installation consists of a lead lined wooden tank 5 x 12 x 3 feet. Heating is accomplished with four gas burners firing into immersion coils of lead pipe 4 inches in diameter. These lead pipes extend the entire length of the tank where they were connected with vertical sections forming stacks. The other ends of the pipes extend through the tank wall and the gas burners fire into them from the outside. Lead supports on the tank floor keep them raised ¼-inch so as to insure circulation while wooden grates protect them from heavy work.

#### Eliminates Dilution

Steam, formerly employed, so diluted the 6 per cent sulphuric acid solution and caused fluctuations in the pickling operation of such a serious nature that it was abandoned. The gas immersion method is most successful and keeps the solution at 180 degrees Fahr. without any difficulty. The work is handled in and out by crane and hoist. Immersion gas burners are also employed to heat the water in the cleaning tank.

The degreaser is a comparatively new development in cleaning. It utilizes the heated tank to vaporize a cleaning solution. The vapors rising and condensing on the cold work, dissolve the grease and flush the parts free of both dirt and grease. The work comes out perfectly clean and dry. The solvent employed is stable and is said to be many times more effective than gasoline, naphtha and other solvents that cannot be heated or boiled with safety. Here again the gas immersion coil is the ideal way of heating these degreasers.

High pressure gas burners are in-  
(Please turn to Page 73)





# WELDING, ETC.

BY ROBERT E. KINKEAD

## Robot Trains Welders

ELECTRICAL equipment is being put on the market which will aid in the training of operators to do arc welding. Instead of using the conventional head shield, the beginner is supplied with a hand shield which is equipped with a small red light on one side of his welding lens and a green light on the other side. The colored lights are out of the direct line of vision when the operator is looking at the arc in operation. When the operator is welding in a normal manner as to current for the size of electrode he is using, arc length, location of the slag, cleanliness of the work, the green light glows so he is conscious of it. On the other hand, if the operator is welding in an unsatisfactory manner, the green light is extinguished and the red light signals something is wrong. As soon as the trouble is eliminated and he is again welding in a normal manner, he gets the green light.

The problem of meeting the necessity for a sudden increase in the number of operators in production has been a severe one in many plants. The use of a robot which follows the operator and informs him how well he is doing may permit the more rapid absorption of green operators.

## Six Hour Day in Welding

IF THE labor forces of the country can enforce demands for a six hour day, the welding business can take it. Technical knowledge, management technique and equipment now available are adequate to meet the situation. That does not mean some manufacturers or users of welding would not suffer financial loss from the six hour day. The same group which now has sloppy inefficient welding departments will be punished the most by a shorter work day.

If going to the six hour day is the way to the more abundant life we are for it. At any rate if enough people believe in it, it should be given a trial. The one interesting possibility about it is a man might hold a six hour a day job which would carry with it social security and job insurance, and at the same time work four or five hours a day

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.

doing something where he is his own boss. As industrial jobs become more completely mechanized, the psychological necessity for some such escape becomes more pressing. Social explosions occur when large groups of people are regimented to such a degree that there is no hope for them to work and win what they want. There is not a large group who would be content to work six hours a day at wages that could be paid for that length of time and not be gainfully employed in some way in addition. But in the interest of those who wish to work six hours and spend the rest of their day in drinking, studying music, reading, or just plain loafing, it might be advantageous to provide the six hour day with social security.

The danger of the six hour day

idea lies in the possibility that fools and demagogues will try to make the wages for the six hour day buy everything anyone who works that long can possibly want. No such scheme will work.

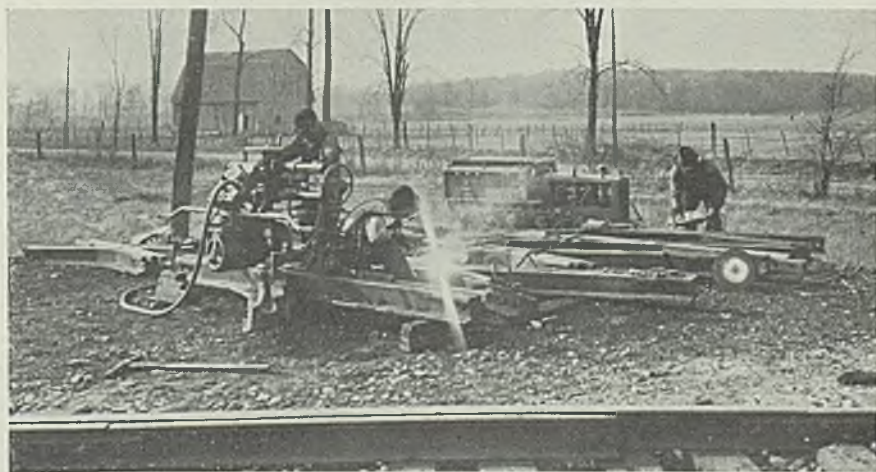
## Notes on Retirement Age:

ONE of the best machine designers we have ever worked with is 68. He can work 10 hours, eat a hearty meal and join the fun before he turns in for the night. Anything five years old is subject to suspicion with him in the line of machine design. A design must be improved every time he looks at it—or else. Recently he ordered the latest type of high-speed welding machine and has in mind improving it considerably.

Reaching the age of 65 recently, an official of one of the gas welding companies submitted his resignation out of a clear sky. Pressed for the reason, he stated he felt he was standing in the way of younger men's advancement. The younger men ganged up on him and compelled him to withdraw the resignation on the grounds they would advance more rapidly with his help than without.

Responsibility tempers the judgment of those who command and who are capable of commanding. The place for men over 70 in government, as in industry, is in a consulting capacity where their experience may be utilized but in which the burden of command rests on younger shoulders.

## Rail Maintenance in the Field



THE mountain goes to Mohammed in this view of rail maintenance work near Cornwall, Ont., at the intersection of the Canadian Pacific and Canadian National railroads. A caterpillar tractor with a Wilson Welder 250-ampere direct-current generator of the 75-volt constant-potential type is shown in the background, supplying power for welding work, as well as for the Hoppley 14-inch electric rail surface grinder in the foreground. Equipment is used for building up and resurfacing rail joints, frogs, diamonds and the like. Photo courtesy Caterpillar Tractor Co., Peoria, Ill.



# Anneals Malleable Free of Scale

**A** NEW type special atmosphere furnace for scale free annealing short cycle malleable castings recently has been constructed by Electric Furnace Co., Salem, O., at a large malleable plant. Of the continuous roller type, this furnace handles approximately 30 tons of castings per day, operating on a cycle requiring approximately 13 hours in the furnace. A duplicate furnace shortly will be installed at the same plant.

Castings to be annealed, consisting of miscellaneous small and large shapes, are loaded into alloy trays or baskets which travel through the furnace in two parallel rows directly on specially designed rollers which serve as the furnace hearth. The trays are loaded on an extension at the charging end of the furnace. At a suitable time interval the charging door of the charging vestibule opens and an auxiliary high speed drive mechanism rapidly charges the loaded trays into the vestibule. This door closes and the door of the heating chamber opens automatically to receive the loaded trays which are conveyed slowly and continuously through the heating and cooling chambers. On reaching the discharge position the trays actuate a limit switch which automatically opens the discharge door. Trays are delivered rapidly to a gas lock chamber or vestibule. This door closes and the material is moved out onto a 2-tray transfer car and dumping equipment. Empty trays then are placed on a gravity

conveyor extending along the side of the furnace and carried to the charging end where they are loaded for another cycle.

The furnace is built gas-tight and a special nonoxidizing atmosphere, obtained from an adjacent Elfurno gas generator, is used in the heating and cooling chambers so that the uniformly annealed castings emerge free of scale. Heating elements used are heavy cast nickel-chromium alloy grids located in the roof and bottom of the heating and soaking chambers; the heating elements are divided into seven separately and automatically controlled zones. While the new unit is 120 feet long, such units also may be designed for larger or smaller capacities and varying cycles, depending on requirements.

## Shrinkage of Metal Is Put on Practical Basis

*Shrinkage*, by H. A. Schwartz; 32 pages, 8% x 11% inches, paper; published by Penton Publishing Co., Cleveland; supplied by STEEL, Cleveland, for \$1 postpaid; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

Shrinkage or the decrease in volume of a metal as it cools, freezes and cools further is a problem wherever metals are cast, but unfortunately, due to the complexity of the various phases entering into shrinkage phenomena, comparatively little quantitative information is available. However, in this volume which recently appeared in *The Foundry* as a series of articles, the author has set up a basis for an approximate quantitative treatment of the shrinkage problem.

While, as might be expected, the

treatment is highly technical, the author has brought each problem's solution into such form that it may be used by substituting in a formula or by reading a graph. Since the intent of the author is to develop principles for guidance in experimenting with the feeding of castings, he has simplified the treatment by limiting the discussion to simple conditions and objects.

Phases discussed in the treatise include temperature distribution in spheres enclosed in various media from 1050 to 25 degrees Cent.; shrinkage in volume; volume of void; excess of temperature required so that the feeder freezes after the casting; size of the feeder; relative heights of casting and feeder to prevent draws in the top of the casting; cooling time for castings; calculation of the length of time that the temperature will remain constant with the metal at two different superheats when poured, and similar studies of shrinkage conditions.

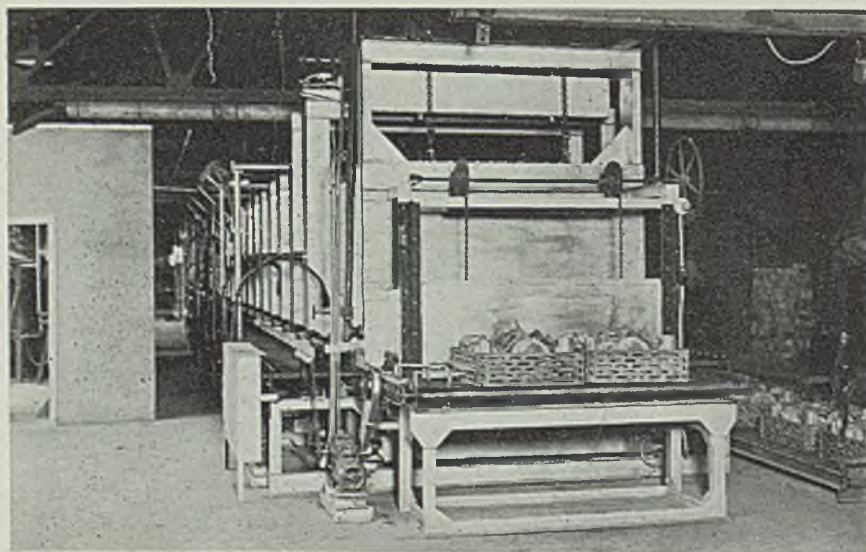
## Three-Dimension Movies Shown in Full Color

The New York Museum of Science and Industry, in conjunction with the Polaroid Corp., New York, now is displaying, at Rockefeller Center, that city, what is said to be the world's first three-dimension motion pictures in full color. The film incorporates a number of views said to be the first experimental, stereoscopic, industrial shots in full color ever taken. They show the various operations in making valves and were filmed at the Hancock Valve division, Consolidated Ashcroft Hancock Co., Bridgeport, Conn.

In these so-called Polaroid movies the screen is not visible. It appears to be a window through which are seen three-dimensional people and machines, in action, and located at different distances from the eye. The third dimension of the colored movies makes the shots unbelievably real. Molten metal in the foundry has natural colors and thickness. Machines, molds and other objects look as if they actually could be handled. Sparks appear to fly right of the screen. An especially effective shot shows a diamond boring machine machining hard metal for valve seats and disks in a metal-working plant.

Polaroid glass, by which the new three-dimensional pictures are made possible, modifies the light that passes through it so that all the light vibrations move in the same plane.

The exhibit at Rockefeller Center will be operated for a period of several months.



Charging end of new continuous electric furnace showing two trays of malleable castings about to go through a 13-hour annealing cycle. Castings are kept free of scale by special atmosphere supplied from adjacent generator



# Studies Effect of Gases on Steel

(Concluded from Page 44)

and fabrication of these less expensive steels and determining the temperature ranges in which their properties justify engineering application. Most of the applications, they added, involved welded structures and the heat effects of welding as well as the nature of the weld metal are matters of prime concern.

Summing up results of a study of this problem, the authors declared that notched-bar impact values obtained in steels at low temperatures fall into various energy levels. This phenomenon, they declared, is a function of the nature of the material and is not due to minor variations in the preparation of the test specimens and test procedure. The nature of the fracture on tensile testing at low temperature shows some correspondence with the discontinuous low-temperature impact values.

The authors further declared that aluminum, vanadium, zirconium and columbium, when added to plain carbon or low-alloyed steels in sufficient amount to produce grain refinement, result in improved retention of impact strength at low temperatures. Aluminum-killed, normalized, plain carbon steels of otherwise appropriate analysis, in small sections are satisfactory for engineering service at temperatures down to approximately minus 80 degrees Cent. Chromium-copper aluminum-killed low-alloy steels are satisfactory for engineering service at temperatures down to minus 100 degrees Cent. and may be used in larger sections.

## Serviceable at Low Temperatures

Welds produced with carbon and low-alloy electrodes having a combustible or mineral coating show sufficient energy absorption on low-temperature notched-bar impact testing to indicate their fitness for engineering service at temperatures down to -80 degrees Cent., it was said. Material in the scarf likewise is satisfactory for service down to this temperature. Where lower temperatures or heavy sections are involved, special precaution is necessary in welding.

The work undertaken indicated the broad conclusion that engineering structures such as pressure vessels, pipe, etc., can be fabricated with appropriate plain carbon and low-alloy aluminum-killed steels so as to be considered safe for service at the low temperatures commonly encountered in the petroleum and chemical industries.

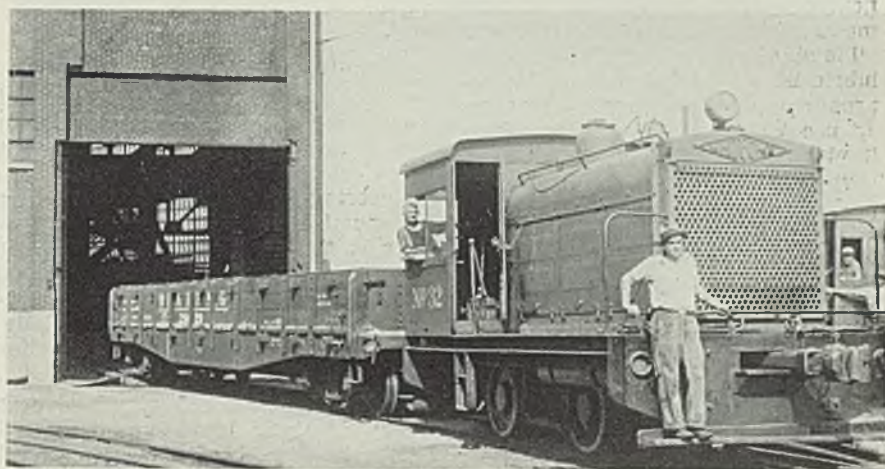
R. F. Mehl, director, metals re-

search laboratory, and head of the department of metallurgy, Carnegie Institute of Technology, Pittsburgh, and E. L. McCandless, formerly a fellow with the laboratory, presented a paper on the subject of oxide films on iron, with one part devoted to the orientation relationships in oxide layers and the other to the temper films and rate of oxidation of single crystals.

## Markets Pressure Sprayers

Designed for use in large orchards and similar applications, a new line of high pressure spray machines

has been placed on the market by Campbell & Budlong Machine Works, San Jose, Calif. These spray outfits are built entirely of special steel and chrome nickel iron. The pumps are attached direct to engines and operated by quiet helical gears running in oil. Spray tanks are of special steel, electrically welded and thoroughly braced. Ball and roller bearings are used throughout, eccentric and shaft are drop-forged, hardened and heat treated. Air chambers are of drawn steel, tested to 3000 pounds, and the machine is built for continuous high pressure operation.



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# Conference Reviews

## Power Application

(Concluded from Page 54)

where the drive is subject to sudden impacts or shocks. One installation was of a synchronous motor group driving four rubber mills.

"Putting the lubricant in the bearing is the beginning and not the end of lubrication," was the keynote of the paper on "What Part Do Bearings and Lubrication Play?" by Paul J. Stuermer, consulting engineer, Chicago. "Even with careful specifications after studies of requirements and tests to see that the best oil is obtained the entire value of the lubricant may be destroyed by improper application, careless storage, or use under conditions for which it was not intended.

"Power savings of from 5 to 10 per cent may be made by the proper application of the correct lubricant with corresponding reductions in maintenance costs and stoppage losses," continued Mr. Stuermer. "Over-lubrication may cost more through increased power consumption than an occasional failure due to under-lubrication."

**S**PEAKERS at the afternoon session on "Generation and Use of Power in Industrial Plants," emphasized that:

1. Though power costs may be only 2 to 4 per cent of the total costs, savings may be profitable even though apparently trifling on the basis of percentage of total cost or cost per unit.

2. A careful analysis of power and steam requirements through 24 hours per day for the full year should be the basis of determining whether to make or buy.

3. Without some knowledge and control of power generation and utilization, such as may be obtained by recording instruments, it is impossible to determine costs and establish how these costs may be reduced. In one case cited, an investment of \$18,000 in instruments and control, permitted savings of \$90,000 the first year.

Advantages and operating characteristics of motors were covered in the evening session on "Planning Electrical Applications of Power," with Milton Hartman, consulting engineer, as chairman.

"Briefly, the principal advantages of electrical drives lie in their ability to carry any load within their rating, provide the correct speed, are safe, and are easily controlled," stated F. E. Butterfield, power sales engineer, Commonwealth Edison Co., Chicago. "However, in the applica-

tion of drives to machines or groups the limitations must receive as thorough consideration as the advantages.

"Motors are obtainable in large or small capacities, as well as to meet unusual speed demands. The possibility of 'plugging' for emergency stopping and the use of dynamic or other braking are important safety features," continue Mr. Butterfield. "Similarly electric motors are easily started, stopped, reversed, or may be operated automatically through a predetermined sequence or cycle of operations, either individually or in co-operation with other motors. This permits versatility and adaptability with definite results not obtainable with other types of drives."

### Motor Is Production Tool

"Consider the motor and control as a tool of production, rather than as a prime mover," urged Gordon Fox, electrical engineer, Freyn Engineering Co., Chicago, in discussing economical applications. "The motor is the means of application of power to the production process or machine which provides a combination of electrical and mechanical elements to obtain a result—in other words, a means to an end.

"Effectiveness, economy and cost are the three most important criteria in the selection of the drive," according to Mr. Fox, who then pointed out how motors can be designed to start, stop, reverse, change speed, indicate, limit, or measure a load, limit torque so as to stop the drive and apply pressure, control interlocking processes so that each operation may be performed in a definite sequence, as in blast furnace charging, and to meet any of a number of other requirements.

In discussing economy in operation, the speaker considered these factors: Convenience for operation, power costs, and maintenance. Frequently, by studying the requirements of the process, the tool and drive can be selected as a unit with greater economy than choosing the tool and then applying the motor. This is especially true in combinations of fans, blowers or pumps with motors.

Selection of a motor to fit the requirements of load or surrounding conditions has an important bearing on maintenance costs. First cost should be considered only in so far as not to sacrifice economy and operation. Also, motor and control should be considered together instead of as separate units. Mr. Fox noted an increasing application of direct-current drives and the use of mercury rectifiers for conversion.

"Power users have a choice of about 20 types of motors, more or less standard, in a wide range of speeds and ratings, each type de-

signed with special characteristics to meet particular operating requirements," stated W. T. Burdick, motor sales, General Electric Co., Chicago. The most important of these requirements are starting torque, temperature rise, and surrounding conditions. Mr. Burdick illustrated with slides several of the types and showed curves of operating characteristics. These types cover a wide range of starting and running torques, such as may be required in valve opening and hoists, punch press operation, and in connection with dusts, fumes and gases. Most common requirements can be met with one of these types although special motors may be designed to fit even more special requirements.

"Two factors enter into the selection of motor drives to speed production," according to Prof. E. H. Freeman, Armour Institute of Technology, Chicago, "the actual first cost plus interest, depreciation, power and maintenance, and the more intangible factors not easily expressed in money value, such as, quality of output, convenience and freedom from noise or vibration. Sometimes the intangibles are more important than money values and always should be considered as a part of whether the installation will or will not pay."

The speaker emphasized the important social significance of the motor in the ease with which it can be applied anywhere, its compactness and its aid in permitting higher wages by multiplying the efforts of the worker.

"When considering the adequacy of the power plant, transformer substation if power is purchased, also check the distribution facilities," was a point brought out by R. H. Keil, power engineer, Western Electric Co., Chicago. "Addition of equipment or shifts in layout may render the feeder distribution circuits inadequate to supply power where required, unless anticipated," he observed.

### Steel Enclosed Switchgear

A new steel-enclosed switchgear was recently designed by the Delta-Star Electric Co., Chicago, for across-the-line control of a 400-horsepower, 2200-volt 3-phase squirrel cage induction motor driving a 200-kilowatt direct current generator and a 20-kilowatt exciter. The front hinged door carries the overload under voltage temperature relay, control switch and polyphase watt-hour meter. A hinged side door gives access to the oil blast circuit breaker and meter in transformer. Both compartment doors have locks and in addition the oil circuit breaker is interlocked with disconnecting switches. The ammeter and voltmeter are separately mounted.





## 180 Handling Fatalities In New York Last Year

(Concluded from Page 48)

listed as casualties in this category.

Over the five year period, 1932-1936, the total deaths from handling were 973, of which 554 were from strains, 243 from being struck by objects handled and the remaining 176 from handling sharp objects and tools. A total of 1413 claims for death benefits were filed during 1936 by dependent survivors of workers who lost their lives in various industries in New York.

♦ ♦ ♦

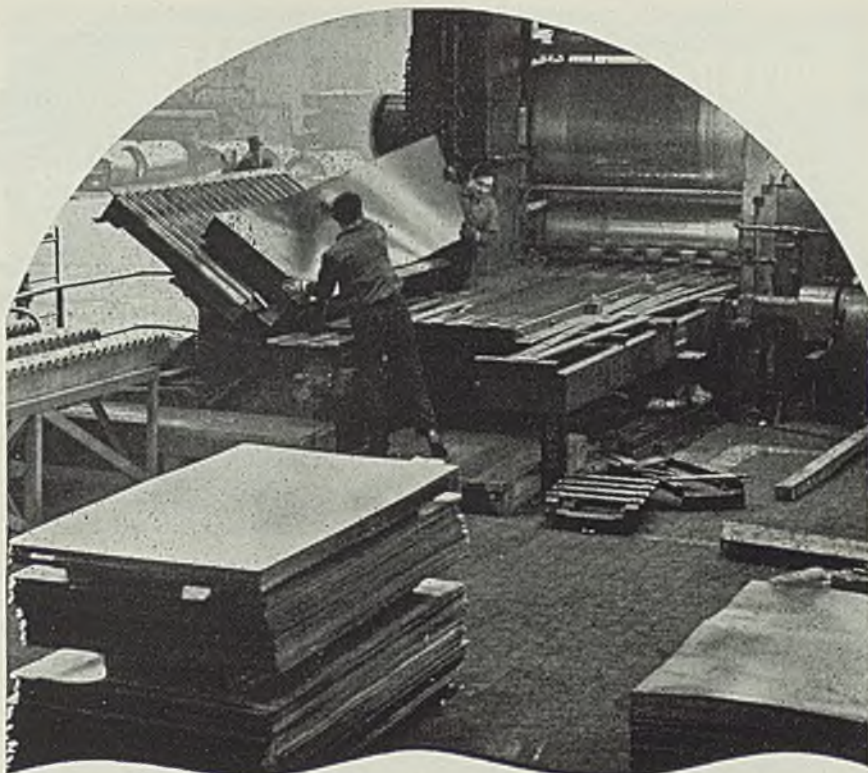
## Better Demand for Cranes

THE electric overhead crane industry has been experiencing its best business for several years. This is substantiated by department of commerce statistics which show that for 11 months of 1936 total sales were approximately \$5,447,000. Also in keeping with the improved situation is the statement of the Harnischfeger Corp., South Milwaukee, Wis., that "after six years of depression the crane and hoist industries generally have picked up due to a marked increase in new plant construction and rehabilitation of existing plant."

