STEEL

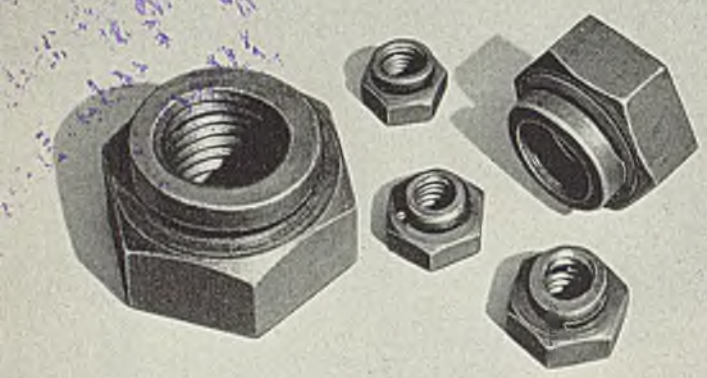
ESTABLISHED 1882

Contents

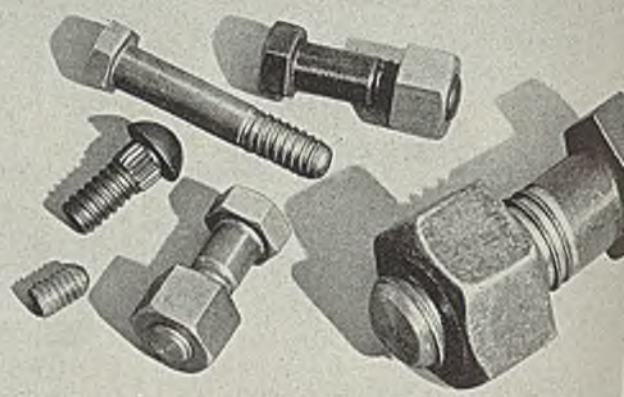
Volume 106—No. 5 January 29, 1940

PRODUCTION • PROCESSING • DISTRIBUTION • USE

MODERN *Fastenings* YOU SHOULD KNOW ABOU



The new Stay-On Lock Nut keeps assemblies tight which are subject to severe vibration. Slotted crown section, eliptical in shape after heat treatment, grips bolt thread like a vise. One-piece design. Can be used repeatedly.



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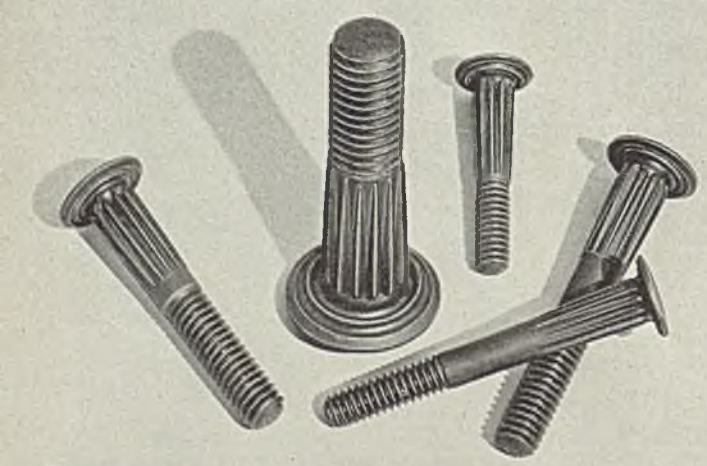
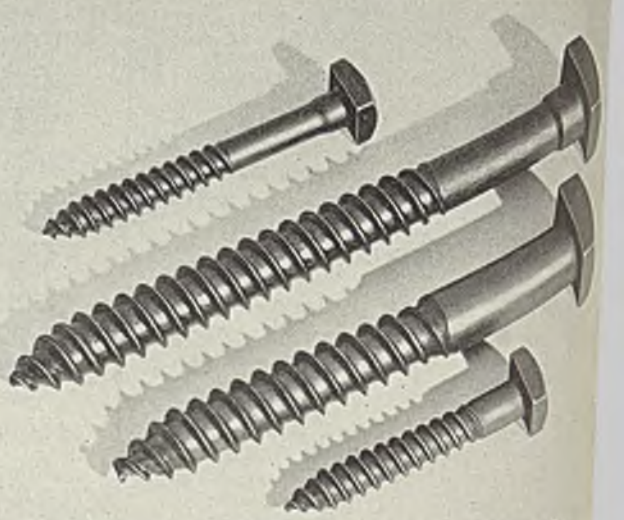


The Weather-tight Bolt is for wood construction. Head of this bolt sets flush with surfoce of wood without counter-boring. Prevents moisture seepage beneath head and from nut end as well. Tapered splined shanks prevent turning when nut is applied.



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BOLTS ... NUTS

As the Editor Views The News

■ STEEL production last week (p. 19) declined 3 points to 81.5 per cent of ingot capacity. Consumption at metalworking plants is at a much higher level than that of present mill bookings, but an enlargement in orders awaits absorption of a larger share of steel now on hand or due on previous commitments (p. 69). Pipe demand, the exception, is brisk. More automotive steel buying is expected shortly. Indications point to a moderate upturn in new steel buying within another 30 days. Export business continues to improve mildly. Domestic tin plate consumption in 1940 should compare favorably with the 1939 volume (p. 67) and there should be a 10 per cent increase in exports.

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First large steel company to report on fourth quarter financial returns is Bethlehem Steel Corp. (p. 19); it earned a net profit of $13,028,928 in that period. . . . At Pittsburgh, the weather (p. 31) is the dominating subject. Deeply frozen ground and thick blankets of snow generate fears of disastrous floods in event of a sudden thaw. . . . United States (p. 34) now is producing about 75 per cent of its normal tungsten ore requirements. . . . Automobile manufacturers (p. 23) believe the reciprocal trade treaties contribute to our domestic prosperity. . . . Air conditioning (p. 30) has vast potentialities, of widespread significance to metals and metalworking.

Pittsburgh Fears Flood

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Following elaborate research, Dr. Yntema last week (p. 13) reported to TNEC that "demand for steel is determined primarily by general business activity, consumers' income and industrial profits, and to only a minor extent by the price of steel. Elasticity of demand for steel is so low that a reduction in steel prices does not provide an effective means of increasing production and employment in the industry." New Deal economists opposed his contentions. . . . In the development stage (p. 28) is a process for making wire from strands slit from strip. . . . Newly organized Anglo-French purchasing board (p. 25) has headquarters at 15 Broad street, New York.

Determines Demand

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A new control system that automatically regulates power input to electrically heated furnaces (p. 40), is particularly suitable in treatment of materials that require a constant temperature. . . . Exposed parts of ball bearing transmissions (p. 42) are made corrosion resistant by chemical treatment. . . . Wider use of welding in ship construction (p. 43) has resulted in large prefabricated subassemblies; a new screw-luffing full-revolving tower crane simplifies the problem of handling them. . . . Joining of oil well casing by welding (p. 46) proves economical. . . . Thirty-gage wire is enameled in a new oven (p. 41) at speeds as high as approximately 1000 feet per minute.

Weld Oil Well Casings

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Considerable progress is reported in direct rolling of strip from molten metal. Thin gages (p. 48) are being produced at speeds up to 500 feet per minute with higher speeds a probability. . . . Trend in industry is to place less reliance on natural light and (p. 51) utilize artificial illumination which is more dependable. . . . A new mechanical parts plant (p. 57) is featured by an exceptionally versatile and efficient department for polishing and plating in small lots. . . . New subdivision of American Institute of Mining and Metallurgical Engineers is a Bessemer Steel committee. It will hold a luncheon meeting Feb. 15 (p. 61) during the institute's annual meeting in New York.

Roll Molten Metal

E. C. Kreutzberg

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RYERSON CERTIFIED STEELS

U. S. Steel Presents Facts To Refute New Deal Price Theories

Shows reductions fail to increase output or employment; would mean bankruptcy in slack times. Voluminous report presented at TNEC hearing

WASHINGTON

■ UNPRECEDENTED challenge to the New Deal theory that lower steel prices would automatically increase demand, reduce unit costs and maintain profits was presented to the temporary national economic committee last week by the United States Steel Corp.

An elaborate and exhaustive analysis, supported by statistical data, showed the inter-relationship between prices, costs and steel demand. Prepared by Dr. Theodore O. Yntema, University of Chicago, the study concluded that demand for steel is so inelastic and so dependent on a multitude of factors that price reductions provide no effective means for increasing production and employment in the industry. It also showed that as result of cost factors, price reductions in periods of low industrial activity would greatly increase steel company losses and, if continued, bankrupt the industry.

"New, Vital Information"

In introducing Dr. Yntema, Benjamin F. Fairless, U. S. Steel president, said the Corporation's records had been thrown open to the professor and his staff to aid the committee in its study.

The analysis, it is generally agreed, is probably the most comprehensive ever made of the operations of U. S. Steel, or any other steel producer. Dr. Theodore Kreps, TNEC economic consultant, characterized it as "new and vital information" long sought by the committee. Any disagreement with the study would be with its conclusions and not with factual data, he said.

Analysis includes a survey of all cost, demand, and profit factors.

"Our studies," Professor Yntema told the committee, "show that the demand for steel is determined primarily by general business activity, consumers' income and industrial profits, and to only a minor extent by the price of steel. The elasticity of demand for steel is so low that a reduction in steel prices does not provide an effective means of increasing production and employment in the industry.

"Because of this inelastic demand and the character of costs in the industry, a moderate decrease in price results in a great decrease in profits or increase in losses.

"Since margins of profit in the steel industry during the past ten years have been and still are extremely low, no substantial reduction in steel prices could have been borne or could now be borne by the industry without corresponding reductions in costs. This could not be effected without great reductions in wage rates."

■ "Substantially lower price levels for steel during the past ten years would have brought general bankruptcy in the industry"—Dr. Theodore O. Yntema, before TNEC. NEA photo

Recognizing TNEC's interest in relation of steel prices to production and employment, Dr. Yntema said: "These studies do not, of course, answer all the questions relating to price flexibility in durable goods, but they do, we believe, present factual evidence illuminating some aspects of the problem.

"The basic questions to which our studies were addressed are these:

"1. To what extent will the production and sale of steel respond to changes in the price of steel?

"2. To what extent do costs vary with volume of production?

"3. How far, if at all, is it feasible for the steel industry to achieve additional sales, production and employment in depression by reduction of prices?

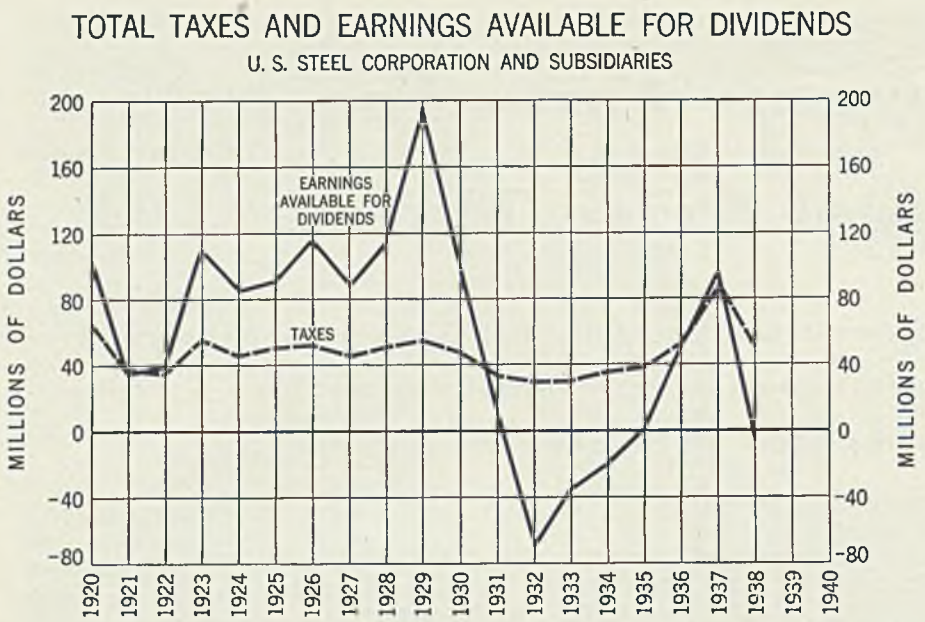
"In other words, is it possible for the steel industry to achieve fuller utilization of its productive facilities and thus greater employment by means of price reductions in periods of low demand?

Steel Demand Inelastic

"An analysis of the evidence available to us leads to these conclusions:

"1. The quantity of steel that can be sold is relatively unresponsive to changes in the level of steel prices. In other words, the demand for steel is inelastic. A reduction in the price of steel, therefore, will bring only a small increase in its consumption. The fluctuations in the production of steel have been due primarily to shifts in demand caused by changes in general business activity, consumers' income and industrial profits. In comparison with these factors, the price of steel has been a minor influence on the quantity of steel sold.

"2. The reduction in average costs resulting from increased output is much less than the reduction in prices which is necessary to induce such increase in output. All but a



■ From 1930 through 1938, U. S. Steel's total tax bill amounted to about $410,615,000 whereas during this period earnings available for dividends to stockholders were about $127,072,000, or less than one-third the tax bill

small percentage of the costs of producing steel, in good times and bad, are cash out-of-pocket expenditures. Unless wages and other costs could have been further reduced in depression, a substantially lower price level for steel during the past ten years would have brought general bankruptcy in the industry.

"In view of these facts, full production and employment cannot be maintained in the steel industry during depression by means of reduction in steel prices."

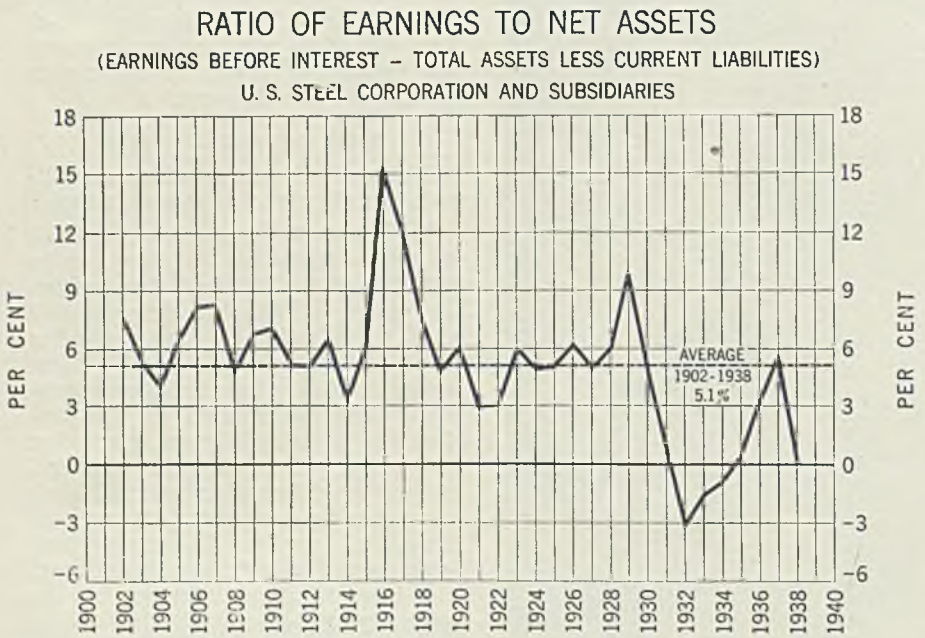
Dr. Yntema told the committee that during the last 15 years the automobile, railroad and container industries have consumed almost 40 per cent of the steel produced. These industries represent three different types of steel consumers, one using steel as a raw material in the manufacture of a consumers' durable goods, another using steel in the form of plant and equipment, and the third using steel as a raw material in the manufacture of a consumers' perishable goods.

"The automobile industry has been the largest single consumer of steel for five of the last six years, taking between one-fourth and one-sixth of the total of all hot-rolled steel products. Although it has had a long-term upward trend, automobile production has been subject to severe cyclical fluctuations. In 1929, approximately 5.6 million cars were produced. In 1932, production slumped to about 1.4 million, only 25 per cent of the 1929 production. By 1937, production had risen to approximately 5 million cars, more than three times that of 1932."

For many years, said the witness, "the railroad industry ranked first as a consumer of steel. In 1926, railroads consumed approximately 7.6 million tons of hot-rolled finished products, which represented about 21.6 per cent of total output.

"The cyclical fluctuations in railroad purchases of steel are particularly marked. In 1932, the railroads took approximately 1 million tons of steel, while in 1937, a relatively good year, they purchased 4.1 million tons, still much less than their pre-depression consumption.

"The serious plight of the railroads is common knowledge. They have suffered both from a downward trend in operations and from the severity of the recent depression. As a consequence, the need for new equipment has declined and the revenues in many cases have been inadequate for maintenance and replacement of existing facilities."



■ Since its organization, the ratio of earnings of U. S. Steel to the combined investment of stockholders and bondholders has averaged 5.1 per cent; since 1920, the ratio has been about 3.4 per cent; for the past ten years the ratio has been slightly less than 2 per cent

Tin Plate Demand Increases

Consumption of steel by the container industry, whose principal products are consumers' perishable goods, has shown a substantial upward trend since 1923. Dr. Yntema explained "in that year the container industry took 3.6 per cent of the total finished rolled steel, but since 1932 it has taken on the average more than 8 per cent of the total output. In 1938, it ranked third among consuming industries, accounting for 9.9 per cent of the total output of steel.

"While the annual average consumption of steel by the container industry was 1.4 million gross tons during the period from 1923 to 1929, in the period from 1932 to 1938 its annual consumption averaged about 1.9 million gross tons, which is roughly an increase of 36 per cent.

"This relative stability of the container industry during depression periods is further shown by the fact that tin plate production ranged from about 60 to 90 per cent of capacity during the depression, while total steel production varied from 15 per cent to 60 per cent of capacity."

Other steel consuming industries were not examined in the same detail. "In nearly all cases," Dr. Yntema said, "the products of these industries are durable goods subject to great cyclical fluctuations.

"Many are producers' goods, which

are utilized in the production of other goods and services. In such cases, the cost of the product made from steel is not usually a large proportion of the value of the goods and services produced by the industries using these products made from steel. Consequently, there is good reason to believe that the demand for the products of these industries is generally not very elastic and in many cases is inelastic."

The witness explained relation of the cost of steel to the price of the finished product. "The demand for steel," he said, "is derived from the demand for the services rendered by steel products, or, more directly, from the demand for the finished products themselves. A reduction in the price of steel, if passed on, will reduce the price of the finished product.

"In greater or less degree, this will increase the consumption of the product and, thus, the consumption of steel used in its manufacture. Furthermore, a reduction in the price of steel may perhaps increase the use of steel per unit of finished product. In each of these cases, however, the critical question is, how much?

"The percentage decrease in the price of a finished product made possible by a reduction in the price of steel depends upon the proportion of the cost of steel to the value of the finished product. What is this proportion?

"In the case of low-priced automobiles, the cost of steel is about 10 per cent of the delivered price. This percentage would be lower for a more expensive automobile. For a representative list of canned food products, the cost of tin plate per can varied from 3.4 per cent to 13.9 per cent of the retail price of such food products.

Steel Not Large Cost Factor

"The cost of steel consumed by the railroads is estimated to average only about 5 per cent of the value of transportation services furnished by them. In the construction industry, steel costs range from 4 per cent of the total cost of a frame house to as much as 30 per cent of the total expenditure for a steel bridge.

"For a modern automatic packaging machine, the steel cost component was found to be less than 2 per cent of the selling price. Extreme examples may be cited showing a very high or very low ratio of the cost of steel to the price of the finished product, but 10 per cent appears to be a reasonably typical proportion.

"On this basis, a 10 per cent reduction in the price of steel would correspond to a 1 per cent reduction in the price of the finished product.

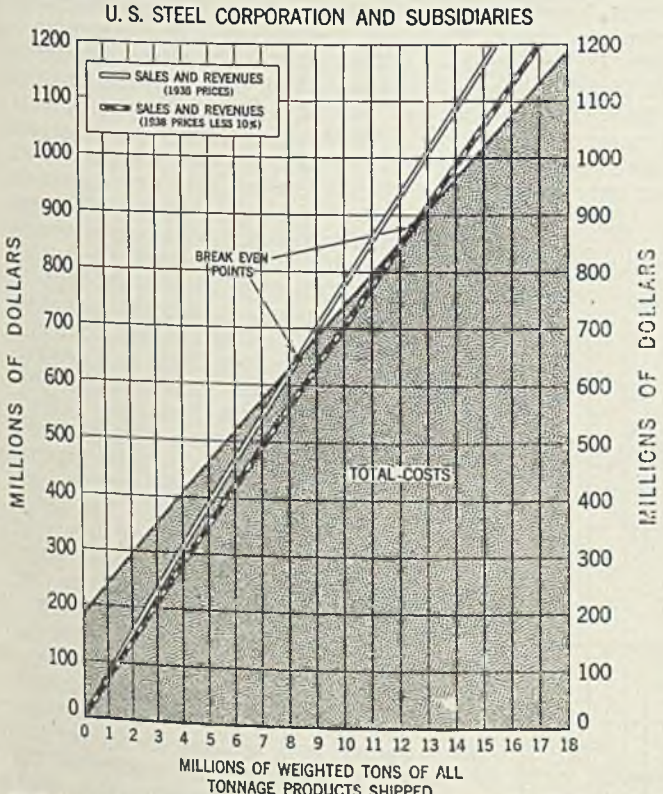
Since the elasticity of demand for the finished products of most steel consuming industries is low, probably less than 1 or 2, a 1 per cent decrease in the price of the product would not increase the quantity sold by more than 1 or 2 per cent. If other conditions affecting demand and costs remain the same, a 10 per cent reduction in the price of steel would not increase the consumption of steel by more than 1 or 2 per cent through its effect upon the price of the finished product."

Dr. Yntema told the committee what he had found as result of studies of effects of price reductions in steel.

"From the relationship between costs and volume it is possible to determine the increase in volume necessary to compensate for a given price reduction. Although our estimates of the elasticity of demand for steel are less than 1, it will be assumed in the following calculations that a given percentage reduction in price will cause an equal relative increase in the volume of steel

RELATIONSHIP BETWEEN SALES AND COSTS

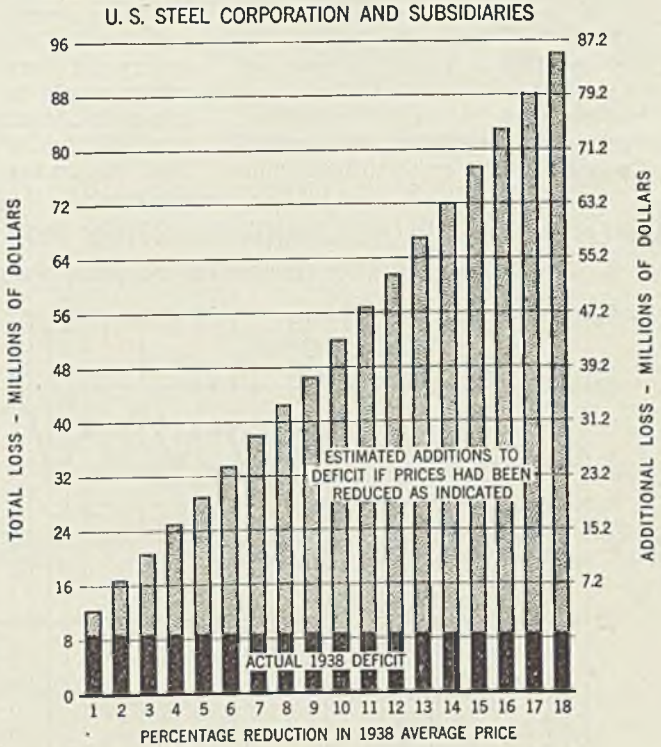
EFFECT OF REDUCTION FROM AVERAGE 1938 PRICES
U. S. STEEL CORPORATION AND SUBSIDIARIES



Ten per cent reduction from the average 1938 prices would have required 48.8 per cent increase in volume, a much greater increase than could result from such a price reduction. Note: Costs in above chart are based on 1927-38 experience, adjusted to 1938 conditions

ESTIMATED ADDITIONS TO 1938 DEFICIT

HOW DEFICIT WOULD HAVE INCREASED IF PRICES HAD BEEN REDUCED AND VOLUME HAD INCREASED TO SAME RELATIVE EXTENT
U. S. STEEL CORPORATION AND SUBSIDIARIES



Any further decrease in prices in 1938 would have served but to increase the year's deficit; the greater the reduction, the more the deficit would have increased. Note: Actual 1938 deficit is after bond interest but before federal income and profit taxes; nonoperating data excluded

sold, so that the dollar amount of sales will remain the same. In other words, the elasticity of demand will be assumed equal to 1.

"The sales and revenues of United States Steel Corp. subsidiaries in 1938 amounted to $77.66 per weighted ton of products shipped. Of this amount $71.86 represented the amount received from the sale of steel and other products, and $5.80 represented income from transportation and miscellaneous operations.

"On the assumption of unitary elasticity of demand and no increase in transportation and miscellaneous operating revenues, a 10 per cent decrease from the average price level in 1938 would require an increase of 48.8 per cent in volume of shipments to avoid loss from price reduction.

Increase Not Commensurate

"But the maximum increase in volume to be expected from the price reduction is only 11 per cent. Thus it is clear that a price decrease would induce only a small proportion of the tonnage increase which would be necessary to compensate for it."

Discussing the price situation in greater detail, Dr. Yntema said that "in 1938 the subsidiaries of the United States Steel Corp. shipped 7,800,000 weighted tons, while in 1937 they shipped 13,200,000 tons. To bring the 1938 weighted tonnage up to the 1937 level, a 69.23 per cent increase would have been necessary. On the assumption of a unitary elasticity of demand, this would have required a price decrease of 40.9 per cent.

"After such a price reduction, revenue per weighted ton would have been $48.26, or $5.10 less than the additional cost per ton of products shipped. On the assumption (contrary to our previous findings) that the price reduction of 40.9 per cent would have been sufficient to restore the 1937 volume, 13,200,000 weighted tons would have been sold. The Corporation and its subsidiaries would then have had a cash loss of $152,600,000 out-of-pocket fixed costs plus a further loss of $5.10 per ton, or a total cash loss of $219,920,000.

"If depreciation and depletion of assets at this rate of operations, amounting to $60,784,000, were added to the cash loss, the total loss would have been $280,704,000. In one year this would have wiped out more than half the current assets of the Corporation.

"The 1938 price level used in the foregoing calculations is the average of price in effect both before and after the June, 1938, reduction of approximately 10 per cent in the published prices. The relationship between annual sales and revenues and annual costs at various levels of production has also been computed on the basis of prices prevailing during the second half of 1938. At this lower price level the break-even point (under 1938 costs conditions, without any allowance for dividends on preferred stock) would have been at about 10,500,000 weighted tons, which is equivalent to an operating rate of 50 to 55 per cent of capacity.

"A 10 per cent reduction in prices from this level would have raised the break-even point to about 90 per cent of capacity. If the break-even point were this high, the Corporation would have to operate at the impossible annual rate of 130 per cent of capacity to earn a return before income taxes of only 5 per cent on its investment in tangible assets."

After Dr. Yntema presented his analysis, New Deal economists opened a broad attack on the study. Attacking forces were led by Mordecai Ezekiel, New Deal adviser to the secretary of agriculture, Martin Taitel, WPA consultant, Louis Bean, of the bureau of agricultural economics, and Prof. Melvin D. de Chazeau, University of Virginia, who has been employed by the justice department to assist in preparing the steel case before TNEC. Professor de Chazeau followed Dr. Yntema to the stand, disagreed with many of the latter's statements.

"If the conclusion reached by the United States Steel Corp. with regard to demand for steel and the variation of cost with changes in volume are accepted as valid," he said, "the possibility of price reduction without 'out-of-pocket' loss is of negligible significance.

Indicates Possible Errors

"In fact, the high level of the variable costs so 'demonstrated,' $55.73 per weighted ton, relative to the fixed cost, and the constant character of these variable costs with changes in output practically render a discussion of demand elasticity academic. That is, the elasticity of demand (i. e., the proportionate change in volume with a given change in price) would have to be between 3 and 4—an amount far beyond any conceivable actual elasticity for steel products—before it would pay the corporation to reduce price. Attention will be directed, then, first to the analysis of cost and then to that of demand.

"With the exception of payroll and 'other expense' items which were adjusted for time trend to correct for changes in efficiency, the fixed and variable components in each of the corporation's expense categories were ascertained by plotting annual adjusted expense against weighted tonnage sold in a scatter diagram, fitting a regression line, and extrapolating that line to the base line.

"There is always possible error in the projection of a total expense function derived from an analysis of historical cost data. The shape of the cost function at levels of output below those actually experienced may be different from that within the range of observations.

"A relatively slight change in the slope of the regression line can make a substantial change in the apparent size of fixed and variable costs. It is possible, therefore, that the actual overhead expense of the Corporation is greater than that calculated by the statistical method employed.

"Neglecting this possibility, however, it is apparent that the character of the total cost function and

PAYMENTS TO EMPLOYEES AND INVESTORS PER DOLLAR OF SALES

U. S. STEEL CORPORATION AND SUBSIDIARIES

■ From 1902 to 1938, payroll payments to employes absorbed an increasing proportion of the sales dollar, while interest and cash dividend payments to investors have absorbed a decreasing proportion

the relative magnitude of fixed and variable components of cost depend on (a) the dependence of actual expenses in a given year on the volume of sales in that year; (b) the reasonableness of the adjustment to 1938 conditions; and (c) the adequacy of the weights employed to obtain a homogeneous single output series.

"Finally, the significance of the result for pricing policy depends on the applicability of this method of cost analysis to a situation in which multiple plants are employed, multiple products manufactured, and dynamic conditions of technology and capacity obtained. Criticisms of the data analyzed, the adjustment of data and especially the weighting of tons are important primarily because of their cumulative rather than their individual effect. Because of the limited number of observations a relatively slight change in the location of points in the scatter diagrams might render the cost function curvilinear rather than linear. The most important limitation on this study, however, is the narrow significance that may rightly be accorded it for the purposes of pricing policy."

May Reflect Managerial Policy

The professor told the committee that the relation of recorded expense to volume of sales may reflect managerial policy rather than actual cost and thereby exaggerate the apparent magnitude of variable costs.

The witness said that the assumptions that must be made to justify the weighted tons employed in the Yntema analysis are so improbable as to throw doubt on the conclusions derived.