According to reports, steel mills, with extensive programs of plant expansion, have been the largest purchasers of cranes, and the automotive manufacturers have also been important customers. It is likely that railroad equipment manufacturers will be more active in the crane market this year after a long absence.

## Keep License Plates Clean

Various states have enacted laws which require automobile number plates to be kept clean. To meet this situation, the Rayline Manufacturing Co., Boston, has patented a new plate frame which is made of brass with double chromium plate. The glass front is protected on all sides and corners by specially constructed cushioned rubber. A special locked feature prevents frame from coming apart, while a new arrangement prevents rattle. Frames are made for all states, all numbers, and all cars including the new 1937 models.



## STEEL FACES MORE HANDLING AND PROCESSING PER TON

STEEL rails and structural S shapes, once the backbone of the steel industry, will never regain their former tonnage ratio. All authorities agree that the future will see steadily increasing tonnage in sheets and lighter forms, and most of them look forward to great developments in building construction as the next source of greatly increased demand.

All of this means that the

steel industry is headed for more processing and for more application of the Continuous Flow Principle of handling materials.

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# NEW EQUIPMENT

## Portable pH Meters—

Thwing-Albert Instrument Co., 3339 Lancaster avenue, Philadelphia, has recently announced a portable pH meter available in two models. The first model is a simple potentiometric circuit with quinhydrone or antimony electrodes or both, while the second model is a vacuum tube potentiometer with quinhydrone, antimony or glass electrodes. The meters are used in obtaining exact determinations of acidity and alkalinity in solutions. This instrument is suitable in making pH determinations in dyeing, water treating, brewing, tanning of leather, electroplating, pickling baths and similar applications.

## Aluminum Welder—

Thomson-Gibb Electric Welding Co., Lynn, Mass., has recently placed on the market a new machine designed for welding aluminum in the construction of aircraft. The entire outfit includes the welder proper, a separate auto transformer and two elaborate control panels. The machine itself is in a large part constructed of aluminum. A bell has been installed on the control panel to warn the operator if the welding variables are not in the right value or sequence for the conditions under which the machine is operating. There is also a recording device which checks the value of the current flow as each weld is made so that inspectors can check up on any welds that appear doubtful. The rolled copper plate transformer



Thomson - Gibb welder designed for use in welding aluminum alloys in the construction of aircraft

secondaries and the silver plated contact surfaces which prevent oxidation are typical of the features embodied in this machine. These machines are built under government specifications for installation at flying fields.

## Insulating Brick—

Johns-Manville, Inc., 22 East Fortieth street, New York, has recently placed on the market a new type of insulating brick known as JM-20. This new brick was developed by the company's research laboratory for use behind refractory walls in open-hearth regenerators, in hot-blast mains and bustle pipes, in producing gas mains and in various types of furnaces. It can also be used for direct exposure and radiant-tube pipe annealing furnaces, electric furnaces or wherever there is no flame impingement, slag action or mechanical abrasion, at temperatures up to 2000 degrees Fahr. This new type of insulation is produced by combining refractory clay with a specially manufactured fibrous, lightweight inorganic aggregate. Weight of the new product is 1.7 pounds per standard 9 inch equivalent.

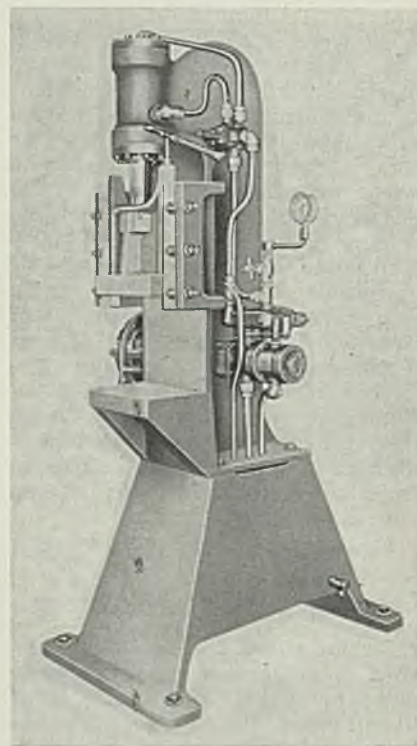
## Stainless Steel Truck—

Stackbin Corp., Providence, R. I., has recently placed on the market a new stainless steel hand truck with a smooth one-piece welded interior. The device is built for use in handling wet or delicate textiles, fabrics,

or similar uses where the materials carried must not be stained or torn. A unique inverted bottom construction provides drainage around the edges. Chassis carries the entire weight and special caster design makes handling easier.

## Hydraulic Press—

Greenerd Arbor Press Co., Nashua, N. H., has recently placed on the market a 6-ton hydraulic press which may be stopped at any



Greenerd hydraulic arbor press which is so controlled that it may be stopped at any point in the cycle

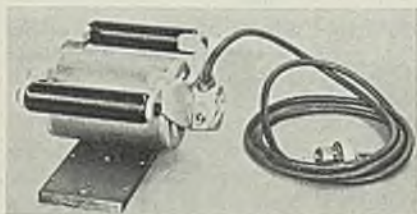
point of the stroke in either direction at the will of the operator. The press is cast of special hydraulic semisteel and equipped with a steel piston with three cast iron rings and sealed with chevron-type packing.



The ram is alloy steel, heat treated and ground. A 3-horsepower motor and pump are mounted on opposite sides of the main housing, the pump being connected between the 20-gallon pump in the base and the control valve which is operated by hand. At the top of the crosshead is a knock-out adjustment that controls the length of the stroke. The press is furnished so that ram is controlled down or up by hand levers. Pressure may be adjusted from  $\frac{1}{2}$  to 6 tons on the down stroke, with a 3-ton pull on the up stroke.

#### Demagnetizer—

O. S. Walker Co., Worcester, Mass., has recently placed on the market a new unit suitable for a wide variety of work and particularly adapted for removal of residual magnetism from machine knives, shear blades, large dies and the like. The laminated core, which is mounted in a frame with handles, is re-



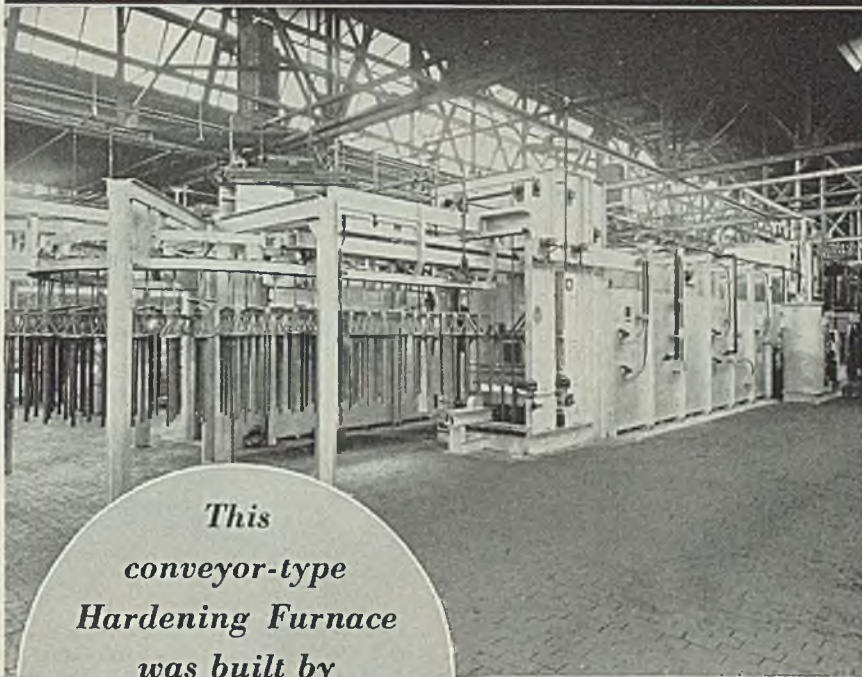
New device built by O. S. Walker Co. for removing residual magnetism from knives, dies and the like

cessed for the energizing coil and enclosed in a cylinder about  $4\frac{1}{2}$  inches in diameter and  $5\frac{1}{2}$  inches long which rotates about the core as the unit is moved along the work. The cylinder heads are pressed in and the cylinder itself is of a material which exerts minimum influence on the path taken by the demagnetizing flux developed by the energizing coil. The unit is equipped with drilled lugs for attaching it to a bench in case it is desired to draw the work over the demagnetizer. Standard units are available for 60 cycle, 110 or 220 volts alternating current operation.

#### Thermal Overload Switch—

General Electric Co., Schenectady, N. Y., has recently placed on the market a new thermal-overload switch for fractional horsepower motors, which operates on line current and is arranged for convenient mounting on a conduit or terminal box of the motor. The unit is completely self-contained and has no links or plugs to be replaced. Known as the "Thermo-Tector," the device automatically disconnects the motor from the line when an overload oc-

## INSULATED FOR CLOSER TEMPERATURE CONTROL . . . LOWER FUEL COSTS . . . *with Armstrong's Brick*



*This  
conveyor-type  
Hardening Furnace  
was built by  
ELECTRIC FURNACE COMPANY  
for Large Automobile  
Plant*

*Above is shown the charging end of the hardening furnace, and the Elfurno generator for producing the special atmosphere which is used in the equipment shown at the right of the illustration.*

**E**FFICIENT insulation plays an important part in the operation of this giant hardening furnace, built by the Electric Furnace Company, Salem, Ohio. Both Armstrong's A-25 and N-16 Insulating Brick are used in this equipment to help maintain constant, uniform temperatures, guard against costly heat losses, and speed up production.

The installation shown above in the plant of a prominent automobile manufacturer is completely automatic, providing continuously controlled atmosphere

and conveyor-type heat treating for scale-free hardening, oil quenching, and drawing rear axle shafts.

Today, more and more manufacturers of furnaces are using Armstrong's Brick to help build greater efficiency into their equipment. In addition to Insulating Brick, the Armstrong Line includes Insulating Fire Brick for a complete range of temperatures and uses. We'd like to send you descriptive literature and samples of these dependable brick. Just write to Armstrong Cork Products Company, Building Materials Division, 985 Concord Street, Lancaster, Pennsylvania.



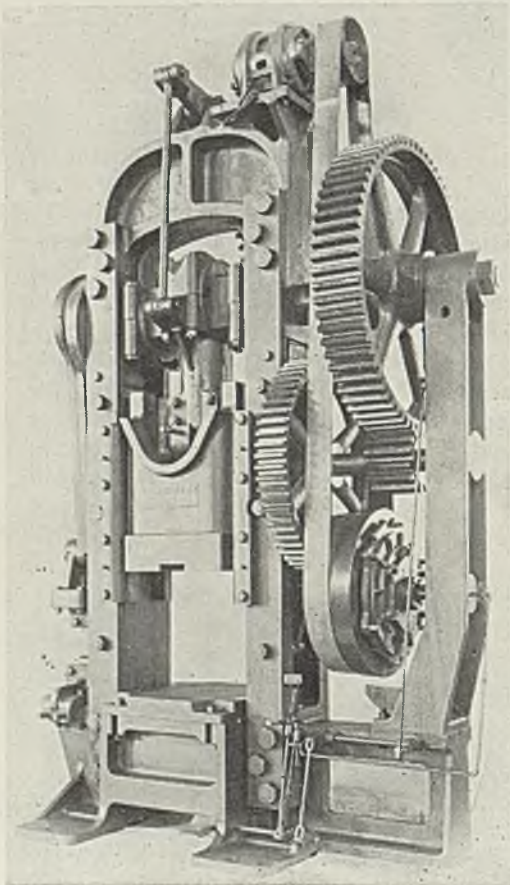
## *Armstrong's* HIGH TEMPERATURE INSULATION



curs, before the motor reaches a dangerous temperature. When the motor has cooled, it is automatically reconnected to the line. Units which leave the motor disconnected until the device is manually reset are also available. Elements of the switch consist of thermostatic bimetallic helix, a heater helix, a flat steel spring and a contact arm. When the bimetallic helix is heated to a temperature above normal, the free end rotates and reverses the bow of the spring. When the spring passes dead center, it also moves the contact arm and disconnects the motor from the line. With the line open, current ceases to flow in the heater helix, the bimetallic helix turns in the opposite direction, and when the temperature is again normal, the spring snaps to the "on" position.

#### Trimming Press—

Chambersburg Engineering Co., Chambersburg, Pa., has added to its line a new 300-ton double geared trimming press with an air-operated clutch. This machine has a forged steel side frame construction, over-size crank and outboard bearings. The air operated clutch makes for ease of control and automatically provides a safety slip in the event of excessive overload. The reinforced steel sides of the press provide a margin of safety, making it unlikely that the frame will break.

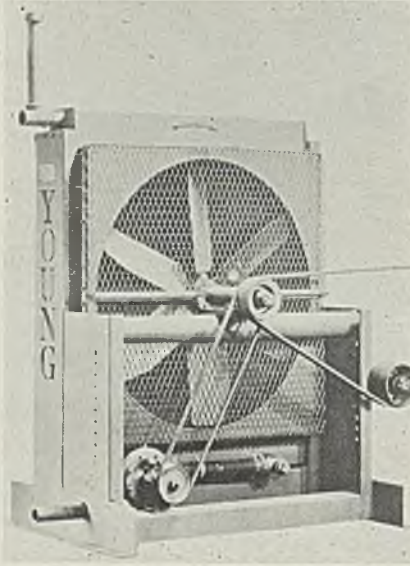


Chambersburg 300-ton press designed for trimming crankshafts. Ease of operation is gained through the use of an air operated clutch

Distance between the frames is 40 inches, and the press is driven by a single motor of 20 horsepower. Ram base is 30 inches square—stroke is 8 inches and adjustment 5 inches.

#### Cooling Unit—

Young Radiator Co., Racine, Wis., announces a new type of self-contained cooling unit which contains all devices needed for circulating

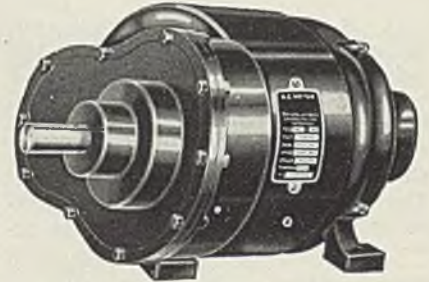


Young self-contained motor cooling unit, which contains all devices needed for circulating air and water

both air and water. The fan is six bladed, of 36-inch diameter. Water capacity in top and bottom tanks is 12.6 gallons. Construction consists of channels, angles, pipe and plates fused into an integral unit by electric welding. The new unit will be manufactured in two sizes, each of which will be equipped with different core specifications to take care of cooling engines of 35 to 125 horsepower.

#### Motorized Speed Reducer—

Foote Brothers Gear & Machine Corp., 5301 South Western boulev-



Motorized speed reducer from the line recently introduced by Foote Bros. Gear & Machine Corp.

vard, Chicago, has recently added a new line of fractional horsepower motorized speed reducer known as IXL fractional horsepower powered gears. These units range in size from 1/50 horsepower to 3/4 horsepower and ratios from 2 to 1 up to 8000 to 1.

#### Electric Drill—

Stanley Electric Tool Division, New Britain, Conn., has announced a new "Victor" drill of 1/2-inch capacity. It has been designed to meet the requirements of contractors and mechanics for wood and metal drilling. Special features of this drill include heat-treated nickel steel gears and a universal motor mounted on seal-type ball bearings. It has a housing of aluminum alloy.



Stanley Victor 1/2-inch drill designed for production use on either wood or metal



## Cleaning Tanks Heated Economically by Gas

(Concluded from page 62)

icated for large installations and when greater speed and better control over combustion are desired. Any one of the conventional gas burner designs—pre-mixing, proportional inspiration or high pressure gas—can be used with equal advantage. Much greater gas burning capacities in tubes of given size are possible with burners in this class. Heat transfer rates as high as 15,000 B.t.u. per square foot of coil area have been reported, and, as newer types of gas firing equipment become available, even greater rates are anticipated. In the case of garages or other locations where explosive gases are present, gas burners are available which are totally enclosed. They are fool proof and there is absolutely no danger of flames or sparks coming in contact with the explosive gases in the room. Pressure gas burners and immersion tubes are also employed to melt heavy materials such as heat treating salt baths, bearing metal, die casting metals, lead baths, electrotypes pots and many others.

## Polishing Wheel Cement Intended to Replace Glue

A new cement for polishing wheels is announced by Midwest Abrasive Company, Detroit. It is intended to replace glue and is offered as a simplified method of preparation, requiring no heat. By the use of a special thinner, any density of cement required can be made up so that wheels of varying densities can be uniformly surfaced. This feature is said to permit exact regulation for wheels of canvas, leather, felt, sheepskin, wood covered with leather, compressed leather or felt. The company will send generous sized samples of the product to those interested in its use.

## Porcelain Enamel Institute Activities Announced

A porcelain enamel forum is to be held May 5, 6 and 7 at the University of Illinois, Champaign, Ill., under the sponsorship of the Porcelain Enamel Institute, 612 North Michigan avenue, Chicago. A review of the industry and a discussion of fundamental porcelain enameling practice will occupy most of the time, the program to conclude with an afternoon of simultaneous ses-

sions on hollow ware, cast iron and sheet iron and steel. Committee in charge of the forum comprises F. E. Hodek Jr., General Porcelain Enameling & Mfg. Co., Chicago; Prof. A. I. Andrews, University of Illinois; Prof. R. M. King, Ohio State university, Columbus, O.; J. E. Hansen, Ferro Enamel Corp., Cleveland. In 1938 such a forum will be held at Ohio State university, such programs thereafter to be held in alternate years at the two universities.

Tentative dates for the 1937 annual meeting of the Porcelain Enamel institute have been set as

Oct. 12-13, with Chicago as headquarters. It is expected that members of the Institute of Vitreous Enamellers of England will be in attendance at this meeting as a finale to their plant visitations in this country.

The Porcelain Enamel institute has renewed its research fellowship at Ohio State university, made tentative arrangements for another porcelain enamel week, has made provision for associate memberships and has made plans for architectural and other research. Architectural data is now being gathered and will be published at an early date.

**TIME TELLS**

**OCTOBER 1935**  
Ad appeared featuring samples of Blue Knight 1-coat finish applied to flat sheet, then blanked out. Readers were invited to twist, bend, linger-nail . . . to test permanent Flexibility and Adhesion.

THESE EXHIBITS TELL THE REMARKABLE STORY OF *Flexible Finishes*  
TRY THESE SIMPLE MANIPULATIONS YOURSELF  
It's Hard to Pull, But Don't!  
ROXALIN FLEXIBLE LACQUER  
FLEXIBILITY AND ADHESION

**JANUARY 10, 1937:** Mr. S. visited plant. Said our "Permanent Flexibility and Adhesion" story certainly impressed him. He only saw ad (above) few days ago. Magazine had been kicking around his office more than a year. But, by gosh, when he happened to pick it up and tested the samples . . . the Blue Knight Flexible Finish did not CHIP, FLAKE or PEEL! *Nothing tests like TIME!*

**FLEXIBILITY AND ADHESION**

*Plus!* **Shortened Baking Time**

ROXYN-C offers many *plus* factors not obtainable with any other synthetic. It is almost as quick-setting as lacquer—far quicker than the fastest drying synthetic. . . .

- (1) Single or Multiple Coating with only *one* bake.
- (2) Impermeability to common finish-destroyers.
- (3) Remarkable Flexibility and Adhesion.

ON REQUEST: A detailed illustrated summary with Comparison Chart. Address Box 472, ROXALIN FLEXIBLE LACQUER CO., INC., Elizabeth, N. J.

**ROXALIN *Flexible* FINISHES**

CELLULOSE & SYNTHETIC TYPES  
ENGINEERED FOR SPECIFIC PERFORMANCE





## RECENT PUBLICATIONS OF MANUFACTURERS

**Floor Treatments**—Truscon Laboratories, Detroit. Leaflet describing Granitex, a non-dusting, oilproof cement floor.

**Excavators**—Hanson Excavator Works, Tiffin, O. Folders describing its unit cast steel construction excavators in various models.

**Flywheels**—Garrison Machine Works Inc., Dayton, O. Folder describing its flywheel chuck, mounted on a drill press.

**Castors**—Darnell Corp. Ltd., New York. Manual No. 38, illustrating and describing its many types of casters, giving specifications and prices.

**Rubber Hose**—United States Rubber Products Inc., 1790 Broadway, New York. Catalog embracing its line of hose; a section is devoted to hose couplings and fittings.

**Lubrication of Natural Gas Machinery**—Texas Co., 135 East Forty-second street, New York. Pamphlet, Vol. 23, No. 1, describing lubrication of natural gas machinery.

**Contour Sawing**—Continental Machine Specialties Inc., Minneapolis. Handbook on contour sawing and filing, including specifications for cutting specific materials.

**Lift Trucks**—Arcade Mfg. Co., Freeport, Ill. Catalog No. 196, illustrating its various type of lift trucks, including a new universal lift truck just placed on the market.

**Sheet Metal**—Niagara Machine & Tool Works, 637 Northland avenue, Buffalo. Reference booklet for sheet metal work, giving condensed descriptions and specifications for machine, tool and sheet metal working.

**Crimped Coils**—American Nickeloid Co., Peru, Ill. Folder describing its crimped coils for new decorative effects and production economy; folder illustrating direct application of its prefinished metals in fabrication of electrical devices.

**Circuit Breakers**—General Electric Co., Schenectady, N. Y. Bulletin No. GEA-2505, describing type AF-I circuit breakers for office buildings and industrials.

**Tools for Universal Turret Lathes**—Gisholt Machine Co., Madison, Wis. Catalog illustrating standard tools and holding devices, showing how they are adapted to a wide range of work for No. 3-45 ram type universal turret lathes.

**Threaded Products**—Pheoll Mfg. Co., 5700 Roosevelt road, Chicago. Catalog containing price lists for

screws, bolts, nuts and related items. Also American standard screw thread specification, dimension tables and weights.

**Operating Valves**—Ross Operating Valve Co., 6488 Epworth boulevard, Detroit. Catalog No. 36, describing its operating valves for control of single and double-acting air cylinders as used on air chucks, lathes, screw machines.

**Selecting Alloy Steels**—International Nickel Co. Inc., 67 Wall street, New York. Chart offered as a guide to the selection of nickel alloy steels, indicating steel compositions and broad range of properties in simple shapes up to 12 inches in diameter; similar chart to aid in the selection of nickel cast irons.

**Factory Lighting**—Benjamin Electric Mfg. Co., Des Plaines, Ill. Handbook covering 30 common lighting problems found in the various operations and locations of the average plant giving definite recommendations, installation diagrams and equipment specifications for their solution.

**Chains**—American Chain division, American Chain & Cable Co. Inc., Bridgeport, Conn. Booklet giving definitions, cautions and instruction governing the purchase and use of chain and showing dimensional illustrations and specifications for single, double and multiple leg sling chains, a table of safe working loads for iron sling chains, specifications for Ajax and H. B. grades dredge or iron crane chain.

## Relation of Steel Testing To Actual Performance

(Concluded from Page 41)

intensifies the effects of corrosive action. The very low endurance limits which have been determined for corrosion fatigue apply only to testing under definite corrosive conditions, such as ocean water, tap water, industrial atmospheres and others.

Very little work has been done to show whether the endurance limit is affected by the size of the piece tested. Recent tests show that, under conditions of stress concentration caused by such things as fillets or transverse holes in shafts, the size of the test bar relative to the radius of the fillet or hole is a very definite factor, and that a lower endurance

limit must be used for larger shafts. Another recently discovered phenomenon is that the endurance limit of a test bar may be definitely increased by subjecting it to a preliminary fatigue test at a stress somewhat lower than the endurance limit. The phenomenon suggests the effects of cold working, although the preliminary stress is well below the yield point. These phenomena have been cited to show that the endurance limit like the other mechanical properties is not an absolute physical property of the metal but a laboratory quantity which is statistically reproducible under the conditions of the test.

In spite of the millions of endurance tests which have been carried out in the last 15 years, we do not know what to expect from a piece of steel in service under varying load conditions. A larger factor of safety must be used than for fairly steady loads, because of uncertainty with regard to starting a crack. We do not know the relation between an over-stress and the number of cycles at which a crack will form in a smooth test bar. We do not know how much such data would be modified in practice by the size, shape, and surface condition of the steel. Most important of all would be a knowledge of how high a stress could be used without causing a crack to spread. Such information would be a boon to the designer.

### Data Should Be Tabulated

Of great importance would be a better knowledge of the relative reliability of different steels. How nearly may we expect one bar of a given steel to be just like another bar of the same type? When these bars are forged or machined or heat treated, how nearly will they behave alike? Considering how many millions of mechanical tests have been carried out, it is high time that we began to accumulate data concerning the spread of test values. If some steels have a much narrower spread than others, the steel user should know it.

There are many excellent reasons for choosing one type of alloy machinery steel rather than another for a given service. Some steels may machine more easily than others of equal hardness; some may have better depth hardening properties; some may be less temperamental in their behavior when subjected to the vicissitudes of commercial heat treatment. In proportioning machine parts and selecting steel, the designer has need of every scrap of reliable information which he can get. In no other field does a man face so many uncertainties. It is possible for the steel manufacturer to lighten this load by furnishing more positive information as to the dependability of steel.



# Steel Production Continues To Increase

## Rate Reaches 83 Per Cent; Scrap Higher; Export Demand Grows

**E**VERY factor save labor uncertainties points to continued and increasing activity of the steel industry.

All lines of domestic business are seeking steel in nearly every form and foreign countries are insistent here for more tonnage. Resumption of motor production has restored demand interrupted by the General Motors strike and rehabilitation following the Ohio river flood is calling for heavy supplies. Mills are falling behind and in some instances sheet deliveries are 12 to 15 weeks delayed. Delivery has become more important than price with many consumers. Buying is being done for second quarter with no price named.

Better operating rates in most producing centers have caused an increase of 2 points to 83 per cent of capacity. Pittsburgh rose two points to 86 per cent, Eastern Pennsylvania 1½ points to 56 per cent, and Chicago one-half point to 80½ per cent; Buffalo increased one point to 86 and Birmingham one point to 77; Cleveland reached 79½ per cent by adding three points and Detroit 94 per cent by adding 8 points; Cincinnati, rising from the flood, increased 30 points to 60 per cent; Youngstown and Wheeling at 80 per cent and St. Louis at 82 showed no change; only New England dropped, losing two points to 86 per cent.

Prices for second quarter are under discussion and it is believed that some adjustments are likely to be made which might include pig iron, sheets and wire. In some quarters last week there was mentioned the possibility of a general advance coupled with a further rise in wages.

Award of 4000 tons for the north tube of the Midtown-Hudson tunnel at New York topped the structural steel market for the week. Total awards were 18,291 tons, compared with 30,470 tons the preceding week and 30,697 tons a year ago. Probably heavy covering before prices advanced is still restricting new business.

World shortage of iron and steel is becoming more apparent. Great Britain, for some time a heavy importer of semifinished steel from the Continent, is unable to obtain as much as she needs and steelworks

### MARKET IN TABLOID

**DEMAND** . . . . Strong for domestic and export.

**PRICES** . . . . Sentiment grows for higher second quarter level.

**PRODUCTION** . . Operations gain 2 points to 83 per cent.

**SHIPMENTS** . . . . Steady, backlogs little reduced.

are crippled. Her imports fell off 11,716 tons in January. British production is sold to the middle of the year. An inquiry for 50,000 tons of pig iron for England has been received in this country. Japan is reliably reported to have bought 35,000 tons of iron in addition to 45,000 tons placed several weeks ago. Export inquiries include also scrap, tin plate, reinforcing bars and wire rods. Current orders booked for tin plate have exceeded domestic orders in the experience of some producers. Export prices have been advanced on barbed wire \$5, wire nails \$8 and plain wire \$4 per ton.

Deliveries are assuming more importance, especially in sheets and strip, sales being made for delivery in second quarter, to be billed at prices prevailing at the time. Position on mill books is eagerly sought. Under prevailing conditions it is difficult, if not impossible, for consumers to accumulate stocks of steel, however much they are desired. Here again the threat of labor interruption of production dictates wisdom of providing supplies wherever possible.

Resumption of automobile production by General Motors carried production last week to 95,698 units, a gain of 22,748 over the preceding week. This was almost equal to production of the week of Jan. 9, when 96,780 cars left the assembly lines. These figures compare with 121,038 the week of Dec. 19, when the industry may be said to have been at its stride.

Advances in steelmaking grades at Chicago brought STEEL's composite of scrap quotations to \$19.25, an increase of 17 cents for the week. The same influences carried the iron and steel composite up 4 cents to \$36.71. The finished steel composite remains unchanged at \$55.80.



## COMPOSITE MARKET AVERAGES

	Feb. 20	Feb. 13	Feb. 6	One Month Ago Jan., 1937	Three Months Ago Nov., 1936	One Year Ago Feb., 1936	Five Years Ago Feb., 1932
Iron and Steel . . . .	\$36.71	\$36.67	\$36.64	\$36.55	\$34.65	\$33.48	\$29.24
Finished Steel . . . .	55.80	55.80	55.80	55.80	53.90	53.70	46.72
Steelworks Scrap . . .	19.25	19.08	18.79	18.12	16.05	13.83	7.89

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

## A COMPARISON OF PRICES

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

Finished Material	Feb. 20 1937	Jan. 1937	Nov. 1936	Feb. 1936	Pig Iron	Feb. 20, 1937	Jan. 1937	Nov. 1936	Feb. 1936
Steel bars, Pittsburgh . . . . .	2.20c	2.20	2.05	1.85	Bessemer, del. Pittsburgh . . . . .	\$22.26	22.26	20.81	20.81
Steel bars, Chicago . . . . .	2.25	2.25	2.10	1.90	Basic, Valley . . . . .	20.50	20.50	19.00	19.00
Steel bars, Philadelphia . . . . .	2.49c	2.49	2.36	2.16	Basic, eastern del. East Pa. . . . .	22.26	22.26	21.06	20.81
Iron bars, Terre Haute, Ind. . . . .	1.95	2.10	1.95	1.75	No. 2 fdy., del. Pittsburgh . . . . .	22.21	22.21	20.31	20.31
Shapes, Pittsburgh . . . . .	2.05	2.05	1.90	1.80	No. 2 fdy., Chicago . . . . .	21.00	21.00	19.75	19.50
Shapes, Philadelphia . . . . .	2.25 1/2	2.25 1/2	2.11 1/2	2.01 1/2	Southern No. 2, Birmingham . . . . .	17.38	17.38	15.75	15.50
Shapes, Chicago . . . . .	2.10	2.10	1.95	1.85	Southern No. 2, del. Cincinnati . . . . .	20.69	20.69	19.69	20.20
Tank plates, Pittsburgh . . . . .	2.05	2.05	1.90	1.80	No. 2X eastern, del. Phila. . . . .	23.135	23.135	21.93	21.68
Tank plates, Philadelphia . . . . .	2.23 1/2	2.23 1/2	2.09	1.99	Malleable, Valley . . . . .	21.00	21.00	19.50	19.50
Tank plates, Chicago . . . . .	2.10	2.10	1.95	1.85	Malleable, Chicago . . . . .	21.00	21.00	19.75	19.50
Sheets, No. 10, hot rolled, Pitts. . . . .	2.15	2.15	1.95	1.85	Lake Sup., charcoal, del. Chicago . . . . .	26.54	26.54	25.87	25.25
Sheets, No. 24, hot ann., Pitts. . . . .	2.80	2.80	2.60	2.40	Gray forge, del. Pittsburgh . . . . .	21.17	21.17	19.67	19.67
Sheets, No. 24, galv., Pitts. . . . .	3.40	3.40	3.20	3.10	Ferromanganese, del. Pittsburgh . . . . .	84.79	84.79	80.13	80.13
Sheets, No. 10, hot rolled, Gary . . . . .	2.25	2.25	2.05	1.95					
Sheets, No. 24, hot anneal., Gary . . . . .	2.90	2.90	2.70	2.50	Scrap				
Sheets, No. 24, galvan., Gary . . . . .	3.50	3.50	3.30	3.20	Heavy melting steel, Pittsburgh . . . . .	\$19.75	18.95	17.40	14.80
Plain wire, Pittsburgh . . . . .	2.60	2.60	2.50	2.30	Heavy melt. steel, No. 2, east Pa. . . . .	17.75	16.40	13.75	12.00
Tin plate, per base box, Pitts. . . . .	\$4.85	4.85	5.25	5.25	Heavy melting steel, Chicago . . . . .	19.75	18.25	16.50	14.30
Wire nails, Pittsburgh . . . . .	2.25	2.25	2.05	2.40	Rail for rolling, Chicago . . . . .	21.25	19.40	17.25	15.50
					Railroad steel specialties, Chicago . . . . .	21.75	19.65	18.25	15.75
Semifinished Material					Coke				
Sheet bars, open-hearth, Youngs. . . . .	\$34.00	34.00	32.00	30.00	Connellsville furnace, ovens . . . . .	\$4.00	4.00	4.00	3.50
Sheet bars, open-hearth, Pitts. . . . .	34.00	34.00	32.00	30.00	Connellsville, foundry, ovens . . . . .	4.25	4.25	4.25	4.20
Billets, open-hearth, Pittsburgh . . . . .	34.00	34.00	32.00	29.00	Chicago, by-product foundry, del. . . . .	10.25	10.25	9.75	9.75
Wire rods, No. 5 to 1 1/2-inch, Pitts. . . . .	43.00	43.00	40.00	40.00					

## Steel, Iron, Raw Material, Fuel and Metals Prices

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

Sheet Steel	Tin Mill Black No. 28	Corrosion and Heat-Resistant Alloys	Structural Shapes
Prices Subject to Quantity Extras and Deductions (Except Galvanized)	Pittsburgh . . . . . 2.95c	Pittsburgh base, cents per lb.	Pittsburgh . . . . . 2.05c
Hot Rolled No. 10, 24-48 in.	Gary . . . . . 3.05c	Chrome-Nickel	Philadelphia, del. . . . . 2.25 1/2 c
Pittsburgh . . . . . 2.15c	St. Louis, delivered . . . . . 3.285c	No. 302 No. 304	New York, del. . . . . 2.30 1/2 c
Gary . . . . . 2.25c		23.00 24.00	Boston, delivered . . . . . 2.43 1/2 c
Chicago, delivered . . . . . 2.28c	Cold Rolled No. 10	Plates . . . . . 26.00 28.00	Bethlehem . . . . . 2.15c
Detroit, del. . . . . 2.35c	Pittsburgh . . . . . 2.80c	Sheets . . . . . 33.00 35.00	Cleveland, del. . . . . 2.25c
New York, del. . . . . 2.48c	Gary . . . . . 2.90c	Hot strip . . . . . 20.75 22.75	Buffalo . . . . . 2.15c
Philadelphia, del. . . . . 2.44c	Detroit, delivered . . . . . 3.00c	Cold strip . . . . . 27.00 29.00	Gulf Ports . . . . . 2.45c
Birmingham . . . . . 2.30c	Philadelphia, del. . . . . 3.09c		Birmingham . . . . . 2.20c
St. Louis, del. . . . . 2.485c	New York, del. . . . . 3.13c		Pacific ports, f.o.b. cars, dock . . . . . 2.60c
Pacific ports, f.o.b. cars, dock . . . . . 2.70c	Pacific ports, f.o.b. cars, dock . . . . . 3.40c	Straight Chromes	Bars
Hot Rolled Annealed No. 24	St. Louis . . . . . 3.135c	No. No. No. No.	Soft Steel
Pittsburgh . . . . . 2.80c	Cold Rolled No. 20	410 430 442 446	(Base, 3 to 25 tons)
Gary . . . . . 2.90c	Pittsburgh . . . . . 3.25c	Bars . . . . . 17.00 18.50 21.00 26.00	Pittsburgh . . . . . 2.20c
Chicago, delivered . . . . . 2.93c	Gary . . . . . 3.35c	Plates . . . . . 20.00 21.50 24.00 29.00	Chicago or Gary . . . . . 2.25c
Detroit, delivered . . . . . 3.00c	Detroit, delivered . . . . . 3.45c	Sheets . . . . . 25.00 28.00 31.00 35.00	Duluth . . . . . 2.35c
New York, del. . . . . 3.13c	Philadelphia, del. . . . . 3.54c	Hot strip . . . . . 15.75 16.75 21.75 26.75	Birmingham . . . . . 2.35c
Philadelphia, del. . . . . 3.09c	New York, del. . . . . 3.58c	Cold stp. . . . . 20.50 22.00 27.00 35.00	Cleveland . . . . . 2.25c
Birmingham . . . . . 2.95c	St. Louis . . . . . 3.585c		Buffalo . . . . . 2.30c
St. Louis, del. . . . . 3.135c	Enameling Sheets		Detroit, delivered . . . . . 2.35c
Pacific ports, f.o.b. cars, dock . . . . . 3.45c	Pittsburgh, No. 10 . . . . . 2.60c	Steel Plate	Pacific ports, f.o.b. cars, dock . . . . . 2.75c
Galvanized No. 24	Pittsburgh, No. 20 . . . . . 3.20c	Pittsburgh . . . . . 2.05c	Philadelphia, del. . . . . 2.49c
Pittsburgh . . . . . 3.40c	Gary, No. 10 . . . . . 2.70c	New York, del. . . . . 2.33c	Boston, delivered . . . . . 2.60c
Gary . . . . . 3.50c	Gary, No. 20 . . . . . 3.30c	Philadelphia, del. . . . . 2.23 1/2 c	New York, del. . . . . 2.53c
Chicago, delivered . . . . . 3.53c	St. Louis, No. 10 . . . . . 2.935c	Boston, delivered . . . . . 2.45c	Pitts., forg. qual. . . . . 2.55c
Philadelphia, del. . . . . 3.69c	St. Louis, No. 20 . . . . . 3.535c	Buffalo, delivered . . . . . 2.30c	
New York, delivered . . . . . 3.73c		Chicago or Gary . . . . . 2.10c	Rail Steel
Birmingham . . . . . 3.55c	Tin and Terne Plate	Cleveland, del. . . . . 2.24 1/2 c	To Manufacturing Trade
St. Louis, del. . . . . 3.735c	Gary base, 10 cents higher.	Birmingham . . . . . 2.20c	Pittsburgh . . . . . 2.05c
Pacific ports, f.o.b. cars, dock . . . . . 4.00c	Tin plate, coke base (box) Pittsburgh . . . . . \$4.85	Coatesville, base . . . . . 2.15c	Chicago or Gary . . . . . 2.10c
	Do., waste-waste . . . . . 2.75c	Sparrows Pt., base . . . . . 2.15c	Moline, Ill. . . . . 2.10c
	Do., strips . . . . . 2.50c	Pacific ports, f.o.b. cars, dock . . . . . 2.60c	Cleveland . . . . . 2.10c
	Long ternes, No. 24 unassorted, Pitts. . . . . 3.70c	St. Louis, delivered . . . . . 2.33c	Buffalo . . . . . 2.15c
	Do., Gary . . . . . 3.80c		



<b>Iron</b>	
Terre Haute, Ind. ....	2.10c
Chicago .....	2.15c
Philadelphia .....	2.39c
Pittsburgh, refined .....	2.75-7.50c

<b>Reinforcing</b>	
New billet, straight lengths, quoted by distributors	
Pittsburgh .....	2.25c
Chicago, Gary, Buffalo	
Cleve., Birm., Young...	2.30c
Gulf ports .....	2.65c
Pacific coast ports f.o.b.	
car docks .....	2.70c
Philadelphia, del. ....	2.54c
Rail steel, straight lengths, quoted by distributors	
Pittsburgh .....	2.10c
Chicago, Buffalo, Cleveland, Birm., Young...	2.15c
Gulf ports .....	2.50c

## Wire Products

Prices apply to straight or mixed carloads; less carloads \$4 higher; less carloads fencing \$5 over base column.	
Base Pitts.-Cleve. 100 lb. keg.	
Standard wire nails .....	\$2.25
Cement coated nails .....	\$2.25
Galv. nails, 15 gage and coarser .....	\$4.25
do. finer than 15 ga. ....	\$4.75
(Per pound)	
Polished staples .....	2.95c
Galv. fence staples .....	3.20c
Barbed wire, galv. ....	2.75c
Annealed fence wire .....	2.90c
Galv. fence wire .....	3.30c
Woven wire fencing (base column, c. 1.) ....	\$63.00

<b>To Manufacturing Trade</b>	
Plain wire, 6-9 ga .....	2.60c
Anderson, Ind. (merchant products only) and Chicago up \$1; Duluth up \$2; Birmingham up \$3.	
Spring wire, Pitts. or Cleveland .....	3.20c
Do., Chicago up \$1, Worc. \$2.	

## Cold-Finished Carbon

<b>Bars and Shafting</b>	
Base, Pitts., one size, shape, grade, shipment at one time to one destination	
10,000 to 19,000 lbs. ....	2.55c
20,000 to 59,999 lbs. ....	2.50c
60,000 to 99,999 lbs. ....	2.45c
100,000 to 299,999 lbs. ....	2.42½c
300,000 lbs. and over....	2.40c
Gary, Ind., Cleve., Chi., up 5c; Buffalo, up 10c; Detroit, up 15c; eastern Michigan, up 20c.	

## Alloy Steel Bars (Hot)

(Base, 3 to 25 tons)			
Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem . . . . . 2.75c			
Alloy		Alloy	
S.A.E.	Diff.	S.A.E.	Diff.
2000 . . . . .	0.35	3100 . . . . .	0.70
2100 . . . . .	0.75	3200 . . . . .	1.35
2300 . . . . .	1.55	3300 . . . . .	3.80
2500 . . . . .	2.25	3400 . . . . .	3.20
4100 0.15 to 0.25 Mo. . . . .			0.55
4600 0.20 to 0.30 Mo. 150-2.00 Ni. . . . .			1.10
5100 0.80-1.10 Cr. . . . .			0.45
5100 Cr. spring . . . . .			0.15
6100 bars . . . . .			1.20
6100 spring . . . . .			0.85
Cr. Ni., Van. . . . .			1.50
Carbon Van. . . . .			0.85
9200 spring flats . . . . .			0.15
9200 spring rounds, squares . . . . .			0.40

## Piling

Pittsburgh .....	2.40c
Chicago, Buffalo .....	2.50c

## Strip and Hoops

(Base, hot rolled, 25-1 ton)	
(Base, cold-rolled, 25-3 tons)	
Hot strip to 23½-in.	
Pittsburgh .....	2.15c
Chicago or Gary .....	2.25c
Birmingham base .....	2.30c
Detroit, del. ....	2.35c
Philadelphia, del. ....	2.44c
New York, del. ....	2.48c
Cooperage hoop, Pittsburgh .....	2.15c
Chicago .....	2.25c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland .....	2.85c
Detroit, del. ....	3.05c
Worcester, Mass. ....	3.05c
<b>Carbon</b>	
Pitts. ter, Mass.	
0.26—0.50... ..	2.85c 3.05c
0.51—0.75... ..	3.95c 4.15c
0.76—1.00... ..	5.70c 5.90c
Over 1.00... ..	7.75c 7.95c

## Rails, Track Material

(Gross Tons)	
Standard rails, mill .....	39.00
Relay rails, Pittsburgh, 20—100 lbs. ....	25.50-28.00
Light rails, billet qual. Pittsburgh, Chicago .....	\$38.00
Do., rerolling quality... ..	37.00
Angle bars, billet, Gary, Pittsburgh, So. Chicago	2.70c
Do., axle steel .....	2.25c
Spikes, R. R. base .....	2.90c
Track bolts, base .....	4.00c
Tie plates, base .....	2.10c
Base, light rails 25 to 40 lbs.; 50 to 60 lbs., inclusive up \$2; 16 and 20 lbs. up \$1; 12 lbs. up \$2; 8 and 10 lbs., up \$5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.	

## Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists:	
<b>Carriage and Machine</b>	
½ x 6 and smaller .....	70 off
Do. larger .....	65-10 off
Tire bolts .....	50-5 off
<b>Plow Bolts</b>	
All sizes .....	65-10-10 off
<b>Stove Bolts</b>	
In packages with nuts attached 72½ off; in packages with nuts separate 72½-5 off; in bulk 81½ off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.	
Step bolts .....	60 off
Elevator bolts .....	60 off

<b>Nuts</b>	
S. A. E. semifinished hex.:	
½ to ¾-inch .....	60-20-5 off
Do., ½ to 1-inch .....	60-20-5 off
Do., over 1-inch .....	60-20-5 off
<b>Hexagon Cap Screws</b>	
Milled .....	50-10 off
Upset, 1-in., smaller .....	60 off
<b>Square Head Set Screws</b>	
Upset, 1-in., smaller .....	75 off
Headless set screws .....	75 off

## Cut Nails

Cut nails, Pitts. (10% discount of size extras) ..	\$3.10
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Do., less carloads, 5 kegs or more, no discount on size extras... ..	\$3.40
Do., under 5 kegs, no disc on size extras... ..	\$3.55

## Pipe and Tubing

Base \$200 net ton, except on less boiler tubes under 2 inches and cold drawn seamless.

## Welded Iron, Steel Pipe

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

<b>Butt Weld Steel</b>	
In. Blk. Galv.	
½ and ¾ .....	60 44½
¾ .....	64½ 55
1 .....	67½ 59
1—3 .....	69½ 61½
<b>Iron</b>	
½ .....	27 10½
¾ .....	32 16
1—1½ .....	35 21
2 .....	38½ 23

<b>Lap Weld Steel</b>	
2 .....	62 53½
2½—3 .....	65 56½
3½—6 .....	67 58½
7 and 8 .....	66 56½
9 and 10 .....	65½ 56

<b>Iron</b>	
2 .....	32½ 18
2½—3½ .....	33½ 20½
4—8 .....	35½ 24

<b>Line Pipe Steel</b>	
¾, butt weld .....	56
¾ and 1, butt weld .....	59
¾, butt weld .....	63½
¾, butt weld .....	66½
1 to 3, butt weld .....	68½
2, lap weld .....	61
2½ to 3, lap weld .....	64
3½ to 6, lap weld .....	66
7 and 8, lap weld .....	65

<b>Iron</b>	
¾—1½ inch, black and galv. take 4 pts. over; 2½—6-inch 2 pts. over discounts for same sizes, standard pipe lists, 8—12-inch, no extra.	

Boiler Tubes			
C. L. Discounts, f.o.b. Pitts.			
Lap Weld		Charcoal	
Steel		Iron	
2—2½.....	33	1¾.....	8
2½—2¾.....	40	2—2½.....	13
3.....	47	2½—2¾.....	16
3½—3¾.....	50	3.....	17
4.....	52	3½—3¾.....	18
4½—5.....	42	4.....	20
		4½.....	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 200 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 lbs., 2 pts. under base.

**Seamless Boiler Tubes**  
Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots of 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are quoted for 55 cold-drawn boiler tube sizes ranging from ¾ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and

per pound. Less-carloads revised as of July 1, 1935, card. Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, inclusive, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices being on lb. and 100 ft. basis.

## Seamless Tubing

Cold drawn; f.o.b. mill disc.	
100 ft. or 150 lbs. ....	32%
15,000 ft. or 22,500 lbs. ....	70%

## Cast Iron Water Pipe

<b>Class B Pipe—Per Net Ton</b>	
6-in. & over, Birm. ....	\$41.00-42.00
4-in., Birmingham .....	44.00-45.00
4-in., Chicago .....	52.00-53.00
6 to 24-in., Chicago. ....	49.00-50.00
6-in & over, east. fdy. ....	45.00
Do., 4-in. ....	46.00
<b>Class A pipe \$3 over Class B</b>	
Std. ftgs., Birm. base .....	\$100.00

## Semifinished Steel

<b>Billets and Blooms</b>	
4 x 4-inch base; gross ton	
Pitts., Chi., Cleve., Buffalo and Young .....	\$34.00
Philadelphia .....	39.30
Duluth .....	36.00

<b>Forging Billets</b>	
6 x 6 to 9 x 9-in., base	
Pitts., Chicago, Buffalo .....	40.00
Forging, Duluth .....	42.00

<b>Sheet Bars</b>	
Pitts., Cleve., Young, Sparrows Point .....	34.00

<b>Slabs</b>	
Pitts., Chicago, Cleveland, Youngstown .....	\$34.00

<b>Wire Rods</b>	
Pitts., Cleve., No. 5 to ½-inch incl .....	43.00
Do., over ½ to ¾-inch incl. ....	45.00
Chicago up \$1; Worcester up \$2.	