"Assuming the propriety of the mill-cost averages, however, it is necessary to assume that the ratio of the average mill-cost of each product to the average mill-cost of all rolled and finished steel products during the sample period 1935-37, was constant throughout the period analyzed, 1927-38, inclusive. This is equivalent to an assumption that no technological improvements took place in one department or geographic area that did not take place in all departments or geographic areas.

"That this was not true, especially for hot and cold-rolled light steel products like strip, sheet and tin plate which constituted a substantial and apparently increasing percentage of the total tonnage of rolled and finished steel shipped during the period, seems likely."

If the contentions of the Corporation with regard to cost and demand are admitted, Dr. de Chazeau told the committee, one is forced to conclude that from any break-even point a price reduction will bring losses and an upward price movement will bring continuous and increasing profits.

Discussing this, the witness said "the Corporation concerns itself exclusively with results which might be expected with a price reduction. But demand elasticity is equally applicable to price increases with a corresponding decline in volume. The conclusion of the Corporation's analysis would indicate that it would be increasingly profitable to raise prices, disastrous to lower them. The theoretical monopoly price would be at a point which allowed the sale of a single ton."

Following the statement made by Dr. de Chazeau, Professor Yntema resumed the stand with two of his assistants, Richard H. Appert, a former instructor at the University of Chicago, and Harold Gregg Lewis, instructor of economics at the University of Chicago. Both of the latter had assisted Professor Yntema in his studies.

"We are glad to have the criticisms of our studies offered by Dr. de Chazeau in his testimony," said Dr. Yntema, "and we appreciate particularly the courtesy extended to us by Dr. Kreps and committee.

"First of all, I should like to clear up any misunderstanding which may exist as to the purposes for which these studies were prepared. They were not made with any idea of providing the United States Steel Corp. or the steel industry with a formula which could be used as a basis for price policy.

"As a matter of fact, steel men were well aware of the characteristics of the demand for steel and the behavior of costs long before we began this study. We have merely applied the methods of statistical and economic analysis to the facts and presented our findings to the committee in the simplest way we could," Dr. Yntema continued.

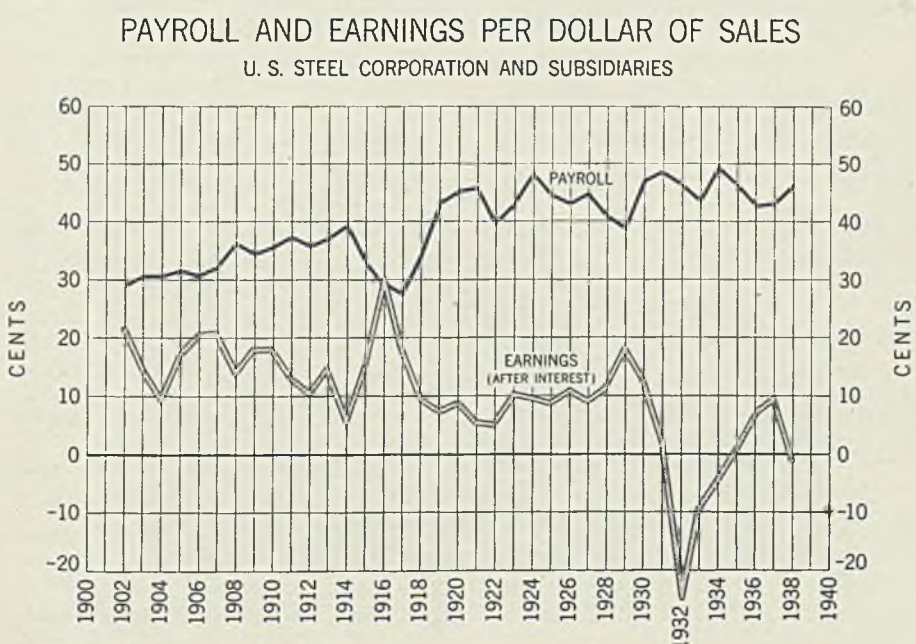
"Near the conclusion of his testimony, Dr. de Chazeau said that if our 'analysis of demand reflects faithfully the businessman's criterion of desirable price he has dramatized the conflict of private and social interest in pricing policy, which is the fundamental issue before the temporary economic committee.'

"In the first place, there was never any implication on our part that our analysis reflected or had anything to do with the business man's criterion of desirable price. In the second place, and more important, the phrase 'conflicts of private and social interest in pricing policy' requires further clarification. In an economic system of private enterprise, each business seeks, and ought to seek, to make the largest possible profit in the long run.

Cites Steel Competition

"I suppose that most businessmen would like to get a higher price for their products than they do, and I think it is probably safe to say that it would not be in the general social interest for them to obtain as high a price as they would like to get. If this is merely what is meant by the conflict of private and social interest in pricing policy, it is an empty phrase. The real question is whether the price level in a particular industry is such as to warrant concern for the social interest.

"There seemed to be some question yesterday as to why the steel



Proportion of sales dollar going to employes in form of wages and salaries has had an upward trend, increasing from about 30 cents in 1901 to about 45 cents in 1938. Portion remaining as earnings available for dividends to stockholders has declined, even more than the portion going to employes has increased

industry did not charge higher prices for their products if they could thereby so obviously reduce their losses and increase their profits. Certainly it is not because the steel companies do not want to raise their profits from the levels which have prevailed over the past ten years. The situation can only be explained by the fact that the forces of competition are great enough to keep individual companies from raising their prices."

During the course of the hearings, Benjamin F. Fairless, president, United States Steel Corp., told the committee his corporation had done everything that it could to cooperate with the committee in its desire to learn about the steel industry.

Named 30 To Aid TNEC

He stated that a special TNEC group had been appointed to see that the committee got what it asked. The group consisted of 30 persons, including executives, lawyers and economists. Studies, he said, had been carried on by the group for the past year and a half.

Mr. Taitel said he regarded Dr. Yntema's study "as highly interesting applications of refined econometrics, but of little use to the committee as a description of the actual conditions upon which steel price decisions are based."

Mr. Taitel said "the steel industry has rather generally been regarded as an industry with high 'fixed' costs, that is, one of those industries in which unit costs of production decline as output increases.

"So far as prices in such an industry are based upon costs, the pricing policy would tend to be one that provides for declining prices as the volume of output increases. Prices in the steel industry, however, have not followed this pattern. They have tended to remain relatively fixed. The typical practice has been to increase prices with increased volume rather than to decrease prices as sales expand. Such price behavior is much more consistent with a situation in which increasing output is associated with constant or rising costs.

"The statistical analysis of costs presented to this committee by the United States Steel Corp. is designed to defend the pricing system practiced by the Corporation."

Mr. Ezekiel told the committee that the material presented by Dr. Yntema may be summarized in three broad statements:

"1. If the steel industry were to reduce its prices at any time, the percentage gain in sales (due solely to the reduction in price) would be at most no greater than the percentage reduction in price, so that the gross income of the steel industry would show no increase.

"2. If the sales of steel were to increase at any time, the larger output would lead to a reduction in production costs per ton. Costs per unit, however, would fall as rapidly as output rose, so that total costs would increase as sales rose.

"3. A reduction in price would always reduce the profits or increase the deficits of the corporation. This result would follow, it is argued, since total income would not increase with the increased sales, whereas total costs would increase.

"There are many weaknesses in both the accounting methods and the statistical techniques used in reaching the first two statements, as other witnesses have already shown."

Dr. Bean criticized the Corporation's statements on analysis of demand for steel in the container, automobile, and railroad industries as presented by Dr. Yntema.

He said examination of the statements reveals grave statistical defects. "These are," he said, "defects in methods of analysis as well as in assumptions and in data. In the first three of these studies, the important objective was to reveal the effect of price on consumption, but the methods and data used were inadequate, with the result that the quantitative conclusions arrived at are unreliable, and so generally recognized by the authors. In some cases adequate data were not fully utilized and important price-volume relationships remained undetected.

Calls Analysis "Unreliable"

"In the study dealing with total steel consumption by all industries, several of the quantitative analyses presented are statistically unreliable because of the wide range within which the 'true' relationships between price and volume may lie. No account was taken of the extent to which one or two extreme observations influenced the results obtained. In certain cases where the analyses show little influence of price on volume, a close examination of the data used reveals substantial price influence; and in cases where low prices were found to be associated with low volume, the underlying relationships can be shown to be just the opposite."

Dr. Bean told the committee that "in general, it may be said that all of the analyses give such unreliable results that the authors themselves discard their showings as to the nature of elasticity of demand for steel and resort to the assumption of unit elasticity as a basis for the further analyses of costs in relation to volume and of losses in relation to price reductions.

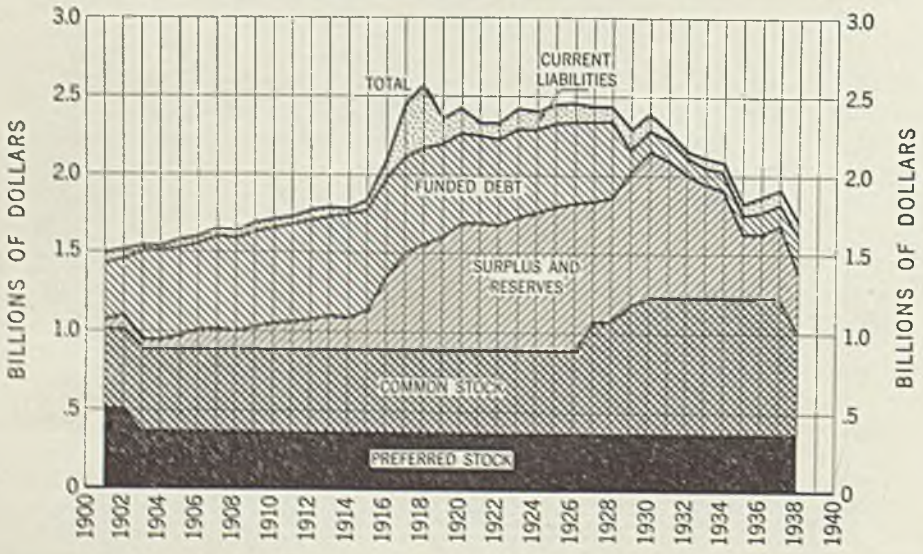
"In their conclusions as to the effect of a given price reduction on the volume of steel, the authors of these studies fail to take into account the effect that such a price reduction would have on the general average of price of goods directly and indirectly affected by steel prices. They also fail to take into account the additional effect of the increased volume of steel due to a price reduction on business in general and therefore on steel.

"That there is a positive relation between steel activity and general activity is well known and demonstrated in these demand studies.

(*Please turn to Page 68*)

CAPITAL, SURPLUS AND LIABILITIES

U. S. STEEL CORPORATION AND SUBSIDIARIES



■ Corporation has sound financial structure, with relatively small amount of liabilities and a comparatively large amount of surplus and reserves, and capital stock. Present capitalization is represented entirely by tangible assets. Goodwill and intangibles now are carried at one dollar

FINANCIAL

BETHLEHEM'S 1939 BOOKINGS NEW PEACE-TIME RECORD

■ BETHLEHEM STEEL CORP., Wilmington, Del., first large steel producer to release fourth quarter earnings statement, reports net income of $13,028,928, equal to $3.74 per common share, compared to $3,658,160 or 56 cents a share for corresponding 1938 quarter. Third quarter profit totaled $5,377,470, equal to $1.10 per share.

Total net income for 1939 was $24,638,384, equal to $5.75 a share on common stock outstanding at year's end, compared to $5,250,239 for previous year. Net income in 1938 was equal to 70.3 per cent of the year's dividends on outstanding preferred stock. In 1937 it was equal to $7.64 per common share.

Eugene G. Grace, president, announced Bethlehem will call its entire issue of 5 per cent preferred stock totaling $18,677,740 April 1. It will be called at par and out of cash, he stated, the directors feeling justified in so doing with the company's liquid assets at present exceeding $75,000,000, compared with about $37,000,000 a year ago. In announcing a dividend of $1 per share on common, payable March 1 to record of Feb. 9, in addition to preferred dividend payments, he also intimated the company would pay another dividend on common for the first quarter, 1940.

Shipbuilding Profits Decrease

New business booked in 1939 totaled more than $538,000,000, established a new peace-time record for the company, according to Mr. Grace. It was exceeded only by the all-time high of about $559,000,000 in the World war year of 1917.

Mr. Grace pointed out that despite the volume of ship work let, Bethlehem actually made less money from its shipbuilding and repair operations last year than in 1938. One reason, he indicated, was that fewer ships were completed on which the company could definitely compute profits. He further explained that profit on a shipbuilding project was not determined until the unit was completed, and was then applied to the year the vessel was finished, even though it may have required two or three years to build.

In the fourth quarter last year 110,824 men were employed, compared with 96,947 in third quarter and 86,352 in final 1938 period. Payroll last quarter totaled $49,167,235, said Mr. Grace, against $39,453,382 for period ending Sept. 30, and $32,955,204 in fourth quarter of the preceding year.

Average hourly wage was 92.4 cents for the fourth quarter and 91.6 cents for the year, against 91.2 for 1938. In last period hours per week averaged 37.2; in third quarter, 34.5. Average for the year was 35 hours per week compared with 29.9 in previous year.

Current steel production, according to Mr. Grace, is at 91 per cent; in fourth quarter it was 98.6 per cent, and average for the year was 70.8 per cent. Average rate of operations in 1937 was 77.7 per cent.

District Steel Rates

Percentage of Ingot Capacity Engaged in Leading Districts

	Week ended Jan. 27	Change	Same week 1939	Same week 1938
Pittsburgh	78	— 4	46	30
Chicago	91	— 1	45.5	27
Eastern Pa. ...	80	None	34	31
Youngstown ..	68	— 6	45	27
Wheeling	80	—16	64	46
Cleveland	74	— 8.5	60	31
Buffalo	67	— 3	44	18.5
Birmingham ..	94	None	77	60
New England..	75	— 8	70	20
Cincinnati	74.5	None	52	40
St. Louis	83	None	40	21
Detroit	87	— 4	88	52
Average	81.5	— 3	51.5	33

LUKENS STEEL CO.

Lukens Steel Co., Coatesville, Pa., reports net income of $83,127, equal to 26 cents per common share for fiscal year ended Oct. 14, 1939, compared with a deficit of $288,505 or 91 cents a share in previous year. Net profit in 1937 was $158,218 or 50 cents a common share.

GREAT NORTHERN ORE

Great Northern Iron Ore Properties, St. Paul, reports consolidated net profit for 1939 as $1,198,726, equal to 80 cents a share on 1,500,000 shares of beneficial interest. This compares with net income of $784,924, or 52 cents a share in 1938. Iron ore shipments last year totaled 7,421,000 tons, against 3,411,000 tons in 1938 and 10,466,000 in 1937.

BLAW-KNOX TO ISSUE BONDS

Blaw-Knox Co., Pittsburgh, will issue $3,000,000 first mortgage bonds, 3½ per cent series, due Feb. 1, 1950. Proceeds will be used for paying off $2,500,000 in short term bank loans and to provide additional working capital.

Bar Mill Wages Steady

■ Monthly settlement of bar mill wage base by Western Bar Iron association and Amalgamated Association of Iron, Steel and Tin Workers last week developed a card rate for February on boiling, bar and 12-inch mills at 2.15c; and on guide and 10-inch mills, 2.25c. The rates are unchanged from those which have prevailed since last June.

PRODUCTION

STEEL RATE DOWN TO 81.5; EIGHT DISTRICTS REDUCED

■ STEELWORKS operations last week declined 3 points to 81.5 per cent. Eight districts curtailed production and four were unchanged. Last year the rate was 51.5 per cent; two years ago it was 33 per cent.

Youngstown, O.—Receded 6 points to 68 per cent, Youngstown Sheet & Tube Co. taking off three open hearths and Carnegie-Illinois Steel Corp. and Republic Steel Corp. one each. Schedule for next week is about 66 per cent.

Chicago—Off 1 point to 91 per cent, only one of principal producers curtailing. Two smaller mills made slight gains and one a loss. Four mills continue production above the theoretical capacity.

St. Louis—Unchanged at 83 per cent, with probability the same rate will continue this week.

Detroit—Down 4 points to 87 per cent, four open hearths being taken off for roof repairs. Little current output is going into inventory but backlogs are sharply reduced.

Birmingham, Ala.—Steady at 94 per cent, which has prevailed since late October, except during Christmas week.

Pittsburgh—Declined 4 points to 78 per cent, with possibility of slight advance this week.

Wheeling—Dropped 16 points to 80 per cent, two plants going down completely. One may resume this week.

Central eastern seaboard—Held at 80 per cent, addition of one open hearth being offset by other changes.

New England—Lost 8 points to 75 per cent. The same schedule is probably due this week.

Buffalo—Off 3 points to 67 per cent as Republic Steel Corp. withdrew an open hearth for repairs.

Cincinnati—Held at 74.5 per cent for third week.

Cleveland—Reduced 8.5 points to 74 per cent, four open hearths being taken off. Indications are for a higher rate this week.

Rolls 902.8 Tons Strip Steel in Eight Hours

■ Ford Motor Co. reports a world record for an eight-hour run of cold-rolled steel at its Rouge plant, Dearborn, Mich. The day shift on the 66-inch three-stand tandem mill recently rolled 902.8 tons. The steel was 19-gage stock, 58½ inches wide for use in pressing body quarter panels. This, the company says, beats the previous record of 855 tons in a similar period, established last fall by a Pittsburgh mill.

MEN of INDUSTRY

■ W. BELTRAN DU MONT, formerly vice president in charge of sales, Greenfield Tap & Die Corp., Greenfield, Mass., has been elected vice president and a director, Threadwell Tap & Die Co., Greenfield. He has been associated with the small tool industry 27 years. Other new directors of the Threadwell company are: Philip Rogers, president, Millers Falls Co., and George C. Lunt, treasurer, Rogers, Lunt & Bowlen Co., both of Greenfield.

♦

Harold R. Smallman, in charge of the Chicago district office, Hanson-Van Winkle-Munning Co., Matawan, N. J., maker of electroplating equipment and supplies, has been made western manager.

♦

Charles E. Sloan has been appointed engineer of bridges, Baltimore & Ohio railroad, with headquarters in Baltimore.

♦

O. C. Hartig has resigned as secretary-treasurer and factory manager, Atlas Drop Forge Co., Lansing, Mich. He had been with the company since 1915.

♦

David S. Youngholm, vice president, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been elected president, Electrical and Gas Association of New York Inc.

♦

Francis B. Davis Jr., president and chairman of the board, United States Rubber Co., New York, will head the industry division in the 1940 campaign of the Greater New York fund.

♦

Raymond F. Heasley, the past five years superintendent, Cleveland branch of Crane Co., Chicago, has resigned to take charge of the warehouse of Edward W. Duffy & Co., Detroit.

♦

George C. Floyd, formerly superintendent, alloy strip department, has been appointed assistant general superintendent, West Leechburg division, Allegheny Ludlum Steel Corp., Brackenridge, Pa.

♦

Gustavo Sommer, S. A., Mexico City, D. F., has been appointed to represent American Nickeloid Co., Peru, Ill., in the sale of American bonded pre-finished metals in Mexico.

♦

Leo C. Pelkus, 665 Atlantic avenue, Boston, has been appointed representative in Maine, Vermont, Massachusetts, Rhode Island and New Hampshire by Ajax Electric Co. Inc., Philadelphia.

H. R. Smallman

♦

Joseph Kaye Wood is resuming active duty as chief engineer, General Spring Corp., New York, after temporary association with the Grinnell Co. Inc., Providence, R. I., and the Babcock & Wilcox Co. Ltd., London, for a period of three years.

♦

H. Wilbur Paret Jr. has been named Pittsburgh district sales manager, Standard Arch Co., with headquarters at 418 Bessemer building.

♦

H. E. Ryker, heretofore assistant works manager, Lockheed Aircraft Corp., Burbank, Calif., has been appointed general manager in charge of all operations, Vega Airplane Co., Burbank, a subsidiary of Lockheed.

♦

Bertram G. Parker, president, Youngstown Foundry & Machine Co., Youngstown, O., has been re-elected president, Youngstown chamber of commerce. W. B. Gillies, vice president, Youngstown Sheet & Tube Co., has been re-elected vice president of the chamber.

Sidney D. Williams

Who has been named vice president and in charge of sales of Copperweld Steel Co.'s new steel division at Warren, O., as noted in STEEL, Jan. 22, page 20

♦

John O. Ostergren, vice president and general manager, Lakey Foundry & Machine Co., Muskegon, Mich., has been elected president and general manager, succeeding Herman A. Becker, who continues as a director.

♦

Charles M. Kearns Jr., research engineer, Hamilton Standard Propellers division of United Aircraft Corp., East Hartford, Conn., was presented with the 1939 Lawrence Sperry award by the Institute of Aeronautical Sciences for a device to test aircraft propellers in flight, at the institute's "honors night" dinner Jan. 26 at the Hotel Biltmore.

♦

Ronald F. Walker, formerly sales manager, Barnes Drill Co., Rockford, Ill., has joined Wilson-Brown Co., New York, machine tool dealer, which will represent the Barnes company in the metropolitan area. He will cover the northern New Jersey area for Wilson-Brown.

♦

Louis C. Melzow, associated with McCord Radiator & Mfg. Co. since 1909, recently as superintendent of the company's Detroit plant, has been named assistant works manager, with supervision over all branch plants. Ray Hawkins succeeds Mr. Melzow as superintendent of the Detroit plant.

♦

John I. Yellott has been appointed professor and director of mechanical engineering, Armour Institute of Technology, Chicago. The appointment will become effective Sept. 1, concurrent with the beginning of operation of the new Illinois Institute of Technology, new engineering school representing a merger of Armour and Lewis institutes.

♦

Walter B. Leishman, formerly vice president, Gardner Machine Co., Beloit, Wis., has been elected president. He succeeds L. Waldo Thompson, who has become chairman of the board. Ingle R. Shue has been made vice president in charge of abrasive manufacture and research; Robert W. Roth, vice president and superintendent; C. Winslow Thompson, secretary-treasurer.

♦

Elmer T. Ripley has been promoted from vice president to executive vice president, Cleveland Quar-

ries Co., Cleveland. Paul A. Mori, formerly works manager for the company at Amherst, O., has been elevated to vice president in charge of mechanical operations and properties. E. A. Burr, vice president in charge of the company's Firestone division, has been elected a director.

♦

Walter E. Mackley has been appointed manager of the Buffalo office, American Steel & Wire Co. He started with the company in 1912. He succeeds F. O. Howard, who has been transferred to New York.

♦

C. A. Smith, formerly superintendent, switchgear division, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been named manager, East Pittsburgh factory service division, succeeding the late F. J. Shiring. He has been with Westinghouse since 1892.

♦

L. R. Westbrook, formerly assistant director of the Cleveland experimental laboratory, Grasselli Chemicals department, E. I. du Pont de Nemours & Co., Wilmington, Del., has been made research manager of the company's electroplating division. He will continue residence in Cleveland.

♦

H. Wilson Ryno, engaged in tool engineering and selling the past 15 years, is now acting as agent in the metropolitan New York and New Jersey territory for Charles L. Jarvis Co., Middletown, Conn.; Swedish Gage Co. of America, Detroit, and National Tool Co., Cleveland. His office is at 1060 Broad street, Newark, N. J.

♦

Leon A. Beeghly has been re-elected chairman of the board, Cold Metal Process Co., Youngstown, O. Mr. Beeghly is also president of Standard Slag Co. Other officers re-elected include: President, Venice J. Lamb; vice president in charge of operations, Howard Lamb; general manager, W. B. Lockwood; secretary-treasurer, W. H. Kilcawley; assistant secretary and assistant treasurer, W. E. Bliss.

♦

Claude E. Shannon, Massachusetts Institute of Technology, Cambridge, Mass., has been awarded the Alfred Noble prize of the American Society of Civil Engineers, American Institute of Mining and Metallurgical Engineers, American Society of Mechanical Engineers, American Institute of Electrical Engineers and Western Society of Engineers, for his paper, "A Symbolic Analysis of Relay and Switching Circuits" as the best published paper by an engineer not more than 30 years of age. Mr. Shannon is 23. Presentation was made at the winter meeting of the Electrical Engineers in New York, Jan. 22-26.

♦

Bertram M. Ainesworth has been appointed eastern sales manager, Designers for Industry Inc., Cleveland, with headquarters in New York. He will continue as head of the merchandising counsel division. Charles L. Bennett has been named western sales manager, with headquarters in Chicago. The following have been appointed account executives: John Badami, Brooklyn, N. Y.; A. E. Hartman, Pittsburgh, covering western Pennsylvania and West Virginia, succeeding Robert Zeidman transferred to the Cleveland office; Charles Ellsworth, Cleveland and northern Ohio; A. A. Platt, Norristown, Pa., eastern Pennsylvania, southern New Jersey and Delaware.

Died:

■ EDWARD E. HUGHES, 77, formerly vice president, Franklin Steel Co., Franklin, Pa., in West Orange, N. J., Jan 19. At time of his death he was president emeritus, Rail Steel Bar association which he founded and served as president 25 years. Prior to 1900, when he was appointed receiver for the Franklin Rolling Mills, he practiced law in Franklin. He retired in 1930.

♦

William C. Hood, 62, general superintendent, H. C. Frick Coke Co., Pittsburgh, a subsidiary of United States Steel Corp., Jan. 22, in Uniontown, Pa. He had been with Frick and affiliated companies since 1897.

♦

Walter M. Schnabel, president, Schnabel Co., Pittsburgh, auto body builder, Jan. 20 in that city.

♦

Frank A. Reuther, 76, vice president and treasurer, Reuther Foundry Co., Harrison, N. J., Jan. 14, in Newark, N. J.

♦

Alvin J. Fuelling, 52, assistant manager, order department, American Steel & Wire Co., Cleveland, Jan. 21 in Cleveland.

♦

D. Clinton McKee, 51, vice president in charge of operations, Bessemer Limestone & Cement Co., Bessemer, Pa., Jan. 8.

♦

Hugh Clifford Colville, retired executive, Newark Steel Drum Co., Linden, N. J., Jan. 21 at his home in Plainfield, N. J.

♦

Albert D. Wade, 65, chief wire salesman, Philadelphia district, Bethlehem Steel Co., Jan. 23 in Glenside, a suburb of Philadelphia. He had long been associated with the steel industry, and had been with Bethlehem in Philadelphia since 1912, originally through the Cambria Steel Co.

♦

G. F. Elliott, 47, chairman, Elliott Co., Jeannette, Pa., power plant equipment manufacturer, recently at his home in Ridgway, Pa.

♦

James Skinner, 76, secretary and a director, E. W. Bliss Co., Brooklyn, N. Y., Jan. 18 in that city. He joined the Bliss company in 1915 as office manager.

♦

Charles McNicholl, former traffic manager, American Bridge Co., Pittsburgh, and former president of the Traffic club, Jan. 12 at his home in Pittsburgh.

♦

Willoughby C. Bigelow, 74, specialty sales manager, Yale & Towne Mfg. Co., Stamford, Conn., Jan. 21 in New Rochelle, N. Y. He was an executive of Yale & Towne 47 years.

♦

J. C. Weisenbach, 44, in Cleveland, Jan. 19. He was employed by the City Foundry Co., Cleveland, the past 16 years, ten years as maintenance engineer and six years as superintendent.

♦

Frank W. Pitman, 59, owner, LaCrosse Electric Supply Co., and a director, LaCrosse Iron Products Co. and of several other business and financial institutions in La Crosse, Wis., in that city, recently.

♦

Thomas H. Heacock, 72, one of the organizers of Superior Sheet Steel Co., Canton, O., Jan. 8. When Henry Roemer and other Canton steel leaders formed the Superior company, he assisted in construction of the plant, and in 1929 went to Kokomo, Ind., to supervise work of rebuilding the Continental Steel Co. plant.

♦

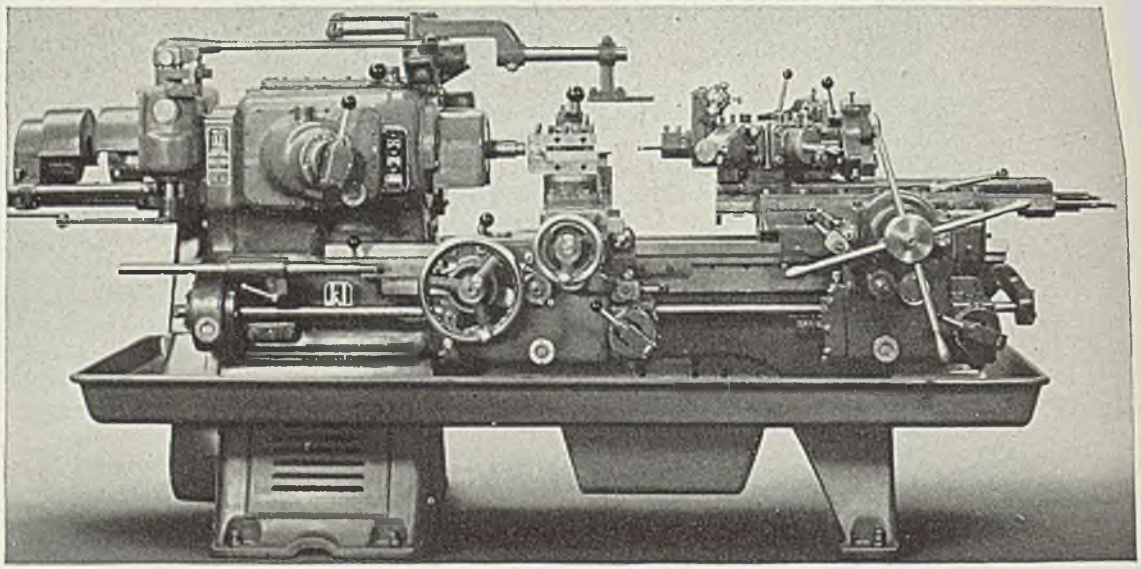
Samuel M. D. Clapper, chairman of the board, General Refractories Co., Philadelphia, and vice president, Cannon Mills Inc., Philadelphia, Jan. 19 in Philadelphia. He was a director, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.

♦

Guy L. Sintz, 64, active in the development of the gasoline engine throughout his life, Jan. 18 at his home in Detroit. He lived in Detroit 17 years and had been employed as factory manager for Claude Sintz, his brother, an automobile parts maker.