<b>Skelp</b>	
Pitts., Chi., Young, Buff., Coatesville, Sparrows Pt. ....	1.80c

## Coke

<b>Price Per Net Ton</b>	
<b>Beehive Ovens</b>	
Connellsville, fur. ....	\$3.90-4.10
Connellsville, fdry. ....	4.50-4.75
Connell. prem. fdry. ....	5.50
New River fdry. ....	6.00
Wise county fdry. ....	4.45-5.00
Wise county fur. ....	4.00-4.50
<b>By-Product Foundry</b>	
Newark, N. J., del. ....	10.17-10.60
Chi., ov., outside del. ....	9.50
Chicago, del. ....	10.25
New England, del. ....	12.00
St. Louis, del. ....	10.50-11.00
Birmingham, ovens .....	6.50
Indianapolis, del. ....	9.65
Cincinnati, del. ....	9.75
Cleveland, del. ....	10.30
Buffalo, del. ....	10.50
Detroit, del. ....	10.70
Philadelphia, del. ....	9.85

## Coke By-Products

<b>Spot, gal. Producers' Plants</b>	
Pure and 90% benzol. ....	16.00c
Toluol .....	30.00c
Solvent naphtha .....	30.00c
Industrial xylol .....	30.00c
Per lb. f.o.b. Frankford	
Phenol (200 lb. drums) ..	15.00c
Do., (450 lbs.) .....	14.00c
<b>Eastern Plants, per lb.</b>	
Naphthalene flakes and balls, in bbls., to jobbers .....	7.25c
Per 100-lbs. Atlantic seaboard	
Sulphate of ammonia. ....	\$1.35.
†Western prices, ¼-cent up.	



## Pig Iron

Delivered prices include switching charges only as noted.  
No. 2 foundry is 1.75-2.25 sl.; 25c diff. for each 0.25 sl. 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. ....	\$22.00	\$22.50	\$21.50	\$23.00
Birdsboro, Pa. ....	22.00	22.50	21.50	23.00
Birmingham, Ala.† ..	17.38	....	16.38	21.50
Buffalo .....	21.00	21.50	20.00	22.00
Chicago .....	21.00	21.00	20.50	21.50
Cleveland .....	21.00	21.00	20.50	21.50
Detroit .....	21.00	21.00	20.50	21.50
Duluth .....	21.50	21.50	....	22.00
Erie, Pa. ....	21.00	21.50	20.50	22.00
Everett, Mass. ....	22.75	23.25	22.25	23.75
Hamilton, O. ....	21.00	21.00	20.50	....
Jackson, O. ....	20.25	20.25	19.75	....
Neville Island, Pa. ....	21.00	21.00	20.50	21.50
Provo, Utah .....	18.50	....	18.00	....
Sharpsville, Pa. ....	21.00	21.00	20.50	21.50
Sparrows Point, Md. ....	22.00	....	21.50	....
Swedeland, Pa. ....	22.00	22.50	21.50	23.00
Toledo, O. ....	21.00	21.00	20.50	21.50
Youngstown, O. ....	21.00	21.00	20.50	21.50

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

Delivered from Basing Points:				
Akron, O., from Cleveland .....	21.76	21.76	21.26	22.26
Baltimore from Birmingham .....	22.58	....	21.46	....
Boston from Birmingham .....	23.37	....	22.87	....
Boston from Everett, Mass. ....	23.25	23.75	22.75	24.25
Boston from Buffalo .....	23.25	23.75	22.75	24.25
Brooklyn, N. Y., from Bethlehem ..	24.27	24.77	....	....
Brooklyn, N. Y., from Bmghm. ....	24.05	....	....	....
Canton, O., from Cleveland .....	21.76	21.76	21.26	22.26
Chicago from Birmingham .....	21.22	....	21.10	....
Cincinnati from Hamilton, O. ....	20.82	21.58	21.08	....
Cincinnati from Birmingham .....	20.69	....	19.69	....
Cleveland from Birmingham .....	21.12	....	20.62	....
Cincinnati from Hamilton, O. ....	21.07	21.79	20.07	....
Mansfield, O., from Toledo, O. ....	22.76	22.76	22.26	22.26
Milwaukee from Chicago .....	22.00	22.00	21.50	22.00
Muskegon, Mich., from Chicago, Toledo or Detroit .....	23.90	23.90	23.40	24.40
Newark, N. J., from Birmingham ..	23.01	....	....	....
Newark, N. J., from Bethlehem. ....	23.39	23.89	....	....
Philadelphia from Birmingham .....	22.38	....	22.26	....
Philadelphia from Swedeland, Pa. ....	22.76	23.26	22.26	....
Pittsburgh district from Neville Island { Neville, base plus 63c, 76c, and \$1.13 switch'g charges	23.25	23.25	22.75	22.75
Saginaw, Mich., from Detroit. ....	21.50	21.50	21.00	....
St. Louis, northern .....	21.50	21.50	21.00	....

Delivered from Basing Points:	No. 2 Fdry.	Malle-able	Basic	Besse-mer
St. Louis from Birmingham .....	\$21.12	....	20.82	....
St. Paul from Duluth .....	22.94	22.94	....	23.44
†Over 0.70 phos.				

### Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., \$25.50, Phila. base, standard and copper bearing, \$26.63.

### Gray Forge

Valley furnace .....	\$20.50	Charcoal Lake Superior fur. ....	\$23.50
Pitts. dist. fur. ....	20.50	do., del. Chicago .....	26.54
		Lyles, Tenn. ....	24.00

### Silvery†

Jackson county, O., base: 6-6.50 per cent \$24.50; 6.51-7—\$25.00; 7-7.50—\$25.50; 7.51-8—\$26.00; 8-8.50—\$26.50; 8.51-9—\$27.00; 9-9.50—\$27.50; Buffalo \$1.25 higher.

### Bessemer Ferrosilicon†

Jackson county, O., base: Prices are the same as for silveries, plus \$1 a ton.  
†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.  
Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, \$1 per ton add. Each unit over 3%, add \$1 per ton.

## Refractories

Per 1000 f.o.b. Works

Fire Clay Brick		
Super Quality		
Pa., Mo., Ky. ....	\$58.90	
First Quality		
Pa., Ill., Md., Mo., Ky. ....	\$45.60	
Alabama, Georgia. ....	\$38.00-45.00	
Second Quality		
Pa., Ill., Ky., Md., Mo. ....	40.85	
Georgia, Alabama .....	36.10	
Ohio		
First quality .....	\$40.85	
Intermediary .....	38.00	
Second quality .....	29.45	
Malleable Bung Brick		
All bases .....	54.15	
Silica Brick		
Pennsylvania .....	\$45.60	
Joliet, E. Chicago .....	54.15	
Birmingham, Ala. ....	45.60	
Ladle Brick		
(Pa., O., W. Va., Mo.)		
Dry press .....	\$25.00	
Wire cut .....	23.00	
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) ..	42.00
Domestic dead - burned gr. net ton f.o.b. Chewelah, Wash. (bulk) ..	24.00
Base Brick	
Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.	
Chrome brick .....	\$47.00
Chem. bonded chrome. ....	47.00
Magnesite brick .....	67.00
Chem. bonded magnesite ..	57.00

## Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton. ....	\$23.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail .....	\$18.00
Do., for barge .....	\$18.50

## Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid. ....	80.00
Do., Baltimore, base. ....	80.00
Do., del. Pittsburgh. ....	84.79
Spiegeleisen, 19-20% dom. Palmerston, Pa., spot. ....	126.00
Do., New Orleans .....	26.00
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. ....	89.00
2% carbon, 94.00; 1%, 104.00	
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del. ....	10.00
Ferrotungsten, stand., lb. con. del. ....	130-140
Ferrovanadium, 35 to 40% lb., cont. ....	2.70-2.90
Ferrotitanium, c. l., prod. plant, frt. all., net ton	137.50
Spot, 1 ton, frt. allow., lb. ....	7.00
Do., under 1 ton, lb. ....	7.75-8.25
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
†C—loads. Quan. diff. apply.	

## Nonferrous

### METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

Copper				Straits Tin		Lead		Alumi-num		Antimony		Nickel	
Electro, del. Conn.	Lake, Midwest	Casting, refinery		New York Spot	Futures	Lead N. Y.	East St. L.	Zinc St. L.	99%	Spot, N. Y.	Chinese Cath-	odes	
Feb. 13 13.00	13.12½	12.95		50.75	50.55	6.00	5.85	6.40	*19.00	14.25	35.00		
Feb. 15 13.00	13.12½	12.95		51.10	50.90	6.00	5.85	6.40	*19.00	14.25	35.00		
Feb. 16 14.00	14.12½	13.70		51.40	51.10	6.00	5.85	6.40	*19.00	14.25	35.00		
Feb. 17 14.00	14.12½	13.70		51.62½	51.35	6.00	5.85	6.40	*19.00	14.25	35.00		
Feb. 18 14.00	14.12½	13.70		52.25	51.95	6.25	6.10	6.60	*19.00	14.25	35.00		
Feb. 19 14.00	14.12½	13.70		53.87½	53.62½	6.50	6.35	6.80	*19.00	14.25	35.00		

\*Nominal range 19.00 to 21.00c.

### MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 13.00.  
Conn. copper

Sheets	
*Yellow brass (high) ....	19.12½
*Copper, hot rolled .....	21.37½
*Lead, cut to jobbers. ....	9.75
Zinc, 100-lb. base .....	10.50
Tubes	
*High yellow brass .....	21.87½
*Seamless copper .....	22.37½
Rods	
*High yellow brass .....	15.75
*Copper, hot rolled .....	18.12½
Anodes	
*Copper, untrimmed .....	18.87½
Wire	
*Yellow brass (high) ....	19.37½

### OLD METALS

Deal. buying prices, cents lb.

No. 1 Composition Red Brass	
*New York .....	9.62½- 9.75
*Cleveland .....	10.75-11.00
*Chicago .....	10.25-10.50
*St. Louis .....	10.00-10.25
Heavy Copper and Wire	
*New York, No. 1. ....	11.37½-11.50
*Chicago, No. 1. ....	12.00-12.25
*Cleveland, No. 1. ....	11.75-12.00
*St. Louis, No. 1. ....	11.75-12.00
Composition Brass Borings	
*New York .....	9.12½- 9.25
Light Copper	
*New York .....	9.87½-10.00
*Chicago .....	10.12½-10.37½
*Cleveland .....	9.75-10.00
*St. Louis .....	9.87½-10.12½

### Light Brass

*Chicago .....	6.50- 6.75
*Cleveland .....	6.50- 6.75
*St. Louis .....	6.37½-6.62½
Lead	
*New York .....	5.40- 5.50
*Cleveland .....	5.00- 5.25
*Chicago .....	5.25- 5.50
*St. Louis .....	5.00- 5.12½
Zinc	
*New York .....	3.50- 3.75
St. Louis .....	3.50- 3.75
*Cleveland .....	3.50- 3.75
Aluminum	
Borings, Cleveland. ....	9.75-10.00
Mixed, cast, Cleve. ....	13.25-13.50
*Mixed, cast, St. L. ....	13.50-13.75
Clips, soft, Cleve. ....	15.00-15.25
SECONDARY METALS	
*Brass, Ingot 85-5-5-5, 1cl. ....	14.50
Stand. No. 12 alum. ....	17.50-17.75



# Warehouse Iron and Steel Prices

*Cents per pound for delivery within metropolitan districts of cities specified*

## STEEL BARS

Baltimore	3.50c
Boston††	3.55c
Buffalo	3.10c
Chattanooga	3.71c
Chicago (j)	3.35c
Cincinnati	3.55c
Cleveland	3.25c
Detroit	3.43½c
Houston	3.10c
Los Angeles	4.00c
Milwaukee	3.46c-3.61c
New Orleans	3.70c
New York† (d)	3.62c
Pitts. (h)	3.30c-3.45c
Philadelphia*	3.45c
Portland	3.85c
San Francisco	3.85c
Seattle	4.10c
St. Louis	3.59c
St. Paul	3.60c-3.75c
Tulsa	3.35c

## IRON BARS

Portland	3.50c
Chattanooga	3.71c
Baltimore*	3.10c
Cincinnati	3.55c
New York† (d)	3.15c
Philadelphia*	3.45c
St. Louis	3.59c
Tulsa	3.35c

## REINFORCING BARS

Buffalo	2.60c
Chattanooga	3.71c
Cleveland (c)	2.25c
Cincinnati	3.40c
Houston	3.25c
Los Angeles, c.l.	2.45c
New Orleans*	2.84c
Pitts., plain (h)	3.25c
Pitts., twisted squares (h)	3.40c
San Francisco	2.72½c
Seattle	3.75c
St. Louis	3.49c
Tulsa	3.25c
Young	2.30c-2.60c

## SHAPES

Baltimore	3.50c
Boston††	3.57c
Buffalo	3.35c
Chattanooga	3.81c
Chicago	3.45c
Cincinnati	3.65c
Cleveland	3.56c
Detroit	3.65c
Houston	3.10c
Los Angeles	4.00c
Milwaukee	3.56c
New Orleans	3.80c
New York† (d)	3.62c
Philadelphia*	3.30c
Pittsburgh (h)	3.40c
Portland (l)	3.85c
San Francisco	3.75c
Seattle (l)	4.05c
St. Louis	3.69c
St. Paul	3.70c
Tulsa	3.60c

## PLATES

Baltimore	3.60c
Boston††	3.58c
Buffalo	3.47c
Chattanooga	3.81c
Chicago	3.45c
Cincinnati	3.65c
Cleveland, ¼-in.	
and over	3.56c
Detroit	3.65c
Detroit, ½-in.	3.85c
Houston	3.10c
Los Angeles	4.00c
Milwaukee	3.41c
New Orleans	3.80c
New York† (d)	3.65c
Philadelphia*	3.30c

Phila. floor	4.95c
Pittsburgh (h)	3.40c
Portland	3.85c
San Francisco	3.75c
Seattle	4.05c
St. Louis	3.69c
St. Paul	3.70c
Tulsa	3.60c

## NO. 10 BLUE

Baltimore	3.45c
Boston (g)	3.70c
Buffalo	3.72c
Chattanooga	3.66c
Chicago	3.35c
Cincinnati	3.50c
Cleveland	3.41c
Det. 8-10 ga.	3.43½c
Houston	3.45c
Los Angeles	4.15c
Milwaukee	3.46c
New Orleans	3.85c
New York† (d)	3.57c
Portland	3.95c
Philadelphia*	3.45c
Pittsburgh (h)	3.25c
San Francisco	3.95c
Seattle	4.10c
St. Louis	3.59c
St. Paul	3.60c
Tulsa	3.80c

## NO. 24 BLACK

Baltimore*†	4.10c
Boston (g)	4.30c
Buffalo	3.35c
Chattanooga*	3.56c
Chicago	3.90c-4.55c
Cincinnati	4.05c
Cleveland	4.31c
Detroit	4.33½c
Los Angeles	4.35c
Milwaukee	4.16c
New York† (d)	4.22c
Philadelphia*†	4.15c
Pitts.** (h)	3.65c-4.95c
Portland	4.65c
Seattle	4.85c
San Francisco	4.65c
St. Louis	4.29c
St. Paul	4.30c
Tulsa	4.85c

## NO. 24 GALV. SHEETS

Baltimore*†	4.20c
Buffalo	4.10c
Boston (g)	4.35c
Chattanooga*	4.16c
Chicago (h)	4.35c-5.35c
Cincinnati	4.65c
Cleveland	4.91c
Detroit	5.00c
Houston	4.50c
Los Angeles	4.60c
Milwaukee	4.76c
New Orleans*	4.09c
New York† (d)	4.50c
Philadelphia*†	4.80c
Pitts.** (h)	4.50c-4.75c
Portland	5.35c
San Francisco	5.25c
Seattle	5.35c
St. Louis	4.89c
St. Paul	5.10c
Tulsa	5.20c

## BANDS

Baltimore	3.50c
Boston††	3.70c
Buffalo	3.52c
Chattanooga	3.91c
Cincinnati	3.75c
Cleveland	3.66c
Chicago	3.60c
Detroit, ½-in.	
and lighter	3.68½c
Houston	3.35c
Los Angeles	4.30c
Milwaukee	3.71c
New Orleans	4.25c
New York† (d)	3.82c

Philadelphia*	3.55c
Pittsburgh (h)	3.50c
Portland	4.60c
San Francisco	4.45c
Seattle	4.60c
St. Louis	3.84c
St. Paul	3.85c
Tulsa	3.55c

## HOOPS

Baltimore	3.75c
Boston††	4.70c
Buffalo	3.52c
Chicago	3.60c
Cincinnati	3.75c
Detroit, No. 14	
and lighter	3.68½c

Los Angeles	6.25c
Milwaukee	3.71c
New York† (d)	3.66c
Philadelphia*	3.80c
Pittsburgh (h)	4.00c
Portland	5.95c
San Francisco	6.50c
Seattle	5.95c
St. Louis	3.84c
St. Paul	3.85c

## COLD FIN. STEEL

Baltimore (c)	4.15c
Boston*	4.30c
Buffalo (h)	3.70c
Chattanooga*	4.51c
Chicago (h)	3.95c
Cincinnati	4.15c
Cleveland (h)	3.95c
Detroit	4.03½c
Los Ang. (f) (d)	6.35c
Milwaukee	4.06c
New Orleans	4.75c

New York† (d)	4.22c
Philadelphia*	4.18c
Pittsburgh	3.80c
Portland (f) (d)	5.35c
San Fran. (f) (d)	6.30c
Seattle (f) (d)	5.35c
St. Louis	4.19c
St. Paul	4.20c
Tulsa	4.80c

## COLD ROLLED STRIP

Boston	3.495c
Buffalo	3.39c
Chicago	3.52c
Cleveland (b)	3.00c
Cleveland (b)	3.20c
Detroit	3.43c
New York† (d)	3.57c
St. Louis	3.61c

## TOOL STEELS

(Applying on or east of Mississippi river; west of Mississippi 1c up.)

Base	
High speed	62c
High carbon, high chrome	41c
Oil hardening	24c
Special tool	22c
Extra tool	18½c
Regular tool	15c
Uniform extras apply.	

## BOLTS AND NUTS

(100 pounds or over)	
Discount	
Chicago (a)	65
Cleveland	70
Detroit	70-10
Milwaukee	65

New Orleans	70-10
Pittsburgh	65-5

(a) Under 100 lbs., 60 off.

(b) Plus straightening, cutting and quantity differentials; (c) Plus mill, size and quantity extras; (d) Quantity base; (e) New mill classif. (f) Rounds only; (g) 50 bundles or over; (h) Outside delivery, 10c less; (i) Under 3 in.; (j) Shapes other than rounds, flats, fillet angles, 3.50c.

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 999 lbs., base; 1000 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; \*\*Under 25 bundles; \*†50 or more bundles; †New extras apply; ††Base 8000 lbs., extras on less.

# Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Feb. 18

Export Prices f. o. b. Ship at Port of Dispatch—(By Cable or Radio)

	British gross tons U. K. ports		Channel or North Sea ports, metric tons	
	£ s d		Quoted in dollars at current value	
PIG IRON				
Foundry, 2.50-3.00 Silicon	\$19.23	3 18 6*	\$18.30	2 5 0
Basic bessemer	19.23	3 18 6*	14.23	1 15 0
Hematite, Phos. .03-.05	21.48	4 7 6		
SEMIFINISHED STEEL				
Billets	\$30.69	6 5 0	\$24.40	3 0 0
Wire rods, No. 5 gage	47.16	9 12 6	41.68	5 2 6
FINISHED STEEL				
Standard rails	\$41.65	8 10 0	\$44.74	5 10 0
Merchant bars	2.03c	9 5 0	1.63c	4 7 6
Structural shapes	2.00c	9 2 6	1.52c to 1.63c	4 2 6 to 4 7 6
Plates, ¼ in. or 5 mm.	2.23c	10 3 9	2.00c to 2.05c	5 9 6 to 5 12 0
Sheets, black, 24 gage or 0.5 mm.	2.64c	12 0 0	2.67c	7 5 0††
Sheets, gal., 24 gage, corr.	3.23c	14 15 0	3.41c	9 5 0
Bands and strips	2.20c	10 0 0	1.75c to 1.89c	4 15 0 to 5 2 6
Plain wire, base	2.31c	10 10 0	2.49c	6 15 0
Galvanized wire, base	2.75c	12 10 0	2.94c	7 17 6
Wire nails, base	2.64c	12 0 0	2.39c	6 10 0
Tin plate, box 108 lbs.	\$ 4.85	0 19 9		

British ferromanganese \$80 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d (\$43.74) f.o.b.

## Domestic Prices at Works or Furnace—Last Reported

	£ s d		French Francs		Belgian Francs		Reich Marks	
Fdy. pig iron, Si. 2.5	\$19.89	4 1 0(a)	\$17.61	378	\$22.75	675	\$25.36	63
Basic bessemer pig iron	20.25	4 2 6(a)	12.84	275	14.66	435	29.97 (b)	69.50
Furnace coke	5.28	1 1 6	5.93	127	4.62	137	7.65	19
Billets	30.69	6 5 0	27.55	590	21.57	640	38.84	96.50
Standard rails	1.82c	8 5 0	1.64c	780	1.73c	1,150	2.38c	132
Merchant bars	2.19c	9 10 0	1.68c	800	1.16c	775	1.98c	110
Structural shapes	2.01c	9 3 0	1.64c	780	1.16c	775	1.93c	107
Plates, ¼ in. or 5 mm.	2.16c	9 16 9	2.12c	1,010	1.43c	950	2.29c	127
Sheets, black	2.64c	12 0 0	2.84c	1,350†	1.82c	1,210†	2.59c	144†
Sheets, galv., corr., 24 ga. or 0.5 mm.	3.08c	14 0 0	4.41c	2,100	2.85c	1,900	6.66c	370
Plain wire	2.42c	11 0 0	2.77c	1,320	2.02c	1,350	3.11c	173
Bands and strips	2.26c	10 5 0	1.92c	915	1.61c	1,075	2.29c	127

\*Basic. †British ship-plates. Continental, bridge plates. \$24 ga. †1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. a del. Middlesbrough. b hematite. ††Close annealed. \*\*Gold pound sterling carries a premium of 67 per cent over paper sterling.



# Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; † indicates brokers prices

## HEAVY MELTING STEEL

Birmingham†	12.50-13.50
Bos. dock, No. 1, exp.	16.00-16.25
N. Eng. del. No. 1.	16.00
Buffalo, No. 1	18.50-19.00
Buffalo, No. 2	17.00-17.50
Chicago, No. 1	19.50-20.00
Cleveland, No. 1	17.50-18.00
Cleveland, No. 2	16.50-17.00
Detroit, No. 1	15.50-16.00
Eastern Pa., No. 1	18.50-19.00
Eastern Pa., No. 2	17.50-18.00
Federal, Ill.	15.25-15.75
Granite City, R. R.	17.00-17.50
Granite City, No. 2	15.25-15.75
New York, No. 1	14.50-15.00
N.Y. dock, No. 1 exp.	14.50
Pitts., No. 1 (R. R.)	20.75-21.25
Pitts., No. 1 (dlr.)	19.50-20.00
Pittsburgh, No. 2	18.00-18.50
St. Louis, R. R.	17.00-17.50
St. Louis, No. 2	15.25-15.75
Toronto, dlrs. No. 1	9.75-10.50
Toronto, No. 2	8.75-9.50
Valleys, No. 1	19.00-19.50

## COMPRESSED SHEETS

Buffalo, dealers	17.00-17.50
Chicago, factory	18.50-19.00
Chicago, dealer	17.50-18.00
Cleveland	17.50-18.00
Detroit	16.00-16.50
E. Pa., new mat.	18.50-19.00
E. Pa., old mat.	16.00-16.50
Pittsburgh	19.50-20.00
St. Louis	16.00-16.50
Valleys	19.00-19.25

## BUNDLED SHEETS

Buffalo	14.50-15.00
Cincinnati, del.	12.50-13.00
Cleveland	14.00-14.50
Pittsburgh	18.00-18.50
St. Louis	12.00-12.50
Toronto, dealers	6.00

## SHEET CLIPPINGS, LOOSE

Chicago	14.00-14.50
Cincinnati	11.50-12.00
Detroit	12.25-12.75
St. Louis	11.00-11.50

## STEEL RAILS, SHORT

Birmingham	16.00-16.50
Buffalo	21.00-22.00
Chicago (3 ft.)	22.00-22.50
Chicago (2 ft.)	23.00-23.50
Cincinnati, del.	20.00-20.50
Detroit	19.00-19.50
Pitts., open-hearth,	
3 ft. and less	23.50-24.00
St. Louis, 2 ft. & less	19.50-20.00

## STEEL RAILS, SCRAP

Boston district	14.00-14.50
Buffalo	18.50-19.00
Chicago	19.50-20.00
Pittsburgh	21.00-21.50
St. Louis	18.00-18.50
Toronto, dealers	9.00

## STOVE PLATE

Birmingham	9.00-9.50
Boston district	19.75-20.00
Buffalo	13.75-14.00
Chicago	10.50-11.00
Cincinnati, dealers	11.25-11.75
Detroit, net	10.50-11.00
Eastern Pa.	15.00
New York, fdry.	11.00
St. Louis	11.75-12.25
Toronto, deal'rs, net	7.50-8.00

## SPRINGS

Buffalo	19.50-20.00
Chicago, leaf	21.50-22.00
Chicago, coil	23.00-23.50
Eastern Pa.	24.50-25.00
Pittsburgh	25.50-26.00
St. Louis	19.00-19.50

## ANGLE BARS—STEEL

Chicago	21.00-21.50
St. Louis	18.00-18.50
Buffalo	14.50-15.00

## RAILROAD SPECIALTIES

Chicago	21.50-22.00
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## LOW PHOSPHORUS

Buffalo, billet and bloom crops	20.50-21.50
Cleveland, billet, bloom crops	22.00-22.50
Eastern Pa., crops	24.50-25.00
Pittsburgh, billet, bloom crops	25.50-26.00
Pittsburgh, sheet bar crops	25.00-25.50

## FROGS, SWITCHES

Chicago	19.00-19.50
St. Louis, cut	18.00-18.50

## SHOVELING STEEL

Chicago	19.50-20.00
Federal, Ill.	15.25-15.75
Granite City, Ill.	15.25-15.75
Toronto, dealers	7.50

## RAILROAD WROUGHT

Birmingham	9.00-10.00
Boston district	10.00-10.25
Buffalo, No. 1	17.00-17.50
Buffalo, No. 2	18.50-19.00
Chicago, No. 1, net	16.75-17.25
Chicago, No. 2	19.50-20.00
Cincinnati, No. 2	16.50-17.00
Eastern Pa.	19.00
St. Louis, No. 1	15.00-15.50
St. Louis, No. 2	17.25-17.75
Toronto, No. 1 dlr.	8.00

## SPECIFICATION PIPE

Eastern Pa.	16.00-16.50
New York	12.00-12.50

## BUSHING

Buffalo, No. 1	17.00-17.50
Chicago, No. 1	18.25-18.75
Cincin., No. 1, deal.	12.25-12.75
Cincinnati, No. 2	9.00-9.50
Cleveland, No. 2	13.00-13.50
Detroit, No. 1, new	15.00-15.50
Valleys, new, No. 1	18.50-19.00
Toronto, dealers	7.00

## MACHINE TURNINGS

Birmingham	6.00-6.50
Buffalo	12.00-12.50
Chicago	10.50-11.00
Cincinnati, dealers	10.00-10.50
Cleveland	11.50-12.00
Detroit	10.50-11.00
Eastern Pa.	12.50-13.00
New York	14.25-14.75
Pittsburgh	14.25-14.75
St. Louis	8.00-8.50
Toronto, dealers	6.25-7.00
Valleys	14.25-14.75

## BORINGS AND TURNINGS

For Blast Furnace Use	
Boston district	7.25-8.25

Buffalo	12.25-12.75
Cincinnati, dealers	10.00-10.50
Cleveland	13.00-13.50
Detroit	10.50-11.00
Eastern Pa.	11.00-11.50
New York	17.00-17.50
Pittsburgh	14.00-14.50
Toronto, dealers	6.25

## CAST IRON BORINGS

Birmingham	6.00-6.50
Boston dist. chem.	19.50-9.75
Boston dist. for mills	18.00-8.25
Buffalo	12.00-12.50
Chicago, dealers	10.50-11.00
Cincinnati, dealers	10.00-10.50
Cleveland	13.00-13.50
Detroit	10.50-11.00
E. Pa., chemical	13.00-13.50
New York	18.00-8.50
St. Louis	8.00-8.50
Toronto, dealers	6.75

## PIPE AND FLUES

Cincinnati, dealers	10.50-11.00
Chicago, net	13.00-13.50

## RAILROAD GRATE BARS

Buffalo	14.50-15.00
Chicago, net	12.50-13.00
Cincinnati	11.00-11.50
Eastern Pa.	15.00
New York	10.50-11.00
St. Louis	12.50-13.00

## FORGE FLASHINGS

Boston district	12.00-12.25
Buffalo	17.00-17.50
Cleveland	17.00-17.50
Detroit	14.50-15.00
Pittsburgh	17.50-18.00

## FORGE SCRAP

Boston district	16.50-7.00
Chicago, heavy	22.50-23.00
Eastern Pa.	16.50-17.00

## ARCH BARS, TRANSOMS

St. Louis	16.50-17.00
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## AXLE TURNINGS

Boston district	19.50-20.00
Buffalo	14.50-15.00
Chicago, elec. fur.	18.00-18.50
Eastern Pa.	17.50-18.00
St. Louis	11.50-12.00
Toronto	6.25

## STEEL CAR AXLES

Birmingham	17.00-18.00
Buffalo	19.50-20.00
Boston district	18.50-19.00
Chicago, net	22.50-23.00
Eastern Pa.	22.50-23.00
St. Louis	22.00-22.50

## SHAFTING

Boston district	18.00-18.50
Eastern Pa.	23.50
New York	19.00-19.50
St. Louis	15.00-15.50

## CAR WHEELS

Birmingham	16.00-17.00
Boston dist. iron	13.00-13.50
Buffalo, iron	17.50-18.00
Buffalo, steel	20.50-21.50
Chicago, iron	19.00-19.50
Chicago, rolled steel	21.50-22.00

Cincinnati, iron	17.50-18.00
Eastern Pa., iron	19.00
Eastern Pa., steel	24.50-25.00
Pittsburgh, iron	19.00-19.50
Pittsburgh, steel	25.50-26.00
St. Louis, iron	17.00-17.50
St. Louis, steel	19.00-19.50

## NO. 1 CAST SCRAP

Birmingham	13.00-14.00
Bos. dis. No. 1 mach.	13.75-14.00
N. Eng., del. No. 2.	13.00
N. Eng., del. textile	16.00
Buffalo, cupola	16.50-17.00
Buffalo, mach.	17.25-17.75
Chicago, agri. net.	13.50-14.00
Chicago, auto	14.75-15.25
Chicago, mach. net.	16.50-17.00
Chicago, rail'd net.	15.00-15.50
Cincl., mach. cup.	16.25-16.75
Cleveland, mach.	19.00-19.50
Eastern Pa., cupola	18.50-19.50
E. Pa., mixed yard.	16.00-16.50
Pittsburgh, cupola.	18.50-19.00
San Francisco, del.	13.50-14.00
Seattle	11.00-12.00
St. Louis, No. 1	14.00-14.50
St. L., No. 1, mach.	15.50-16.00
Toronto, No. 1, mach., net	10.50-11.00

## HEAVY CAST

Boston dist. break	12.75-13.00
New England, del.	15.00
Buffalo, break.	14.50-15.00
Cleveland, break.	14.50-15.00
Detroit, No. 1 mach. net	13.50-14.00
Detroit, break.	12.50-13.00
Detroit, auto net.	14.25-14.75
Eastern Pa.	18.00
New York, break.	13.50-14.00
Pittsburgh	16.00-16.50

## MALLEABLE

Birmingham, R. R.	15.00-15.50
New England, del.	16.25-17.50
Buffalo	18.50-19.00
Chicago, R. R.	21.00-21.50
Cincl., agri. del.	15.25-15.75
Cleveland, rail.	20.00-20.50
Detroit, auto, net.	15.00-15.50
Eastern Pa., R. R.	18.50-19.00
Pittsburgh, rail	19.50-20.00
St. Louis, R. R.	18.00-18.50

## RAILS FOR ROLLING

5 feet and over	
Birmingham	16.00-16.50
Boston	14.50-15.00
Buffalo	20.00-20.50
Chicago	20.50-21.00
Eastern Pa.	18.50-19.00
New York	16.50-17.00
St. Louis	17.75-18.25

## LOCOMOTIVE TIRES

Chicago (cut)	22.00-22.50
St. Louis, No. 1	19.00-19.50

## LOW PHOS. PUNCHINGS

Buffalo	20.00-21.00
Chicago	22.50-23.00
Eastern Pa.	23.00-23.50
Pittsburgh (heavy)	24.75-25.25
Pittsburgh (light)	23.00-23.50

## Iron Ore

Lake Superior Ore	
Gross ton, 51 1/2%	
Lower Lake Ports	
Old range bessemer	\$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbess.	4.65

## Eastern Local Ore

Cents, unit, del. E. Pa.	
Foundry and basic	
56.63% con. (nom.)	8.50-9.00
Cop.-free low phos.	
58-60% (nom.)	10.00-10.50

## Foreign Ore

Cents per unit, f.a.s. Atlantic ports (nominal)	
Foreign manganifer-	

ous ore, 45.55%	
iron, 6-10% man.	16.00
No. Afr. low phos.	16.00
Swedish low phos.	nominal
Spanish No. Africa	
basic, 50 to 60%.	15.50
Tungsten, spot sh.	
ton unit, duty pd.	\$15.85-16.00
N. F., fdy., 55%....	7.00
Chrome ore, 48%	
gross ton, c.i.f.	22.00-22.50

## Manganese Ore

(Nominal)

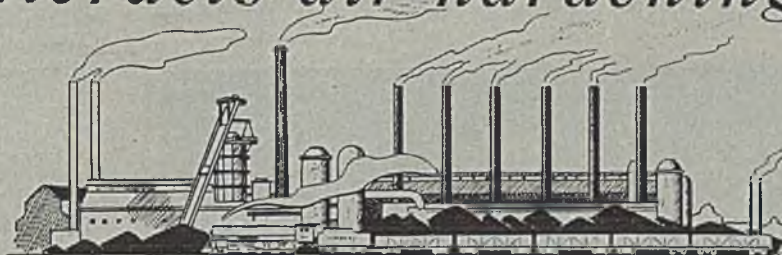
Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52%	34.00
So. African, 50-52%	34.00
Indian, 50-52%	34.00



# Columbium

*in wrought high-Chromium Steels  
counteracts air-hardening . . .*



## CHROMIUM

Low-Carbon Ferrochrome (in grades, maximum 0.06% to maximum 2.00% carbon)

High-Carbon Ferrochrome (maximum 6.00% carbon)

High-Nitrogen Ferrochrome

Chromium Metal

Chromium-Copper

Miscellaneous Chromium Alloys

## SILICON

Ferrosilicon 15%

Ferrosilicon 50%

Ferrosilicon 75%

Ferrosilicon

80 to 90%

Ferrosilicon

90 to 95%

Refined Silicon (minimum 97% silicon)

Miscellaneous

Silicon Alloys

## SILICO-MANGANESE

All grades including Silico-Spiegel

## MANGANESE

Standard Ferromanganese

78 to 82%

Low-Carbon Ferromanganese

Medium-Carbon

Ferromanganese

Spiegeleisen

Manganese Metal

Manganese-Copper

Miscellaneous

Manganese Alloys



## CALCIUM

Calcium-Silicon  
Calcium-Aluminum-Silicon

Calcium-Manganese-Silicon

## ZIRCONIUM

12 to 15% Zirconium

35 to 40% Zirconium

Aluminum-Zirconium

## VANADIUM

All Grades

## BRIQUETS

(Patented)

Chrome Briquets

Manganese Briquets

Silicon Briquets

## COLUMBIUM

## TUNGSTEN

COLUMBIUM in small amounts in wrought steels containing 12 to 30 per cent chromium counteracts air-hardening. As a result, the steels are soft in the as-rolled state. Hot-working is facilitated. The annealing period for further improving the properties of the metal, if necessary at all, is shortened. Welding and cutting are facilitated.

Perhaps columbium will improve your wrought high-chromium steels. It will pay you to try it.

Columbium is easily added to steel as ferrocolumbium. Electromet can supply you with ferrocolumbium and assist you in its advantageous use. Write for further information.

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Unit of Union Carbide and Carbon Corporation



**Electromet**  
Ferro-Alloys & Metals

CARBIDE & CARBON BUILDING

30 EAST 42nd ST., NEW YORK, N. Y.



## Bars

Bar Prices, Page 76

**Pittsburgh**—Bar shipments at present average about four weeks. With the automotive strike settled, railroad equipment makers active and other consumers operating at a high rate, mill schedules have far less slack than a few weeks ago. Repair work resulting from the floods has brought in numerous tonnages. Pressure for deliveries is

daily becoming stronger. Carbon bars are quoted 2.20c, base, Pittsburgh.

**Chicago**—Bar specifications are heavier, due largely to increased demand from the farm implement industry which is near the peak level of recent years. Heavier releases are being received from the automotive industry. Some bar mills are completely sold out for first quarter and minimum deliveries on new business average around 30 days.

**Cleveland**—Producers of commercial and alloy steel bars report that

although backlogs have been extended considerably, due to General Motors releases, they are still booking tonnage for first quarter. The alloy bar divisions have been more seriously affected as auto partsmakers resume active operations. Cold bar finishers and farm and road-making equipment manufacturers are exceptionally active. Prices are firm at 2.25c, base, Cleveland.

**Boston**—Alloy steel bar demand is fair with consumers pressing for delivery. Buying is well spread. Forging material is more active. Merchant bar shipments are heavy. Textile and other machinery builders are specifying liberally and miscellaneous requirements are encouraging.

**New York**—Steel bar specifications are coming from diversified sources, with railroads and jobbers most active. Most sellers are booked four to five weeks or longer.

**Philadelphia** — Commercial steel bar deliveries range from four to five weeks with current buying brisk.

**Youngstown, O.**—Steel bar orders continue to pour in from a wide variety of miscellaneous users. Until comparatively recently smaller bars and bar-mill shapes were keeping the smaller mills busy and now larger bar mills are becoming just as busy. This is taken as indicating that the heavier industries are busier.

## Plates

Plate Prices, Page 76

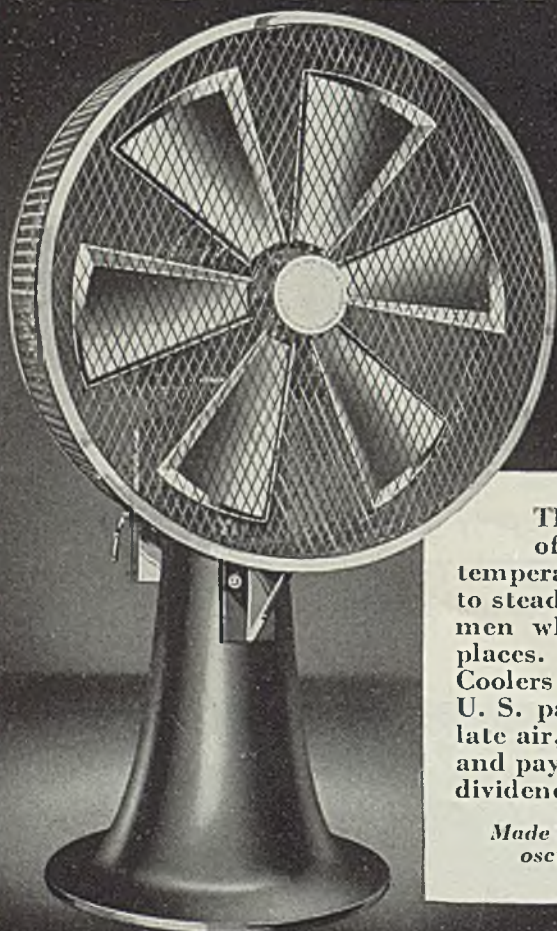
**Pittsburgh**—An important factor in current activity has been demand for plates from railroad equipment manufacturers, tank fabricators, and numerous other consumers who are unusually busy. Prices are steady at 2.05c, Pittsburgh.

**Cleveland**—Mills are active in making deliveries on orders placed during January. Shipments are reported best in some time. Awards are confined to small lots but the outlook is particularly bright with considerable tonnage expected to be placed for freight cars and general repairs on lake boats. Prices are firm.

Officials of the Pittsburgh Steamship Co., Cleveland, subsidiary of United States Steel Corp., held a meeting in New York Friday to definitely decide whether to take bids on two bulk freighters requiring approximately 12,000 tons of plates and shapes.

**Chicago**—Plate specifications are heavy as railroads and freight car builders are pressing mills for shipment. Structural fabricators also

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The maintenance of normal body temperature is essential to steady production by men who work in hot places. Perkins Man Coolers (trade mark reg. U. S. pat. off.) recirculate air, refresh workers and pay you production dividends.

Made in stationary and oscillating types.

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are increasing operations and tank builders are moderately busier. The oil industry and other industrial users are expected to be active in tank buying during coming months, but few large pipe line projects are active. Plate mills are well booked through this quarter.

**Boston**—Plate demand is active for a wide range of miscellaneous needs. Except for a 350-ton inquiry for fuel tanks, South Boston, and a 500-ton award, large diameter steel pipe for Hartford, Conn., there are few large projects. Deliveries are three to four weeks on plain material.

**New York**—Miscellaneous demand for plates is increasing, particularly as sentiment for higher prices develops. Gulf Oil Co. is inquiring for three tanks requiring about 400 tons for Staten Island.

**Philadelphia** — Eastern plate mills are in much better position with respect to deliveries than those further inland. At least three eastern producers are able to ship within two weeks, although the general average for the district is being further extended. Pusey & Jones Corp., Wilmington, Del., is low on three coastwise freighters involving 2700 tons of plates and 1700 tons of shapes and bars, bids being handled by Theodore Ferris, New York. Car and locomotive business continues brisk. Prices are strong.

**Birmingham, Ala.** — Plate fabricators continue to specify and further buying is also being done. Carbuilding is taking heavy tonnages and general demand also is active.

**San Francisco**—The largest plate lettings involved a large tank for Beverly Hills, Calif., calling for 300 tons, placed with Chicago Bridge & Iron Works. No large inquiries are pending. So far this year only 6916 tons have been placed, compared with 39,276 tons for the corresponding period in 1936.

**Seattle**—With transportation by water again open, it is expected that important new projects will develop. Recent awards have been in small tonnages. Tacoma's 1937 program includes nearly 16,000 feet of 24 to 36-inch steel pipe in a project estimated to cost over \$1,500,000.

## Contracts Placed

1150 tons, 24-inch o.d. gas line pipe, Kansas City, to A. O. Smith Corp., Milwaukee.

575 tons, 48 and 54-inch electrically welded steel pipe, metropolitan water district, Hartford, Conn., to Alco Products Inc., Dunkirk, N. Y.

300 tons, tanks for Beverly Hills, Calif., to Chicago Bridge & Iron Works, Chicago.

260 tons, 170 x 40 x 17-foot barge, for Oliver Transportation Co., Philadelphia, to Dravo Corp., Neville Island, Pittsburgh.

235 tons, deck barge, St. Louis, to Ingalls Iron Works Co., Birmingham, Ala.

100 tons, two tanks for Publicker Commercial Alcohol Co., Philadelphia, to Chicago Bridge & Iron Works, Chicago.

100 tons, lighthouse tender, for Staten Island, New York, to Defoe Boat & Motor Works, Bay City, Mich.

## Contracts Pending

2700 tons, three coastwise freighters, plans by Theodore Ferris, New York; Pusey & Jones Co., Wilmington, Del., low; includes also 1700 tons shapes and bars.

# Sheets

Sheet Prices, Page 76

**Philadelphia**—Most leading sheet sellers are out of the market on all descriptions for this quarter, even on heavy gages of hot-rolled. Several midwestern interests are booked into June on some grades. Special interest centers in galvanized, more frequently mentioned for an advance next quarter and on

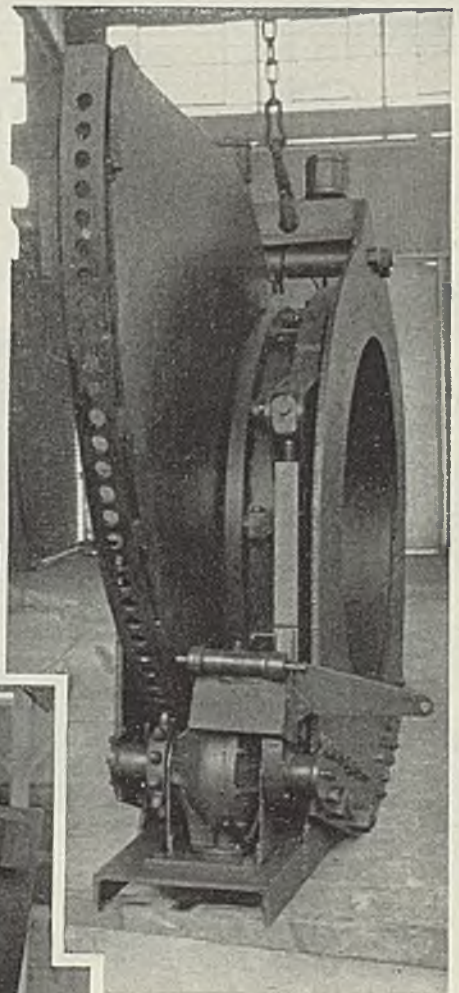
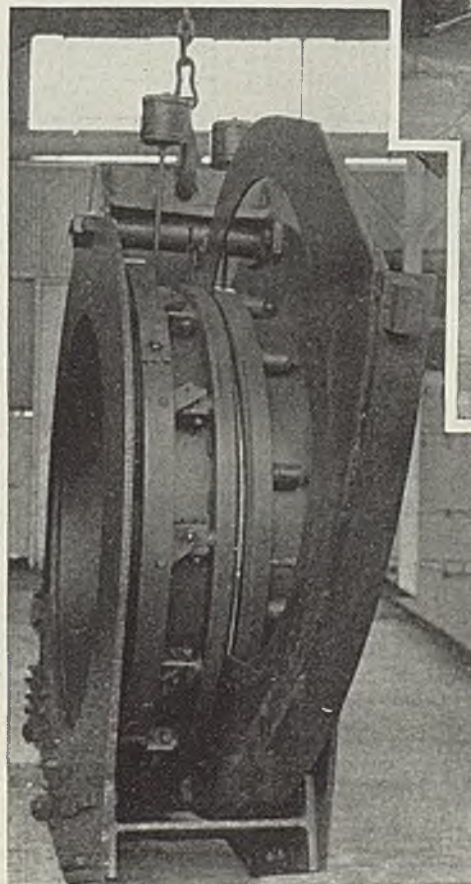
## BROSIUS Motor-Driven Automatic Goggle Valves

are self contained and independent of the gas line in their operation.

Continuous operation of the motor releases the seat, swings the goggle plate, and closes the seat. Reversing the motor, reverses the cycle.

A cycle is completed in from 12 to 20 seconds, depending upon the size of the valve.

Valve seats are renewable and



flexible, conforming to any slight distortion of the valve due to stresses in the line, thus maintaining a tight valve at all times.

(Patented in the United States and Foreign Countries)

**EDGAR E.  
BROSIUS  
INC.**

Pittsburgh, Pa.

European Distributors: Dango & Dienenthal, Siegen, Westphalia, Germany



which deliveries are weeks ahead. About 700 tons of No. 10 hot-rolled sheets will be required for foundation work for electrification towers for the Pennsylvania railroad on the Paoli-Harrisburg section. Much of this tonnage is at the expense of reinforcing bars. This steel probably will be bought direct, though the Pennsylvania has announced award of general contracts for various sections. Successful contracts are Arundel Corp., Baltimore; Vare Construction Co., James McGraw Co. and McCloskey & Co., all of

Philadelphia. The latter firm was awarded the larger portion.

**Pittsburgh**—With shipments ranging up to 15 or 16 weeks on some sizes, pressure for sheet steel deliveries has reached a new peak in wake of resumption of operations by General Motors. Requirements of household and railroad equipment manufacturers have been heavy. Many consumers anticipated the situation and placed specifications for second-quarter delivery at prevailing prices. Pittsburgh base prices on sheets are steady.

**Cleveland**—Sheet producers find an encouraging amount of new business placed for second quarter delivery. This is particularly true among consumers requiring large tonnages, whose needs are more or less constant. Miscellaneous consumers are specifying freely. Release of General Motors requirements has noticeably extended deliveries, especially in wide sheets.

**Chicago** — Delivery problem has been aggravated further in sheets by upturn in automotive operations. New bookings call for second quarter delivery and mills rapidly are filling order books for next period. Consumption is heavy but to a large extent activity has been stimulated by users' desire to be protected on shipments. Price changes next quarter still are a matter for conjecture.

**New York**—Sheet sellers are out of the market for this quarter. Advance in galvanized for second quarter seems probable.

**Buffalo**—Pressure for delivery of sheets has again been increased as automotive works return to full production. Local sheet works are operating at near maximum capacity.

**Youngstown, O.**—Practically all sheet mill capacity is scheduled for the current quarter's delivery. Considerable sheet business for second quarter is being accepted at price prevailing at date of delivery.

**Cincinnati**—All plants of the American Rolling Mill Co. are in production but district output of sheets remains curtailed pending rehabilitation of the Newport Rolling Mill Co. works. Loss of tonnage because of flood is emphasizing delivery problems. Although books for second quarter are not opened, orders at prices then prevailing are multiplying with anxiety noticed in some cases over future deliveries.

**St. Louis**—Producers and distributors of steel sheets report no slackening in new business and increased pressure for delivery. Movement of galvanized sheets has increased. Miscellaneous users are specifying heavily, and apparently are not able to get sufficient tonnages to satisfy requirements.

**Birmingham, Ala.**—Sheet demand continues active and production is at a high rate, with backlogs for at least 60 days. Second quarter activity seems assured.

## Tin Plate

Tin Plate Prices, Page 76

**Pittsburgh**—Heavy demand for tin plate for general line cans is undiminished and mills show no sign of slackening from their operating rate of around 96 per cent of capacity.

# The BON-AIR

AUGUSTA, GEORGIA

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## ONE OF AMERICA'S FINEST WINTER RESORT HOTELS

A veritable Paradise for those who appreciate fine hunting or golfing in a remarkably even climate, claimed by many to be unsurpassed elsewhere. Augusta, Georgia and The Bon-Air are synonymous with a perfect wintertime vacation. Every facility for rest or relaxation. 400 outside rooms.

American Plan. Season until April 10th.

Write to-day for illustrated folder to JOHN F. SANDERSON,  
Pres. & General Manager.



**FREE GOLF TO WEEKLY GUESTS  
ON 2 CHAMPIONSHIP COURSES**



Backlogs of both hot and cold reduction mills are large. The situation has been enlivened by inquiries and orders from abroad. For replacement of equipment damaged in the recent floods many manufacturers, such as makers of gas meters, have found their requirements unusually large.

## Pipe

Pipe Prices, Page 77

**Pittsburgh** — Seamless tubing has been benefitted somewhat by the return of General Motors to production. Standard steel pipe and boiler tube specifications are well maintained. Higher cost of other steel products may force an advance in prices, is the opinion of many observers.

**Cleveland**—Pipe requirements are encouraging for this season of the year. Jobbers report active stock turnover and expect this condition to improve somewhat over the next 30 days. City of Cleveland is expected to have plans ready soon for  $3\frac{1}{2}$  miles of 24-inch steel pipe for water main. Cast iron pipe continues dull.

**Chicago** — Cast pipe demand is slow and inquiries have yet to show the improvement which is anticipated with the approach of spring. The only sizable inquiry pending here is 2355 tons for Chicago.

**New York**—Cast pipe inquiry is heavier. Prices are firm. Pipe foundries are less active and partly engaged in building up stocks. Bids on the foundations, westside elevated highway, from Spring street south, Manhattan, taking 4220 tons, 12 and 18-inch steel pipe for piling were postponed from Feb. 17 to March 2.

Deliveries on standard pipe are being extended, with some leading mills unable to make shipment under a month on butt weld, and under two to three months on lap weld. An advance in standard pipe prices next quarter appears increasingly probable.

**Birmingham, Ala.**—Most cast pipe business is in small lots, but shops continue to operate on fairly steady schedules.

**San Francisco**—Cast pipe inquiries are negligible, but some sizable lots are expected to be released soon. The treasury department, Los Angeles, placed 172 tons of 6-inch with an unnamed interest.

**Seattle** — Manufacturers' agents are replenishing stocks and, being able to guarantee deliveries, they report increased interest and demand. Washington Gas & Electric Co. is increasing storage facilities and ex-

tending pipe lines at Longview, Wash., spending \$50,000. White Salmon, Wash., has awarded general contract to Eugene & Co., Portland, Ore., at \$62,719 for a water system involving 41,000 feet of 10 and 12-inch treated wood or steel pipe. Toledo, Ore., has approved a bond issue for proposed \$96,780 water system improvement.

## Cast Pipe Placed

630 tons, 16-inch, Public Service Corp. of New Jersey, Newark, to R. D. Wood & Co., Florence, N. J.

475 tons, 10-inch, Swanton, Vt., to Cen-

tral Foundry Co., New York.

200 tons, 6 and 8-inch, for Maplewood, Ore., to H. G. Purcell, Seattle, representing United States Pipe & Foundry Co., Burlington, N. J.

172 tons, 6-inch, invitation 21,069 treasury department, Los Angeles, to unnamed interest.

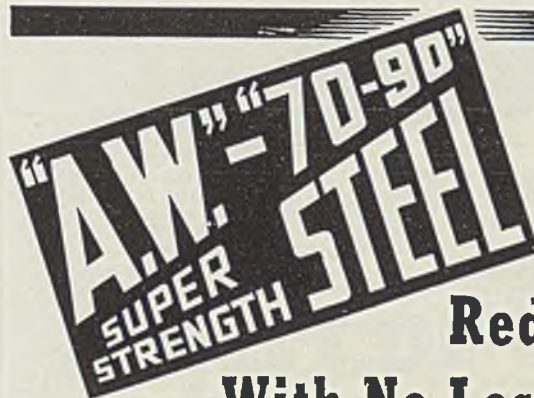
100 tons, 60-inch, class A, Los Angeles county sanitation district No. 2, Los Angeles, to unnamed interest.

## Cast Pipe Pending

1300 tons, 6 and 8-inch, Stony Brook water district, Brookhaven, N. Y.

530 tons, 2 to 8-inch, for Tacoma, Wash., bids in.

400 tons, 16-inch and under, Colonie,



## Reduces Weight With No Loss Of Strength



Cuts dead weight as much as 40%.



Lends itself readily to difficult cold forming and cold flanging.



Its corrosion resistance is superior to all ordinary steels.



Efficient metallurgical and chemical control is ensured by completely equipped laboratories.



Its weldability is excellent—requires no treatment to prevent brittleness.

—and its cost  
is low

Write for new literature and call on our Engineering Departments for competent collaboration.

## ALAN WOOD STEEL COMPANY

CONSHOHOCKEN, PA.

BRANCHES:

Philadelphia, New York, Boston, Detroit, Los Angeles, San Francisco, Seattle, Houston

111 YEARS' IRON AND STEEL-MAKING EXPERIENCE





- N. Y.; bids Feb. 18.
- 190 tons, 16-inch, high pressure water mains, foundations, west side elevated highway, Spring to Cedar streets, on West and Marginal streets, Manhattan, N. Y.; bids in.
- 140 tons, 20-inch treasury department, procurement division, Newark, N. J.; United States Pipe & Foundry Co., Burlington, N. J., low.
- 120 tons, 4 and 8-inch, for Medical Lake, Wash.; general contract to West Coast Construction Co., Seattle.
- 100 tons, small sizes, New Brunswick, N. J.; also 100,000-gallon steel tank; bids in.
- 100 tons, Taholah Indian agency, Washington; bids in.

## Steel Pipe Pending

Unstated tonnage, 47,500 feet, up to 4-inch, welded steel pipe, galvanized, and 3300 feet, 5-inch and under black welded steel pipe, Panama; bids March 4, schedule 3225.

## Cold Finished

Cold Finished Prices, Page 77

**Pittsburgh**—Shipments of cold-finished bars now range from four to six weeks but are gradually becoming more extended under strong de-

mand from divers sources and General Motors' return to production. Numerous miscellaneous consumers who have encountered better business than they expected have been reordering recently. Cold-finished bars continue at 2.55c, base, Pittsburgh.

## Transportation

Track Material Prices, Page 77

Railroad equipment inquiries are well maintained considering the amount of business placed in December and January. Baldwin Locomotive Works has received an order from the Santa Barbara railroad, Venezuela, for a locomotive and has also received an order from Pickands Mather Co., Cleveland, for a locomotive. Detroit, Toledo & Ironton is inquiring for 800 freight cars, Grand Trunk Western for 400, and Newburgh & South Shore for 100. Phelps-Dodge Corp. has ordered 30 dump cars from Differential Car Co.

Most freight cars and locomotives included in buying programs have been allocated. In the meantime equipment builders are pushing operations as a consequence of heavy backlogs and mills have substantial contracts for plates, shapes and bars against which specifications are being issued freely. Rail mills still encounter difficulty in increasing their production, due to the lack of sufficient raw steel. Railroads are seeking heavier shipments of rails while an increase in track accessory output will be necessary with the approach of the active tracklaying season.

## Car Orders Pending

Detroit, Toledo & Ironton, 500 fifty-ton box and 300 fifty-ton automobile cars; bids asked.

Navy department, bureau of supplies and accounts, two 50-ton box cars for White Plains, Haffner-Thrall Car Co., Chicago, low.

Newburgh & South Shore, 10 fifty-ton gondolas; bids asked.

## Locomotives Placed

Canadian Pacific, thirty locomotives, to Montreal Locomotive Works Ltd., Montreal.

Pickands, Mather & Co., Cleveland, switch engine, to Baldwin Locomotive Works, Philadelphia.

Santa Barbara, Venezuela, freight and passenger locomotive, to Baldwin Locomotive Works, Philadelphia.

## Buses Booked

American Car & Foundry Motors Co., New York, 20 buses, 10 for Worcester, Mass., street railway and 10 for New Orleans Public Service Co.

Twin Coach Co., Kent, O.; Nine 31-passenger for Spokane United Railways, Spokane, Wash.; four 23-passenger for

## Behind the Scenes with STEEL

### Hail, Pa!

TODAY America pauses, for varying lengths of time, to pay homage to the father of the country. History tells us he chopped down a cherry tree, fought the Indians and the British, and walked in the frozen mud at Valley Forge; became president and had a wife named Martha.

His name is perpetuated in a city, a state, on postage stamps and on cans of a certain denatured coffee.

Washington was a great man. Perhaps his spirit often wonders as it roams the land today whether the rigors of Valley Forge and the toils of the campaign were justified.

Perhaps his spirit winced when, many decades ago, the rapidly decomposing bodies of George and his wife were disinterred and placed in a marble sarcophagus.

Perhaps his spirit smiled when an ancient souvenir hunter hacked a piece of wood from his body's coffin and fashioned it into a locket, containing a lock of hair snipped from the long-dead frame of the stalwart General.

At any rate, John Struthers Dunn who heads the electrical company of that name has the above locket—and not only that but also the trowel used to seal the lid of the coffin.

Gad, what next!

### Send Those Photos

THANKS to all who submitted photographs in connection with our recent offer to publish, at \$2 per, those which rang the bell in interest and novel aspects. Unfortunately, none of those received so far has been quite up to snuff, but we're still hoping to get one or two. Keep trying, men; after all \$2 plus being represented in this most exclusive of columns should be well worth the effort of mailing us that superphoto of yours.

### Employment Dept.

IF ANY reader is looking for a skilled machinist and die maker in the Monaca, Pa., district, let him write in to this department and we will start the machinery going to put him in touch with

such a man. With the current shortage of men trained in these fields, there may be someone we can help out by making the arrangements (not a classified advt.).

On the other hand, if you happen to be a young engineer quali-

INQUISITIVE CAMERA DEPT.—XXIII



*AL V. ANDERSON, who slings a mean bowling ball and whose curly hair is the envy of all, has been active in advertising production work for STEEL and the Penton Publishing Co. since 1920. Our cameraman apologizes for inadvertently slicing off the top of Andy's head, but those things will happen.*

fied for steel plant engineering work, and your family does not go beyond a wife, P. F. Kohlhaas, chief engineer of the Tata Iron & Steel Co. Ltd. at Jamshedpur, India, may be able to use you in his organization. P. F. says in an air mail letter he is anxious to find someone for this job, but that "young kids shouldn't be here."

If, in addition to the above qualifications, you are pretty fair at the Indian rope trick, you should be just the man.

### Swing It, U.S.R.!

HEADLINE OF THE WEEK: "They Said Good-bye to 'Jenny' and 'Jinny'" . . . United States Rubber Co. in the Feb. 15 issue. If you'll pardon us for butting in this way, we'll complete the line: Gone with the wind was their puffing and whinny.

—SHIRDLU



Peoples Transport Corp., Muskegon, Mich.; four 23-passenger for Mississippi Power & Light Co., Jackson, Miss.; four 23-passenger for Washington, Virginia & Maryland Coach Co., Clarendon, Va.; four 23-passenger for Savannah Electric & Power Co., Savannah, Ga.

## Wire

Wire Prices, Page 77

**New York**—Insistent demand for iron and steel products for export continues to be exerted upon American mills. Inquiries are coming from Greece, Turkey, Great Britain, Italy, Brazil, Argentina and other South and Central American countries which formerly were customers of British, German and Belgian mills.

American mills as of Feb. 16 have advanced prices of various wire products for export. Barbed wire now is \$5 a ton higher than formerly, wire nails are up \$8 a ton, and plain wire \$4 a ton.

**Pittsburgh** — Some producers are confronted by difficult problems in attempting to provide deliveries to meet needs of wire consumers. Shipments are 10 to 12 weeks behind in certain lines. Specifications are steady with most material desired apparently for current consumption. Although there has been considerable discussion of price adjustments in order to bring certain products into a better alignment, such as nails and plain wire, no definite announcement has been made yet. Current prices are steady.

**Cleveland**—While backlogs on wire products have been further extended as result of General Motors releases, most mills are still able to book tonnage for first quarter. Miscellaneous demand, led by agricultural and bolt and nut requirements, continues strong. General opinion, while strictly speculative, looks for a price advance on some wire products.

**Chicago**—Steel wire demand is heavy and production is near capacity. Pickup in automotive schedules has placed additional pressure for shipments of manufacturers' wire while movement of merchant products is expanding. Deliveries of barbed wire, fencing, etc. are expected to rise steadily during coming weeks. Little indication is given of second quarter prices though higher levels on some items would not be surprising.

**Boston**—Demand for manufacturers' wire, specialties and spring material holds well. Merchant goods, which have lagged somewhat in New England, are selling slightly better. Cable guard rail inquiry has improved, 32,000 feet being out for Vermont highways.

## Strip

Strip Prices, Page 77

**Pittsburgh** — Strip deliveries are about four weeks in hot-rolled and six weeks in cold-rolled. Mill activity has been increased as a result of larger demand from the automotive industry following the resumption of operations by General Motors. Most partsmakers now are in full operation and pressing for shipments. Requirements have been steady from other sources for

nearly all grades. Strip continues at 2.15c, base, Pittsburgh, for hot-rolled and 2.85c, base, Pittsburgh or Cleveland, for cold-rolled.

**Cleveland**—Shipments so far this month compare favorably with January, as mills sought to clear up miscellaneous tonnages before General Motors resumed active operations. However, general requirements are larger than anticipated with the result that most mills have been unable to take more tonnage for first quarter delivery. Prices are firm.

**Chicago**—Strip steel specifications

**Buyer's Directory**

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have been aided by increase in automotive schedules and steady demand is appearing from miscellaneous users. Producers are well booked through the balance of this quarter and active schedules appear in prospect into the next period. Prices are steady.

**Boston**—Cold strip shipments are heavy. Suspended releases to the automotive industry have generally resumed. Numerous consumers, especially in the mid-west, are placing orders for narrow widths at eastern mills with a view of building up stocks against an uncertain labor outlook. Hot strip shipments are moderately heavy to rerollers.

**Philadelphia** — Narrow strip appears to be among the few light steel products available for first quarter delivery, although little is being offered under four weeks. Current movement is against contracts.

## Bolts, Nut, Rivet Prices, Page 76

Bolt, Nut, Rivet Prices, Page 76

Bolt, nut and rivet consumption has been bolstered by increased operations among railroad shops, freight car builders, farm implement, tractor and automotive parts

manufacturers. Shipments from jobbers' stocks are fairly steady and reflect heavier requirements of miscellaneous users than a year ago. Structural and tank fabricators are heavier users of rivets, with further gains in prospect for coming months. Bolt and nut prices are slightly steadier.

## Shapes

Structural Shape Prices, Page 76

**Pittsburgh** — Awards during the past week included 1500 tons for a plant for the Container Corp. at San Fernandino, Fla., placed with Jones & Laughlin Steel Corp., Pittsburgh, and 1350 tons for a factory building in Rochester, N. Y., placed with American Bridge Co., Pittsburgh. is led by 3000 tons for a plant of the Sheffield Farms Co., New York City. Prices are steady.

**Cleveland**—Structural awards have lately declined seasonally and also because many who had planned construction work took advantage of the price protection period. Prices are firm although no real test has yet been offered at the new prices.

**Chicago** — Fabricated structural

steel is quiet as both inquiries and awards involve small lots. Growing demand for private construction is looked for in the near future, while substantial tonnages are involved in public construction now pending.

**New York**—Structural awards are heavier, 4000 tons for the north tube, Midtown-Hudson tunnel, being the largest contracts placed. About 1400 tons for an addition to a glass-lined steel tank fabricating plant, Rochester, N. Y., has also been bought. Inquiry has improved substantially, at least 20,000 tons being active. Old specified project tonnage has been practically awarded and more new volume is being done on plain material at 2.305c, New York.

**Philadelphia**—Structural activity involved several relatively small awards with little outstanding tonnage pending. Structural shapes are available for delivery in three to four weeks.

**San Francisco** — Structural market was active last week with over 1100 tons placed, bringing the year's aggregate to 18,514 tons, compared with 14,017 tons a year ago.

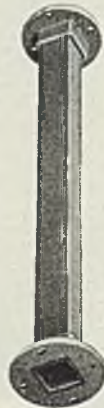
## Shape Contracts Placed

4000 tons, structurals, plate work and miscellaneous requirements, rock tunnel portion, north tube, Midtown-Hudson tunnel, Manhattan—Weehawken, N. J., to American Bridge Co. and Carnegie-Illinois Steel Corp., Pittsburgh; Mason & Hanger Co. Inc., New York, general contractor.  
1500 tons, building, Universal Atlas Cement Corp., Hudson, N. Y., to American Bridge Co., Pittsburgh.  
1400 tons, factory building, Pfaunder Co., Rochester, N. Y., to American Bridge Co., Pittsburgh, A. W. Hopeman & Sons Co., Rochester, general contractor.  
1300 tons, sheet piling and shapes, Pennsylvania railroad bridge alterations, over Chesapeake & Delaware canal, Point Pleasant, Del.; 930 tons, piling, to Bethlehem Steel Corp., Bethlehem, Pa., and Carnegie Illinois Steel Corp., Pittsburgh and 380 tons of shapes divided equally between Phoenix Bridge Co., Phoenixville, Pa., and American Bridge Co., Pittsburgh.  
750 tons, three buildings, Los Angeles, Calif., for Aluminum Co. of America, to Bethlehem Steel Corp., Bethlehem, Pa.  
700 tons, bridge, Meron, Ind., to Wisconsin Bridge & Iron Co., Milwaukee.  
600 tons, Hill street bridge, Houston,

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## Shape Awards Compared

	Tons
Week ended Feb. 20 .....	18,291
Week ended Feb. 13 .....	30,470
Week ended Feb. 6 .....	17,095
This week, 1936 .....	30,697
Weekly average, 1936 .....	15,523
Weekly average, 1937 .....	15,128
Weekly average, January ...	31,148
Total to date, 1936 .....	180,937
Total to date, 1937 .....	124,185



Tex., to Virginia Bridge Co., Roanoke, Va.  
 600 tons, tainter gates, Beverly, Tex., to Lakeside Bridge & Steel Co., Milwaukee.  
 470 tons, railroad grade separation bridge, route No. 53, Lombard, Ill., to Bethlehem Steel Corp., Bethlehem, Pa.  
 440 tons, High street bridge, Muncie, Ind., for Delaware county, to Indiana Bridge Co., Muncie, Ind.  
 400 tons, high school building, for board of education, Stevens Point, Wis., to Kupfer Foundry & Iron Works, Inc., Madison, Wis.  
 380 tons, West Jackson street bridge, Muncie, Ind., for Delaware county, to Indiana Bridge Co., Muncie, Ind.  
 370 tons, Elm street bridge, Muncie, Ind., for Delaware county, to Indiana Bridge Co., Muncie, Ind.  
 330 tons, high school, Norristown, Pa., to Le High Structural Engineering Co., Allentown, Pa., through Ralph Herzog, Philadelphia.  
 310 tons, temporary supports, alterations to bridge No. 18.00, Canal, Del., for Pennsylvania railroad, to Phoenix Bridge Co., Phoenixville, Pa.  
 310 tons, horse barn, state of Minnesota, St. Paul, to St. Paul Foundry Co., St. Paul.  
 310 tons, 17 radial gate, Bonneville dam, Oreg., to unnamed interest.  
 300 tons, state bridge RC-3858, Hancock, N. Y., to American Bridge Co., Pittsburgh.  
 280 tons, East Jackson street bridge, Muncie, Ind., for Delaware county, to Indiana Bridge Co., Muncie, Ind.  
 280 tons, college buildings, Charleston, Ill., to Mississippi Valley Structural Steel Co., Decatur, Ill.  
 270 tons, highway bridges, Route 31013, Entrikey, Pa., to Fort Pitt Bridge Works, Pittsburgh.  
 250 tons, railroad grade separation bridges, route No. 54, Villa Park, Ill., for state of Illinois, to Bethlehem Steel Corp., Bethlehem, Pa.  
 250 tons, plant addition, Edward G. Budd Mfg. Co., Philadelphia, to Belmont Iron Works, Eddystone, Pa.  
 240 tons, addition to Russeks store, Brooklyn, N. Y., to Harris Structural Steel Co., New York, through Nathan Korn architect.  
 235 tons, State highway bridge WF36-4, Queens County, New York, to American Bridge Co., Pittsburgh.  
 230 tons, Romy street bridge, Muncie, Ind., for Delaware county, to Indiana Bridge Co., Muncie, Ind.  
 229 tons, bridge, Mesa county, Colorado, to unnamed interest.  
 210 tons, Walnut street bridge, Muncie, Ind., for Delaware county, to Indiana Bridge Co., Muncie, Ind.  
 200 tons, switch racks, metropolitan water district, Los Angeles, specification 2175, to Western Pipe & Steel Co., Los Angeles.  
 180 tons, small buildings and miscellaneous steel, Glassboro, N. J., to Frank M. Weaver & Co., Lansdale, Pa.  
 180 tons, warehouse buildings, Peoria, Ill., to Mississippi Valley Structural Steel Co., Decatur, Ill.  
 155 tons, state highway bridge, Columbia-Windham, Conn., to American Bridge Co., Pittsburgh, through A. I. Savin Construction Co., Hartford, Conn.  
 150 tons, building addition, Du Pont interests, Wilmington, Del., to Bethlehem Steel Corp., Bethlehem, Pa.  
 150 tons, state bridge work, Berks and Potter counties, Pennsylvania, to Bethlehem Steel Corp., Bethlehem, Pa.  
 125 tons, state highway bridge, Attleboro, Mass.—Pawtucket, R. I. to Bethlehem Steel Corp., Bethlehem, Pa., Arute Bros. Inc., New Britain, Conn., general contractor.  
 105 tons, steel sheet piling, for United States engineers, Pittsburgh, to Jones & Laughlin Steel Corp., Pittsburgh.