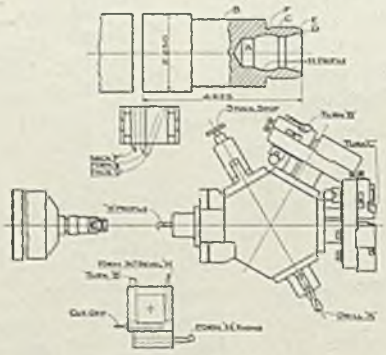
Profitable Performance

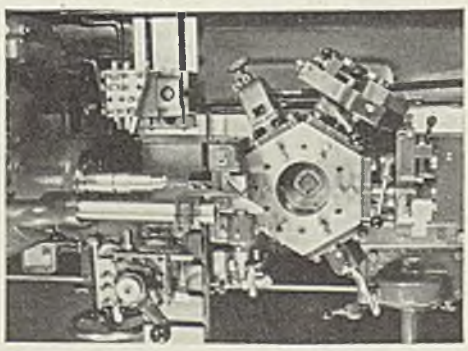
WITH STANDARD TOOLS ON JONES & LAMSON UNIVERSAL TURRET LATHES



Adaptability, Rigidity and Ease of Operation make Jones & Lamson Universal Turret Lathes profitable producers on small lots of intricate special parts as well as on longer runs of parts of comparatively simple design. . . . Even the most complicated jobs, impossible to machine economically on lathes of less advanced design, are produced profitably with standard Jones & Lamson Turret Lathe Tools. Multiple tooling on cross-slide and hexagon turret reduces number of operations and cutting time and with all controls within easy reach of the operator, handling time and operator fatigue are minimized.

New catalogs describing the complete line of Jones & Lamson Universal Turret Lathes will be mailed upon request.





This part is made from chrome molybdenum steel bar stock on a No. 5 Jones & Lamson Ram Type Universal Turret Lathe. All tools and tool holders are standard Jones & Lamson Turret Lathe Tools. A taper turning and boring attachment on the hexagon turret finish bores the taper, straight and radial interior diameters, guided by a former attached to a bar mounted on the headstock. This bar can be swung out of the way when not in use.

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Windows of *WASHINGTON*

By L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ INTEREST in trade between United States and Japan has risen sharply due to abrogation, Jan. 26, of the 1911 commercial treaty between the two countries.

In recent months, orders from Japan, especially for iron and steel products, scrap iron, machinery and tools have been increasing. Government officals state the increases have been due in part to anxiety regarding uncertainties engendered by termination of the treaty. They also indicate Japan's increased dependence on United States as a source of supply. Recognition that with increasing volume of domestic orders for our defense program, and of orders from Europe, filling of new orders will become more difficult is likewise probable.

Reports indicate United States supplies Japan with approximately 56 per cent of its essential requirements for heavy industries. According to the American commercial attache at Tokyo, Japan normally depends upon United States for 40 per cent of its total metal imports, 70 per cent of its scrap iron, and 50 per cent of its machinery imports.

Exports to Japan Increase

United States export figures show that in 1938 $22,061,000 worth of scrap iron was exported to Japan compared with $30,032,000 in the first eleven months of 1939. Value of machinery exported to Japan in 1938 was $27,815,000, compared with $30,720,000 for the eleven months in 1939. Generally Germany and United Kingdom were Japan's secondary sources of supply for machinery and iron and steel products.

Japan has of late ranked third in United States trade, behind Canada and United Kingdom, both as customer and as a source of supplies. United States, however, is by far Japan's best customer—with the exception of Manchuria—and the largest supplier of equipment and raw materials needed for her industries. Japan, in recent years, has supplied about 7 per cent of United States' annual import trade, and 8 per cent of our exports. The latter, however, regularly supplies Japan with 34 per cent of her total imports, and buys 16 to 20 per cent of her exports.

Considering only trade with foreign currency countries, United States' share in Japan's trade is considerably greater than the above percentages indicate. In 1938, and during the first 10 months of 1939, United States supplied nearly 44 per cent of Japan's imports from foreign currency countries, while we bought 27.9 per cent of her exports to those areas in 1938 and 33.7 per cent in the 10-month period of 1939.

SUMMARY OF WALSH-HEALEY PURCHASES IS ISSUED

Labor department has issued a compilation of government purchases under the Walsh-Healey act from the time the act went into effect in September, 1936, through 1939.

Compilation shows 2078 contracts were let under the act for iron and steel products, totaling approximately $121,000,000, equal to 7.93 per cent of total contracts let by the government during that period. Under the heading "Other Machinery" 2044 contracts were let, totaling nearly $107,000,000 or 7.01 per cent of the total.

AUTO MANUFACTURERS URGE TRADE AGREEMENTS RENEWAL

Renewal of the reciprocal trade agreements act, because of its importance as a contributor to domestic prosperity as well as foreign sales, was urged in a statement submitted to the house ways and means committee on behalf of the Automobile Manufacturers' association.

Addressed to the committee by B. C. Budd, chairman of the association's export committee, and vice president of Packard Motors Export Corp., the statement emphasized that while trade agreements have contributed to an expansion in automobile exports, between 85 and 90 per cent of United States' motor vehicle production is for domestic consumption.

"We would not endorse trade agreements if it were thought they jeopardized or adversely affected the home market, where such a preponderance of our production is sold," Mr. Budd pointed out.

LUKENS STEEL CO. OPPOSES LABOR DEPARTMENT'S APPEAL

Counsel for Lukens Steel Co. and seven smaller eastern steel mills last week filed a brief with United States Supreme Court in opposition to the request of the secretary of labor that the court grant a writ of certiorari in connection with minimum steel wages set under the Walsh-Healey act. Court is expected to decide within two or three weeks whether it will grant a review of the lower court in this case.

When Secretary of Labor Perkins refused to postpone the effective date of her minimum wage order under the Walsh-Healey act, Lukens Co. and seven others went into the courts with the result that Secretary Perkins was enjoined from enforcing the minimum wages.

The labor department asked Supreme Court for a writ of certiorari in connection with a decision last autumn in the United States court of appeals for the District of Columbia. Question presented to the Supreme Court is whether it should exercise its discretion to review judgment of the court below.

Lukens' brief contends decision of the lower court holding the wage determination invalid because such procedure is beyond authority of

the secretary of labor "plainly conforms with both the letter and spirit of the statute involved."

In arguing against granting of the writ by the Supreme Court, Lukens counsel contends the government has already had two hearings in court before an appellate tribunal. Attention is also called to the fact the court of appeals characterized the Perkins minimum wage decision as a palpable evasion of the law "in the teeth of the statute."

BOARD CHARGES STRATEGIC MATERIALS ARE EXPORTED

Army and navy munitions board is not satisfied with the voluntary co-operation accorded it in connection with exports of essential raw materials. Last week, Secretary of the Navy Edison and Assistant Secretary of War Johnson authorized the board to state that if voluntary co-operation does not "operate with complete effectiveness" with special regard to exports of tin and crude rubber "it will become necessary to use other means to deal with the situation."

Referring to this matter, the munitions board stated:

"While there has been a cessation of abnormal exports of some deficiency materials . . . the situation in regard to others has become more difficult.

"The war and navy departments believe that unless the method of voluntary co-operation can be counted upon to operate with complete effectiveness it will become necessary to use other means to deal with the situation which has developed with respect to the export of crude rubber and tin."

LIST EXECUTIVES WHOSE SALARIES EXCEED $75,000

Secretary of Treasury Morgenthau has published a list of individuals receiving compensation from corporations for personal services in excess of $75,000 for calendar year 1938 or fiscal year ending in 1939. This action is in accordance with a new provision of the internal revenue code.

Among those listed are: Midland Steel Products Co., Cleveland: E. J. Kulas, salary $96,150; Gordon Stoner, salary $76,150.

Bethlehem Steel Co. (Delaware): Paul Mackall, salary $90,000. bonus $59,610, total $149,610. Bethlehem Steel Co. (Pennsylvania): E. G. Grace, salary $180,000, bonus $198,698, total $378,698; R. E. McMath, salary $60,000, bonus $52,986, total $112,986; F. A. Shick, salary $60,000, bonus $52,986, total $112,986; C. R. Holton, salary $50,000, bonus $32,116, total $83,116; Q. Bent, salary $90,000, bonus $59,610, total $149,610; C. A. Buck, salary $90,000, bonus $59,610, total $149,610. Bethlehem Steel Corp.: C. M. Schwab, salary $180,000.

Copperweld Steel Co., Glassport, Pa.: S. E. Bramer, salary $25,000, bonus $1,041.66, other compensation $67,188.57, total $93,230.23.

Jones & Laughlin Steel Corp., Pittsburgh: H. E. Lewis, salary $92,013.85.

McKeesport Tin Plate Corp., McKeesport, Pa.: G. V. Parkins, salary $83,333.42.

National Steel Corp., Pittsburgh: George R. Fink, salary $50,000, bonus $50,000, other compensation $400, total $100,400.

Weirton Steel Co., Weirton, W. Va., E. T. Weir, salary $75,000, bonus $47,500, other compensation $400, total $122,900.

Hughes Tool Co., Houston, Tex.: R. C. Kuldell, salary $30,000, bonus $142,849.54, total $172,849.54; S. P. Brown, salary $24,000, bonus $60,716.15, total $84,716.15.

WALSH-HEALEY IRON, STEEL AWARDS TOTAL $2,414,682

During the week ended Jan. 13, the government purchased $2,414,682.68 worth of iron and steel products under the Walsh-Healey act as follows: Pollak Mfg. Co., Arlington, N. J., $58,865.40; Bethlehem Steel Co., Bethlehem, Pa., $20,745 (estimated); Jessop Steel Co., Washington, Pa., $26,075.96; Elastic Stop Nut Corp., Elizabeth, N. J., $11,458.09.

Allegheny Ludlum Steel Corp., Watervliet, N. Y., $11,700 (estimated); Bethlehem Steel Export Corp., New York, $291,547.90; United States Steel Export Co., Washington, $110,189.74; Sheffield Steel Corp., Kansas City, Mo., $31,375.32; Carpenter Steel Co., Reading, Pa., $11,700 (estimated).

Crucible Steel Co. of America, New York, $11,520 (estimated); American Steel Foundries, Chicago, $30,169.22; York Safe & Lock Co., York, Pa., $604,188; Baldwin Locomotive Works, Philadelphia, $1,114,454; Frank M. Weaver & Co. Inc., Lansdale, Pa., $18,099; Lancaster Iron Works Inc., Lancaster, Pa., $17,380 (estimated).

National Cast Iron Pipe A Division of James B. Clow & Sons, Kansas City, Mo., $11,939.40; Koppers Co., Bartlett Hayward division, Baltimore, $15,621.65; and American Welding Co., New York, $17.654.

COURT INTERPRETS WAGE-HOUR LAW

United States district court, as a result of action to compel adherence to provisions of the fair labor standards act, has directed a Chicago firm to re-employ a worker allegedly discharged because he complained to the wage and hour division, United States department of labor, that his employer was violating the act.

Announcement of this ruling, regarded as of primary significance in proper enforcement of the law, has been made by the wage and hour division upon receipt of notice from Chicago that Federal Judge Charles E. Woodward, in United States district court there, had signed an injunction restraining the G. & G. Genuine Majestic Refrigerator & Radio Parts Co., Chicago, from further violations of the fair labor standards act. Notice further directed the company to rehire John Gary, a former employe discharged because he supplied wage and hour inspectors with information concerning his employer's failure to comply with the act. Injunction also directed payment of $854.35 to twenty-nine employes in restitution of unpaid overtime due under the act.

Complaint, filed by the wage and hour division, charged failure to pay time and half for overtime, failure to keep proper records, and discharge of an employe for filing a complaint with wage and hour division.

ENGLAND TO LICENSE ALUMINUM IMPORTS

Department of commerce last week received a cablegram from London stating that effective Feb. 1 imports into England of aluminum and its alloys are prohibited except under license.

Amendment of Wagner Act Declared Essential

■ Industry has "about worn out the olive branch" in its efforts to maintain labor peace, asserted William Frew Long, manager, Associated Industries of Cleveland, at the twentieth anniversary meeting of that organization in Cleveland, Jan. 24.

Charging "closed shop tyranny" was responsible for much labor unrest, Mr. Long declared amendment of the Wagner act is essential for stable employer-employe relations. Referring to a recent speech by J. Warren Madden, chairman, national labor relations board, he charged Madden's attitude was an expression of "downright intellectual dishonesty."

George S. Case, president of the association and chairman of the board, Lamson & Sessions Co., Cleveland, presided. E. J. Gleason, resident manager, Fisher Body division, Cleveland, was elected a director. J. D. Cox Jr., T. H. Doan, A. B Norton and S. W. Rolph were re-elected to the board.

AVIATION

REVENUES OF DOMESTIC AIR LINES MAY INCREASE 20%

■ ACCORDING to estimates by the civil aeronautics authority, domestic air lines will increase aggregate net revenues this year by 20 to 25 per cent over 1939. The gain in passenger revenue is expected to be 30 to 35 per cent; express, 15 to 20 per cent; airmail, 15 per cent.

Carriers flew 65,024,044 revenue passenger miles in December, Col. E. S. Gorrell, president, Air Transport association, reported. This is an increase of 72.1 per cent over the mileage in November, and 74 per cent over December, 1938. In 1939, the industry flew a record of 677,325,511 miles against 476,039,896 miles in 1938, a gain of approximately 42.28 per cent.

Preliminary figures from Lockheed Aircraft Corp., Burbank, Calif., show a net profit of approximately $3,140,000 for 1939. Backlog Jan. 15 this year, exceeded $40,000,000, of which 20 per cent represents commercial business.

More than 4000 planes have been ordered in the United States and Canada, in connection with the air training plan now under way in the dominion, according to Transport Minister Howe. These are separate from contracts being negotiated directly between the British government and Canadian Associated Aircraft Ltd. for fighting planes. The fighting planes will go directly to the military services in England.

Because of rapid aviation development, the United States must accelerate its own research to keep abreast of foreign countries, Vannevar Bush, chairman, National Advisory Committee for Aeronautics told a house appropriations subcommittee.

"Airplanes have now reached speeds of 400 miles per hour, with 500 miles per hour considered likely within the next two years," he said.

He told the committee Germany has five research centers, in contrast to our one at Langley Field, Va., and a second one being constructed at Moffett Field, Calif. Research activities at the latter field probably will start Aug. 1, with a force of 77.

Secretary of the Treasury Morgenthau indicated a program is being worked out for co-ordination of military aircraft purchases in this country by the government and allied powers. Procurement division of the treasury department apparently is to be the central co-ordinating agency.

At Detroit preparations are under way for launching "The Capital Fleet," as the new Pennsylvania Central Airlines' group of 1940 Douglas DC-3s are known. The ships are scheduled to go into service between Detroit and Norfolk Feb. 1.

The war department last week announced award of a contract totaling $3,005,600 to Pratt & Whitney division, United Aircraft Corp., for engines to be installed in pursuit and observation planes.

Along the Flying Fortress Production Line

■ After being assembled in a series of steel jigs in another section of Boeing Aircraft Co.'s plant at Seattle, these B-17B bomber bodies take their place at the start of final assembly line. As each body receives its wings, on which landing gear has already been installed, it is rolled forward in the line. Body in middle of picture is just being lowered by overhead cranes to its place on assembly floor

British, French To Co-ordinate War Buying

■ ESTABLISHMENT of a joint Anglo-French purchasing board in this country was announced last week by Arthur B. Purvis, head of the British purchasing commission, who will be chairman of the new board. J. Frederick Bloch-Laine, head of the French purchasing commission, will be vice chairman. Headquarters will be at 15 Broad street, New York, where the French commission already is located, and soon to be headquarters for the British commission.

Board will be composed of members of the two purchasing commissions and will direct all major policies of both commissions. While the new board will conduct certain negotiations directly with producers and manufacturers, the general routine of purchasing, tenders, specifications and inspections will continue to be handled by the British and French missions.

Contemplates Liaison With U. S.

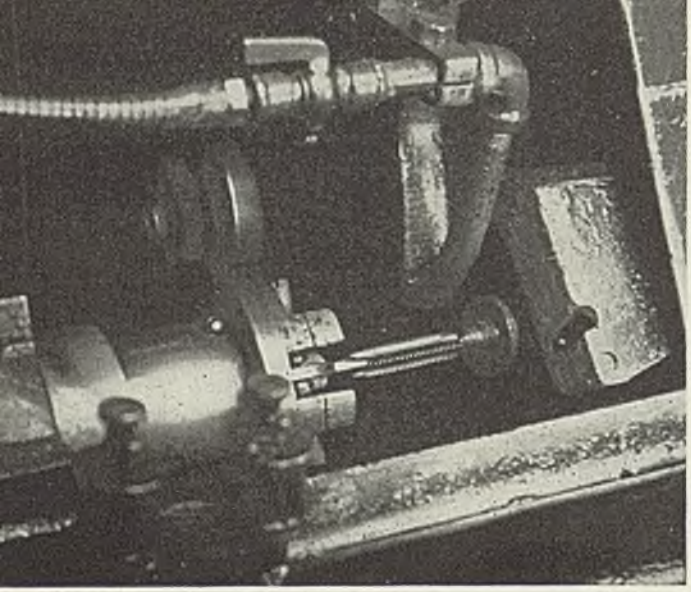
Mr. Purvis declared "every endeavor would be made by the board to insure that its purchasing policies and practices do not conflict in any way with the best interests of American economy." Board will maintain an office at 725 Fifteenth street N. W., Washington, to provide a "liaison with the United States government in matters which may arise out of the purchasing of war materials and supplies at the same time as the United States is itself engaged in its own preparedness program."

Department heads in the British commission: Frederick Johnson, director of administration; Edgar S. Bloom, director of purchasing; Sir Ashley Sparks, representative of the British shipping ministry; Air Vice Marshal H. M. Cave-Brown-Cave, British air ministry representative. G. Miller Hyde, Montreal, Que., is secretary general at the Washington office.

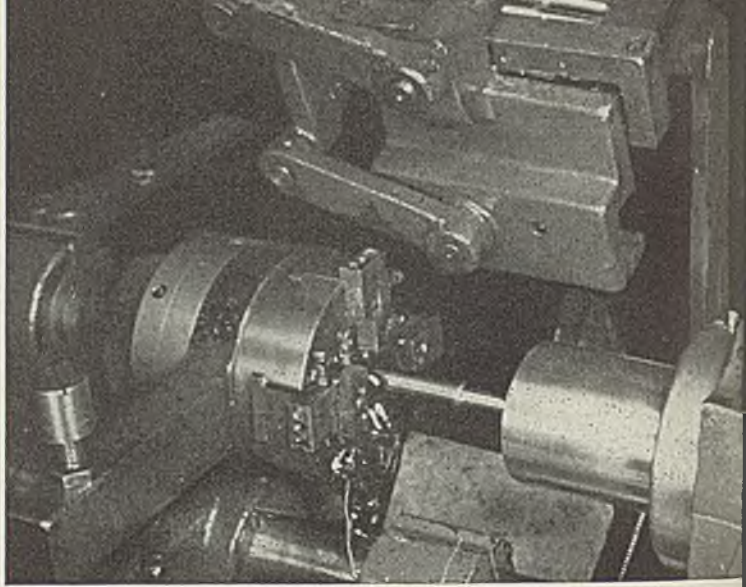
French commission officials: Eugene Gentil, assistant to the director general; Col. Jean Francois de Curieres de Castelnau, director of armaments; Henri Morin de Linclays, director of shipping; Lieut. Col. Paul Jacquin, director of aviation; Andre Forget, assistant secretary in Washington office.

Mr. Purvis said the missions likely will continue in the market for a wide variety of goods as long as war continues.

As yet the missions have not purchased any semifinished steel since the war began, although other buyers placed orders just before hostilities started and deliveries of these contracts now are being made.



Machines of this type, designed by G. T. D. Greenfield's own engineers, grind threads with minimum lead error and to extremely close size tolerances.



Even cut-thread carbon taps are threaded by machines that automatically feed, thread and size.

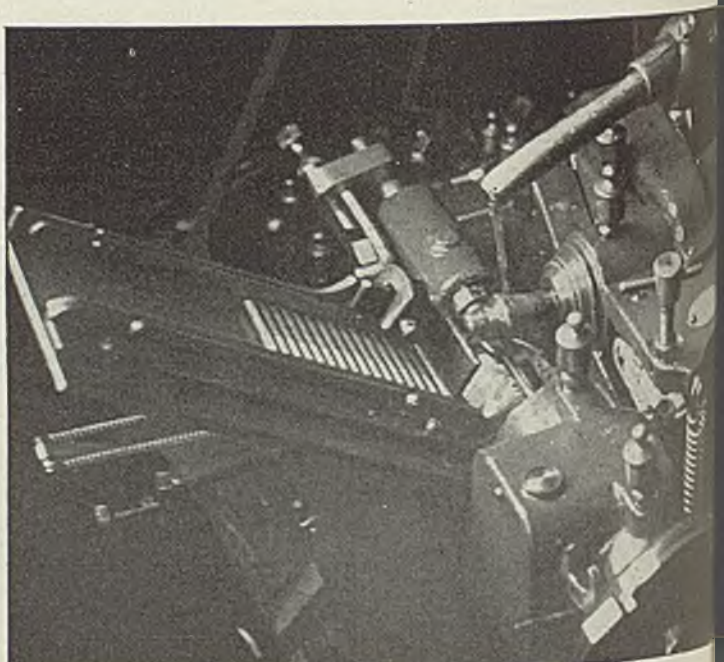
ACCURATE TAPS REDUCE COSTS

How G. T. D. Greenfield's modern machinery makes closer tolerances possible

More taps wear out (i. e. wear undersize) than ever break. In terms of tap tolerances, this means that a tap near the "low" limit may produce only a fraction of the finished holes tapped by one near the high limit. To give users a greater average production per tap, Greenfield has developed super-accurate machinery which permits closer size control than required by standard tap tolerances.

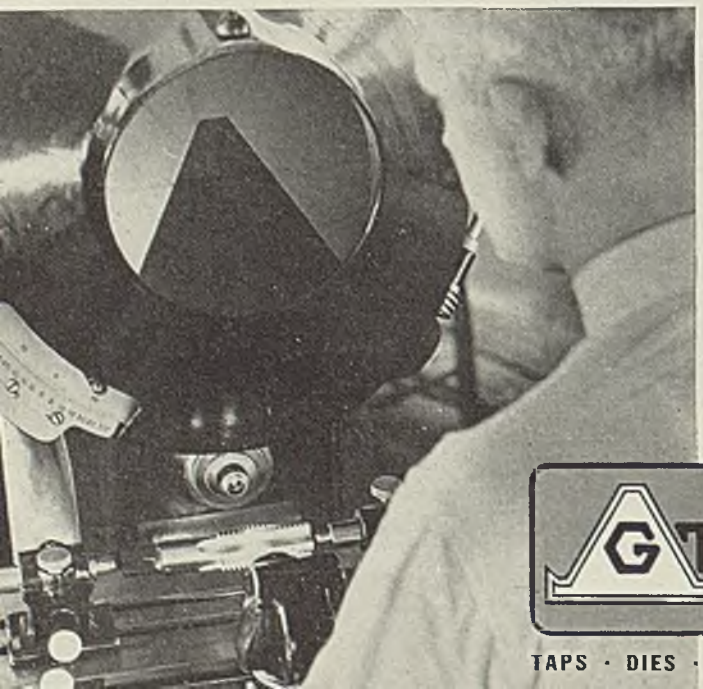
Heat treatment is vital, too. Typical of Greenfield research and leadership here is "Maxi" heat treatment, responsible for amazing performance in threading abrasive or stringy metals.

As the world's largest manufacturer of threading tools, G. T. D. Greenfield has outstanding opportunities to study performance and give its many thousands of customers all over the world the benefit of that wide experience. Call in the Greenfield engineer.



(*Right*) The right shape and depth of flute are very important in developing fine cutting qualities and reducing tap breakage.

(*Below*) This comparator helps to insure correct thread form, which contributes to both accuracy and long tap life.



Greenfield Tap & Die Corporation · Greenfield, Mass.

Detroit Plant: 2102 West Fort St.
Warehouses in New York, Chicago, Los Angeles and San Francisco
In Canada: Greenfield Tap & Die Corp. of Canada, Ltd., Galt, Ont.

GTD GREENFIELD

TAPS · DIES · GAGES · TWIST DRILLS · REAMERS · SCREW PLATES · PIPE TOOL

Mirrors of MOTORDOM

By A. H. ALLEN
Detroit Editor, STEEL

DETROIT

■ INQUIRIES on parts for 1941 models are being fed out at an accelerated pace, the smaller or independent manufacturers as usual being ahead of their larger brethren. Nash, Packard, Studebaker and Hudson all are taking figures on a wide variety of material, such as hardware, upholstery, moldings and the like. Nash and Studebaker will have completely new bodies next year inasmuch as present body styles have had only minor refinements in two years.

The early start being made on 1941 requirements suggests new models again will be introduced in the late summer or early fall, despite widespread preference among dealers to move introduction dates back to January. Even some suppliers would like to see new model activity deferred a few months, since it conflicts with similar work from domestic appliance manufacturers who put their tool and die programs through in the spring and start manufacturing in the summer to have dealers stocked in ample time for Christmas trade. If automotive programs could be deferred until the appliance programs were out of the way, a more even pace could be maintained over the year by a number of suppliers concentrating on these industries.

The small Nash car which has been in process of design for the past two or three years now is in the active stage, although it will not be introduced probably until the 1940 model run is nearly through. It will be recalled four sample jobs were built up some time ago, three by Briggs and one by Budd. However, a complete redesign has been made, the proposal now being for Nash to build its own bodies.

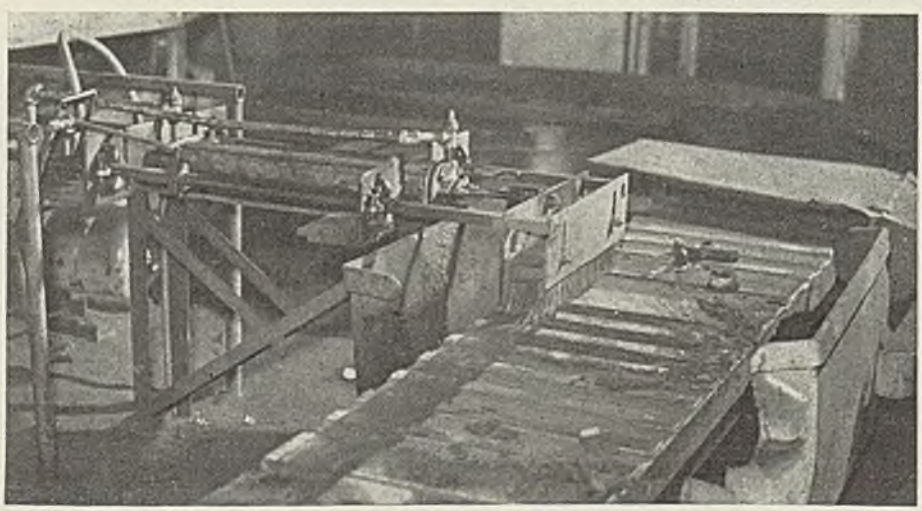
The car will be on 113-inch wheelbase, it is understood, powered by a 6-cylinder engine. The chassis is nearing the manufacturing stage, but a number of decisions remain to be made on body design. As late as last week it was not definitely known whether the job would have a "trunk" back or the so-called "fast" back. The latter is the type used by Chrysler and Ford lines and is claimed to give the impression of greater size and roominess to a small, light car such as Nash is planning.

Originally the price set on the little Nash was $550, but it is believed that when final costs are determined, the retail price will be considerably above this figure. Designers are still at work on details such as the instrument panels, door handles, window regulators, seat cushions and other interior appointments. As far as possible an attempt is being made to adapt tools and dies used for parts in the larger models to similar parts in the small model.

Complete redesign is indicated for the large Nash and Lafayette series, with the probability they will be patterned along the lines of the new bodies introduced by General Motors this year for Buick, Pontiac, Olds and Cadillac—known in automobile trade circles as the Torpedo bodies.

So successful has this body style been that General Motors likely will adopt it as standard for its 1941 lines, and develop an altogether new style to replace the Torpedo body next year as the "style bellwether." Designers in fact are reported to be putting finishing touches on a new body concept which will appear in a limited way as the Torpedo body did this year. Lines are lower and the trunk back has been eliminated in favor of a smooth, unin-

Automatic Broom Sweeps Mold Conveyor Line



■ Automatic broom designed by Buick engineers to sweep sand from mold conveyor line in foundry. Referred to in STEEL, Jan. 15, p. 36, the handle is mounted in an air cylinder arranged to reciprocate the width of the conveyor. Side bars move in rollers and support the broom rigidly

terrupted general body contour.

Gossip has it that several models will appear with periscopes instead of rearview mirrors, in the effort to overcome rear quarter blindspots which are practically unavoidable with the streamlined roofs now popular. Use of a periscope with a curved mirror would give the driver a full sweep of the rear vista, and would prove undoubtedly quite a novelty or fad, particularly in view of the frequency with which submarines and periscopes make the news columns these days.

The periscopes probably would be streamlined some way into the roof contour and would have to be high enough to clear the roof crown. Manufacturing costs would be increased appreciably but, being used on more expensive models, this would not be a serious problem.

A simpler way to clear up blindspots at the rear of bodies would be to use curved glass all the way around the rear quarters. Several bodies with this type of rear window design have been drawn up, but managements are inclined to think them too radical for present-day consumption. The cost of curved glass pieces of this size, too, is a serious drawback, but against this would be a slight saving in steel. When glass company technicians have made available a curved glass of this size at a reasonable cost and capable of absorbing average impacts, you may see some rear windows in automobiles instead of the "slits" which designers dub the windows now in use.

Retain Running Boards

The subject of running boards still comes up for a lot of discussion. At one time it appeared running boards were doomed to extinction by virtue of expanding bodies and lowering of floor levels. But there are many arguments in favor of their retention. In the first place, persons of short stature find difficulty in hoisting themselves into cars with no step to mount first. Complaints have been heard from women who have ruined silk stockings, or barked shins against sills of cars with no running boards. A third deficiency is that, without a tread on which to wipe shoes, car interiors are being tracked up with much more dirt than otherwise.

Hudson has found more buyers are specifying running boards than not this year, and other manufacturers offering running boards state there are still many drivers who prefer them.

■ POSSIBILITY that continuous strip-sheet mills may find a new outlet for their enormous tonnage is seen in the development of a process for making wire out of narrow sheet continuously. Nearing the pilot mill stage, the process essentially is as follows: A 6-inch hot rolled strip is fed through grooving rolls in a four-high mill wnich marks off 24 or 48 strands on the strip, depending on whether ¼-inch or ⅛-inch wire strands are wanted. The grooved strip then is passed through rotary shears which simultaneously and continuously cut off the strands through the grooves.