102 tons, bridge, Bent county, Colorado, to unnamed interest.

## Shape Contracts Pending

8500 tons, Westside Elevated highway,

135th to 145th streets, New York; P. T. Cox Contracting Co., New York low on general contract; project also takes 700 tons of reinforcing bars.

2400 tons, garage, department of sanitation, 12th avenue and Fifty-sixth



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street, Manhattan, New York; bids in.  
500 tons, addition to building, Columbia Presbyterian Medical Center, New York.  
500 tons, shafts of Delaware aqueduct, contracts No. 333 and 334, for city of New York.  
400 tons, beam spans, Shattuck and Watonga, Okla., for state of Oklahoma.  
300 tons, extension to foundry building, for National Malleable & Steel Casting Co., Sharon, Pa.  
300 tons, infirmary building, Yaphank, N. Y., for Suffolk county, New York.  
300 tons, Fifty-seventh street plant, for Sheffield Farms Co., New York.  
225 tons, school, Ovid, N. Y.; bids in.  
200 tons, building, for American Brass Co., Waterbury, Conn.  
190 tons, grade crossing elimination, Cedar Brook road, Winslow township, Camden county, New Jersey; bids March 1.  
180 tons, for southerly sewage disposal plant incinerator building, Cleveland; bids Feb. 25; includes 70 tons of reinforcing bars.

## Reinforcing

Reinforcing Bar Prices, Page 77

Pittsburgh—Inquiries are well maintained and the outlook for con-

crete reinforcing bar tonnage is good. Awards during the past week covered considerable private construction work, including five apartment buildings in Washington, requiring between 125 and 250 tons each.

**Cleveland**—Reinforcing awards so far this month have been confined to small jobs well under 100 tons from private sources. This tonnage is considerably below that recorded in the corresponding period of January. Considerable tonnage is pending on two grade crossing eliminations at Akron, O. Prices are holding up well in spite of relatively little demand.

## Concrete Awards Compared

	Tons
Week ended Feb. 20 .....	2,968
Week ended Feb. 13 .....	4,858
Week ended Feb. 6 .....	683
This week, 1936 .....	10,542
Weekly average, 1936 .....	3,015
Weekly average, 1937 .....	3,022
Weekly average, January...	3,787
Total to date, 1936 .....	76,102
Total to date, 1937 .....	24,120

**Chicago**—Few large reinforcing bar tonnages are pending but producers have fairly large backlogs and shipments against contracts are steady. New business in small tonnages is fair and prospective building points to a steady increase over coming months. While prices have yet to become firmly established, the tone is slightly stronger.

**New York**—Approximately 4500 tons of reinforcing bars and mesh have been figured in this district, most of which is expected to be placed within the next two weeks. New inquiry and awards are confined to small lots. Prices appear a bit steadier.

**Philadelphia** — Reinforcing bar market is registering the dullness expected by many because of the numerous awards placed during the protective period last January. Apart from two schools requiring a total of 700 tons, recent awards have been confined to jobs well under 100 tons.

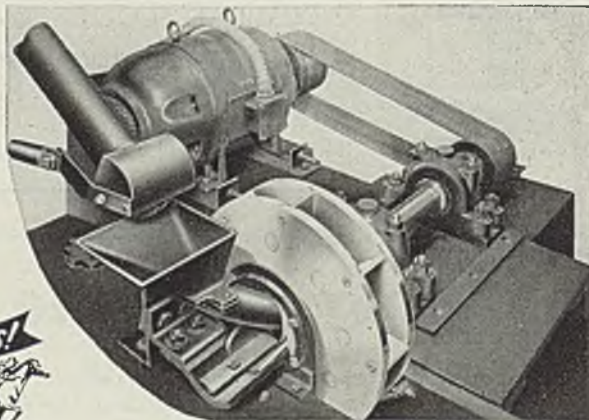
**San Francisco** — While Pacific coast mills are well booked in advance, new inquiries are slackening and recent awards did not exceed 500 tons. To date this year only 4488 tons have been booked, compared with 44,592 tons for the corresponding period in 1936.

**Seattle**—Mills are running to capacity on backlogs, but new orders are developing slowly. Private construction is lagging, evidently handicapped by rising costs. Prices are firm and further advances may be announced.

## Reinforcing Steel Awards

550 tons, McGregor Bridge, Manchester, N. H., 375 tons to Concrete Steel Co., New York, and 175 tons to Truscon Steel Co., Youngstown, Ohio, Arute Bros. Inc., New Britain, Conn., general contractor.  
380 tons, high school, Norristown, Pa., Ralph S. Herzog, contractor, to Concrete Engineering Co., Omaha, Nebr.  
350 tons, rail bars, school, Sixty-sixth and Chester avenue, Philadelphia, through McCloskey & Co., Philadelphia, to Sweet Steel Co., Williamsport, Pa.  
300 tons, Gilmerton bridge, Norfolk, Va., Carpenter Construction Co., contractor to Hall-Hodges Co., Norfolk.  
250 tons, apartment, Fourteenth street, Washington, to Rooslyn Cement Co., Washington.  
200 ton, Calvert apartment, Washington, to Rooslyn Cement Co., Washington.  
200 tons, apartment, Clarendon, Va., to Hudson Supply & Equipment Co., Washington.  
189 tons, apartment, Sixteenth and Fuller streets, Washington, to Hudson Supply & Equipment Co., Washington.  
125 tons, apartment, K street, Washington, to Hudson Supply & Equipment Co., Washington.  
124 tons, Deer Creek bridge, Douglas county, Oregon, to unnamed interest.  
100 tons, grade crossing, New York Central railroad, Melrose, N. Y., to Jones & Laughlin Steel Service Inc., Long Island City, N. Y.; Foley Bros. Inc., New York general contractors.  
100 tons, building for Montgomery, Ward & Co., Walla Walla, Wash., to unnamed interest.

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100 tons, Salmon River bridge, Idaho, to unnamed interest.

## Reinforcing Steel Pending

250 tons, garage, for dept. of Sanitation, New York; O'Driscoll & Grove Inc., New York, low.

107 tons, highway work, Lincoln and Clark counties, Nevada; bids opened.

100 tons, Riverdale avenue bridge, Bronx, N. Y.; Garofano Construction Co., New York, low.

100 tons, State armory, Orange, N. Y.

## Pig Iron

Pig Iron Prices, Page 78

New York—Great Britain is inquiring for 50,000 tons of basic iron for delivery at the rate of 5000 tons per month over the remainder of this year. Trade interests admit that a shortage of pig iron is developing abroad. Movement of iron to domestic consumers continues heavy, with some furnaces well scheduled over the remainder of this quarter.

Purchase of 35,000 tons of pig iron by Japan in this country is reported. This is in addition to approximately 45,000 tons placed several weeks ago.

Pittsburgh — Pig iron shipments are unusually heavy and producers have had little chance to replenish stocks. In some cases, consumers have been forced to reorder, and it is apparent that other contracts will run out well before the end of this quarter. High scrap prices have been forcing an increasing number of malleable foundries to turn to pig iron. Producers are awaiting an announcement on iron ore prices and watching the outcome of the coal conferences in the East for clues as to their future position. Prices are steady.

Cleveland—Pig iron suppliers report the heaviest melt in some time as they rush to complete shipments on orders placed at the old prices. This is clearly illustrated by the fact shipments so far this month exceed those in the corresponding period of January. While new business is naturally light in contrast to shipments, it has proved encouraging in view of the heavy buying before Jan. 1, and the fact that no second quarter tonnage is being accepted until prices are announced March 1.

Chicago — Pig iron demand is heavy and the rapid rise in scrap prices, coupled with the possibility of a scarcity in iron supplies next quarter, points to the likelihood of higher quotations for the coming period. Shipments are gaining, showing a sizable increase over January. One additional merchant furnace was placed in blast last week.

Boston—Shipments of pig iron

against coverage are steady, and far exceed new buying. Prices are unchanged. Foundries continue to operate at a high rate in most cases. Denial of a purchase of 35,000 tons

for export from the Everett, Mass., furnace is made by Mystic Iron Works.

Philadelphia—Pig iron sellers are highly bullish. Continued heavy con-

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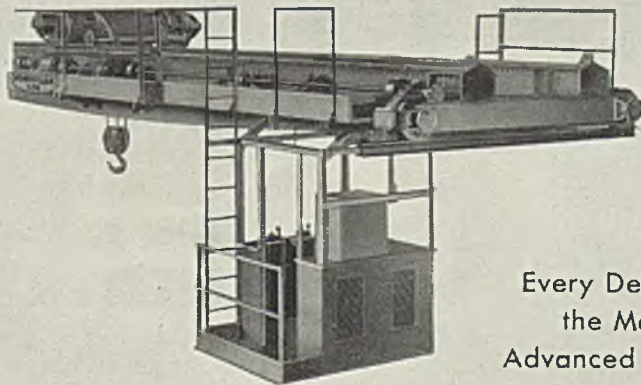
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sumption, combined with shortage of foreign ore and of pig iron abroad, is expected by some observers to lead to an acute delivery situation here later. Some trade leaders look for an advance of at least \$1 a ton for second quarter.

Alan Wood Steel Co., Conshohocken, Pa., is low on 224 tons of foundry pig iron for Norfolk, Va., at \$26, delivered, bureau of supplies and accounts, navy department.

**Buffalo**—Merchants report increasing interest on the part of consumers in iron for delivery before the end of the quarter. Some consumers, not previously in the market this quarter, have been buying single carloads to 200 or 300 tons. Melt continues to approach all-time records in tonnage. Twelve furnaces continue active.

**Cincinnati**—Shipments of pig iron are gradually expanding in proportion to the return of flood-affected foundries to production. Lack of castings, and damage to patterns in some cases, is hampering several users. New business is dull.

**St. Louis**—Activity in pig iron consists mainly of efforts by sellers to make shipments. Shipments the first half of February were at a higher average daily rate than in January, and the month's total is also expected to top that of January. Some buying of small lots is reported, but no purchasing movement of consequence is expected before March 1. Melt is being maintained at the recent high level.

**Birmingham, Ala.**—Production of pig iron is at very high level, greater than for several years, and ship-

ments are steady. Fifteen blast furnaces are active. Prices are firm.

**Toronto, Ont.**—Demand for merchant pig iron is increasing steadily and sales now are exceeding 1500 tons weekly. Melters are placing orders at frequent intervals for spot needs. Production is holding at a high level with six stacks blowing. Prices are firm.

## Scrap

Scrap Prices, Page 80

**Pittsburgh**—With steelworks operations at an unusually high rate, scrap is stronger. All items in this district are active and quotable prices in a number of lines are slightly higher. A downriver consumer is reported to have paid \$20 for approximately 5000 tons of No. 1 heavy melting steel, and an upriver consumer is paying \$21.25 for railroad steel or its equivalent.

Other sales into consumption have been more frequent than during the latter part of January, although tonnages have not been large. Brokers are hesitant to commit themselves on large tonnage sales because the demand for export is taking most of the heavy grades. According to reports late last week \$21 was paid by one mill consumer for special selected No. 1 heavy melting steel.

**Cleveland**—While iron and steel scrap is firmer than ever quotations have not changed. However, they have advanced by 50 cents a ton at Youngstown. Dealers and brokers are chary of taking new business,

some having been refused at the offered price.

**Chicago**—Lack of sufficient tonnages of old material to accommodate the active demand for most grades continues to push prices up rapidly. While last mill purchases of heavy melting steel were at \$19.50, brokers are paying \$20 and railroad offerings are bringing still higher figures. The trade looks for little increase in scrap supplies before the opening of lake navigation. Steel foundry grades are in active demand with prices at a new high for the current movement.


**Boston**—While heavy melting steel scrap prices, both domestic and export, are unchanged, substantial advances have been registered by several grades for domestic shipment. Dealers are paying higher prices, f.o.b. cars, for axle turnings, forge flashings, rails for rolling, scrap rails, skeleton and No. 1 railroad wrought. Several of these grades are more than \$1 a ton higher. Shafting is strong with \$18.75 reported bid for rail loading.

**New York**—Heavy melting steel, stove plate and No. 2 cast for export are higher for dock delivery, notably cast is up more than \$1 per ton. For No. 1 heavy melting steel for domestic shipment \$15 is being paid, an advance of 50 cents. Shafting is up a like amount, some dealers paying \$19.50, cars. Strong export demand is attracting much scrap, little going from here to Pittsburgh in spite of strong demand there. Bethlehem is taking large shipments.

**Philadelphia**—Heavy foreign demand gives scrap further strength although some leading melters are out of the market. Japan, England and Italy are buying heavily with some other countries inquiring as new buyers. With substantial accumulations at Port Richmond dealer offering prices are not yet affected. One ship left that harbor recently with 5000 tons and three more are expected to sail in the next three weeks. Some predictions are made that by April scrap exports will be the largest on record. Several specialties have been advanced.

**Buffalo**—Shipments on orders are proceeding steadily. Brokers are bidding for carlot material and this activity enables the market to retain all the firmness it has displayed in recent sales to consumers. Last contracts for No. 1 steel were made at \$18.75. Reports are current that J. G. Campbell, Buffalo, representing large scrap interests, is negotiating for purchase of the trolley lines at Jamestown, N. Y.

**Cincinnati**—The undertone of the iron and steel scrap market is strong,



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with prices unchanged. Outlets for scrap continue curtailed as a flood sequel. Activities of dealers are in anticipation of a high steelmaking rate in second quarter rather than immediate requirements. The David Joseph Co., Cincinnati, will continue as heretofore although as subsidiary to the Middletown Iron & Steel Co., which has been incorporated to become sole supplier of scrap for Middletown needs of the American Rolling Mill Co.

**St. Louis**—Heavy sales of scrap during the past two or three weeks, numerous inquiries locally and from the outside and acute tightening in the supply situation are reflected in further price advances.

The latest markups have affected all grades, with some items quoted at the highest levels in more than a decade. Heavy melting steel, malleable, certain railroad specialties and sheets are selling at the highest point in twelve years.

**Birmingham, Ala.**—Demand for iron and steel scrap is steady. Practically all business is in small lots.

**Seattle**—Scrap is active, strong demand continuing. The domestic market is firm and a large volume of business is reported with mills and foundries interested in premium material. While Japan is not buying heavily, Oriental interest is apparent. In addition to a tidewater price of around \$12, freight rates have advanced to \$7 and \$8, double the freight of last year, and space is extremely tight.

**Toronto, Ont.**—Trading in iron and steel scrap continues brisk, but some dealers continue to report scarcity in a few lines and new offerings are limited. Large shipments of heavy melting steel and turnings are being made to mills in the Hamilton district against contract, and Montreal dealers report good demand for steel grades.

## Warehouse

Warehouse Prices, Page 79

**Pittsburgh**—Emergency demand from manufacturers who have had difficulty obtaining shipments from mills recently, has reacted to the advantage of jobbers. Sheet orders especially are heavy, while bars, plates, cold-finished, specialty and alloy items are moving well. Aggregate business is better than expected at the first of this year and considerably ahead of the like period a year ago. Prices are steady.

**Cleveland**—Warehouse steel jobbers report slight increase in daily average sales, primarily attributed to settlement of General Motors tie-up. Extended mill delivery on

wire and flat-rolled steel has forced many customers to purchase from warehouse jobbers, and has been a severe test of the jobbers' ability to keep well supplied. Prices are firm.

**Chicago**—Sales continue at a fairly steady rate, comparing favorably with January volume and are well ahead of activity a year ago. Prices are steady. Distributors generally are protected on stocks.

**New York**—Replacement of some steels by warehouses, notably alloys, sheets and tubing, is difficult due

to unimproved deliveries by mills. Forward buying of cold-finished from jobbers has been heavy. Prices are firm.

**Philadelphia**—Warehouse business is active, with prolonged deliveries at mills diverting an increased amount of tonnage to distributors who, in turn, are having difficulty keeping stocks filled.

**Cincinnati**—Warehouses have been restored to near normal and stocks reclaimed, following flood conditions. Considerable business is

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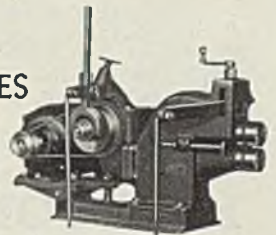
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appearing for rehabilitation projects. Sheet stocks, against active demand, are low and deliveries on some grades delayed.

**St. Louis**—Sales of iron and steel from store the first half of February have exceeded the total for the like period of January. Volume has been bolstered by further heavy calls for emergency work in the flooded areas. General manufacturing trade continues to account for heavy tonnages, this outlet being affected by delayed mill deliveries.

**Seattle**—Jobbing houses are replenishing stocks as rapidly as possible but meanwhile business is slow. Prices are firm.

## Semifinished

Semifinished Prices, Page 77

Faced by insistent demands on all sides, semifinished producers find themselves in one of the strongest sellers' markets in some time. Integrated mills are having difficulty

supplying their own finishing departments and supplies in the open market are scarce. Rerolling billets, wire rods, sheet and tin bars are in heavy demand. Billets, blooms, sheet bars and slabs are quoted \$34, base, Pittsburgh, and common wire rods, \$43 and \$45.

## Iron Ore

Iron Ore Prices, Page 80

**New York**—Increasing scarcity of chrome ore is reflected in a further advance on Turkish and Indian ores of about \$2 a ton. Demand from European countries has been particularly strong and is an important factor. Turkish ore, 52 per cent concentrates, is now quotable at \$25 to \$25.50, c.i.f. Atlantic ports; and 48 to 49 per cent both concentrates in lump, \$22 to \$22.50. Indian ore prices have been increased to comparable levels.

Scarcity of foreign iron ore is being felt materially by seaboard consumers. Where supplies are available prices have been advanced to practically prohibitive levels. Germany and England have been the principal competitors for ore usually available for this country. They have taken most of the Scandinavian supply for this year and large tonnages of African ore. Continued suspension at Spanish mines is a factor. Germany is reported to have bought a heavy tonnage from Mexico recently.

**Cleveland**—Stocks of iron at Lower Lake ports and furnaces Feb. 1 were approximately 2,000,000 tons less than on the comparable date last year, according to Lake Superior Iron Ore association. The association's report follows:

	Tons
Consumed in December .....	4,551,379
Consumed in January .....	4,694,312
Increase in January .....	142,933
Consumed in January, 1936 .....	2,951,568
On hand at furnaces Feb. 1 .....	22,985,780
On Lake Erie docks Feb. 1 .....	3,761,226
Total on hand at furnaces and Lake Erie docks Feb. 1 .....	26,747,006
Reserves total Feb. 1, 1936 .....	28,404,335

## Metallurgical Coke

Coke Prices, Page 77

Acute demand for coke for current consumption has made virtually impossible accumulation of supplies which might be needed in the event of labor trouble following expiration of union mine contracts April 1. It is reported that one or two blast furnace operators are perturbed over a possible shortage of coke and this may result in a slightly higher price. All available ovens in the Connellsville, Pa., district are

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operating. Demand for foundry coke has been unusually strong.

One coal company has announced that "within the last week or so, there has been a noticeable increase in the demand for storage coal. It is quite possible that producers will be unable to supply demands from new sources between now and the first of April, with a consequent material stiffening in market price levels."

## Steel in Europe

Foreign Steel Prices, Page 79

London — (By Radio) — Shortage of pig iron and scrap in Great Britain is now giving anxiety and impending expansion of steel production. An organization is being formed to control the scrap situation. Prices of ore and coke are rising. Pig iron producers are sold to June. Steelworks are fully booked but some mills may be forced to stop on account of material shortage.

Steel and iron exports in January at 215,030 gross tons were 10,201 tons greater than in December. Imports declined 11,716 tons to 83,077 tons in January.

The Continent reports many works are out of the market and a large export demand cannot be met, although premium prices are being offered.

## Ferroalloys

Ferroalloy Prices, Page 78

New York—Further expansion is noted in ferromanganese shipments, as consumers who covered before the advance in December find stocks of the cheaper material being depleted. Still further expansion is expected. The market is firm at \$30, duty paid, Atlantic ports. Domestic spiegeleisen, 19 to 21 per cent, is holding at \$26, Palmerton, Pa.

Electro Metallurgical Sales Corp., New York, is low on 100,000 pounds of ferrosilicon for the bureau of supplies and accounts, navy department, Washington, at 2.98c, delivered. The same bidder is low on 100,000 pounds of ferromanganese for the same bureau at 3.66c. Bids were taken Feb. 5.

## Nonferrous Metals

Nonferrous Metal Prices, Page 78

New York—All major nonferrous metal prices advanced sharply last week, amounting to \$20 per ton in copper, \$10 in lead, \$8 in zinc and about \$62.50 in Straits tin. Hectic

trading on the London Metal Exchange which reached a peak on Friday carried prices there to new high levels for recent years. Speculative buying was stimulated on announcement of re-armament programs abroad. Consumption of all metals in this country maintains an active pace.

Copper—Electrolytic copper advanced to 14.00c, Connecticut, following the rise in export copper above domestic levels. As the week closed a further advance to at least 15.00c appeared imminent with the foreign

market around 14.85c to 15.00c. Domestic sellers restricted sales but the turnover for the week was active.

Lead — Demand was extremely heavy even at the higher levels established. Spot through March was quoted 6.35c, East St. Louis, and 6.50c, New York, with St. Joseph Lead Co. still asking \$1 premium on the latter market.

Tin—Following the sharp advances in London, Straits tin prices soared here to around 52.87½c for spot delivery. Supplies of metal for nearby



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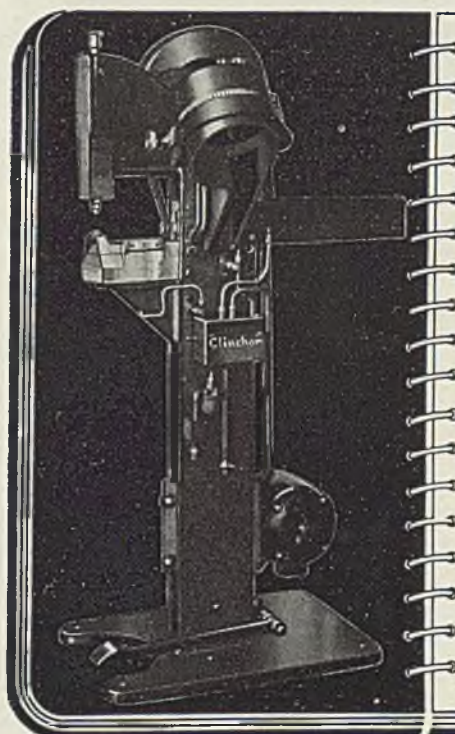
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delivery tightened and consumers withdrew tonnages from warehouses.

**Zinc**—Supplies continued tight with still higher prices foreseen. Prime western zinc advanced to 6.80c, East St. Louis, and 7.15c, New York.

**Antimony**—Prices held unchanged at 14.25c, New York, in generally quiet markets.

## Coke By-Products

Coke By-Product Prices, Page 77

**New York**—Demand for toluol has improved materially with lacquer makers taking heavier shipments, result largely of increased automobile production. Xylol supplies are short with orders ahead of output. Benzol is also active. Distillate prices are firm and unchanged. Phenol buying, notably to the resin and plastic trade, is brisk. Chemical demand for naphthalene is active with the usual seasonal increase for disinfectant purposes expected in about 30 days.