The resulting strands, approximately octagonal in shape, are then pulled through a die which shaves off corners to make approximately a 16-sided section of wire, or nearly round. The wire may be used in this form, or it may be further reduced by drawbenches to smaller diameters.

Preliminary estimates indicate about $10 per ton can be saved on the price of wire made by this method, but this presupposes a slight "chiseling" on the price of the hot rolled strip.

A point to be considered is that hot-rolled strip is made from so-called "wild" steel and always will have some segregation of impurities or pipe at the center. Wire sheared from this center section might be too inferior in quality for subsequent use. Of course, it still might be suitable for core wire in foundries or similar applications, and by the same token strands sheared from the outer edges of the strip would be of high quality with practically no segregation. problem of guiding the strip rately during grooving and shea also would appear to be a m consideration. Further, if it comes necessary to pickle or an the strip in the processing a l amount of the cost saving migh dissipated.

Patents on the process are ow by a large equipment manufa ing company. License has granted to an independent gr for perfection of the process marketing the product, the pa owner reserving the right to b necessary machinery and prob receive a royalty on sales of product. An experimental p may be set up shortly in the Det district.

Manufacturing plant and mis laneous properties of Contine Motors Corp. here was placed the auction block last Monday over 500 attended the ceremon Reproductive value of the pl alone was estimated several ye ago as $5,314,000.

Bids received were so "unrep sentative of true values" t Wednesday the company rejec all of them and refunded depos Future course of action is not indicated.

Building Programs Continue

Continental has moved all its erations to Muskegon, Mich., a under supervision of the RFC is d posing of its Detroit propert which are adjacent to plants of Hu son and Chrysler. They cover 75 000 square feet and include a "m lion dollar" lawn whnch has be awarded two national prizes. A proximately $35,000 worth of m chine tools and miscellaneous equi ment also was offered at the auctio

New building programs continu to attract attention in the autom tive and allied fields here. Inclu ed in the substantial program no being shaped up by Buick is a ne and modern forge shop. Consider tion is being given to a foundr plant for the Olds division of GM now supplied with castings from th Buick foundry.

Vickers Inc., manufacturer of hy draulic equipment and controls, i contemplating plant expansion here

Hayes Industries Inc., is drawing up plans for a 200,000 square foot manufacturing space at Jackson, Mich.

Bundy Tubing Co. here is renew ing sketches for a new plant on the outskirts of the city.

New auto parts plant, Portland Mfg. Co., Portland, Mich., involv ing expenditure of $150,000, has been started by the parent company, Holley Carburetor Co. here. Punch presses, plating equipment and heat treating furnaces will be installed.

Automobile Production

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

	1937	1938	1939
Jan.	399,186	226,952	356,950
Feb.	383,900	202,597	317,517
March	519,022	238,447	389,489
April	553,231	237,929	354,263
May	540,377	210,174	313,214
June	521,153	189,402	324,235
July	456,909	150,450	218,478
Aug.	405,072	96,946	103,343
Sept.	175,630	89,623	192,672
Oct.	337,979	215,286	*324,673
Nov.	376,629	390,405	*368,538
Dec.	347,349	406,960	469,002
Year	5,016,437	2,655,171	3,732,374

* Revised.

Estimated by *Ward's Reports*

Week ended:	1940	1939†
Dec. 30	89,365	75,215
Jan. 6	87,510	76,685
Jan. 13	111,330	86,925
Jan. 20	108,545	90,205
Jan. 27	106,400	89,200

†Comparable week.

	Week Ended Jan. 27	Jan. 20
General Motors	42,155	45,140
Chrysler	27,535	27,105
Ford	26,250	25,650
All Others	10,460	10,650

Air Conditioning Manufacturers Confident Great Expansion Is Near

■ AUTOMATIC heating and air conditioning are on the threshold of an impressive expansion. That was the consensus of the more than 300 exhibitors at the sixth International Heating and Ventilating exposition in Cleveland last week.

The show, held in conjunction with the annual meetings of the American Society of Heating and Ventilating Engineers and the National Warm Air Heating and Air Conditioning association, brought out a large display of oil, gas and coal heating units, air conditioning equipment and refrigerating apparatus to be used in connection, hundreds of precision and automatic controls, electrical machinery, motors, electrostatic air cleaners and other modern equipment.

Manufacturers revealed 1939 generally had been a much better year than 1938, especially for oil burners, gas heating and air conditioning. Many expect 1940 to be the biggest year in their history. Some, figuring on the increase at the beginning of the year, are planning for up to 40 per cent larger sales, an expansion in which the steel and metalworking industries will share.

Automatic heating and air conditioning, winter and summer, is in a favorable position for growth. The market is far from saturation. New, improved equipment is offered a lower first costs than formerly, and its increased efficiency is making for economy of operation that augurs well for sales.

One air conditioning manufacturer estimates sales during the next five years will total $2,000,000,000. Of this, at least $600,000,000, he believes, will be spent for portable air conditioners for home and office use.

Growth Impressive, but Slow

Summer air conditioning builders, of course, have been ready to dress the industry in long trousers for the past several years, but the infant has been slow to grow to anticipated proportions. Its growth has been impressive percentage-wise — from $1,000,000 (installed cost) in 1920 to $17,000,000 in 1930 and to more than $80,000,000 in 1937.

Its market, however, hardly has been scratched yet. Most reliable surveys indicate residential summer air conditioning is less than one-half of 1 per cent of saturation; estimates of industrial process and commercial saturation are difficult, but it is known to be low.

The industry believes it rapidly is approaching a solution to the major problems which have retarded its public acceptance. From earlier basic but crude apparatus, engineering progress has developed efficient, compact and reliable equipment for year round air conditioning of any insulated building. Safe refrigerants have been developed. Costs—first and operating—have been lowered. Distribution channels have been improved. The industry is confident about the future.

Self-Contained Units for Homes

Potentially the largest, but at present the smallest, outlet for air conditioning is in residences. Manufacturers recognize this field may be the last to be exploited and that most profits for the next few years will be in commercial and industrial process installations.

That progress toward home air conditioning is being made was clearly indicated by the Cleveland show exhibits. Most pronounced trend was toward self-contained units, big brothers to the room coolers introduced several years ago. These now come in sizes up to 15 tons capacity, sufficient for the average house, suite of offices or small shop. In some cases these can be installed without duct work, or extensive engineering or surveying. They may be moved easily if a tenant desires. They are made in standard sizes by mass production methods, resulting in substantially lower costs.

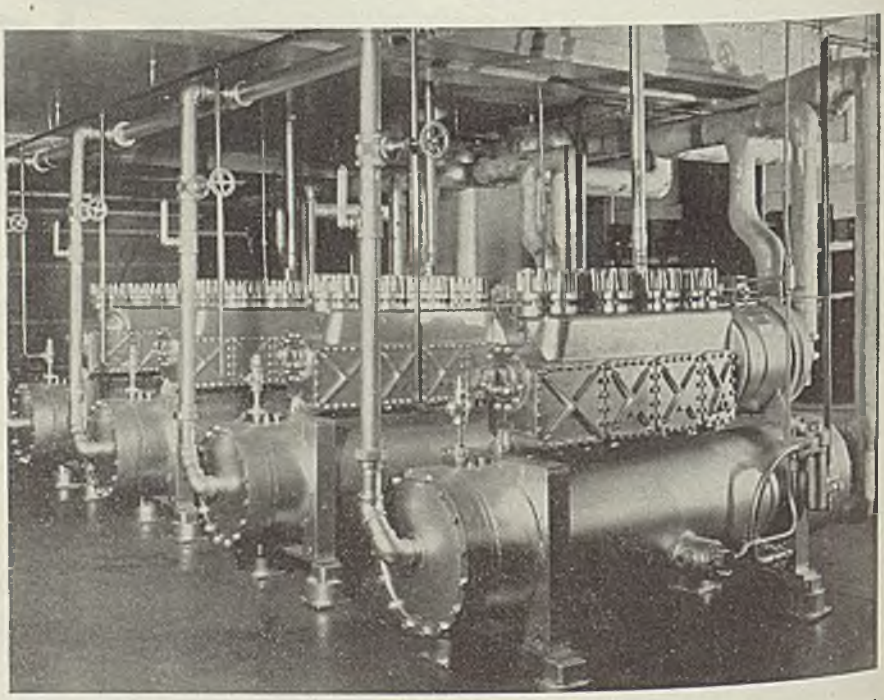
Artisically the modern units are highly advanced. Industrial designers were consulted in styling exteriors with the result the smaller models are well proportioned and attractively finished. When desired, cabinet exteriors may be finished to harmonize with buyer's particular color scheme.

Units of more than 10 tons capacity generally are placed in closet or basement, and exterior styling is not so important.

Winter air conditioning has made better progress in residential installations. Coal, gas and oil-burning units exhibited at the exposition cost very little more to install than the older type heating plants. Efficiency, manufacturers claim, has been so improved that operating costs are comparable to those for heating alone. Many of these installations make provision for later installation of summer air conditioning.

The self-contained or packaged unit also is expected to tap a new commercial outlet, that of the small

Modern Plant Cuts Air Conditioning Costs 40 Per Cent



■ Air conditioning operating costs were reduced 40 per cent by this battery of four 40-ton Westinghouse hermetically-sealed condensing units, installed at State Lake theater, Chicago, by Kroeschell Engineering Co., Chicago. Units are automatically controlled, use suction gas to cool the driving motor. They require only one-fifth the floor space used by the 15-year-old, less powerful plant they replaced

shop or store. A few years ago, the corner drug store owner would have had to expend about $10,000 and hire an engineer or two to run the plant; today, for $3000 he can buy a foolproof unit that requires practically no attention.

The commercial market in the past has been the most important, accounting roughly for 60 per cent of total installations and about 80 per cent of the total horsepower installed. It probably will continue to hold its lead for some years to come. Despite the wide acceptance of year round air conditioning few classes of commercial outlets are near the saturation point.

Department store installations are relatively few in number but large in size. Only about 10 per cent of the country's 3500 are equipped with year round air conditioning. Office buildings present a problem akin to residential field. Some utility and privately owned offices are equipped. The federal government is one of the largest users of air conditioning. Among year round air conditioned buildings are the department of interior, interstate commerce and labor, post office, justice, archives, federal trade commission, federal home loan bank, the Capitol, senate and house office, federal reserve, treasury and social security.

E. I. du Pont de Nemours & Co. recently spent $1,000,000 for air conditioning its headquarters building at Wilmington, Del.

Restaurants, hotels and miscellaneous small shops are estimated to be from 15 to 20 per cent air conditioned, at least in part. Competitive considerations are forcing more installations.

Boon to Railroads

Railroads were among the first to capitalize on air conditioning's advantages. At midsummer, 11,351 passenger cars were equipped; 6327 were owned by the railroads and 5024 by the Pullman Co. Total passenger car ownership by the railroads is approximately 39,000. Shipping companies are installing cooling equipment in important liners, while the navy has ordered it for some of its new vessels.

The industrial processing field was the first to adopt air conditioning, is still far from saturated. During the past year, dehumidifying equipment was installed in southern blast furnaces. The Tata Iron & Steel Co. Ltd., Jamshedpur, India, formerly had to cease operations during the monsoon season, installed an air conditioning system, now operates continuously.

Air conditioning plays an important part in the manufacture of such ordnance as high explosive shells, depth bombs, mines, time fuses, star shells. In time fuses, for instance, which are set before the shell leaves the gun to a predetermined time of bursting, the moisture content of the powder affects burning time.

The rayon industry is dependent on air conditioning for its existence. Other textile manufacturers were quick to perceive its advantages. Tobacco plants, candy manufacturers, flour mills and bakeries, many precision machinery manufacturers, breweries, food processing, deep mining, safety glass, and dozens of other industries have improved their product, increased output by installing air conditioning.

In other applications such equipment is used to create extreme conditions, hot or cold, for test purposes. The duralium for Russia's airplanes is aged at 15 degrees Fahr. by tailor-made cold.

Steel, of course, is used for a great variety of purposes in air conditioning installations. In the field, contractors use pipe, valves and fitting. Then there are the grilles, dampers, cooling towers, and other accessories, as well as a tremendous amount of sheet steel for air distributing and air return ducts.

At the factory, steel is used for motors, compressors, pumps, fans, blowers, mountings, framework and casings, shells for water coolers and condensers, and steel tubing for coils of evaporators, condensers and water coolers. There is a trend toward use of finned steel coils, providing a new market for sheets.

Air conditioning manufacturers are unable to estimate with accuracy the total tonnage of steel consumed by their industry annually. The total, while considerable, would not be impressive, on a tonnage basis, compared with the major steel users.

The manufacture of air conditioning equipment involves practically all the operations of a metalworking plant: Machining, finishing, welding, cutting, forming and fabricating.

What's New at Pittsburgh . . .

By R. L. HARTFORD, Pittsburgh Editor, STEEL

■ CHIEF interest in Pittsburgh last week was the weather. Conditions were almost ideal for a repetition of the 1936 disaster, with rivers running so low that water supplies were endangered in some towns and most of the surface covered with ice.

The freeze is the worst in 22 years, according to river authorities, with ice gorges jamming the Ohio for more than 100 miles. United States Army engineers found evidence in the Cincinnati section that the river was cutting new channels around the ice, which in many places reached 4 feet above the water level. The river is below pool stage over its entire length.

To add to the potentialities of the situation, heavy snowfall began on Tuesday in the upper reaches of the Monongahela and at the week's end had blanketed almost the entire western half of Pennsylvania. The ground underneath had already been hardened by two weeks of near-zero weather, and government observers stated a sudden thaw would bring certain floods to the tri-state area. In the office of Public Safety Director George E. A. Fairley last week the Pittsburgh Flood Menace and Disaster committee met to bring up to date plans to meet an emergency.

Although an extensive flood control program was mapped out after the St. Patrick's day flood of 1936, the work has not yet progressed far enough to be of much help. Four dams are under construction but none of these is far enough along to have any considerable effect should warm weather bring on a sudden thaw.

Rivermen stated that under normal conditions it will take at least 30 days to clear the rivers sufficiently to resume traffic. Meanwhile, all shipping is paralyzed with the exception of some short hauls in the Monongahela above Pittsburgh, where warm water discharged from industrial plants have prevented heavy ice formation.

♦

Ask for Checkoff

Last week a union labor committee called on Jones & Laughlin Steel Corp. in an effort to discuss the checkoff. Committee presented demands and was told to go home and present them through the national offices.

The committee was composed of representatives of the three lodges at Aliquippa, Hazelwood and Southside plants, without power to open contract negotiations. In order to bring up the closed shop-checkoff question, it is necessary to give ten days' notice to the company. The men indicated this would be recommended to the national office by the judges, but there is no assurance the matter will go farther than that.

According to them it is "the opening gun" in a nation-wide campaign to secure closed shop and checkoff for all steelworkers. Only a few small plants in the district have contracts of this kind.

Activities of Steel Users, Makers

■ KOPPERS CO., engineering and construction division, Pittsburgh, has been awarded a contract by J. M. Huber Corp., Borger, Tex., manufacturer of gasoline and carbon black, for a seaboard process type of liquid purification plant. This is stated to be the largest plant ever built for purification of natural gas, having capacity of 70,000,000 cubic feet of gas daily.

Koppers-Rheolaveur Co., Pittsburgh, an affiliate of Koppers Co., has been awarded contract by American Rolling Mill Co., Middletown, O., for installing a Koppers Battelle launder at its Nellis, W. Va., coal mine. Koppers-Rheolaveur also has been awarded contract by Jones & Laughlin Steel Corp., Pittsburgh, for installing a coal washing plant and extensions to present conveying, crushing and storage system at its Hazelwood by-product plant in Pittsburgh.

♦

Pittsburgh Crucible Steel Co., Pittsburgh, with mills at Midland, Pa., has appointed William & Kilsby, Standard Oil building, Los Angeles, a newly-formed partnership, as exclusive Pacific coast representatives for the sale of its products in California, Oregon and Washington.

♦

Automatic Gas-Steam Radiator Co., Pittsburgh, has changed its name to Automatic Gas Equipment Co. Broadening of the company's line of products to include many types of heating units made the change necessary.

♦

Union Metal Mfg. Co., Canton, O., has acquired the Corrugated Steel Sheet Piling Corp., Chicago. Alexander Mayer, former president of the Chicago corporation, will be placed in charge of sales of sheet pilings which will be manufactured in Canton.

♦

Robins Conveying Belt Co., 15 Park Row, New York, will move its executive offices to Passaic, N. J., effective May 1, where a three-story office building is being constructed adjacent to its plant. A sales office will be maintained in New York.

♦

Rex Cutlery Co., Newark, N. J., has purchased the former Tylocase factory at 16-20 Cordier street, Irvington, N. J., containing approximately 18,000 square feet of floor space. The new facilities will provide the Rex company with about twice its present space.

♦

Earle M. Jorgensen Co., Los Angeles, steel distributor, has erected a new warehouse on a 3½-acre site at Oakland, Calif., to serve the Oakland-San Francisco bay district. Company also has warehouses at Los Angeles and Houston, Tex.

♦

American Scrap Iron Co., Cambridge, O., has been organized by Max Wein, until recently engaged in business at Akron, O., under the firm name of Akron Junk Co. He has taken over the business in Cambridge conducted by H. Rosenberg the past 40 years and property is being modernized.

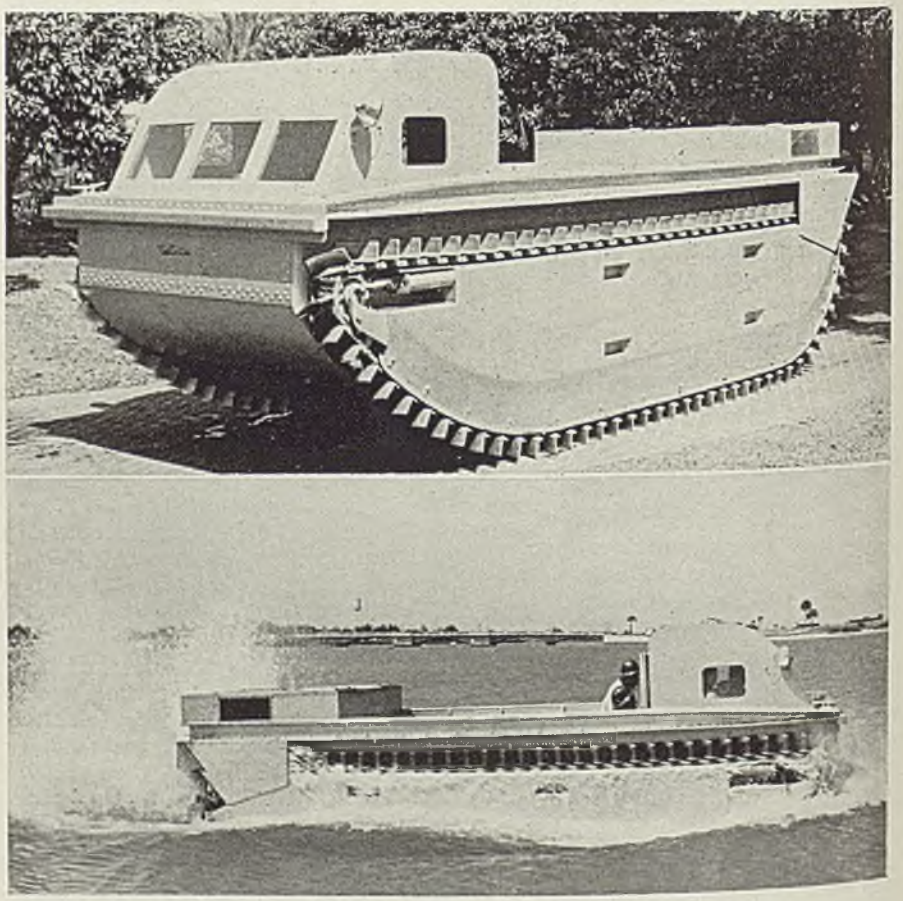
♦

Deli-Atjeh Trading society, general exporting firm, Amsterdam, The Netherlands, has terminated its arrangement with Adolphe Hurst & Co. Inc., New York, and has named H. E. Voegeli its agent in the United States and Canada, with headquarters at 303 West Forty-second street, New York. H. A. Wolter, of the Amsterdam head office, will continue to make his headquarters at Mr. Voegeli's office to supervise purchases.

♦

Rock Island Railroad Co. recently decided to put 55 main line steam locomotives on Timken roller bearings. Forty of these are freight locomotives, type 4-8-4, and 15 are passenger locomotives, type 4-8-2. Rock Island equipped ten other locomotives with Timken bearings two years ago. Maintenance savings shown for these locomotives over the two-year period are reported as 8.2 cents per mile per locomotive.

Amphibian Tractor Has Fabricated Duralumin Hull



■ In the 1940 model Alligator amphibian tractor built by Donald Roebling, Clearwater, Fla., for work in flooded areas, both land and water propulsion are obtained from an endless chain on either side fitted with curved cleats 6 inches high. On land, top speed is 25 miles per hour; in water, 8.6 miles per hour. Tractor draws less than 3 feet of water without cargo. Hull, 20 feet long, is duralumin, Alcoa 17 ST and has bottom plate of Alcoa 24 ST. Motor is a Mercury V-8, 95-horsepower engine. Two 50-gallon tanks hold fuel, and two radiators mounted against rear underside of motor compartment deck cool motor. For heavy towing on land or water, two rings are provided at lower rear corners of hull. Clearance under hull is 22 inches. Sealed-beam headlights, protected by Plexiglass windows, are mounted on front below bumper. Tractor accommodates 40 persons standing or a cargo of 7000 pounds.

Points to Important Economies in Preferred Number System

■ ADOPTION of the system of Preferred Numbers as the basis for simplified standardization of sizes of materials and manufactured articles would result in real economies for industry, according to H. W. Tenney, manager, engineering laboratories and standards department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Speaking recently before the industrial standards group, Industrial Management council, Rochester, N. Y., Mr. Tenney cited some of the unrelated sizes and ratings currently employed.

"For instance," he said, "sheet steel thicknesses are produced according to one system and strip steel according to another. For the sake of economy, sheet steel is often slit into strips. Strip material, produced as such, cannot be substituted because it is produced to another gage system.

"Because of the development of many independent gage systems we find ourselves in a very serious situation. We not only have one gage system for copper wires and another for steel wires, but worse than that we have eight well known systems for steel wires alone. This situation is not one of recent development, for as early as 1887 there were over 30 gage systems, 19 of which were wire gages. Furthermore, there were at that time a number of additional proposed systems under consideration.

Creation of the present confused situation is attributed by Mr. Tenney to the absence of any generally accepted system for the selection of sizes. "In the range between 10 and 100, there are 90 integral numbers to choose from," he pointed out. "If I arbitrarily select certain sizes in this range of numbers for standardization of a certain dimension of a product and each of you independently established a series of your own, we will arrive at a situation not unlike that which exists today.

Must Standardize System

"Suppose I am a motor manufacturer and I decide to make a line of motors having the following ratings—20, 25, 35, 50 and 75 horsepower, and some one else decides to establish a line of motors, rated at 20, 30, 50, 60 and 75 horsepower, soon I find I must include the ratings my competitor has, which I do not have, and he finds he must include the sizes in my line which he does not have, and we will both be asked to include ratings not contained in either. If we are going to have any semblance of order, of system of standardization, both of us must select sizes according to the same system. It was to fill this need that the Preferred Number system was developed."

Simply stated, Preferred Numbers are certain numbers that have been selected which should be used for standardizing purposes in preference to any other numbers. They should be used wherever possible for individual sizes and ratings or for series of these.

Tracing the history of the selection of these numbers, Mr. Tenney stated that years ago it was recognized the most satisfactory system would be one in which each succeeding number in a series was a fixed percentage larger than the preceding number. This is the plan that has been adopted.

Four Series in System

"The present Preferred Number system, approved by the American Standards association, consists of four series, known as the 5, 10, 20 and 40 series," the speaker continued. "This simply means that there are 5, 10, 20 or 40 steps within the same limits. The percentage difference between successive steps is obtained by taking various roots of ten.

"For example: For the five series the fifth root of ten gives us a factor of 1.5849, or for practical purposes this is called 1.60. In the range of 10 to 100, we will have five successive steps in a geometrical series, varying by a constant factor 1.6. In a like manner, the ten series is based on the tenth root of ten, or a factor of 1.2589, which for practical purposes is called 1.25; for the twenty series, the factor is obtainable by the twentieth root of ten, or 1.1220, which for practical purposes is called 1.12; and for the forty series the factor is obtained by the fortieth root of ten, or 1.0593, which for practical purposes is called 1.06.

"The use of factors obtained from the roots of ten have the advantage that numbers above 100 can be obtained by multiplying the numbers between 10 and 100 by 10, 100, etc., and numbers below ten can be obtained by dividing by 10, 100, etc.

"Between any limits an infinite number of geometrical progressions can be developed, and unless specific series are accepted for general use little progress toward standardization has been accomplished. With the general acceptance of the approved series, or Preferred Numbers, a tremendous stride will be made in standardization."

An important reason why Preferred Numbers have not been adopted more rapidly, according to Mr. Tenney, is because their long term economies are obscured by immediate economic considerations. For example, a manufacturer tooled up to make a certain product according to accepted standards in effect for an extended period possibly cannot afford to discard and start over.

In discussing reasons why Preferred Numbers should be adopted. it was pointed out that when new articles are to be manufactured, it is usually impossible to delay action until national standardization can be brought about. "If, therefore, the individual manufacturers proceed with Preferred Numbers as the basis of their work, the chances are that the standards of the various manufacturers will already coincide to a great extent, if not completely, when later on national standardization is attempted.

"At times the use of these numbers will naturally result in national standardization without any further time-consuming and costly committee activities. Not only will standardization of certain articles come about through the use of this system, but it will also bring with it a standardization of tools and many other interrelated parts or articles.

Eliminates Irregular Steps

"In cases where national standardization may never be involved, similar advantages will accrue from their use because it will tend toward standardization within an individual company, through automatic co-operation of the work of different departments, sections, or individuals. Even with successive designs brought out by the same individual, adherence to the use of Preferred Numbers will have the advantage of counteracting the use of too many or irregular steps in a line or unnecessary differences between such sucessive designs. There is quite frequently an urge in practice for small and irregular steps or sizes because of some temporary advantage which can be secured either from a design or commercial point of view. However, such temporary advantages are afterwards nearly always paid for rather dearly by the expense and complications caused by additional tools, stock, spare parts, etc.

"Finally, the fact these numbers represent a geometric series facilitates many calculations and eliminates a repetition of complicated calculations because many results will bear the proper relation to one another in a line of devices based on these numbers."

United States Increases Tungsten Ore Production; Can Fill All Needs

NEW YORK

■ TUNGSTEN ore output has been increased to a point where this country now is producing approximately 75 per cent of normal requirements, and where in emergency, by disregarding cost, could produce within six months sufficient tonnage to meet all requirements.

In 1938, United States produced 3500 net tons of 60 per cent WO_3, equivalent to 3000 net tons of 70 per cent WO_3. While figures are not yet available for 1939, output should at least equal 1938 production, due to the increase in demand and production during the last quarter.

If present conditions continue, it is believed 1940 will be a banner year for tungsten production; many new properties have been opened and production is being inereased by some older producing properties.

Demand for tungsten ore in the past four months has been active, but the supply has been equal to the demand. The navy department purchased a tonnage of domestic ore in September at $25 per net ton unit, the year's high price. Procurement division of the treasury also purchased 425 tons of Chinese ore in October at $23.75 per net ton unit. Government purchases increased market prices temporarily, but for the past 60 days the market has been stable. Material for prompt shipment from New York stocks is available at from $23.75 to $24 for material of standard analysis.

Whatever improvement in demand for tungsten develops this year it is believed that production will be stepped up to meet it. Present prices should continue fairly steady, unless Chinese shipments are cut off, and this seems improbable as there are many roads out of China.

Price Well in Hand

Behavior of prices over recent months, or since the outbreak of the European war, has contrasted sharply with that in 1914. At the beginning of the World war, when known production was small, tungsten ore soared to $100 per net ton unit. Today, despite a major war in Europe, and continued hostilities in China, prices have held within reasonable bounds. Not only has tungsten production expanded, but Europe has been accumulating stocks since 1937, and last fall, England, to forestall possibility of a run-away market, fixed the prices it was willing to pay (this also applied to France) for a period of several weeks.

As a result, producers throughout the world wanted to sell in the United States. Bolivia, Portugal, Australia, Africa, Argentina, and many others wanted to take advantage of higher prices prevailing here.

However, they found ore specifications in the United States market stringent and because of impurities (high copper, phosphorus, arsenic and combined tin) little, if any, was sold even at the lower prices, because of the beneficiation and chemical treatment necessary to produce ferrotungsten to specification.

Taking these costs and recovery loss into consideration, the price per unit, even with these lower prices, actually works out higher than if ores produced here or standard Chinese ores were used.

Situation Has Eased

As Europe in recent weeks has increased its price, pressure of South American ore, in particular, has lessened, with a better movement to the normal European market and with Japan having purchased a considerable tonnage for prompt shipment

Incidentally, at the beginning of the Japanese-Chinese war, tungsten ore sold as high as $37 per net ton unit, because of the inability of the Chinese to ship. This lasted only for a few months, when the various truck routes in China and Burma were opened, enabling the Chinese to deliver every pound of ore under contract.

The market had overbought, and when the demand came to a standstill in the last two months of 1937, high priced ore continued to arrive in this country, only to be exported to Europe to take advantage of a differential of as much as $4 to $6 per net ton unit. Even as late as the spring and summer of 1939 some steel manufacturers were still using material purchased in 1937.

Demand for tungsten took its first sharp spurt at the turn of the century, when Messrs. Taylor and White discovered high-speed steel, that is, tungsten high-speed steel containing about 18 per cent tungsten, 4 per cent chromium, and 1 per cent vanadium. This steel, it is pointed out, has maintained its supremacy for production work in the machine tool industry for the past three decades and survived through the discovery of "stellite" and numerous other metals of this type as well as all of the carbide tool developments.

"Stellite," in spite of costing eight to 10 times as much as high-speed steel, is highly economical in certain fields and has found its particular niche. Tungsten carbide, a later discovery, selling for 50 times as much as 18-4-1 also came along to find its particular function in the high-speed tool field where it is more economical to use than ordinary high speed.

So-called "super-high-speed steels" have come into the market, all a variation of the original yet primarily maintaining at all times the same or even higher tungsten content. Tungsten high-speed steel has been the yardstick for the machine tool industry for production work practically ever since its discovery.

After the World war, development of molybdenum high-speed steel was undertaken. Since molybdenum was plentiful in the United States, it was thought that, if high speed steel of this type were developed, American consumers would not have to worry about the source of tungsten supply. Great strides have been made and practically every steel manufacturer produces a molybdenum high speed steel, which sells for approximately 25 per cent less than 18-4-1.

This, too, will find its niche and when the results are in, molybdenum high-speed steel may cut into the tungsten high-speed steel tonnage for as much as 10 per cent, it is said. On the other hand, due to the character of the molybdenum producing industry, with its three or four companies with large sources of molybdenum and with virtually unlimited capital and plenty of vision, concentrated development research is possible and therefore an ideal high-speed steel may be developed. Because tungsten ores come from many small and varied sources, little money has been expended in direct research work.

Tariff Saves U. S. Industry

At the outset of the World war, production of tungsten ore was small, most of it coming from the western part of the United States and Portugal. Late in 1914, wolframite was discovered in China in large quantities and due largely to the fact that it came in outcroppings and surface ores the cost of mining was low, and Chinese labor is cheap.

On the other hand, mine costs in the United States have increased. This is particularly true where operations have been forced deeper into the ground. Some mines today are operating on 1500 to 2500-foot levels. Increased costs in this country have been more or less offset by the tariff protection given tungsten to encourage development and production. Without this protection, it is pointed out, not one mine in the United States could operate, and in such times as the present this country would be at the mercy of the rest of the world for its supply.

States Seek To Prevent Loss of Industries

■ Franklin Machine & Foundry Co,. Providence, R. I., has been formed as successor to Franklin Machine Co., which, after nearly 150 years of existence, was threatened with liquidation because of dwindling business. Consolidated Products Co. Inc., New York, purchased the property on request of the Rhode Island rehabilitation commission, holding it until new capital could be obtained. The new company is headed by Robert S. Holding, president and general manager; Albert L. Smith, vice president and director of sales.

Gov. Raymond E. Baldwin, Connecticut, has called the state's development commission to intervene in a proposal by Eagle Lock Co., Terryville, Conn., that the company be authorized to purchase its own stock up to amount of $800,000. Reportedly the governor feared proposed action might be first step in liquidation.

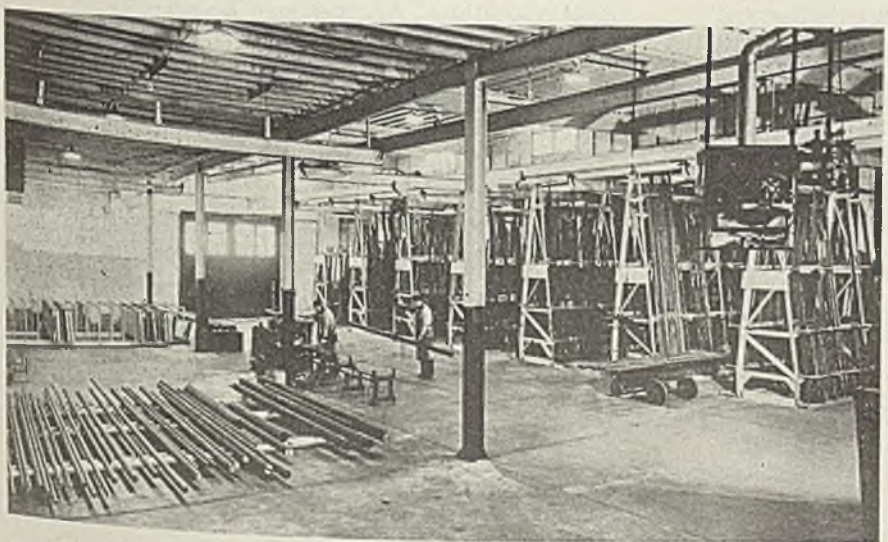
Editor's Note: The foregoing paragraphs are significant when considered in the light that most states now are making special efforts to hold their industries and to attract others. Pennsylvania and Minnesota, as recently noted in STEEL, are outstanding examples. A more comprehensive survey of what is being done by other states will be presented in an early issue of STEEL.

Millions of USS Labels On Consumer Goods

■ United States Steel Corp., which for a number of years has been identifying its steel for industrial buyers by a label bearing its trade mark, USS, more recently extended its use to consumer goods. In 1939 more than 6,000,000 labels were placed on such goods by manufacturers.

Color distinguishes various forms of steel. The basic label is red and gray, for any product using steel made by corporation subsidiaries. A green label on enameled ware identifies the underlying steel as a corporation product, a blue label indicates stainless steel and orange and blue identifies its springs in mattresses, beds and upholstery.

Crucible Steel Opens New St. Louis Warehouse



■ Crucible Steel Co. of America, New York, celebrated the opening of its enlarged warehouse facilities in St. Louis with an "open house" Jan. 20, attended by more than 400. R. E. Desvernine, president, A. T. Galbraith, vice president in charge of sales, and J. P. Woodlock, director of warehouse sales, were present to assist R. C. Oram, St. Louis district manager, in welcoming visitors.

Following the reception at the warehouse, Mr. Desvernine presented a dinner to employes in the evening at the Missouri Athletic club.

The new quarters are located at 1021-27 Cheuteau avenue, and more than triples the company's former space at 1518-22 North Ninth street.

A substantial amount was spent on alterations. The warehouse, 60 x 189 feet, is one of 27 branches and warehouses maintained by Crucible in key industrial centers.

The St. Louis district comprises Texas, Missouri, Louisiana, Arkansas, Kansas and part of Illinois.

On his way to St. Louis Mr. Desvernine also attended branch meetings in Cincinnati and Indianapolis, reporting success of the company's new cast cutting material, Rexalloy.

Estimate 12.1 Per Cent Increase in Carloadings

■ Freight carloadings for first 1940 quarter will be 12.1 per cent higher than in the same period last year, for a total of 5,123,227, according to estimates by regional shippers' advisory boards, furnished to the American Association of Railroads.

Iron and steel carloadings in the quarter are estimated at 447,293, an increase of 45.3 per cent over the corresponding 1939 period; automobiles, trucks and parts, 193,238 cars, up 18.8 per cent; machinery and boilers, 26,931 cars, 24.8 per cent higher; and agricultural implements and vehicles, other than automobiles, 25,855 cars, an increase of 21.4 per cent.

"Ships' Earning Power Raised 5% by Welding"

■ An increase of more than 5 per cent in the earning power of ships has been achieved by the use of welding, according to a report by the welding research committee, Engineering Foundation, New York.

"The saving in weight has reached about 1000 tons in 6000 tons, which represents about 16 per cent," it states. "Approximately 800 tons of this weight decrease may be attributed to the use of welding and 200 tons to the improved machinery weights. The amount due to welding represents about 13 per cent in saving in hull rate.

"In other words, this means an increase of about 1000 tons in about 15,000 dead weight tons carrying capacity. There is available, then, an increase of more than 6 per cent in earning power, more than 5 per cent of which is the result of welding."

Ryerson Building Large Addition to Chicago Plant

■ A modern all-steel building is nearing completion at the Chicago plant of Joseph T. Ryerson & Son Inc., already reported to be the largest steel service plant in the world. The new building 75 x 555 feet will increase the total floor space to well over 650,000 square feet, a remarkable growth from the two-story iron and steel store built in 1842.

The new span with its 46,000 square feet of floor space will be used for storing hot rolled steel bars, shapes and plates. It will be served by two new 15-ton cranes and direct railroad sidings. In addition to this new unit, an extension has been erected on a 100-foot span in the concrete reinforcing steel section, increasing facilities for handling and racking extra long length stock.

Former Questionmark Eliminated

■ STEEL deeply appreciates the co-operation of several hundreds of manufacturing companies in enabling it again to report (STEEL, Jan. 22, p. 13) on steel inventories at consuming plants. Results of the survey showed steel inventories, after increasing 12.2 per cent during September and October, moved up an additional 8.6 per cent in November and December, or a total increase, in the four months immediately following the outbreak of the war in Europe, of 21.8 per cent.

Seventy-seven per cent of the companies reporting estimated that their steel inventories at the turn of the year would last less than 90 days at the then existing and anticipated rate of consumption. Satisfied that the steel industry is and will continue to be in a better position to make deliveries, a number of large consumers signified that they would reduce their inventories during the first quarter. In general, results of the survey showed that fears of last fall that an undue proportion of the buying represented inventory replenishment were unfounded.

Careful Sampling Assures Accuracy: Most Companies Give Data Freely

The companies whose figures were included comprise a representative sample of some 8500 companies that commonly are believed to consume approximately 90 per cent of the steel used in this country. They included large and small companies in substantially the right proportion. Hence, results of the survey can be regarded as accurately indicative of the trend. It is unlikely, for example, that the increase in steel inventories during November and December was exactly 8.6 per cent. It is certain, however, that the real increase was quite close to 8.6 per cent.

One of the gratifying features of these surveys was the liberality of manufacturers in supplying the needed information. Great progress has been made in recent years in releasing data which at one time would have been considered a business secret. In fact, only four manufacturers questionnaired replied that they were opposed to giving out such information. One manufacturer, for instance, explained how the government crop forecasts affected farm commodity prices, and he did not want to be a party to anything that might influence steel quotations. Another said he never replies to questionnaires.

STEEL'S Study Valuable Contribution To Knowledge of Industrial Trends

STEEL'S survey results indicate that it never will be feasible to measure steel inventory monthly or quarterly fluctuations in exact percentages. That is because a majority of companies do not maintain records necessary for accurate reports.

STEEL believes that its studies of steel inventory trends provide valuable new information to the field that it serves. This information provides a definite answer to a question which heretofore has been largely a matter of guess. With it businessmen will be in a better position to study trends and establish policies.

Future surveys of steel inventories at consuming plants will be made when it appears that inventory information will be timely. The next questionnaire is slated for March 31 and will be aimed at obtaining data as to what happened to steel inventories during the first quarter.

The *BUSINESS TREND*

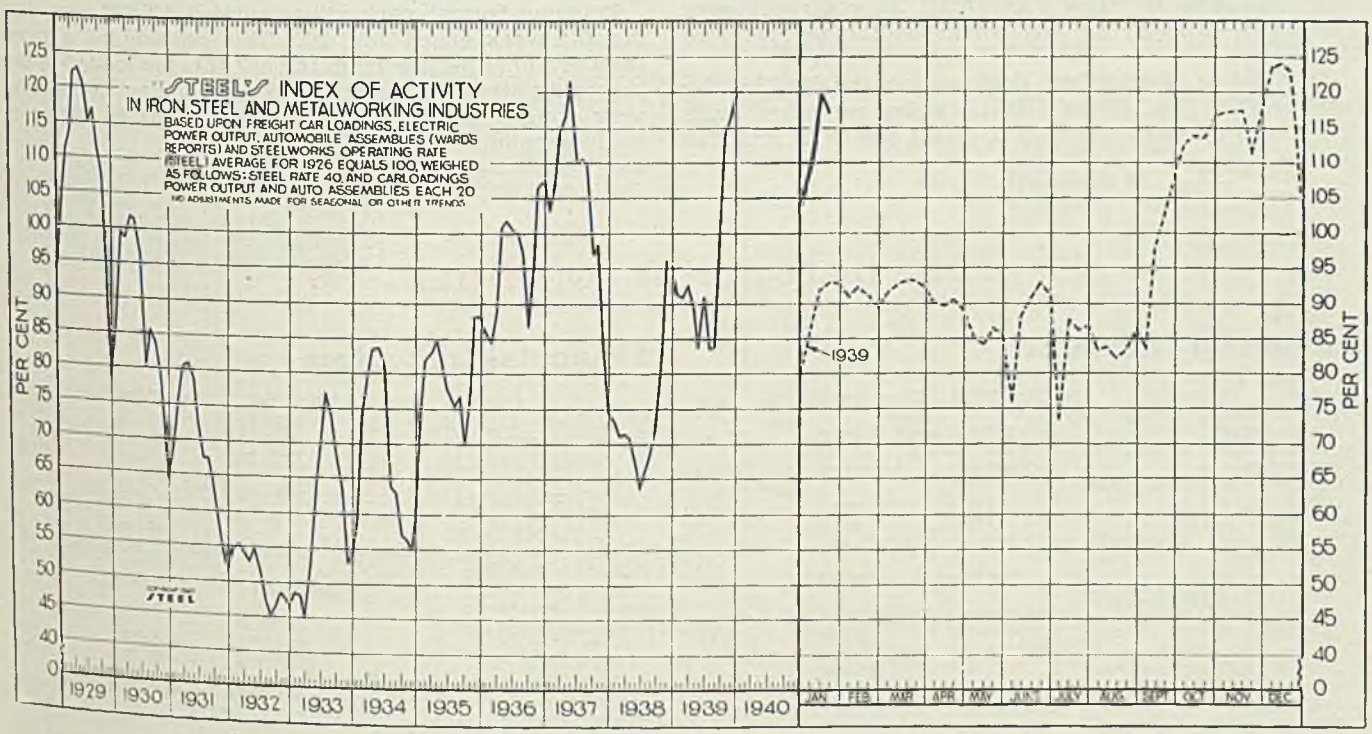
Activity Index Drifts To Lower Levels

RATE of industrial activity is holding at encouraging high levels in view of the disappointing volume of new business that has developed since the first of the year.

Influences tending to retard additional forward purchases at this time are that manufacturers have now built up inventories in line with the higher level of operations and in most instances have additional commitments scheduled for shipment in the near future. More prompt deliveries now available and the probability that prices of raw material and finished products will not record sharp increases in the near future also tend to induce purchasing agents to follow a more conservative course.

Large order backlogs accumulated during the closing months of last year are expected to support a high level of industrial output through most of this quarter. But the absence of new demand, particularly in the durable goods industries, has resulted in a moderate recession in activity of this group, the duration and extent of which cannot be determined at this time.

There is little statistical information to indicate an important retrenchment in industrial production. Most business indicators, while declining moderately in recent weeks,



STEEL'S index of activity declined 1.9 *points to* 117.3 *in the week ended Jan.* 20:

Week ending	1939	1938
Nov. 18	117.3	100.4
Nov. 25	111.4	93.9
Dec. 2	117.9	100.1
Dec. 9	123.9	100.7
Dec. 16	124.2	99.8
Dec. 23	123.4	94.8
Dec. 30	104.0	79.9
Week ending	**1940**	**1939**
Jan. 6	110.3	86.5
Jan. 13	119.2	91.9
Jan. 20	117.3	93.0

Mo. Data	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Jan.	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6	104.1
Feb.	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2	111.2
March	92.6	71.2	114.4	88.7	83.1	78.9	44.5	54.2	80.4	98.6	114.0
April	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7	122.5
May	83.4	67.4	121.7	101.8	81.8	93.7	63.5	54.8	78.6	101.2	122.9
June	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8	120.3
July	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9	115.2
Aug.	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4	116.9
Sept.	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7	110.8
Oct.	114.0	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8	107.1
Nov.	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0	92.2
Dec.	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3	78.3

are still at high levels. In some instances business indexes are only moderately below the peak levels recorded late last year.

Activity in the iron, steel and metalworking industries as recorded by STEEL's index receded 1.9 points to 117.3 during the week ended Jan. 20. In the corresponding week last month the index stood at 123.4, but at this time last year it was at the 93 level, in 1938 at 74.7 and 1937 at 104.

Steelmaking operations eased 1.5 points during the week ended Jan. 20 to 84.5 per cent. Indications point to a further decline in the national steel rate for the weeks immediately ahead. However, contrasted with a year ago, when the national steel rate stood at 52 per cent, steelworks operations afford a highly favorable comparison.

Other statistical measures of industrial activity, while declining further from the recent highs, continue in most instances to show substantial improvement over the levels recorded for any corresponding period since 1929.

Automobile production declined seasonally in the week ended Jan. 20 to 108,545 units, compared with the record January week total of 111,330 units reported in the previous period. However, output in the week ended Jan. 20 was 20 per cent over the 90,205 units assembled in the comparable 1939 week. Retail sales of passenger cars and trucks are being maintained at an encouraging high level.

Despite a slight decline in electric power consumption during the week ended Jan. 20 to 2,572,117,000 kilowatt-hours, output remained well above any comparable week in the industry's history.

Revenue freight carloadings totaled 645,822 cars during the week ended Jan. 20. This represented a more than seasonal decline from the 667,713 cars loaded in the preceding week. During the corresponding period last year freight traffic totaled 590,359, while in 1937 carloadings numbered 679,376.

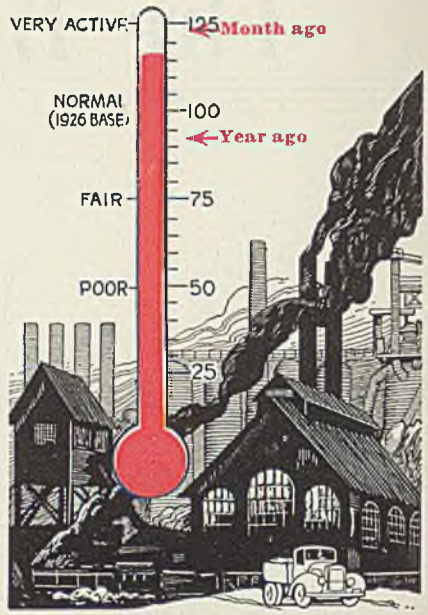
Where Business Stands

Monthly Averages, 1938 = 100

	Dec., 1939	Nov., 1939	Dec., 1938
Steel Ingot Output	228.5	232.4	133.7
Pig Iron Output	234.8	240.0	137.9
Freight Movement	112.1	129.9	100.2
Automobile Production	210.1	164.5	183.9
Building Construction	132.9	112.5	146.2
Wholesale Prices	100.6*	100.8	98.0

*Preliminary.

Industrial Weather



TREND:

Downward

The Barometer of Business

Industrial Indicators

	Dec., 1939	Nov., 1939	Dec., 1938
Pig iron output (daily average, tons)	121,535	124,003	71,378
Iron and steel scrap consumption	3,805,000	4,025,000	2,441,000
Foundry equipment new order index	164.8	203.1	141.8
Gear sales index	111.0	126.0	81.0
Finished steel shipments.	1,304,284	1,270,894	694,204
Ingot output (daily average, tons)	206,577	210,101	120,891
Dodge bldg. awards in 37 states (sq. ft.)	$354,098,000	$299,847,000	$389,439,000
Automobile output	469,002	370,194	406,960
Coal output, tons	37,283,000	42,835,000	36,541,000
Business failure; number.	882	886	875
Business failures; liabilities	$12,078,000	$11,877,000	$36,528,000
Nat'l Ind. Conf. board (25 industries, factory):			
†Av. wkly. hrs. per worker	39.1	39.0	36.9
†Av. weekly earnings...	$28.49	$28.24	$26.32
Cement production, bbls.†	11,053,000	12,539,000	10,184,000
Cotton consumption bales.	652,695	718,721	565,627
Car loadings (weekly av.)	643,380	745,726	575,003

† November, October and November respectively.

Foreign Trade

	Nov., 1939	Oct., 1939	Nov., 1938
Exports	$292,734,000	$332,079,000	$252,381,000
Imports	$235,402,000	$215,281,000	$181,461,000
Gold exports	$10,000	$15,000	$14,000
Gold imports	$167,991,000	$69,740,000	$177,782,000

Financial Indicators

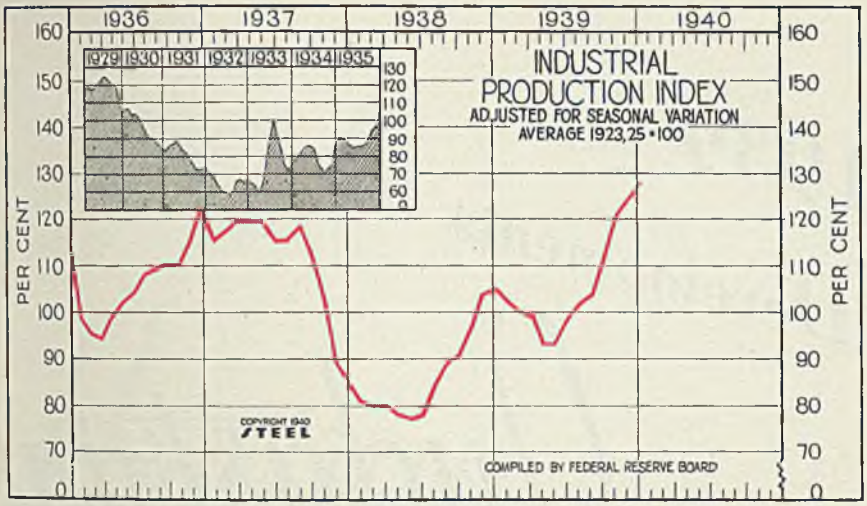
	Dec., 1939	Nov., 1939	Dec., 1938
25 Industrial stocks	$194.21	$192.28	$186.99
25 Rail stocks	$23.82	$24.90	$23.74
40 Bonds	$72.28	$72.58	$71.39
Bank clearings (000 omitted)†	$22,598,000	$22,244,000	$21,637,000
Commercial paper rate (N. Y., per cent)	½-¾	¾-1	1
*Com'l. loans (000 omitted)	$8,758,000	$8,656,000	$8,412,000
Federal Reserve ratio (per cent)	86.7	86.3	83.7
Capital flotations (000 omitted)			
New Capital	$26,971	$21,408	$241,001
Refunding	$235,016	$126,140	$288,181
Federal Gross debt, (mill. of dol.)	$41,942	$41,305	$39,439
Railroad earnings	$70,345,795	$101,616,298	$49,373,177
Stock sales, New York stock exchange	17,768,713	19,219,736	27,490,471
Bond sales, par value	$176,437,000	$151,867,000	$217,717,070

†November, December and November respectively.
*Leading member banks Federal Reserve System.

Commodity Prices

STEEL'S composite average of 25 iron and steel prices	$37.18	$37.50	$36.36
U. S. Bureau of Labor's index	79.1	79.2	77.0
Wheat, cash (bushel)	$1.22	$1.08	$0.81
Corn, cash (bushel)	$0.72	$0.66	$0.67

*Preliminary.



Industrial Production
Federal Reserve Board's Index

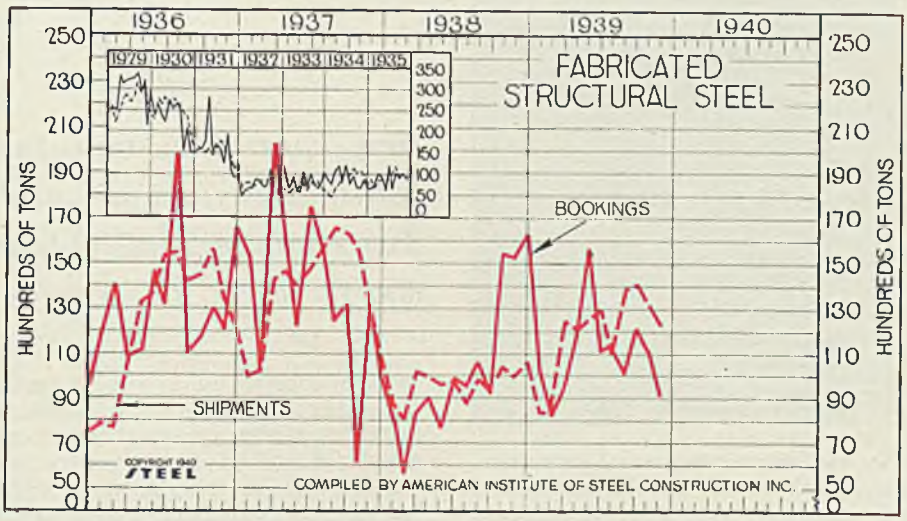
(1923-25 = 100)

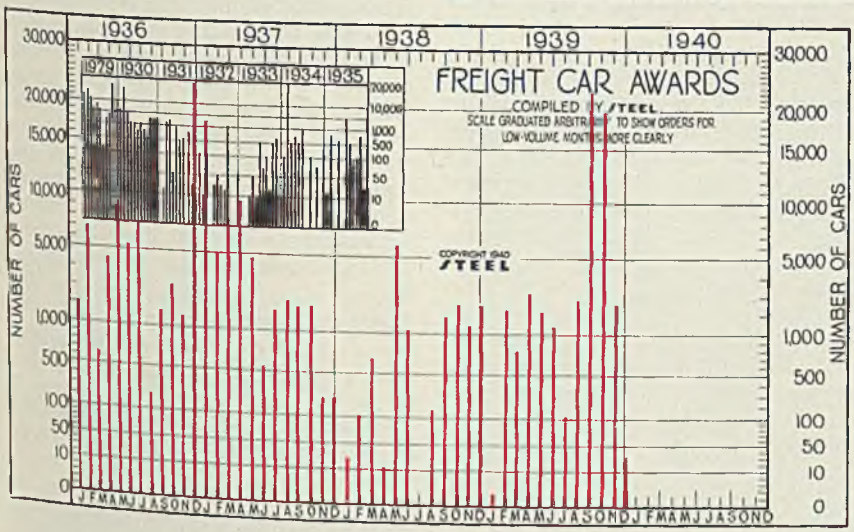
	1939	1938	1937	1936
Jan.	101	80	114	98
Feb.	99	79	116	94
March	98	79	118	93
April	92	77	118	98
May	92	76	118	101
June	98	77	114	103
July	101	83	114	107
Aug.	103	88	117	108
Sept.	111	90	111	109
Oct.	120	96	102	109
Nov.	124	103	88	114
Dec.	128	104	84	121
Average	106	86	110	105

Fabricated Structural Steel

(1000 tons)

	Shipments			Bookings		
	1939	1938	1937	1939	1938	1937
Jan.	84.3	87.8	99.9	101.7	80.3	153.8
Feb.	84.4	81.2	102.2	82.7	57.1	101.7
Mar.	125.3	103.3	143.0	95.1	84.3	206.3
Apr.	120.9	100.0	146.8	118.3	91.2	158.5
May	125.9	96.4	140.5	156.9	77.3	122.9
June	130.1	98.6	147.6	111.6	99.9	175.5
July	110.5	88.0	156.4	114.1	96.0	158.3
Aug.	139.7	98.6	166.1	100.9	106.8	124.9
Sept.	140.8	93.5	163.5	121.4	92.5	132.4
Oct.	132.1	105.0	155.9	112.6	154.8	62.3
Nov.	123.2	99.9	130.2	91.6	153.1	132.8
Dec.	.....	106.5	108.4	.....	163.4	99.1
Total	.... 1,158.8	1,660.6		..... 1,256.6	1,628.6	





Freight Car Awards

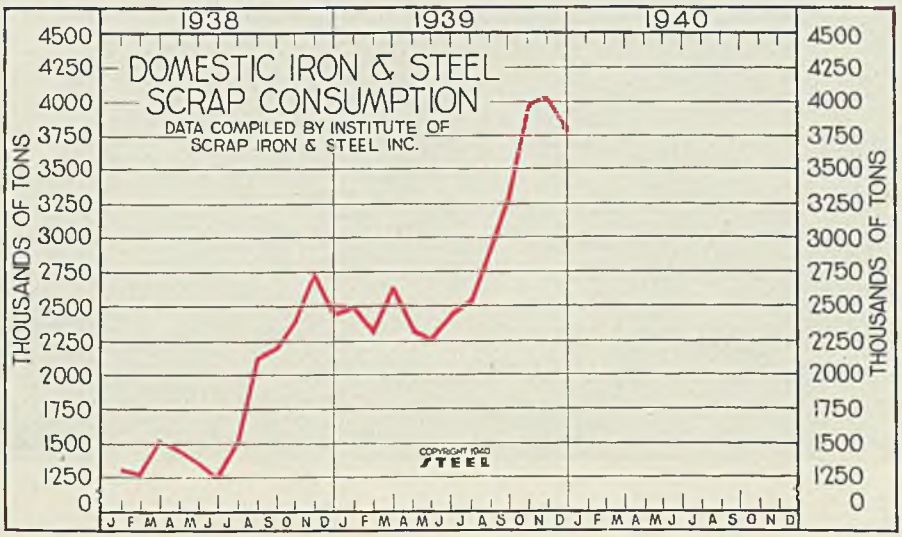
(Hundreds of Cars)

	1939	1938	1937	1936
Jan.	.03	.25	178.06	20.50
Feb.	22.59	1.09	49.72	69.00
Mar.	8.00	6.80	81.55	6.32
April	30.95	.15	97.72	44.27
May	20.51	60.14	47.32	89.00
June	13.24	11.78	5.48	52.00
July	1.10	.00	10.30	72.28
Aug.	28.14	1.82	14.75	2.25
Sept.	230.00	17.50	12.16	17.50
Oct.	196.34	25.37	13.55	22.10
Nov.	26.50	12.32	2.75	15.50
Dec.	.35	25.81	2.75	234.50
Total	577.75	163.03	516.11	645.23

Iron and Steel Scrap Consumption

Gross tons

	1939	1938
Jan.	2,495,000	1,332,000
Feb.	2,313,000	1,306,000
March	2,634,000	1,543,000
April	2,317,000	1,477,000
May	2,263,000	1,387,000
June	2,428,000	1,257,000
July	2,551,000	1,520,000
Aug.	2,919,000	2,133,000
Sept.	3,282,000	2,218,000
Oct.	3,974,000	2,393,000
Nov.	4,025,000	2,740,000
Dec.	3,805,000	2,441,000
Total	35,006,000	21,746,000



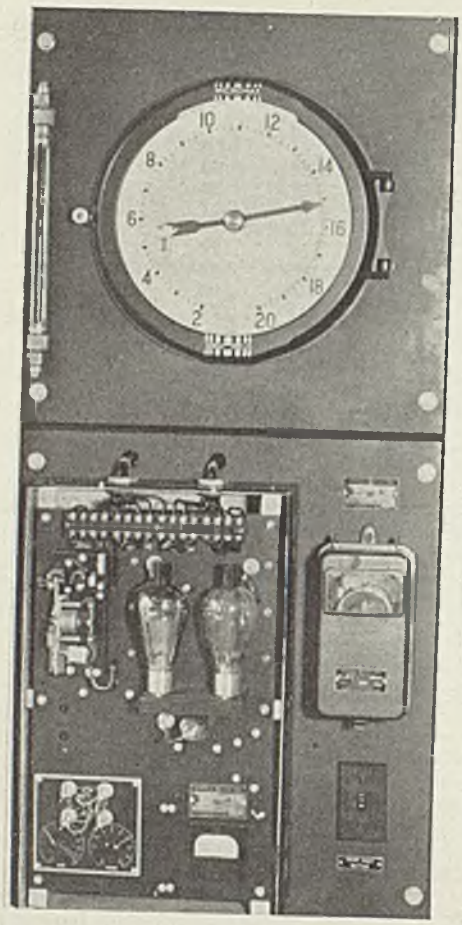


Fig. 1—Temperature control instrument, time clock, control switch and Reactrol control panel without cover at lower left, for gas carburizing furnace

1939 Developments in Industria

New control system found particularly suitable continuous furnace and critical temperature wo Two chamber malleable-iron annealing furnace perm shorter cycle, low energy costs

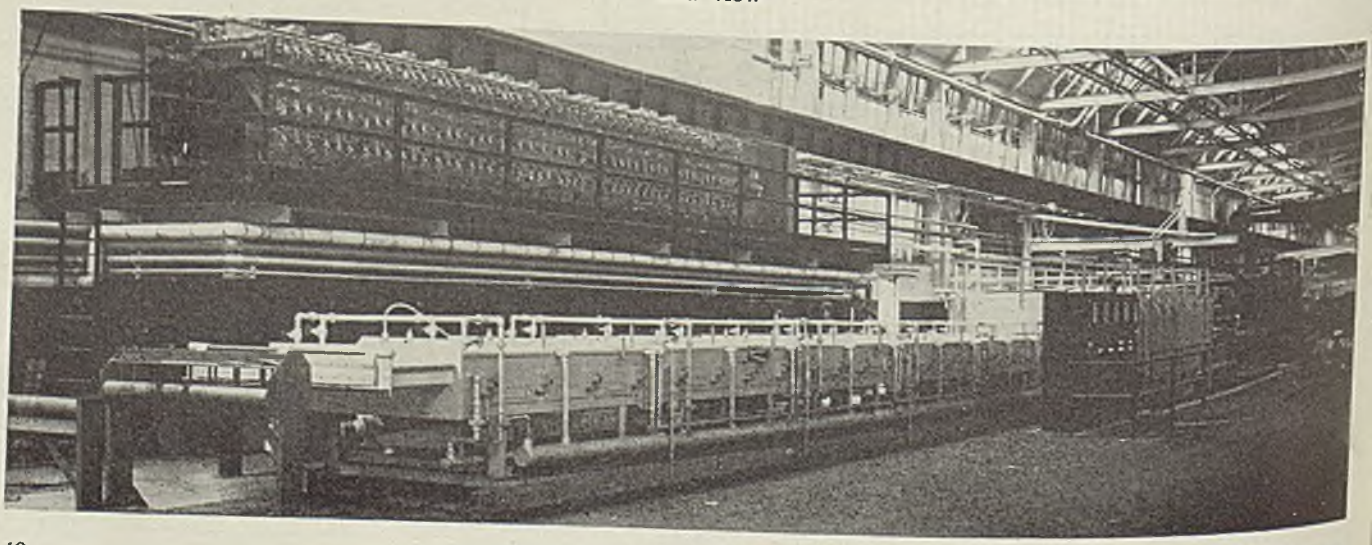
■ A NEW system for automatically regulating the power input to electrically heated equipments such as furnaces, boilers, superheaters and air heaters is called the Reactrol system. It regulates power input by varying the voltage impressed on the heating resistors in accordance with temperature or pressure requirements. It is particularly suitable for continuous processes and in the treatment of materials that might be affected by slight changes in temperature.