## Horseshoes in Steady Decline, Census Shows

Production of horseshoes in the United States in 1935 totaled 246,635 kegs, a decrease of nearly 21 per cent from 1933 and of nearly 70 per cent as compared with 1925, according to the bureau of census.

## Floods Cause Decline in River Steel Shipments

Shipments of all commodities on the Allegheny, Monongahela, and Ohio rivers declined in January compared with December, 1936, largely as result of flood conditions.

Shipments of steel products on the Monongahela river declined from 107,474 short tons to 74,602; on the Ohio river from 111,450 to 96,400 tons, and on the Allegheny river from 15,550 to 50 tons.

Coal shipments on the Monongahela river declined from 2,289,876 to 1,675,716 tons; on the Ohio river from 972,658 to 605,008 tons, and on the Allegheny river from 135,990 to 71,625 tons. January output from the mines, however, was considerably ahead of immediate needs of consumers.

## Employees' Savings Increase In Company's Credit Unions

Increase of 59 per cent in savings through four plant credit

unions sponsored by the American Rolling Mill Co. is reported for 1936. With a membership of 58.5 per cent of all eligible employees, the value of shares bought during 1936 totaled \$498,833, as compared with \$312,360 in 1935. Volume of business transacted by employees amounted to \$1,500,784 for the year.

The credit unions, which are operated and controlled by employees, were instituted by the company in 1932 to enable workers to obtain small loans at reasonable rates, and to make small profitable investments. There are credit unions at the company's plants at Middletown, O., Zanesville, O., Ashland, Ky., and Butler, Pa.

## Industrialists Named to Great Lakes Expo Board

More than a score of industrialists have been named to serve as trustees for Cleveland's 1937 Great Lakes exposition which will open May 29, according to W. T. Holliday, president of Standard Oil Co. of Ohio and president of the exposition.

Among those named are: Philip E. Bliss, president, Warner & Swasey Co.; Carl W. Blossom, president and treasurer, the Cleveland Hobbing Machine Co.; Courtney Burton, director, Ferro Machine & Foundry Co.; Fred H. Chapin, chairman and president, the National Acme Co.; L. W. Greve, president, Cleveland Pneumatic Tool Co.; E. L. Cheyney, district sales manager, Aluminum Co. of America; Jacob D. Cox Jr., president and general manager, Cleveland Twist Drill Co.; William H. Davey, president and treasurer, W. H. Davey Steel Co.; Earl P. Disbro, executive vice president, W. S. Tyler Co.; H. G. Dalton, senior partner, Pickands, Mather & Co.; N. J. Clarke, vice president, Republic Steel Corp.; C. C. Gibbs, president, National Malleable & Steel Castings; Tom M. Girdler, chairman and president, Republic Steel Corp.; E. B. Greene, president, the Cleveland-Cliffs Iron Co.; C. W. Hannon, president and treasurer, Murray Ohio Manufacturing Co.; Ben F. Hopkins, president, the Cleveland Graphite Bronze Co.; Elton Hoyt II, Pickands, Mather & Co.; George M. Humphrey, president, M. A. Hanna Co.; E. J. Kulas, president, Otis Steel Co.; W. G. Mather, chairman of the board, Cleveland-Cliffs Iron Co.; John P. McWilliams, president, Youngstown Steel Door Co.; Crispin Oglebay, president, Oglebay, Norton & Co.; Franklin G. Smith, president, Osborn Mfg. Co.; Henry C. Zeeryp, manager, Otis Elevator Co.

Emphasis will be laid on industrial exhibits, especially iron and steel, during the current year's exposition.

## Step Up Trade Renewals

The bill to extend this country's foreign trade agreement, which has passed the house of representatives, has been reported out by the senate committee on finance with a favorable recommendation. (See p. 33 for details.)

## Tunnel Rings Inspected

Bethlehem Steel Co. has completed the first lot of cast iron rings for linings for the Midtown-Hudson tunnel, New York. The work is being done at its foundry at Bethlehem, Pa., where a total of 47,700 tons of ring segments are being turned out.

Engineers and officials of the New York city tunnel authority visited the foundry recently and inspected the test rings built up of the first lot of castings.

## Equipment

**Chicago**—While machine tool inquiries are less active, pending business makes unfavorable comparison only with unusual December and January volumes. Orders from railroads this year have been the heaviest since pre-depression days, with additional buying in prospect. Deliveries are no better and used equipment market offers little relief to buyers seeking better quality tools. Small tools and miscellaneous plant equipment are in good demand.

**New York**—Covering a broad range, machine tool buying continues active. Small orders are being booked. Such buying has developed among several eastern railroads. Steel fabricating plants also are purchasing single tools. Machine building plants are working full time as a rule but find it difficult to attain record capacity, due to lack of skilled mechanics. Delivery is three months on some units.

**Cleveland**—Machine tool and equipment buying continues in fair volume with many small orders being booked. Lathes, drilling machines, punch presses and scattered items for automotive, electrical and paint industries are active. Representatives of an eastern tool manufacturing firm have noted a pause in demand for certain equipment while buyers study uncertain labor conditions and effect of government policies on prices. Deliveries are fair except from the Cincinnati district where output is still impeded by effects of flood. Damage has been most extensive to patterns.

**Seattle**—Highway machinery demand increases as weather conditions improve. Logging and lumber industry is buying replacement items. Marine, electrical and pumping equipment is active. Seattle will receive tenders Feb. 23 for furnishing light department equipment. Tacoma, Wash., will call bids soon for oil circuit breakers.



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# Construction and Enterprise

## Ohio

**BELLEFONTAINE, O.**—City is considering purchase of various water and light plant equipment, including coal handling apparatus. T. C. Vanica is service director, City Hall.

**COSHOCTON, O.**—Muskingum Valley Farm Bureau Electrification Co-operative association, E. C. Darling, manager, care of Ohio Farm Bureau, 620 East Broad street, Columbus, plans to erect rural transmission lines in townships around Coshocton. Maturity is dependent on allocation of approximately \$68,000 by REA.

**FRANKLIN, O.**—Franklin Fibreware Corp. plant was damaged by explosion recently.

**GALION, O.**—Perfection Steel Body Co., Harry Cohen, president, plans to construct a new 67,000-square foot plant to replace one destroyed last December. Cost is estimated around \$300,000.

**LIBERTY CENTER, O.**—Village is taking bids due Feb. 27 for construction of waterworks plant and distribution system. A turbine pump and electric motor will be installed and a 100,000-gallon tank on a 100-foot tower will be erected. Bryan Jennings is clerk of board of public affairs, and engineers are Champe, Finkbeler & Associates, 1025 Nicholas building, Toledo.

**LONDON, O.**—Ohio Tubular Products Co. will move its plant from South Main street to East First street, and will remodel and install new machinery. H. A. Tyson is vice president and general manager.

**MIDDLETOWN, O.**—City manager Walter Braun plans to appoint a committee to investigate construction of municipal light plant. Froelich & Emery, Second National Bank building, Toledo, are possible engineers.

**MONROE, O.**—Consolidated Paper Co. is considering construction of a sewage disposal plant.

**PAINESVILLE, O.**—Charles A. Siron has purchased the machine shop of the late Elmo A. Hard on Maiden lane, and will install some new equipment. Special tools and dies, surgical equipment, etc., will be manufactured.

**PIQUA, O.**—City has cancelled bids due Feb. 4 for auxiliary equipment for light plant and is now taking new bids due noon Feb. 24. A 200-kilowatt generating unit is among the items needed. City engineer is Albert Schroeder, City Hall. (Noted Steel, Feb. 1)

**PORTSMOUTH, O.**—City is considering installation of new pumping and filtration equipment in waterworks pumping station, which was badly damaged by recent floods. Aid from PWA or WPA is being sought. Frank E. Sheehan is city manager, and Charles Stevenson is city engineer.

**PROSPECT, O.**—Village has passed ordinance to purchase plant of Prospect Light & Power Co., North Main street, owned by George W. Whysall, Marion, and improve it. Cost will be about \$15,000. W. E. Hess is mayor.

**TOLEDO, O.**—City is taking bids March 2 for two 2-inch electric centrifugal pumps and one 3-inch pump, an engine lathe, tool and cutting grinding machine, pipe threading machine, milling machine, and other equipment. D. E. A.

Cameron is commissioner of purchases, 324 Safety building.

**TOLEDO, O.**—Libbey-Owens-Ford Glass Co., Nicholas building, is preparing plans which will mature within three months for power plant modernization, to include removal of two boilers and installation of one 1500-horsepower boiler. Cost will be about \$600,000. This work will be the first in a general modernization program involving three Toledo plants. David H. Goodwille is vice president and general manager, and I. G. Fowler is company engineer. Consulting engineer is Stone & Webster Engineering Corp., Boston.

**WEST JEFFERSON, O.**—Village has selected Charles Hoover, 8 East Long street, Columbus, as engineer for proposed construction of water softening and iron removal plant which it is estimated will cost \$25,000. Maturity dependent on PWA approval.

## Illinois

**ELGIN, ILL.**—Elgin Machine Works, Martin Skok, president, manufacturer of auto piston plns, plans construction of plant additions and installation of new machinery and equipment.

**CHICAGO**—Inland Machinery Co. Inc. has been organized to deal in machinery, machine tools, etc. Correspondent is Lavin & Palles, 188 West Randolph street.

## Michigan

**ANN ARBOR, MICH.**—City will take bids until March 15 for construction of a water softening plant. Ayres, Lewis, Norris & May, Ann Arbor, are engineers.

**BIRMINGHAM, MICH.**—City plans to construct a \$305,000 sewage disposal plant and has appropriated \$40,000 for purchase of site. Don Egbert is city manager.

**DETROIT**—Acme Die Casting Co. has been incorporated, and Daniel D. J. Jend, 1127 Berkshire road, Grosse Pointe, is correspondent.

**DETROIT**—Hydraulic Devices Inc., will build a factory building in Detroit, and Lyle F. Zisler, architect, 13397 Malden Lane, is preparing plans.

**DETROIT**—Clayton & Lambert Mfg. Co. will build a plant on French road, and general contractor is the Austin Co., 429 Curtis building. Estimated cost is \$72,000.

**DETROIT**—Koestlin Tool & Die Corp., Foster Fralick, vice president and general manager, Humboldt avenue, has acquired 10,000 square feet adjacent to its plant and will construct a \$100,000 addition.

**HOLLAND, MICH.**—Garrard Foundry Co., 320 East Eighth street, has been incorporated to manufacture castings. James G. Garrard is correspondent.

**JACKSON, MICH.**—Consumers Power Co. plans to spend \$13,500,000 during 1937 for construction and improvements to its properties. Dan. E. Karn is vice president and general manager.

**NEWBERRY, MICH.**—Robbins Flooring Co. plant was badly damaged by fire recently.

**PONTIAC, MICH.**—Baldwin Rubber Co. is starting construction of a plant addition estimated to cost \$100,000, and Darin & Armstrong, Detroit, have general contract. L. J. Heenan, Pontiac, is architect.

**ZEELAND, MICH.**—City plans construction of a municipal light plant to cost \$90,000, and Ayers, Lewis, Norris & May, Ann Arbor, are engineers.

## New York

**BROOKLYN, N. Y.**—Williamsburgh Power Plant Corp., 385 Flatbush avenue, subsidiary of Brooklyn-Manhattan Transit Corp., plans to build a 7-story addition to its steam-electric generating plant at 492 Kent avenue. Two 18,750-kilowatt turbogenerators, two high-pressure boiler units, and auxiliaries will be installed. Cost is estimated at \$4,300,000, and Stone & Webster Engineering Corp., Boston, is engineer.

**BUFFALO, N. Y.**—Tonawanda Engineering Corp., plans to replace its Buffalo machine shop which was recently badly damaged by fire. New machinery will be installed.

**TONAWANDA, N. Y.**—General Plastics Co. plans construction of a new mill building and warehouse, to cost about \$50,000. George W. Morris, Tonawanda, has general contract.

## Pennsylvania

**ETNA, PA.**—Borough will take bids until March 4 for construction of a water softening plant and installation of appurtenances. Engineers are Chester Engineers, Century building, Pittsburgh.

## Indiana

**MUNCIE, IND.**—Rodgers-Yohey Body Corp., 345 Hoyt avenue, has been formed to manufacture automobile, truck, trailer and aircraft bodies.

## Maryland

**BALTIMORE, MD.**—Consolidated Gas, Electric Light & Power Co. plans to build a new power substation, 46 x 130 feet, at 5200 Newgate avenue. Cost will be over \$100,000.

**HAVRE DE GRACE, MD.**—City will receive bids about March 1 for waterworks improvements. J. Spence Howard, 20 East Lexington street, Baltimore, is engineer.

## District of Columbia

**WASHINGTON**—Bureau of supplies and accounts, navy department, will take bids until Feb. 26 for chrome-nickel steel bars, schedule 9995, copper-nickel alloy tubing, schedule 9997, seamless steel tubing, schedule 9998, and 4800 pounds of steel forgings, schedule 1022. Bids will be taken until March 2 for slab zinc, schedule 1015, and for motor-driven diesel oil pumps, schedule 1011.

## Florida

**DELAND, FLA.**—Voters recently approved plans to build a municipal electric plant, pending a PWA loan of \$351,000 and a grant of \$117,000.

**PORT ST. JOE, FLA.**—City probably will ask bids early in March for construction of a sewage disposal plant. Engineers are Weldeman & Singleton Inc., 1404 Candler building, Atlanta, Ga.

## Georgia

**ATLANTA, GA.**—Edgewood Shoe Factories, operators of plants in Tennessee, have started work on a \$300,000 plant at Atlanta, to be 75 x 300 feet. Robert & Co., Bona Allen building, Atlanta, is engineer.

**ATLANTA, GA.**—Appropriation of \$695,000 to city for construction of a new filtration and water purification plant has been recommended by Presi-

(Please turn to Page 100)



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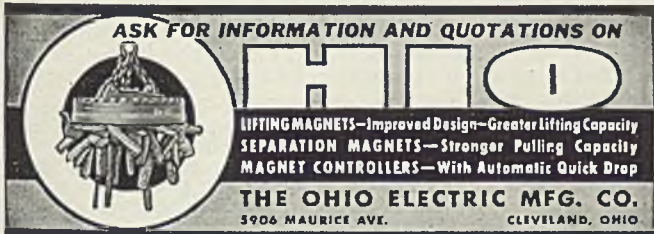
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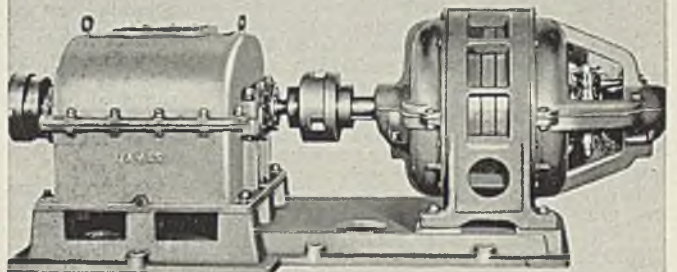
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(Concluded from Page 98)

dent Roosevelt in a report to the National Resources committee. W. Zode Smith is superintendent of the water department, City Hall.

**CEDARTOWN, GA.**—National Oil Products Co., C. P. Gullek, president, Harrison, N. J., plans to alter and rebuild the former plant of the United States Finishing Co., at a cost of \$40,000.

**LYONS, GA.**—Toombs County Rural Electrification association, W. A. Chapman, president, will receive bids March 3 for erection of rural transmission lines in Toombs and Montgomery counties. Engineer is J. B. McCrary Engineering Corp., Atlanta.

**MACON, GA.**—Jeffreys-McElrath Mfg. Co., W. H. Jeffreys, president, Chase City, Va., has acquired the old Case-Fowler Lumber Co. plant near Payne City, Ga., and will install some new machinery.

**ROME, GA.**—Southern Co-operative Foundry Co. plans to build a 1-story, 65 x 140-foot foundry, and is now taking bids.

**SAVANNAH, GA.**—Resin Products Corp. plans to build a 1-story, 60 x 200-foot manufacturing plant. D. G. Moon is plant engineer, Union Bag & Paper Co., of which the Resin Corp. is a subsidiary.

## Kentucky

**GUTHRIE, KY.**—City receives bids March 2 for water softening equipment and other waterworks improvements. Engineer is Freeland, Roberts & Co., Third National Bank building, Nashville.

## Missouri

**ST. LOUIS, MO.**—Ludlow-Saylor Wire Co., 634 South Newstead avenue, has acquired a new building and will equip it for manufacturing.

**ST. LOUIS**—Mississippi Valley Equipment Co., dealer, Chamber of Commerce building, is in the market for an overhead electric traveling crane, 10 to 15-ton capacity; an oil engine, 100 or 120-horsepower, and diesel generator sets, 250 and 350 kilowatts.

**ST. MARY'S, MO.**—City plans construction of waterworks plant and system, to include construction of iron removal plant and installation of pumping equipment. Russell & Axon, 4803 Delmar boulevard, St. Louis, are engineers.

## Oklahoma

**ALBERT, OKLA.**—William Bryant, Albert, is interested in construction of rural transmission lines in Comanche and Grady counties, and has an allotment of \$180,000.

**TULSA, OKLA.**—Progressive Brass Mfg. Co., 1702 East Sixth street, will soon start an expansion program. Foundry space will be increased 75 per cent and new core ovens, an abrasive cut-off machine and a molding machine will be purchased. E. J. Thomas is president.

## Texas

**DALLAS, TEX.**—Willard Storage Battery Co., Nineteenth street and Allegheny avenue, Philadelphia, plans to build a 1 and 2-story plant, 130 x 320 feet, at Dallas, with a daily capacity of 1000 batteries.

**ELECTRA, TEX.**—City has been granted loan of \$221,000 from PWA for construction of electric light plant, add Oklahoma

**HOUSTON, TEX.**—Humble Oil & Re-

fining Co. plans to improve and expand its bulk plant on McKinney avenue.

**HOUSTON, TEX.**—Dixon Packing Co., S. F. Dixon, president, 108 Milan street, plans construction of \$50,000 first unit of \$150,000 packing plant. Building will be 2-story, 60 x 225 feet. Architect is William H. Knehan, St. Louis, Mo.

**ROCKWALL, TEX.**—Rockwall County Light & Power Co., William G. Morrison, engineer, 204 Professional building, Waco, plans to construct a generating station and erect 200 miles of rural transmission lines at a total cost of \$275,000. A 900-horsepower diesel engine generating unit will be needed.

**WACO, TEX.**—Tri-County Electric Co. has been allotted \$360,000 for rural transmission lines in Raines, Hunt and Hopkins counties.

## Wisconsin

**CHIPPEWA FALLS, WIS.**—Board of education will close bids Feb. 26 for construction of a 3-story vocational institute, 50 x 150 feet, where wood and metalworking machinery will be installed. Total cost is estimated at \$130,000. Architect is Howard M. Nelson, Eau Claire, and John J. Nibble is secretary of board.

**MILWAUKEE**—Reliable Heat Treating Co. Inc., 2620 South Fifth street, has leased space at 1555 South Barclay street for establishment of tool and die and forging departments. John D. Dolhun and J. P. Smith head the company.

**STOUGHTON, WIS.**—Stoughton Cab & Body Co. has been incorporated, and will manufacture motor truck and bus equipment in the plant of the former New Stoughton Co. M. H. Teige is president.

## Minnesota

**AITKIN, MINN.**—Farm Electric Service Co., Louis Hallum, president, will take bids March 1 for erection of rural lines in Aitkin and Crow Wing counties. Estimated cost is \$100,000.

**ALEXANDRIA, MINN.**—Board of public works, H. S. Campbell, city clerk, will take bids Feb. 26 for equipment for municipal heating and generating plant. Burlingame, Hitchcock & Estabrook, Sexton building, Minneapolis, are engineers.

**REDWOOD FALLS, MINN.**—Central Minnesota Co-operative Power association, Louis Fredrickson, president, has been allotted \$70,000 by REA for construction of rural transmission lines. A. W. Buell, 536 South Mainline avenue, St. Paul, is engineer.

**ST. PAUL**—Board of trustees, Minneapolis-St. Paul sanitary district, will receive bids March 8 for pneumatic conveying equipment and appurtenances and for various construction at new sewage treatment plant. The entire Twin Cities' sewage disposal project, to be completed in 1937, will cost \$16,000,000, of which the sewage disposal plant will take \$3,375,000. C. C. Wilbur is chief engineer.

## Iowa

**DUBUQUE, IOWA**—Eastern Iowa Electric Co., Dubuque, plans extensions in rural transmission lines in part of Dubuque county, and an application for funds and permission has been made.

## Nebraska

**CLAY CENTER, NEBR.**—Clay county rural public power district, care of C. A. Sorenson, Barkley building, Lincoln, plans to erect rural transmission lines in parts of Clay county, at a cost of approxi-

mately \$475,000, to be arranged through federal aid. O. R. Toman, Barkley building, Lincoln, is engineer.

## Pacific Coast

**LOS ANGELES**—Aller Foundry & Pattern Co., 136 Sotello street, will construct a brass foundry building at 1453 Beale street. M. V. Storm is manager.

**LOS ANGELES**—Gladding-McBean & Co., 2901 Los Feliz boulevard, plans to build a machine shop, 60 x 100 feet, and L. G. Jost is engineer.

**LOS ANGELES**—Premier Oil & Lead Works, 3950 Medford street, has purchased two acres and plans to construct a plant addition there.

**LOS ANGELES**—W. P. Fuller & Co., 135 North Los Angeles street, will build a factory at 210 Avenue 21, and Gordon B. Kaufmann, 627 South Carondelet street, is architect.

**LOS ANGELES**—Crown Body Corp. Ltd., 2500 McPherson street, will construct an automobile body plant, 40 x 140 feet, and George J. Fosdyke, 112 North Main street, is engineer.

**LOS ANGELES**—National Automotive Fibres Inc., Detroit, will build a 1-story factory at 5000 Randolph street, and Harry T. Miller, 4814 Loma Vista avenue, is architect. General contractor is William P. Neil Co., 4814 Loma Vista avenue.

**SAN DIEGO, CALIF.**—San Diego Consolidated Gas & Electric Co. plans construction of a 1-story addition to local generating plant at 707 West Broadway. Cost will be over \$150,000.

**SAN FRANCISCO**—Turner Machinery Co., 734 Bryant street, is taking bids for construction of a 1-story machine shop to be located at Folsom and Thirteenth streets. W. H. Ellison, 821 Market street, is engineer.

**SAN FRANCISCO**—Modern Malting & Mfg. Co., 200A Rialto building, is asking bids for construction of a factory on South Linden street, estimated to cost \$450,000. Paul C. Von Gontard is president, and Galland-Henning Mfg. Co., Milwaukee, Wis., is engineer, coast offices with Simonds Machinery Co., 816 Folsom street.

**EVERETT, WASH.**—Soundview Pulp Co., Bayside, plans to install transformers and accessories, motors and controls, regulators, electric hoists, conveyors and other equipment in third unit of local sulphite pulp mills, on which bids will be asked soon. Total cost will be about \$1,500,000. Leo S. Burdon is general manager.

**SEATTLE**—General Paint Corp. is rebuilding its plant which was damaged by fire several months ago.

**SEATTLE**—Independent Paper Stock Co. is building a new 120 x 130-foot plant at Hanford and Colorado streets, at a cost of \$100,000.

**SEATTLE**—City rejected recent bids for construction of a 300-foot power dam in the Ruby Basin district for a hydroelectric power project, and will have revised plans drawn at once for a dam 625 feet high, instead of 300 feet. Proposed generating station will have an ultimate capacity of 400,000 horsepower, and will cost nearly \$5,000,000.

**SPOKANE, WASH.**—Ohler Diesel & Electric Co., 808 West Second street, has been incorporated by G. H. Ohler and associates.

**PORTLAND, OREG.**—Furniture factory of B. P. John Corp. was damaged by fire recently.