In its simplest form, the Reactrol system consists of a control panel, a temperature or pressure control instrument and a saturable-core reactor. See Fig. 1. In operation, the pressure or temperature control instrument containing a special potentiometer feeds low-voltage current into an amplifying tube on the control panel. This tube, in turn, regulates the flow of direct current to the saturable-core reactor which acts like a valve to regulate the voltage applied and thus the amount of power going to the electric heating equipment. The system provides accurate and rapid temperature or pressure control with pr tically no overshooting.

Marking or scratching the surfa of bright steel strips is avoided a new type of continuous furnace ranged to support the strips on ro outside the heating chamber at ea end, where they as well as the str are relatively cool. The strip hang in a free catenary between the roll so the high-temperature portion the strip is untouched by a su porting means. If the rolls wer in the heating chamber, marks o scratches would be likely to occu

The new furnace, Fig. 2, desig nated as a catenary type, has the usual extended cooling chamber to cool the strip below oxidizing tem perature before it emerges and also has the necessary feed-in rolls and coiling reels. The 460-kilowatt heating chamber is 30 feet long, 5 feet

Fig. 2—Catenary-type furnace with Reactrol control for normalizing steel strip. Heating chamber 31 feet long, 5 feet active width; cooling chamber 60 feet long. Rated 460 kilowatts. Oblique delivery-end view



By C. L. IPSEN
Industrial Department
General Electric Co.
Schenectady, N. Y.

Heating

wide and operates at 2000 degrees Fahr. Reactrol control is employed, with a temperature-control instrument provided for each of the four zones.

Elevator Furnace

For those foundries where production does not warrant a continuous-type furnace, a 2-chamber electrically heated elevator furnace was produced for annealing malleable iron castings. After completion of the high-temperature portion of the annealing cycle, the furnace car is lowered from that chamber and placed in the low-temperature chamber. At the same time a new cold charge is placed in the high-temperature chamber.

Such a furnace eliminates the time required for cooling the furnace, and the time and energy for reheating the furnace as compared with a single-chamber furnace. The resulting advantages are a shorter annealing cycle and lower energy consumption.

Wire Enameling Oven

Economy in operation, smoothness of operation, uniformity of product and increase in wire speed were achieved in new oven equipment for enameling wire. For the manufacture of the new Formex magnet wire it was necessary to develop new equipment and methods for applying and baking the coating on the wire since the insulation has high viscosity and is applied by pulling the wire through a die rather than by the conventional dip method. Several sizes and types of ovens, all with Calrod heating units, were developed for baking the insulating film on the wire. A horizontal oven is used for wire sizes 31 gage and smaller, and a vertical oven for 30 gage and larger.

A typical equipment, Fig. 3, consists of a 14-kilowatt oven with top and bottom sheaves and automatic temperature control, a motor-driven take-off reeling mechanism, and supply racks for holding the spools of wire.

When enameling wire sizes from 23 to 30 gage, 16 spools feed bare wire into the oven. Since the wire travels up and down until it has received six dips there are actually 96 strands in the oven at one time. Such an oven will enamel approximately 1000 feet of 30-gage wire per minute. Of course, production varies with wire size—the larger the diameter of the wire, the slower the speed.

Induction Furnace Equipment

In some industrial heating or induction melting applications, high-frequency generators occasionally operate in an atmosphere containing harmful foreign particles. Clean ventilating air can be piped to a generator, but this requires extra space and is sometimes costly. On a large unit it is usually advantageous to totally enclose the machine to prevent entrance of foreign matter, and cool the machine with water-cooling coils.

Since in a high-frequency inductor-type generator the magnetic flux does not reverse or change appreciably in the stator, the water-cooling coils may be placed directly in the core. Here the heat is not transferred to the air, but it is conducted directly to the cooling coil. This method of cooling was applied to a totally enclosed, 1200 kilowatt, 1800 revolution per minute, 960 cycle, single phase, inductor-type generator which is one of the largest units ever supplied for use with an induction furnace.

Powder metallurgy commonly re-

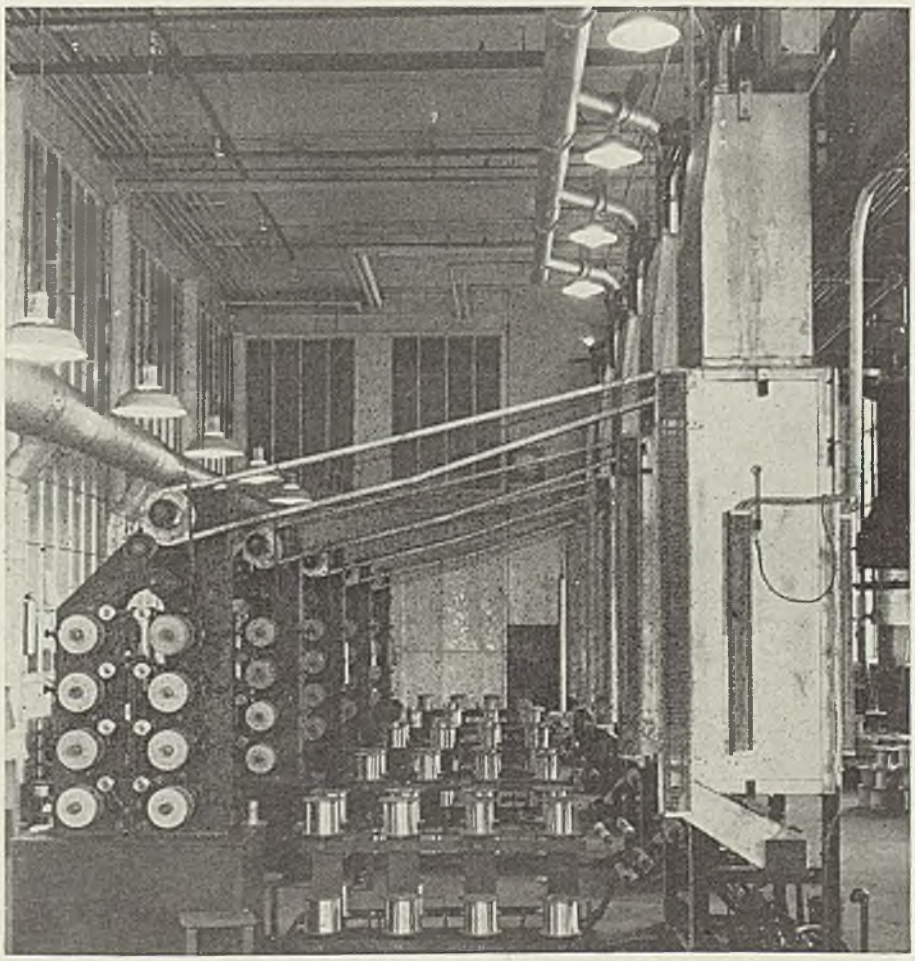


Fig. 3—Enameling machine; 16 heads, electric oven and bare wire stand, at River works of General Electric Co., West Lynn, Mass.

quires the sintering of parts made of pressed, powdered metals at elevated temperatures in a controlled atmosphere. A new mesh-belt conveyor-type electric furnace has been produced for such work. Suitable for operating temperatures up to 2100 degrees Fahr., the heating chamber is equipped with heavy nickel-chromium rolled-ribbon resistors.

Work is loaded on light pans which are carried through the furnace on a woven wire belt. After sintering in the heating chamber, the work travels through an adjoining water - j a c k e t e d cooling chamber where the parts cool in protective atmosphere. Fig. 4 shows recently installed furnace rated 102 kilowatts. It has a door opening 12 inches wide by 8 inches high, heating chamber 10 feet long, cooling chamber 20 feet long. Several standard sizes of furnaces of various types—box, mesh-belt and roller-hearth type—are available for sintering. The type chosen generally depends upon the rate of production—the box type for the lowest and the roller-hearth type for the highest production rates.

Electric Brazing Furnaces

Manufacturers of electric refrigerators were the first to make wide use of electric furnace brazing in the fabrication and assembly of parts. From this field, the brazing method spread to the automotive industry where it is today a familiar and successful manufacturing process. In like fashion, the past year has seen an increasing acceptance of electric furnace brazing by the aircraft industry.

In general, the application of electric furnace brazing has increased during the past year in a normal, steady manner. Standard furnace equipment, for the most part, has been the type usually demanded. There have been, however, occasional installations of special equipment for out-of-the-ordinary jobs such as the brazing of aluminum.

Fig. 4—Electric controlled-atmosphere furnace for sintering powdered metals. Mesh-belt conveyor 12 inches wide, door opening 8 inches high, heating chamber 10 feet long, cooling end 20 feet. Total 102 kilowatts, operating temperature 2100 degrees Fahr. maximum, oblique charging-end view

♦

Text on Materials Used in Engineering

■ *Engineering Materials,* by Alfred H. White, professor of chemical engineering and chairman of the department of chemical and metallurgical engineering, University of Michigan; cloth, 547 pages, 6 x 9 inches; published by McGraw-Hill Book Co. Inc., New York, supplied by STEEL, Cleveland, for $4.50.

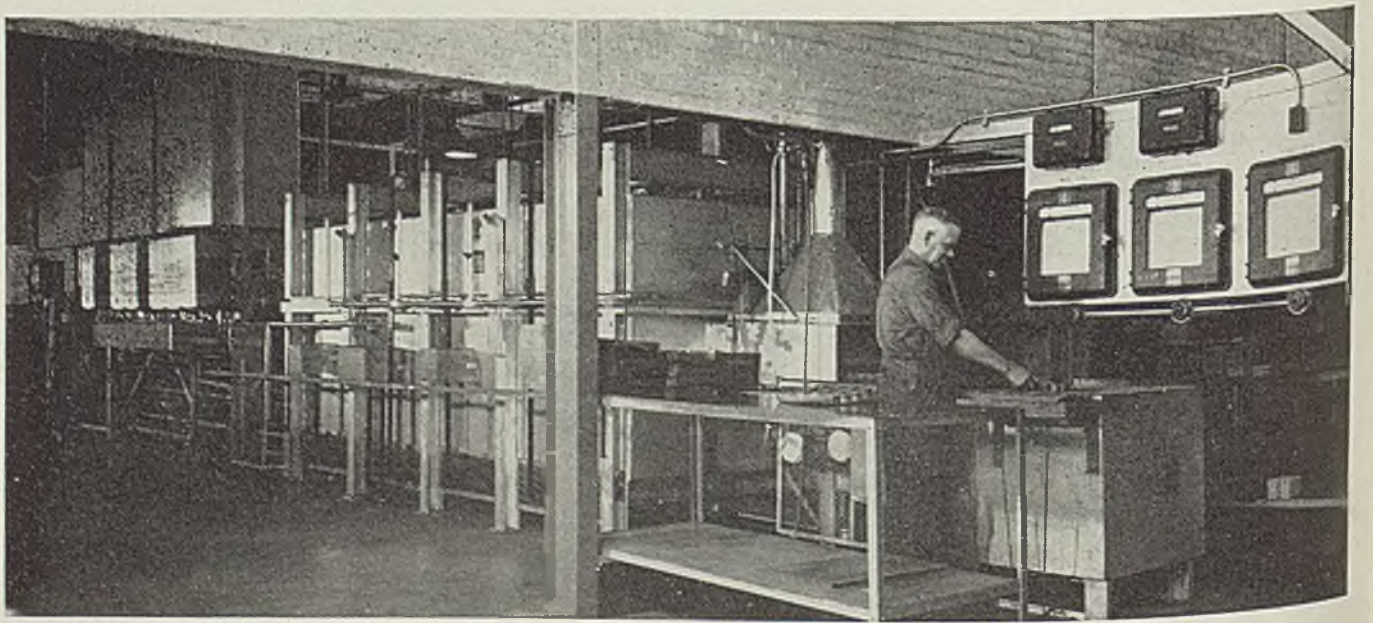
This is intended primarily as a text for engineering students who have had the usual course in freshman chemistry. Practicing engineers will be interested in a systematic presentation of recent advances in the field of materials. No knowledge of organic chemistry is assumed and the treatment of protective coatings and plastics is elementary, preceded by a brief introduction to carbon compounds.

The text is supplemented by 75 tables and 200 illustrations. Scope is indicated by chapter headings: Theoretical introduction; iron and its alloys with carbon; effect of heat treatment on iron-carbon alloys; manufacture of iron and iron-carbon alloys from the ore; early methods of producing wrought iron and steel; manufacture of steel by the bessemer, open hearth and electric furnace process; influence of chemical composition and mill finishing operations on the properties of plain carbon steel; properties of plain carbon steel as affected by fabrication; casting processes; gray cast irons and malleable castings; steels with one alloying element; steels with two or more alloying constituents and steels for special purposes; copper, nickel, zinc, tin and their alloys; aluminum, magnesium and the light alloys; lead and its alloys; solders and bearing metals; corrosion of metals and protection by metal coatings, rocks and their decomposition products; clay products; fused silicates, vitrified clay products, glass, slags and refractories; lime, gypsum and magnesium oxychloride products; silicate cements and other cements; fuels and combustion; water and its industrial utilization, soaps; organic preservative materials and protective coatings; plastics and related products.

Corrosion-Resistant Rolled Alloy Sheet

■ Fafnir Bearing Co., New Britain, Conn., announces a chemical treatment to render exposed parts of ball bearing transmissions corrosion resistant without changing physical properties or dimensions. Treatment forms a jet-black oxide-layer penetrating 0.0002 to 0.0003-inch into surface of metal without changing external dimensions. This protective layer is claimed not to be affected by temperature and not to chip or peel.

According to U. S. navy salt-spray corrosion tests, seals, shields and collars so treated are 10 to 25 times more resistant to corrosion than untreated metal.



Shipyard Handling Units

Prefabrication of large subassemblies in shipbuilding operations results in development of screw luffing, full revolving, tower type cranes which easily handle 20 tons at 62-foot radius, 8 at 113 feet

■ ADVANCES in construction of all-welded and partly welded ship have resulted in fabrication of larger and larger assemblies. In fact, one shipbuilding yard has found it possible to decrease construction time greatly by employing large prefabricated subassemblies produced in the shop and simply joined together at the ways to form the ship.

Drydock work also is found to involve larger and heavier pieces of equipment than formerly, requiring cranes of larger capacity alongside the ways. Both of these trends are causing the size of handling equipment to increase to take care of these larger loads. At the same time, utmost in safety must be incorporated as in all cases a failure or fumble in operating the crane units would result in serious financial loss and serious hazard to nearby workmen.

Typical of the heavier equipment being used for such service are the two new screw-luffing full-revolving tower cranes recently built by Dravo Corp., 300 Penn avenue, Pittsburgh, for installation in the yards of the Newport News Shipbuilding & Drydock Co., Newport News, Va. These new cranes are installed one on each of two trestles to replace two worn out and obsolete cantilever-type units. The two new units supplement the first revolving crane purchased in 1930 to replace an old cantilever-type crane similar to those now being discarded. In addition to the increased capacity, use of the first full-revolving crane has resulted in materially increasing speed of assembly of vessels on the adjacent shipways.

Mounted On Trestle

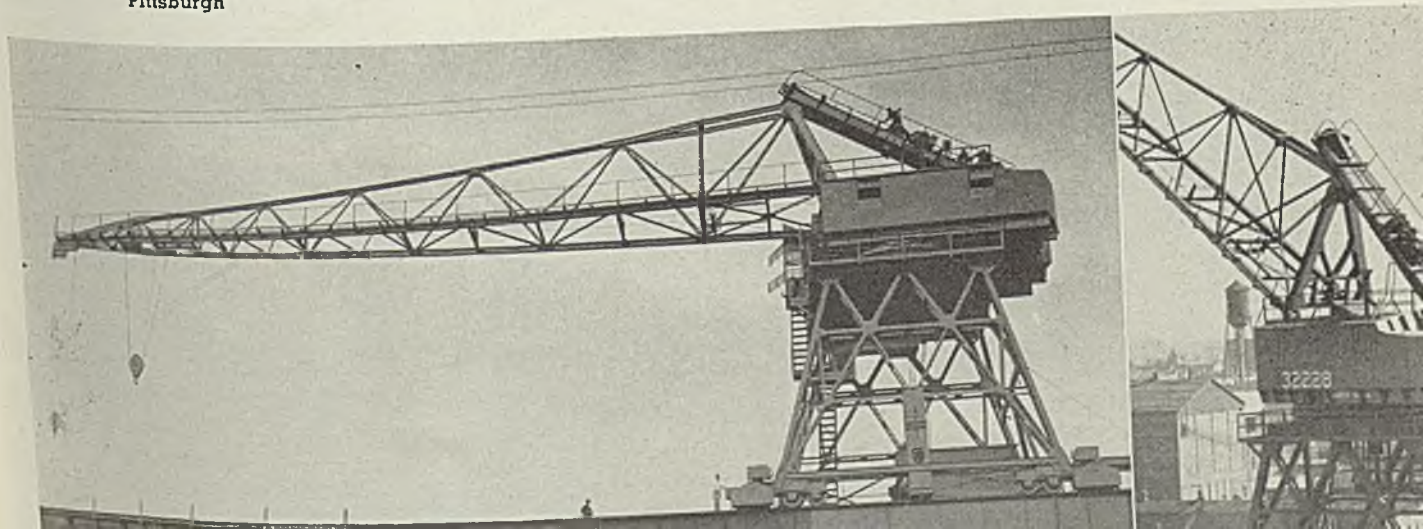
Each of the new cranes has a 125-foot boom and a main hoist hook with an operating capacity of 20 tons at a radius of 62 feet and 10 tons at a radius of 93 feet. An auxiliary hoist provides a capacity of 8 tons at a radius of 113 feet. As shown in accompanying illustration, Fig. 1, the units are mounted on trestle runways with crane rails spaced on 20-foot centers. The new units provide adequate flexibility for heavy-duty shipyard service.

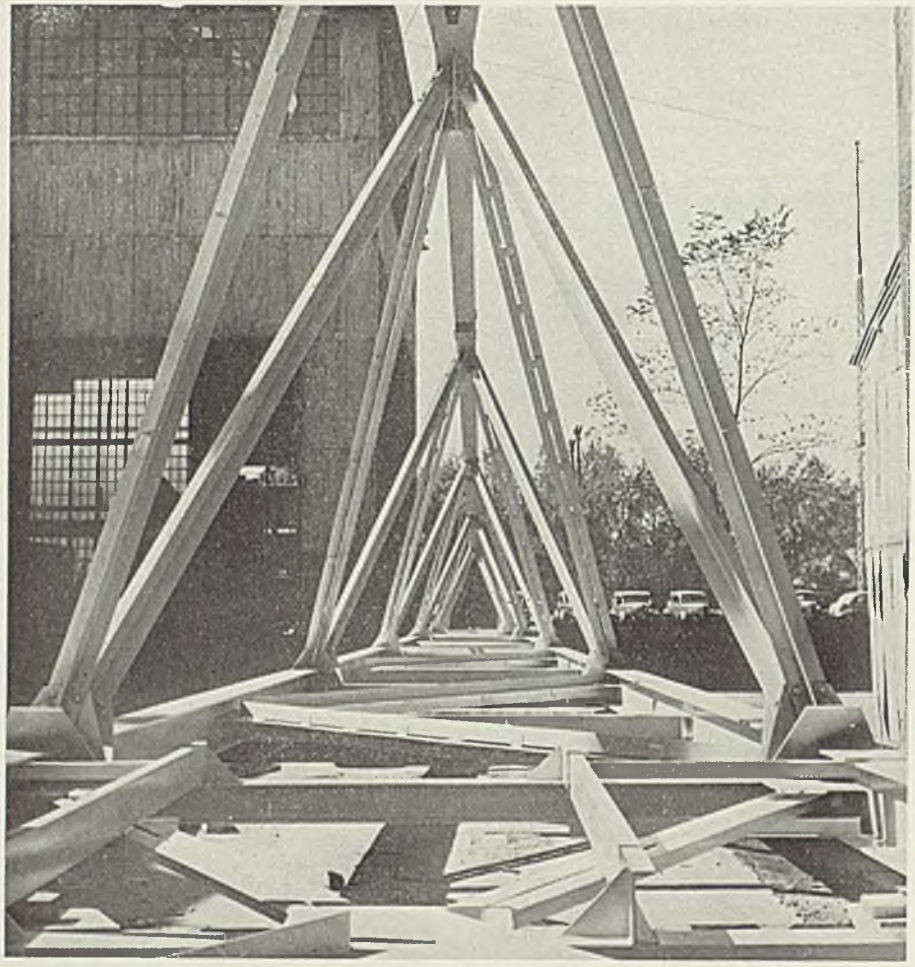
An outstanding feature of the new units is the screw-luffing mechanism which affords an exteme margin of safety in handling of heavy crane lifts over expensive completed assemblies. In these units, a luffing screw replaces the standard, multi-part, wire rope, luffing lines usually employed. Use of a luffing screw permits accurate and safe spotting of heavy assemblies into a ship.

Use of the screw-luffing mechanism has been made practical by applying a welded, triangular boom. The luffing mechanism consists of a screw arrangement working on two nonrotating nuts mounted in steel trunions. Having an overall length of 35 feet, the screw is made of forged nickel steel, normalized and quenched. The screw has a lineal travel speed of 2.15 feet per minute. To change the boom from maximum to minimum radius re-

Fig. 1—Electrically driven 20-ton screw luffing crane with boom in horizontal position. Photos courtesy Dravo Corp., Pittsburgh

Fig. 2—Here screw has been actuated to lift boom, providing adequate flexibility for heavy duty shipyard service





quires 1 2/3 minutes. The screw is motor driven through a gear-reduction unit designed so the boom cannot change position except when the mechanism is in operation. This provides an added safety factor. Upper and lower boom positions are protected by an electric limit switch with slowdown and final stop arrangements.

Driven independently, the two hoisting units are mounted on an integral welded base. The main hoist drum of Mayari cast iron is grooved for ⅞-inch wire rope lead lines, the load block being reeved for four parts of line. Mechanism is motor driven through a double set of spur reduction gears to give a rope speed of 78 feet per minute.

Auxiliary hoisting unit is driven by a motor identical with the unit driving the main drum. This drum likewise is grooved for a single ⅞-inch wire-rope lead line. Auxiliary block is reeved in two parts of line, using a nonspinning-type of wire rope. Speed of rope is 205 feet per minute..

The tower structure is 35 feet high above the runway rails and has a wheelbase of 35 feet with a travel speed of 350 feet per minute in still air. Tower is of welded design and built of heavy structural shapes rigidly braced on all four sides. Two double-jaw automatic rail clamps are mounted in the center of each tower leg and are designed to hold the crane against a 100-mile-per-hour wind.

Top of tower is arranged to form a sturdy base on which are mounted the lower rail circle, the rotating rack and the center stediment casting. The center stediment, consisting of a bronze-bushed male-female part, is mounted at the center of rotation of the crane and is designed to absorb all of the horizontal forces. A racking mechanism provides the machine with a rotating speed of 1½ revolutions per minute.

Entire weight of rotating structure is supported on a circular roller path of high-carbon rolled steel. Double-flanged wheels with bronze bushings are assembled in a double-channel circular cage. Heavy rails form the upper and lower rail circles, the complete assembly making an unyielding, level turntable.

Rotating platform is completely welded and consists of four longitudinal girders and two vertical trusses, with crossbeams for supporting machinery, counterweight and kingpin.

The 125-foot boom is pin-connected to the top front end of the longitudinal trusses. Triangular shape and framing details of this boom represent departures from orthodox boom design. The efficient proportion of the component parts and tri-

(*Please turn to Page 66*)

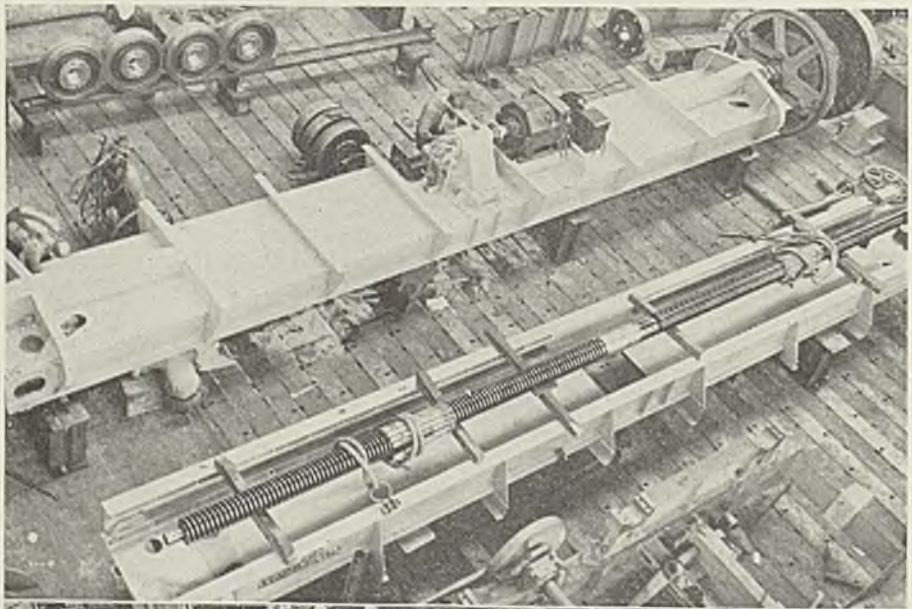


Fig. 3. (Top)—The triangular shape of the boom, found most suited to the use of the screw luffing principle, was made practical through modern welding design shown here

Fig. 4. (Center)—Luffing mechanism in process of assembly

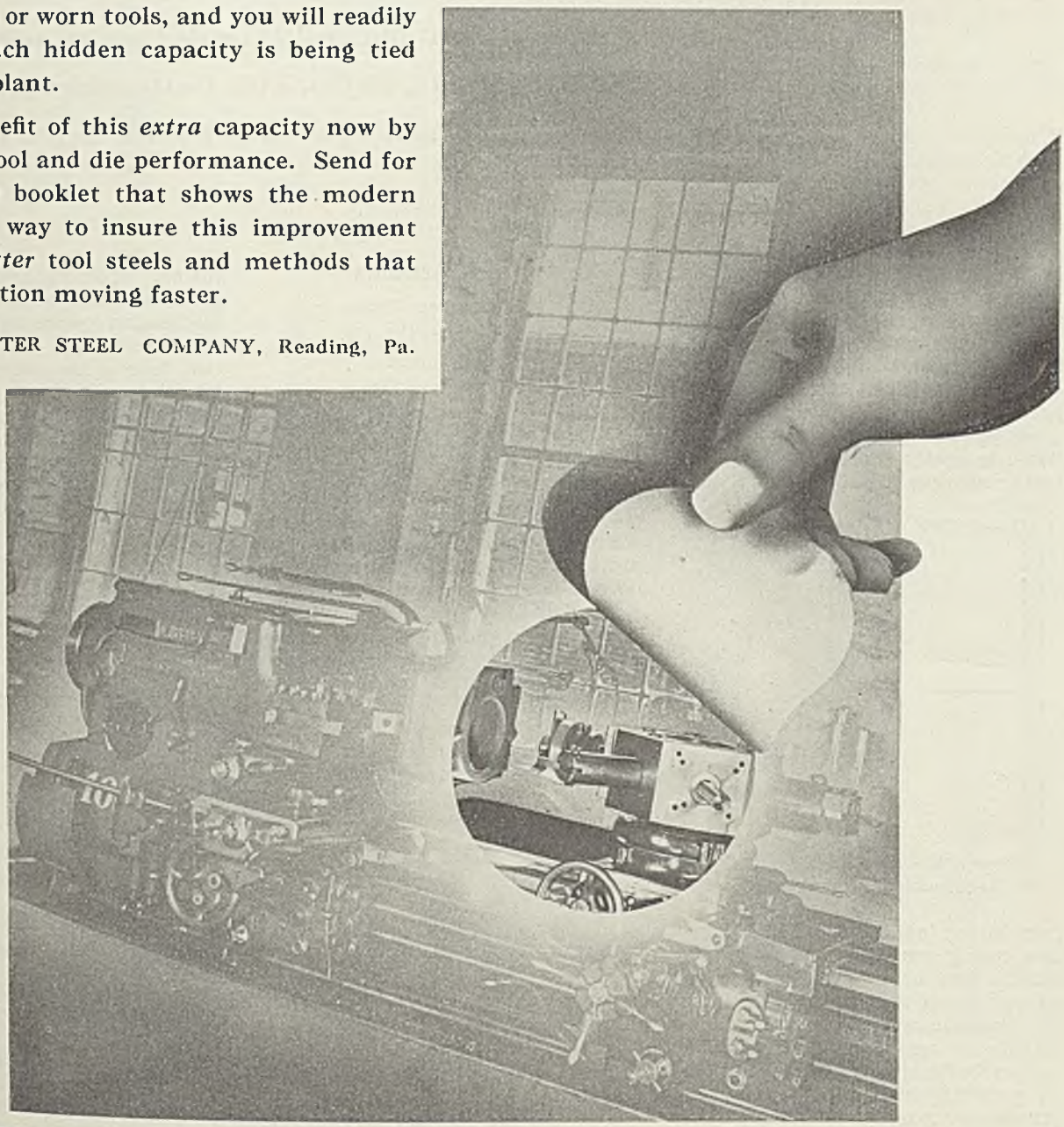
Fig. 5. (Bottom)—Turntables being assembled. Other parts such as drums, trucks, etc. also are being prepared

Discover your HIDDEN PLANT CAPACITY

TO relieve congested machine shops or press rooms, look for hidden plant capacity in your present production set-up. What is this hidden plant capacity? It is the hours lost at each machine through shutdowns caused by poor tool performance. Every time a tool must be re-ground or replaced, it ties up the production of one machine. Multiply this by the number of shutdowns caused by prematurely dull, broken or worn tools, and you will readily see how much hidden capacity is being tied up in *your* plant.

Get the benefit of this *extra* capacity now by improving tool and die performance. Send for a Carpenter booklet that shows the modern time-saving way to insure this improvement through *better* tool steels and methods that keep production moving faster.

THE CARPENTER STEEL COMPANY, Reading, Pa.



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Welded Oil-Well Casing

Difference in cost of plain-end and threaded casing minus cost of welding amounts to $681 in 4500-foot well. Butt-welded casing affords tightly sealed well and is easily pulled out when well is abandoned

By G. M. STEARNS
District Production Engineer
Cities Service Oil Co.
Russell, Kans.

■ IN PRACTICALLY all localities where oil wells are drilled, there are surface water supplies and shallow water sands which must be protected from pollution by fluids from deeper salt-water sands and oil-producing zones. Failure to prevent such pollution leaves the operator liable to costly damage suits. This factor requires installation of a sur-

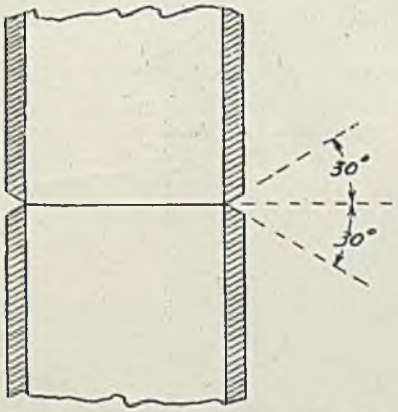


Fig. 1—Symmetrical vee butt joint

face string of casings. This surface casing generally is set with the bottom just below any fresh-water supply which may possibly be used for domestic or public purposes and usually is sealed in cement from top to bottom. Naturally it must be perfectly leak-proof or else its primary purpose is defeated. Leaks are caused principally by corrosion, bad joints and wear occasioned by drilling through this string in finishing a well. In some cases, this casing also shuts off caving formations which otherwise would fall into the well and hamper progress.

Intermediate strings may be used to exclude a high-pressure or high-volume water sand which fills the hole, hindering drilling progress, or to shut off high-pressure gas where oil is sought and the gas is unsuitable for commercial usage. Also, additional casing may be used to protect an inner string of casing to be run later.

In addition, all wells are equipped with what is known as an oil string of casing. Modern operating practice is to encase at least the lower part of this string in cement generally up to the next larger and shorter string of pipe. It is important that this casing be leak-proof under any

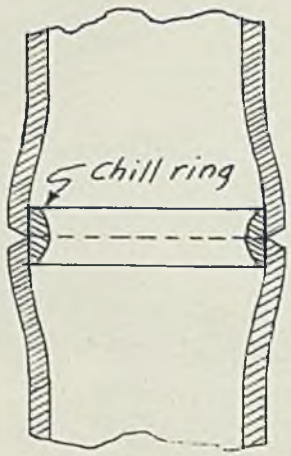


Fig. 2—Double bell joint with chill ring

pressures encountered, have high tensile strength so the joints will not part, and have high resistance to collapse since enormous pressures act against the pipe at the greater depth.

Until recently, general practice has been to use threaded and coupled casing. Lately, however, a new technique has been developed for installation of casing. It involves arc welding the joints on the derrick floor as the casing is being run into the well.

This is advantageous because a substantial saving can be obtained in total cost of pipe strings. Also increased joint strength results which makes possible safe run-

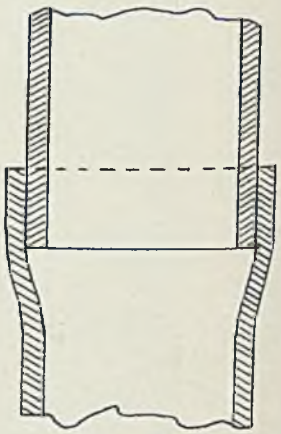


Fig. 3—Bell-and-spigot joint

ning of longer strings of pipe with less possibility of loss of pipe in the hole due to failure of the string under stress. Also there is less possibility of leaks under high-pressure conditions and pipe can be recovered more easily from abandoned wells since there are no couplings or similar projections on the outer circumference of the pipe to hinder pulling the string. These advantages are vital so it is expected arc-welded casing will shortly become generally accepted. Even where the casing is only temporary, the development of portable cutting and beveling machines may result in practically universal use of welded casing.

Preliminary studies showed that

From paper receiving $2543.88 award in contest sponsored by The James F. Lincoln Arc Welding Foundation, Box 5728, Cleveland.

carbon content of the steel in the casing is the controlling factor in its weldability. So casing with an average carbon content of 0.25 and not over 0.35 per cent is employed.

Largest size electrode which can be used without molten metal running down the side of the pipe is employed. In welding a butt joint

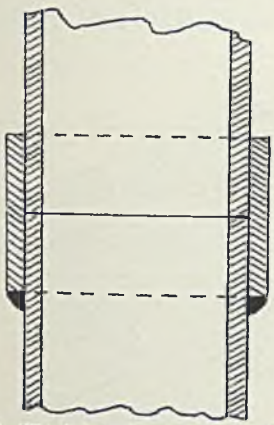


Fig. 4—Slip joint. Lower side of coupling is welded by pipe manufacturer

in casing of usual wall thickness, a 3/16-inch electrode is largest that can be used successfully. With bell-and-spigot and slip-joint pipe, size of electrode is limited only by thickness of the top of the bell or collar which forms a flat surface against which the welder deposits the metal. Strength of electrode is not allowed to exceed strength of pipe by an appreciable amount as this would produce a less ductile weld.

Pull-out joint tests show efficiencies from 84.6 to 100 per cent for straight butt joints and from 93.4 to 100 per cent for double-bell butt joints with chill ring as shown in Figs. 1 and 2 respectively. Greater efficiency of the double-bell butt joint is due probably to more complete penetration obtained with the chill ring as backing. Tests on bell-and-spigot joints, Fig. 3, show efficiencies from 90 to 100 per cent. However, since the straight butt joint shows practically as much strength as the two other types and costs less in buying the pipe, it was selected by Cities Service Oil Co. for its welded string. The slip joint, Fig. 4, was disregarded because it gave little additional strength and little saving compared with the threaded and coupled joint.

Joints on the first few strings were beveled with a 30-degree bevel on each end, leaving a 60-degree symmetrical opening in which to deposit the weld metal. See Fig. 1. Later, a string of casing was tried with a 50-degree bevel on one end and a 45-degree bevel on the other end of each joint, Fig. 5, in hopes this would result in a more easily welded joint because this more nearly approached the position of a fillet weld. Use of this bevel did not prove of any special advantage. Operators did not like it as well as the symmetrical V-butt joint, Fig. 1, because it was more difficult to obtain thorough penetration.

Since then, further experience and investigation have shown the U-bevel, Fig. 6, to have greatest welding speed with complete penetration.

Running butt-welded casing requires special tools for picking up each joint from the rig walk and lifting it into a vertical position preparatory to aligning for welding. Clamps used have ridges of babbitt metal sunk into grooves to provide extra safety against slipping when pulling the joints. Clamps also were devised for lining up each joint. These clamps are about 42 inches in length and are hinged on one side with toggle screws on the

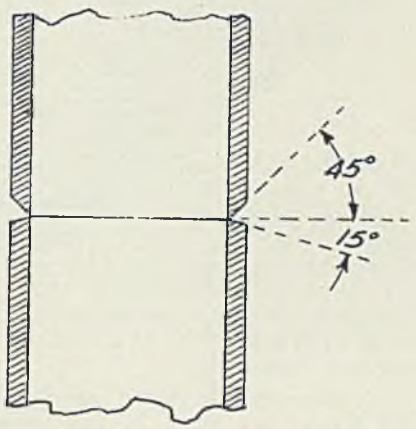


Fig. 5—Asymmetrical vee butt joint

opposite side. They are hung on a line which runs over a pulley with a counterweight to balance them.

An automatic-trip casing spider is better than the ordinary casing spider for holding the part of the casing already in the well. Since there is no coupling at top of each joint, ordinary casing elevators cannot be used. Slip-type elevators are employed.

Actual data on a typical job is tabulated here on a string of casing 7 inches outside diameter, 22 pound, plain end, 0.25 per cent carbon, 0.80 per cent manganese. Joints have a 15-degree bevel on top and 45-degree bevel on bottom. Some 69 joints were run into the well. Circumferential welds including shoe and nipple totaled 71. Total footage of casing string was 2933 feet. Three beads were deposited at each joint. Total elapsed time per joint was 8 minutes 10 seconds. Actual welding time as found by stopwatch was 29 seconds to tackweld, 46 seconds for first bead, 71 seconds for second bead, 72 seconds for third bead—a total of three minutes, 38 seconds, actual welding time per joint. Average weld metal deposited was 0.73 pounds per joint. Generators delivered power 4 hours 18 minutes. Average current was 175 amperes at 30 volts. Total power input was 45.15 kilowatt hours. Two direct-current welding generators driven by V-8 engines were used.

Procedure was as follows. Aligning clamps were placed on each joint. Joint was tack welded at four points. Aligning clamps were removed. First bead was welded. Slag was chipped off manually with ball hammers and cleaned with wire brushes. Second bead was welded. Slag was chipped off as. before. Third bead was welded.

Weld was allowed to cool about 1 minute 45 seconds before placing the weld in tension by lifting the pipe to remove the slips from casing spider to permit lowering pipe into the well. An additional 15 seconds elapsed before each weld came in contact with the drilling fluid, making a total of about 2 minutes cooling time for each weld before quenching in the drilling fluid. Tests showed this to be ample cooling time to prevent embrittlement and subsequent weakening of the weld and adjacent steel in the pipe, which might occur if cooled too fast.

It is doubtful if use of ball hammers and wire brushes is most effective method of slag removal. An electric or air hammer possibly would be better in removing slag along edges of weld.

Casing job described above is quite

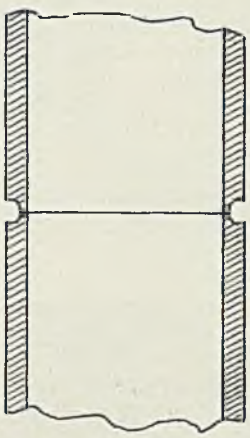


Fig. 6—U-bevel butt joint

typical of procedure employed in western Kansas. In considering savings effected by welding, two cases will be considered: First is where an oil company has its own welding equipment and operators and does a large amount of welding in a particular locality. Second is where the oil company hires the welding to be done by an outside concern for each individual job as it arises. Cities Service Oil Co. falls

(*Please turn to Page* 65)

Direct Rolling of Strip

Newly developed continuous belt provides low-cost surface pouring, prevents segregation, gives metal of sufficiently accu gage for rerolling. Surfacing rolls operate at low press

By C. W. HAZELETT

Hazelett Metals Inc.
51 East Forty-second street
New York

■ PRODUCTION of strip metal of high-melting-point material directly from the molten metal has made important advances. Recently, in addition to brass, strip of monel and stainless steel has been rolled to a gage of 0.15-inch and at a rate of more than 400 feet per minute by this method.

Attempts at direct rolling were made as far back as 1845. Between that year and 1860, Sir Henry Bessemer did sufficient experimental work to be convinced that direct rolling of steel was possible. In the early nineties, Messrs. Norton and Hodgson carried on extensive researches confirming his conclusion.

In 1921, a machine was developed by C. W. Hazelett which would produce continuous strips of antimonial lead for the production of storage battery grids. One of these machines is still in commercial use.

From paper presented at Philadelphia meeting of American Society of Mechanical Engineers, December, 1939.

It consisted of a single cooled drum with a spaced stationary copper shoe, through which the metal was poured. Later a double horizontal roll casting machine was developed. This produced satisfactory strip from lead, tin and their alloys. It was of high quality as to structure, gage and surface.

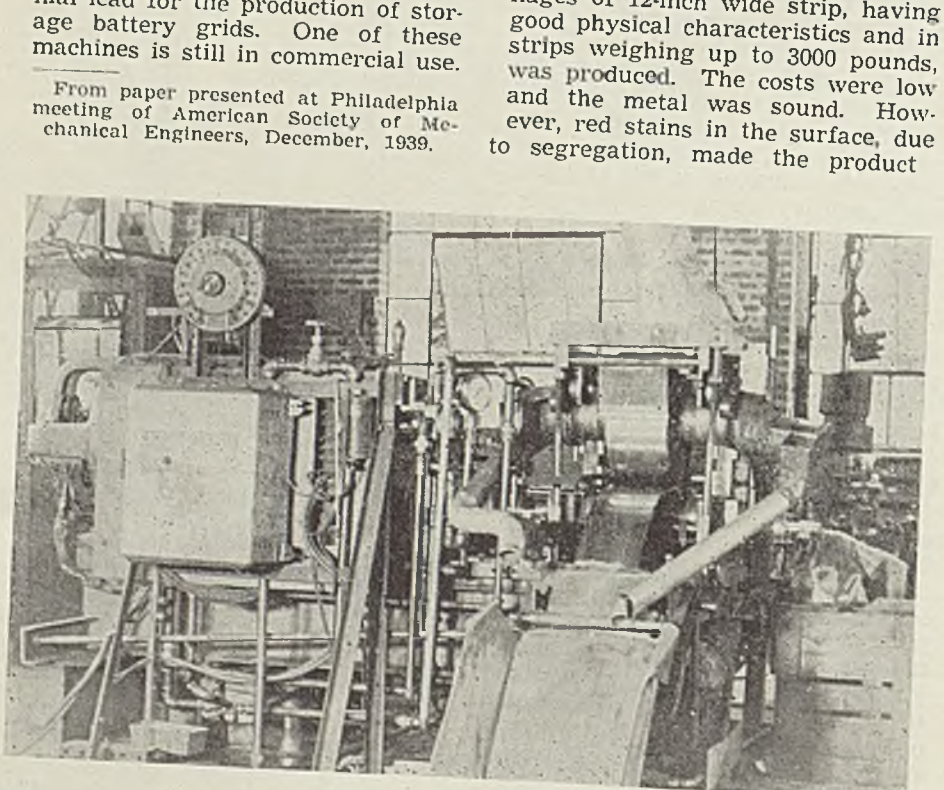
A few years ago some development work was done in the production of brass strip. With cooperation of Scovill Mfg. Co. of Waterbury, Conn., substantial tonnages of 12-inch wide strip, having good physical characteristics and in strips weighing up to 3000 pounds, was produced. The costs were low and the metal was sound. However, red stains in the surface, due to segregation, made the product unsalable where high finish or mium plating was required. this stage, it would thus req the use of two processes in a pl vitiating a large part of the ad tages due to lower costs.

A little later, Crown Cork & Co., 4401 Eastern avenue, Ba more, undertook to commercia the production of aluminum st Large quantities of strip, 24 inc wide, sound and accurate in ga was produced but still substant segregation was encountered sin the metal was, of course, alloy with copper.

Obviously, the rolling of allo has its disadvantages because the segregation inherent in the o eration of these particular m chines. Segregation comes abou because of irregularities in cooling due to folding of the frozen film in contact with the rolls. This in turn, is because the frozen film does not travel at the same speed as a point on the roll. At the pass where high pressures are being ap plied to the partially chilled alloy, the lower melting point constituents of the alloy then are forced into the places of least cooling and least pressure. It is to be noted that all of these mills performed substantial work on the product.

Controlled Atmosphere Applied

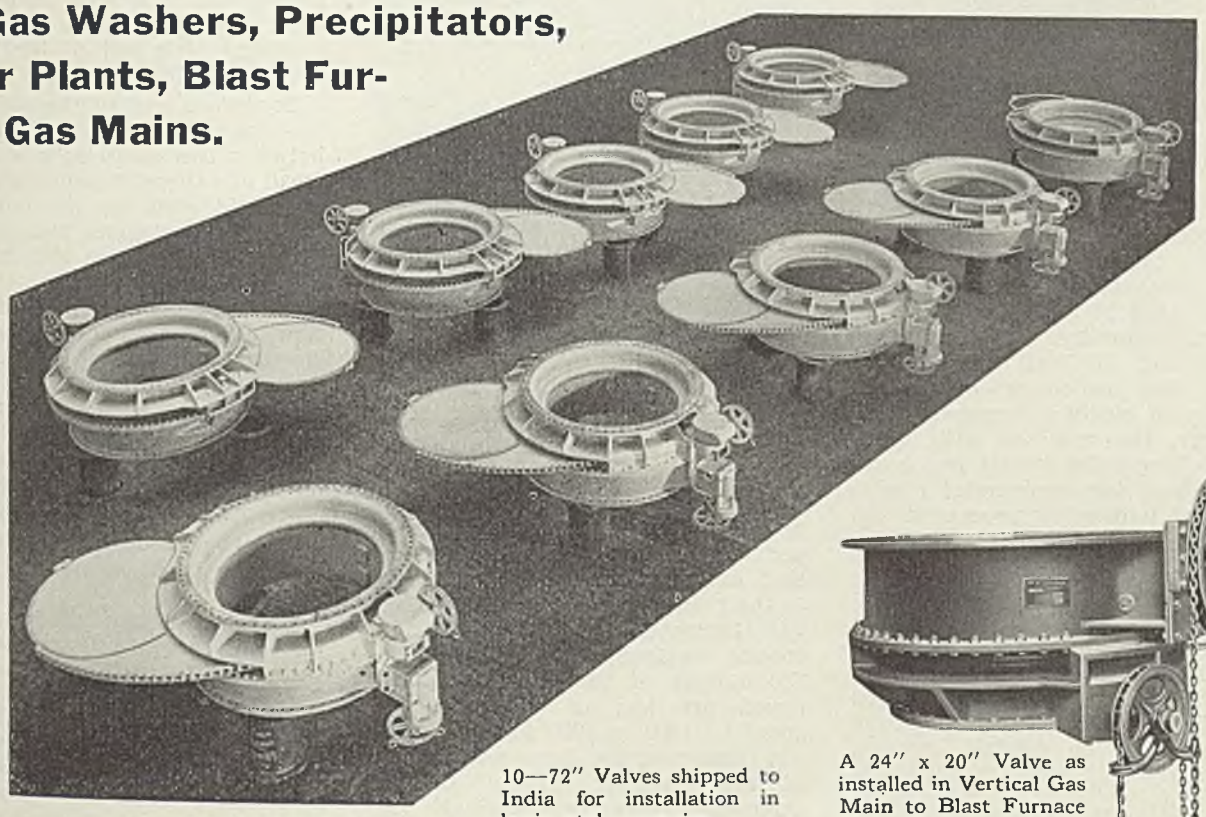
The most refined work on one of these mills has been done recently by American Metal Co., Newark, N. J., in conjunction with Scovill Mfg. Co. Efforts were confined to a pure metal—copper—which of course is not subject to segregation. A carefully developed system of controlled atmosphere was applied in the furnace, the runners and in



Equipment used for rolling strip direct from molten metal

DEPENDABLE GOGGLE VALVES

For Gas Washers, Precipitators, Boiler Plants, Blast Furnace Gas Mains.



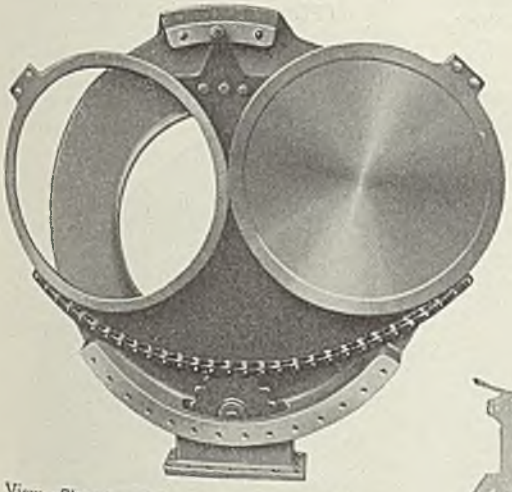
10—72" Valves shipped to India for installation in horizontal gas mains.

A 24" x 20" Valve as installed in Vertical Gas Main to Blast Furnace Stove Burners.

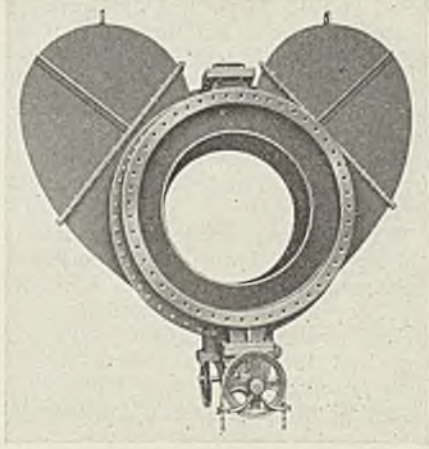
VALVE SIZES:

20" Diameter
24" Diameter
30" Diameter
36" Diameter
42" Diameter
48" Diameter
54" Diameter
60" Diameter
66" Diameter
72" Diameter

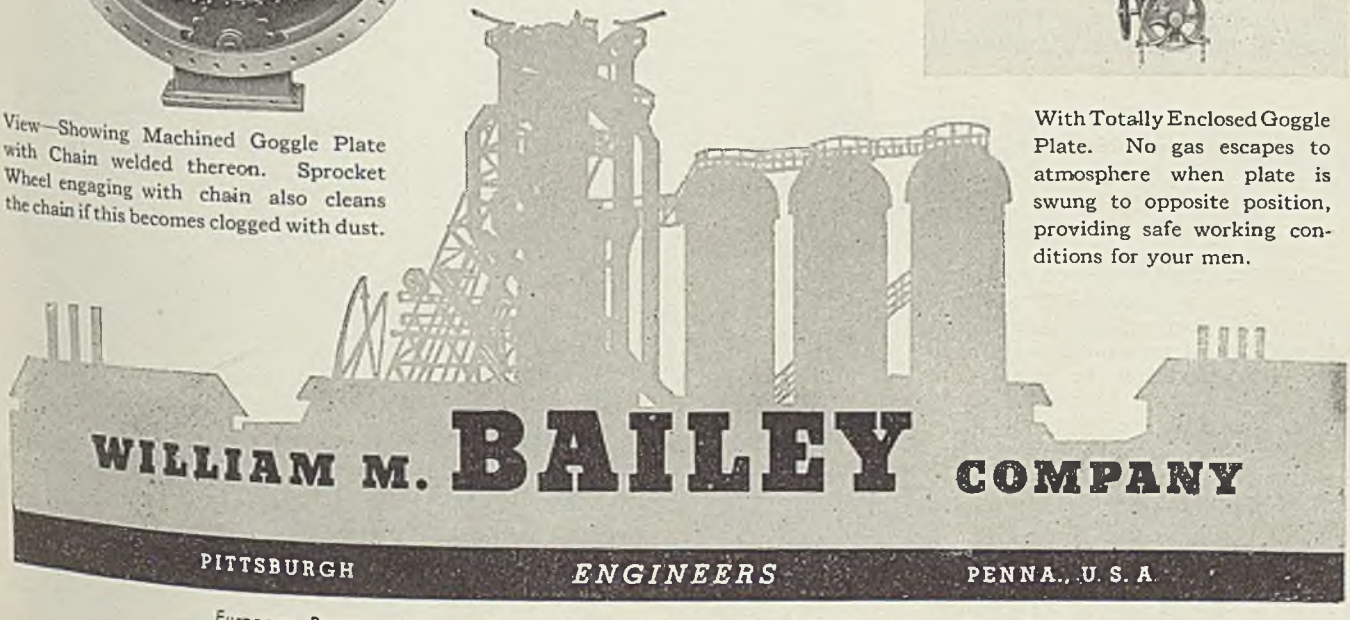
Write for our Valve Bulletin.



View—Showing Machined Goggle Plate with Chain welded thereon. Sprocket Wheel engaging with chain also cleans the chain if this becomes clogged with dust.



With Totally Enclosed Goggle Plate. No gas escapes to atmosphere when plate is swung to opposite position, providing safe working conditions for your men.



WILLIAM M. BAILEY COMPANY

PITTSBURGH *ENGINEERS* PENNA., U. S. A.

European Representative: Ashmore, Benson, Pease & Co., Ltd., Stockton-on-Tees, England

Micrograph of brass rolled directly to 0.020-inch at 500 feet per minute; cold rolled to 0.010-inch and annealed; suitably etched to show complete recrystallization. Magnification 200 diameters

shrouds about the mill itself to produce oxygen-free copper strip.

Sound metal of great length, straight and flat, was produced with sufficiently accurate gages for rerolling. Widths up to 24 inches were made at low cost and with commercial roll life for all of these metals. Crown Cork & Seal Co. rolled substantial tonnages of low-carbon steel, 24 inches wide and of excellent quality. International Nickel Co., 67 Wall street, New York, also rolled a substantial quantity of nickel and monel metal. However, the roll life with these high-melting-point metals was hopelessly short for commercial results compared with other processes. As a result, surface of the metal rapidly became defective.

At this stage, the problems were: Segregation; inability to roll thin gages due to the increasing effect of folding with thinner strip; lack of high speeds as rate was between 15 to 50 feet per minute; excessive cost of rolls or cooling surface, particularly with steel, monel metal and nickel.

To solve the problem of segregation, it was decided that molten metal should be poured first on one cooling member and be allowed to chill almost throughout its thickness and then surface-rolled to chill and compress small film of unsolidified metal. To do this, it was necessary to form the bath on one surface instead of between two rolls as heretofore.

This has been achieved by pouring molten metal both on the outside and inside of a cylindrical surface, but here important difficulties had to be overcome. These surfaces first had to be degassed to get a sound metal. Then they had to be cooled at high rates for continuous

Micrograph of direct-rolled brass as received from mill, suitably etched, under polarized light. Magnification 200 diameters

production. This has been achieved. The strip is solidified almost throughout before the surfacing roll finishes it so no folding takes place. Segregation is eliminated also.

The production of thinner strip has been worked out primarily by the use of high speeds and short contact between the molten metal and the cooling surface. For example, 0.025-inch strip is produced at 500 feet per minute with a contact of 2 inches or in an elapsed time of 0.02-second. Obviously, greatest savings are in production of thin strip.

Thin gages at present are being produced at speeds up to 500 feet per minute with every indication that these speeds can be increased to the point where centrifugal force will throw the metal off of the cooling surface when pouring on the outside of the roll. It is believed practical to operate at a speed of 1500 to 2000 feet per minute. However, the continuous speed of 500 feet per minute already achieved seems fast enough for any commercial requirements when compared with intermittent feeding of ingots. Little, if any, segregation occurs in the short period of time, 0.02-second.

Research is being done in production of strip, 0.25-inch thick, and in pouring metal on the inside of a ring to form a bath in the lower part, moving the ring to carry the solidified strip out of the bath beneath a surfacing roll.

To reduce cost of the cooling surface, a belt of strip steel driven between two small rolls is used instead of expensive solid rolls. Cooling solid rolls on the outside resulted in enormous fluctuations in temperature on that side and early fire-cracking. Molten metal poured on the belt gives up the major portion of its heat of fusion to it. However, this belt is cheap. It can be 20 feet in diameter, if desired. It presents such an enormous amount of inexpensive cooling surface that high speeds and high production can be obtained cheaply.

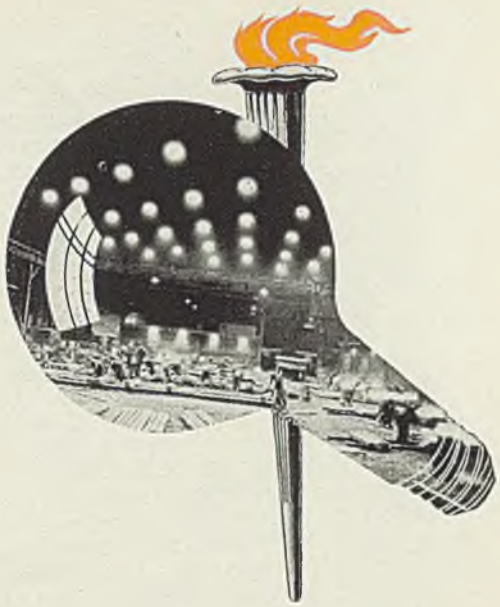
To avoid large amounts of scrap at the beginning of a heat, it is necessary to degas this belt by preheating it.

To surface the product, upper internally cooled rolls are used with walls as thin as ⅛-inch. Such rolls are shrunk on splined shafts. It is an amazing fact that a roll as small as 2½ inches in diameter with ⅛-inch wall will apparently run continuously at these high speeds without heating up if a sufficient quantity of water at high pressure is

(*Please turn to Page* 66)

By DEAN M. WARREN and A. R. FINLEY

Industrial Illumination



Fixtures available in a wide variety utilize light to best advantage. Less dependence is placed on natural light. Mercury, filament and fluorescent installations discussed

This is the second of a series of articles on industrial illumination. The first appeared in STEEL of Jan. 22, 1940, p. 36

Part II

■ THE SUPPLEMENTARY lighting units discussed last week do not by any means represent all of the units recently made and installed, but only are typical of many available.

Confronted by this growing multitude of light sources and fixtures, the factory executive may well ask himself, "Now that there are all these fixtures, how can I go about applying them so as to derive the best from my production facilities? Why does there seem to be such a variety of both general and supplementary lighting units and reflectors? How can I choose between the mercury, filament and fluorescent types of lamps, if they are all good, to get the most for my money? "Of course, this is where the lighting application engineer performs his services. If effective lighting could be achieved by a simple set of rules in a handbook with perhaps a few instruments, there obviously would be no need for all these fixtures and services of an expert.

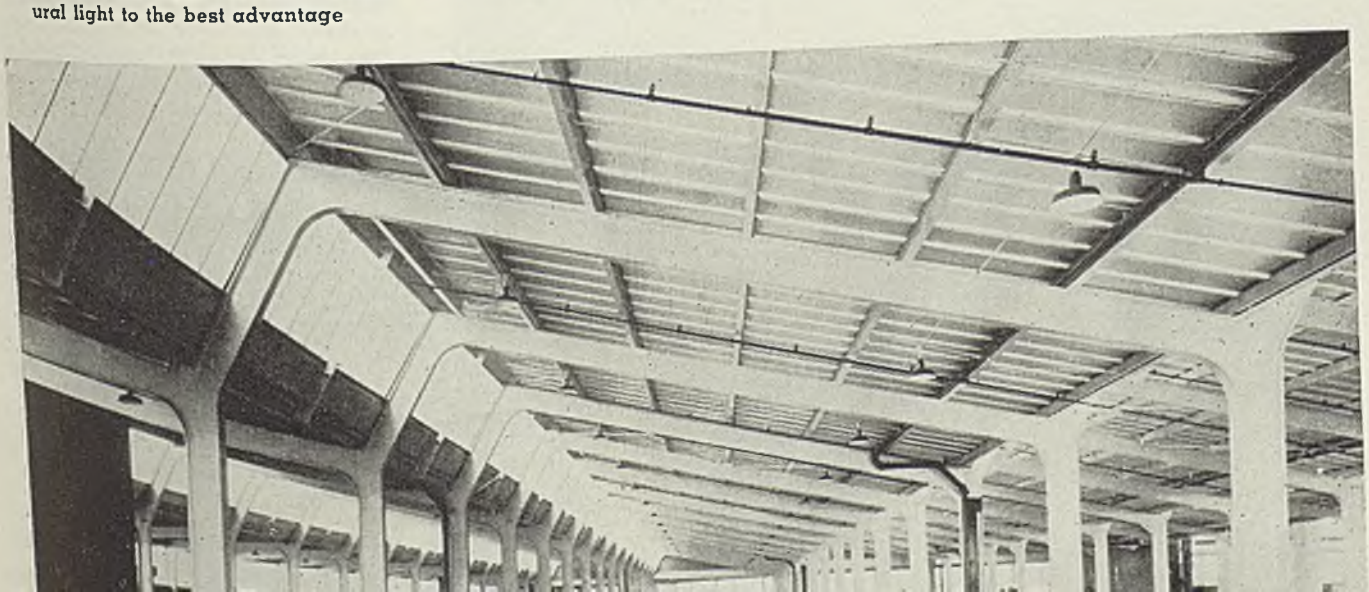
By keeping in mind fundamental considerations, however, the shop man can do much to determine whether or not he is utilizing lighting to its best advantage, or at least he can decide whether he should call in a lighting engineer to modernize his plant. Since it is not the purpose of this article to educate the shop man to supplant the illuminating expert, the following discussion, like the preceding, is intended only to familiarize the shop man with what he can get by calling the local power company. This is important because many shops have lighting systems which seem efficient yet actually are not; and in building plant additions, the plans frequently fail to make provision for adequate lighting.

In designing a lighting installation, whether for an old building or for one to be built, advantage is generally taken of as much natural lighting as possible. However, some of the new plants exclude natural light altogether because of its unreliability. The trend is more and more to uniform lighting regardless of weather conditions. For instance, the new plant of Simonds Saw & Steel Co., Fitchburg Mass. (see STEEL, July 10, 1939, p. 48) is a single 5-acre room with no windows. In this plant day and night shifts work under exactly the same illumination and visibility.

If daylight is to be utilized to its fullest extent, it is well to study the style of roof with a view to obtaining maximum natural lighting. In this respect, the sawtooth, monitors or skylight windows of modern factory construction, as shown in Fig. 12, appear to be most desirable. When rooms are lighted by side windows alone, it is impossible to light satisfactorily all parts of the room unless artificial lighting is provided. How natural light decreases with distance from sidewall windows is shown graphically in Fig. 13.

Here are a few general rules: If only one wall contains windows,

Fig. 12—Sawtooth type roof utilizes natural light to the best advantage



width of room perpendicular to wall should be less than twice the distance from floor to top of windows. If windows are in parallel walls, width of room would not exceed six times height to top of windows. The monitor gives best results when its width is about half the width of building and height of windows in monitor is half of monitor width. Height of windows in the sawtooth construction should be about one-third of the span. In general, single-story industrial buildings should have a window area at least 30 per cent of the floor area.

Another important factor is the reflection of sunlight from outside surfaces into building. Opposing structures, walls of course and roofs of sawtooth buildings should be finished in lightest practicable color and so maintained. Possibility of glare from these surfaces also should be considered.

Windows should be equipped with adjustable devices to accommodate illumination to changing outdoor conditions. Shades diffusely transmitting daylight will improve the daytime illumination. Window shades of light tones are preferable, for at night they reflect artificial light back into the room. When practicable, shades should be mounted to permit covering any desired part of windows. Louvers or venetian blinds employing reflecting and diffusing surfaces effectively control distribution of sunlight from windows if properly finished and adjusted. More uniform results are obtainable if such window devices are controlled by some specified individual.

But natural lighting alone seldom is sufficient. Even in comparatively sunny territories, measurements show that desirable daylight conditions are lacking for a large percentage of the time. To maintain good seeing conditions, artificial lighting must be supplied on dark and cloudy days.

Natural light is so subject to variation throughout the day that no individual can be relied upon in practice to determine by visual observation when more light should be added in the room or when artificial lighting can be spared. Practical equipment utilizing photoelectric tubes or light-sensitive cells has been developed for controlling the lighting automatically. Shown in Fig. 15 is a photoelectric relay which follows changes in daylight and turn artificial lights on and off even when the change is so gradual as to escape attention.

This automatic control is recommended particularly where critical seeing is done under varying daylight illumination. Frequently a man engrossed in his work will not notice the gradual diminution of daylight until he realizes he has a headache or reaches the point where he simply cannot see. When this happens to an entire department, the loss in employe efficiency is serious. The photoelectric relay stands guard against such eventualities and is an inexpensive means of avoiding penalties of insufficient illuminaton when reliance is placed on daylight as the principal source of light.

Modern industrial lighting practice requires the establishment of a base or minimum quantity of light throughout the room, termed general lighting, which may vary depending on operations. Where visual tasks are particularly severe, much higher supplementary illumination over restricted areas can be added to this base.

This general or base quantity of light should be uniform to illuminate satisfactorily any portion of the room—this being particularly desirable for interiors where the machine layout may be changed. If general lighting is designed for uniform illumination, machines may be moved without expensive changes in the lighting system.

Supplementary lighting, however, is specifically designed for particular visual tasks. High illumination usually accompanies supplementary lighting, but care should be taken that contrast between work and surroundings is not too great. In some cases, the reverse must be guarded against—that is, having excessive brightness elsewhere in field of vision. Though no two sets of conditions are exact-

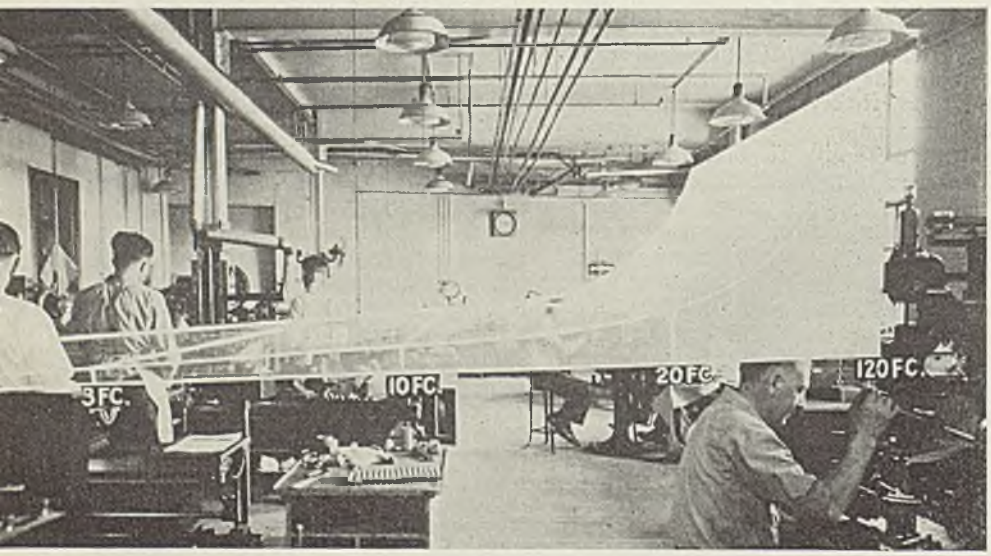
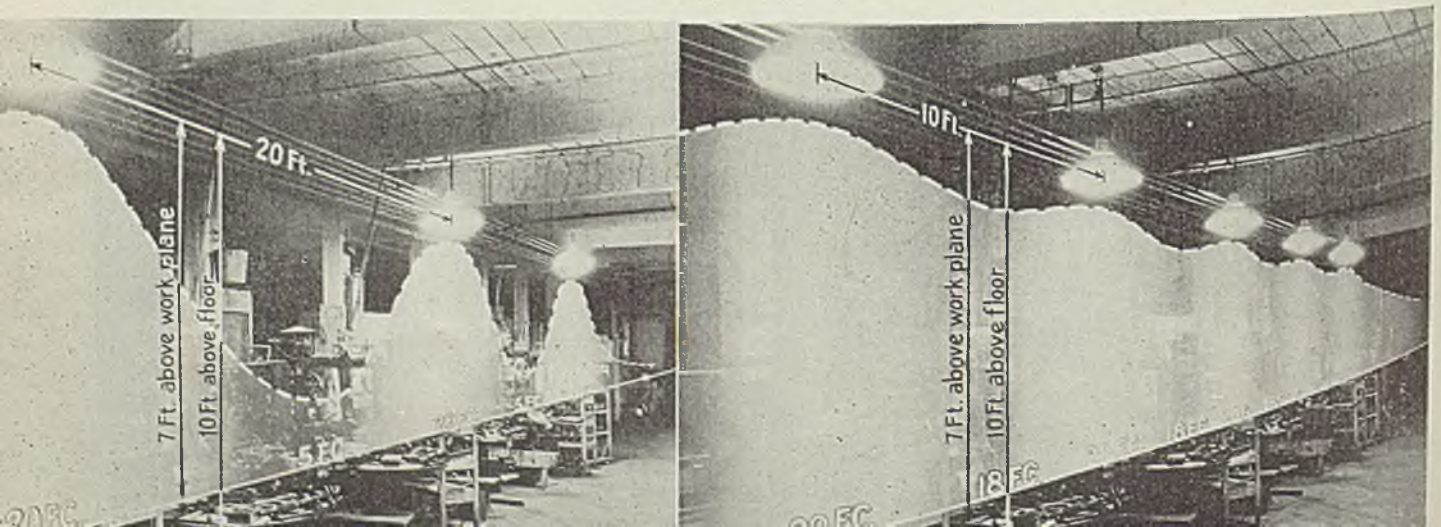


Fig. 13. (Right)—Showing graphically how rapidly daylight decreases away from windows

Fig. 14. (Below)—Spacing of lighting units plays a vital part in procuring uniform lighting over an area. At left is shown deficiency of light between units when these are spaced too far apart. Illustration at right shows proper spacing



ly alike, the brightness ratio between highly illuminated work and the darker surroundings in general should not exceed ten to one. While measurement by a light meter in footcandles is not an actual determination of brightness, it suffices in most cases for this matter of satisfactory contrast. Hence the common statement that, using general and supplementary lighting the ratio of maximum to minimum footcandles should not exceed ten to one.

Recommended values of illumination in accompanying Table I refer mostly to general lighting throughout total area involved as measured on a horizontal plane 30 inches above floor. In many cases where illumination of more than 40 footcandles is necessary, it should be obtained by a combination of general lighting plus supplementary lighting. An asterisk after the footcandle figure denotes that this composite type of illumination is desirable. The findings up to date of the Illuminating Engineering society's studies of specific industries

TABLE 1—Recommended Minimum Standards of Illumination For Industrial Interiors

(These minimum footcandle values represent order of magnitude measured on work rather than exact levels of illumination)

	Footcandles
Aisles, Stairways	5
Assembly:	
Rough	10
Medium	20
Fine	B*
Extra Fine	A*
Automobile Manufacturing:	
Assembly Line	B*
Frame Assembly	15
Body Manufacturing—	
Parts	20
Assembly	20
Finishing and Inspecting	A*
Chemical Works:	
Hand Furnaces, Tanks, Gravity Crystallizers	5
Mechanical Furnaces, Driers, Evaporators, Filtration	10
Extractors, Nitrators, Electrolytic Cells	15
Clay Products and Cements:	
Grinding, Filter Presses, Kiln Rooms	5
Molding, Pressing Trimming	10
Enameling	15
Color and Glazing	20
Coal Tipples and Cleaning Plants:	
Breaking, Screening and Cleaning	10
Picking	A*
Construction—Indoor:	
General	10
Elevators—Freight and Passenger	10
Engraving	A*
Forge Shops and Welding	10
Foundries:	
Charging Floor, Tumbling, Shaking Out	5
Rough Molding and Core Making	10
Fine Molding and Core Making	20
Inspection:	
Rough	10
Medium	20
Fine	B*
Extra Fine	A*
Machine Shops:	
Rough Bench and Machine Work	10
Medium Bench and Machine Work, Automatic Machines, Rough Grinding, Medium Buffing and Polishing	20
Fine Bench and Machine Work, Fine Automatic Machines, Medium Grinding, Fine Buffing and Polishing	B*
Extra Fine Bench and Machine Work, Grinding—Fine Work	A*
Offices:	
Bookkeeping, Typing and Accounting	30
Conference Room	10
Corridors and Stairways	5
Desk Work	
Intermittent Reading and Writing	20
Prolonged Close Work, Computing, Studying, Designing, etc.	C*
Reading Blueprints and Plans	30
Drafting	
Prolonged Close Work—Art Drafting and Designing in Detail	C*
Rough Drawing and Sketching	30
Filing and Index References	20
Lobby	10
Mail Sorting	20
Reception Rooms	10
Stenographic Work	
Prolonged Reading Shorthand Notes	C*
Vault	10
Paint Shops:	
Dipping, Simple Spraying, Firing	10
Rubbing, Ordinary Hand Painting and Finishing; Art, Stencil and Special Spraying	20
Fine Hand Painting and Finishing	B*
Extra Fine Hand Painting and Finishing (Automobile Bodies, Piano Cases, Etc.)	A*
Paper Manufacturing:	
Beaters, Grinding, Calendering	10
Finishing, Cutting, Trimming, Paper Making Machines	20
Plating	10
Polishing and Burnishing	15
Power Plants, Engine Room, Boilers:	
Boilers, Coal and Ash Handling, Storage Battery Rooms	5
Auxiliary Equipment, Oil Switches and Transformers	10
Engines, Generators, Blowers, Compressors	15
Switchboards	C
Receiving and Shipping	10
Sheet Metal Works:	
Miscellaneous Machines, Ordinary Bench Works	15
Punches, Presses, Shears, Stamps, Welders, Spinning, Medium Bench Work	20 D*
Tin Plate Inspection	B*D*
Steel and Iron Manufacturing:	
Billet, Skelp and Slabbing Mills	5
Boiler Room, House, Foundry Rooms	5
Hot Sheet and Hot Strip Mills	10
Cold Strip, Pipe, Rail, Rod, Tube, Universal Plate and Wire Drawing	10*
Merchant and Sheared Plate Mills	15**
Tin Plate Mills—	
Hot Strip Rolling and Tinning Machine Dept.	10
Cold Strip Rolling	15
Inspection—	
Black Plate	C*
Bloom and Billet Chipping	C*
Tin Plate and Other Bright Surfaces	B*D*
Machine Shops and Maintenance Department—	
Rough Bench and Machine Work	10
Medium Bench and Machine Work	20
Fine Work—Buffing, Polishing, etc.	B*
Extra Fine Work	A*
Blacksmith Shop	10
Laboratories (Chemical and Physical)	15
Carpenter and Pattern Shop	20
Storage	2
Stone Crushing and Screening:	
Belt Conveyor Tubes, Main Line Shafting Spaces, Chute Rooms, Inside of Bins	5
Primary Breaker Room, Auxiliary Breakers under Bins	5
Screens	10
Storage Battery Manufacturing:	
Molding of Grids	10
Store and Stock Rooms:	
Rough Bulky Material	5
Medium or Fine Material Requiring Care	10
Structural Steel Fabrication	10
Testing:	
Rough	10
Fine	20
Extra Fine Instruments, Scales, etc.	A*
Warehouse	5
Woodworking:	
Rough Sawing and Bench Work	10
Sizing, Planing, Rough Sanding, Medium Machine and Bench Work, Gluing, Veneering, Cooperage	20
Fine Bench and Machine Work, Fine Sanding and Finishing	C*

(**) In these areas many of the machines require one or more supplementary lighting units mounted on them in order to effectively direct light toward the working points.

(*) Lighting recommendations for the more difficult seeing tasks, as indicated by A, B, C and D in the foregoing table are given in the following:

GROUP A:—These seeing tasks involve (a) the discrimination of extremely fine detail under conditions of (b) extremely poor contrast, (c) for long period of time. To meet these requirements, illumination levels above 100 foot-candles are recommended.

To provide illumination of this order a combination of at least 20 foot-candles of general lighting plus specialized supplementary lighting is necessary.

GROUP B:—This group of visual tasks involves (a) the discrimination of fine detail under conditions of (b) a fair degree of contrast (c) for long periods of time. Illumination levels from 50 to 100 foot-candles are required.

To provide illumination of this order a combination of 10 to 20 foot-candles of general lighting plus specialized supplementary lighting is necessary.

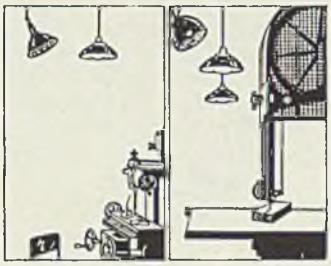
GROUP C:—The seeing tasks in this group involve (a) the discrimination of moderately fine detail under conditions of (b) better than average contrast (c) for intermittent periods of time.

The level of illumination required is of the order of 30 to 50 foot-candles and in some instances it may be provided from a general lighting system. Oftentimes, however, it will be found more economical and yet equally satisfactory to provide from 10 to 20 foot-candles from the general system and the remainder from specialized and supplementary lighting.

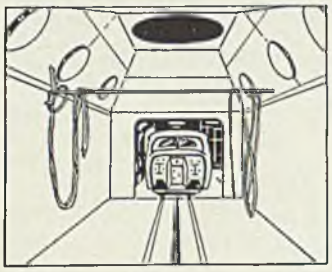
GROUP D:—The seeing tasks of this group require the discrimination of fine detail by utilizing (a) the reflected image of a luminous area or (b) the transmitted light from a luminous area.

The essential requirements are (1) that the luminous area shall be large enough to cover the surface which is being inspected and (2) that the brightness be within the limits necessary to obtain comfortable contrast conditions. This involves the use of sources of large area and relatively low brightness in which the source brightness is the principle factor rather than the foot-candles produced at a given point.

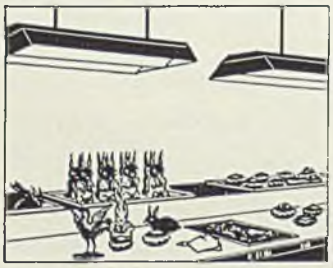
TABLE II—Supplementary Lighting Recommendations



Concentrated Beam Sources—Drill Presses—Spotlights provide high illumination over restricted areas where critical seeing requires from 50 to 250 footcandles. When properly louvered and positioned such units give glare-free lighting. Particular care must be exercised in their location so that confusing shadows are not introduced.

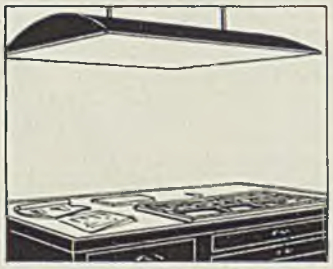


Vapor-Proof and Explosion-Proof Equipment—Paint Shops—These units are designed for locations where corrosive vapor, inflammable gases or explosive dusts are encountered. In moisture-laden atmospheres, such as steam processing, engine rooms, also where gases and vapors are present from such processes as oil refining, paint and varnish making, units of this kind are recommended. Mandatory requirements are covered in the National Electrical Code. Sketch shows both angle and symmetrical types of reflectors from 75 to 500-watt sizes.

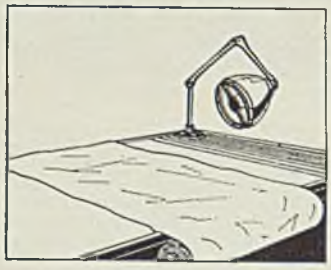


Fluorescent Lamp Trough Units—Inspection, Machine Shops—Sources of large luminous area and relatively uniform brightness may be obtained by employing fluorescent lamps in suitably designed specular trough reflectors. Units of this type produce high illumination of good quality. Because the radiant heat from fluorescent lamps is only one quarter that of incandescent lamps for equal foot-candles, a source of this type can furnish several hundred foot-candles without the discomfort from heat formerly associated with high foot-candles.

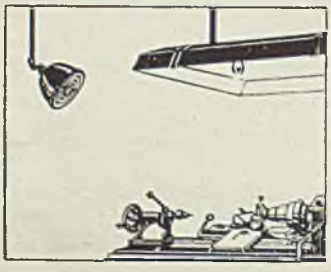
Bench, Assembly and Inspection—Where a high degree of diffusion is not required the Glassteel diffuser, the RLM dome reflectors equipped with white bowl lamps, or the deep bowl porcelain enameled reflectors will produce the desired result. Each job requires analysis to meet specific requirements. In some instances dual facilities must be provided, (1) diffuse lighting for certain defects, (2) directional lighting producing "glint" which may be essential to reveal others.



Large Area Sources of Uniform Brightness—Assembly, Inspection—Developed initially for lighting the type on imposing stones, units of this type are particularly applicable for those operations involving detail upon polished surfaces, such as scribing. If the source is uniformly bright, the detail on the specular surface will not be obscured in a confusing background, such as frequently results when small sources or a source of varying brightness is employed.



Directional Light—Assembly, Inspection—Surface flaws, irregularities in surface shape, pit marks, scratches and cracks in materials are most easily seen by lighting which strikes surface obliquely, casting a shadow and revealing irregularities by shadow contrast. Thus wrinkles in roofing materials, such as illustrated, are revealed by small shadows, emphasized by sharp directional light. Light may be undiffused for matte surfaces, but diffused at source for polished or shiny materials.



Machine Tool Lighting—Inspection, Machine Shops—Seeing tasks in majority of machine tool operations are similar, consisting of reading indicating scales, dials and micrometers, as well as observing the progress of the work. Because these measuring instruments generally have a semipolished background, it is desirable to employ a large area source to minimize reflected glare and obtain high visibility. A concentrating source is frequently desirable to project light into deep boring operations.

have been incorporated in this table. Operating values are minimum. They apply to the lighting system in actual use, not simply when lamps and reflectors are new and clean. Higher values often may be used with greater benefit. Table I has been included so that anyone with a light meter may be able to check for himself whether he is obtaining all he is entitled to receive from his lighting system.

Perhaps most common of the various general lighting systems now in use is that using ordinary RLM Dome reflectors. This type unit provides a fair degree of quality, particularly where a white bowl lamp is employed. Since many of these already have been installed it is advisable to point out how illumination from these units is affected by their spacing. Fig. 14 gives results of tests with a simple light meter showing irregularity of illumination when units are spaced too far apart. It also indicates spacing that will make lighting more uniform. In general, these direct lighting units should be spaced no further apart than their height above the floor.

Variety of Units Aids Lighting

The question might be asked: "If these units give good results, why bother with units of other types?" The main reason is in the refinements of the lighting. For example, the lighting produced by the RLM Dome reflector is not of the proper quality for lighting objects having shiny surfaces such as scales, micrometer calipers, etc. The resulting reflected glare makes it extremely difficult to read the markings on the barrel. This will be discussed in detail in a later article.

The RLM Dome reflector should always be equipped with a white-bowl lamp when used at the usual mounting heights. However, it is practicable to use inside-frosted lamps in locations where the units are mounted above 20 feet.

If a better quality of illumination than that given by RLM Dome reflectors is desired, Glassteel Diffusers and Silvered Bowl Diffusers may be employed. They are comfortable to look at, particularly at angles where direct glare is ordinarily most noticeable.

Since the Glassteel Diffuser has openings on the top, some light reaches the ceiling, thus giving the room a more cheerful, pleasant appearance than with the ceiling dark. It has a white enclosing globe and gives a soft light. This type of unit is also available for use with mercury lamps alone or combined with incandescent filament lamps.

The Silvered Bowl Diffuser uses silvered-bowl lamps. Light produced by this unit is somewhat more diffuse and shadows are softer than those produced by RLM

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Dome reflector. The character of the work is the determining factor as to which type of equipment should be employed.

As previously mentioned, height alone does not govern use of high-bay reflectors, but most of these equipments are mounted 20 feet or more high. Spacing, of course, varies with the mounting height.

When buying these units, it is well to consider difficulty of cleaning, which is no small problem at high mountings. If installation is to be over dusty, dirty operations, units will become dirty and yield less light in a shorter time than will units in other locations.

Mercury Lamps

Mercury lamps are more efficient than filament lamps. When used by themselves, mercury lamps may have an annoying stroboscopic effect. Also, the quality of the lighting is quite different than that produced by filament lamps. When supplemented with incandescent lamps, however, the light mixes quite well with daylight and also appears to be cool. Mercury lamp installations are recommended with an equal wattage of incandescent lamps in the same or alternate units. As a rule, under a mounting height of 16 feet, the combination light should be in the same fixture—that is, a mercury and a filament lamp should be placed in the same globe. Above a mounting height of 16 feet, the lamps should be spaced eight-tenths of their mounting height apart and should be staggered and alternated —that is, one mercury, one incandescent, etc. This provides good light mixture from the two systems resulting in illumination approximating that of daylight in color value. Two lamps mounted in the same luminaire are at least 10 per cent less efficient than that type of unit designed for a single lamp. Minimum mounting height for the alternate arrangement is 13 feet.

Although fluorescent lighting has gained rapidly, it must be remembered that so far it has proven its worth mainly in supplementary lighting. The addition of the 40-watt and 85-watt sizes however, has greatly increased its possibilities for general lighting.

Desirable levels of illumination are so far ahead of practical means of attaining them that any illuminant promising more efficient light production is extremely significant. So wide are the unfilled gaps in lighting needs that illuminants having many times the efficiency of fluorescent lamps can be used before the saturation point is reached so far as visual benefits are concerned.

The introduction of fluorescent sources in low wattage units has undoubtedly resulted in some confusion as to proper practice. General lighting practice today involves lamps which deliver 5000, 10,000, 20,000 and, in the case of the 1500-watt lamps, 33,000 lumens from a single lamp. Some lighting technicians may feel loathe to revert to low-powered sources and may be at some loss to comprehend methods by which large groups of 15, 20, 30, 40 or 85-watt lamps economically might replace the 500 or 1000-watt lamps now commonly used for general lighting.

A sound practice, however, is

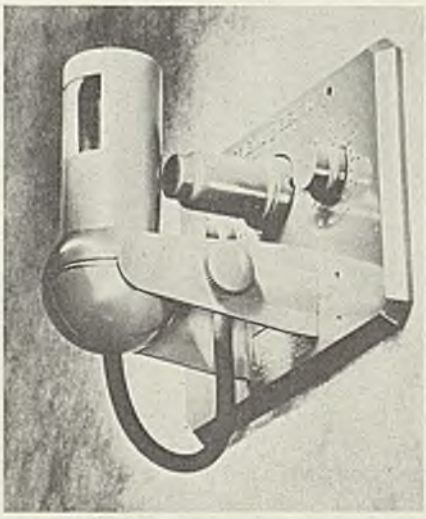

Fig. 15—This photoelectric control stands guard against failing daylight and turns on lights even when decrease in natural light has been too gradual to be noticeable

evolving and fields of logical application are being extended as new equipment is developed to fulfill the requirements. Before the introduction of the 40-watt 48-inch and the 85-watt 58-inch fluorescent lamp, fluorescent lighting was employed primarily for supplementary installations.

Now there is the 85-watt lamp which produces 4250 lumens of cool, blue, white light and more recently the new RLM porcelain enameled unit using two of the 40-watt Mazda fluorescent lamps. Good results are obtained when these are installed end to end in continuous rows.

Economics in lighting always has involved quality and general satisfactoriness as well as costs, and the economics problem never has been revealed by arithmetic alone. Fluorescent lamps offer coolness, daylight quality, a previously unexperienced availability of color and a new freedom in creative design. It is apparent some of those factors have nothing exactly in common with filament lamps against which to base costs. For a specific case, investment and operating costs easily may be compared and any differential saving must be balanced against such factors as color quality, coolness, low brightness, etc., which cannot be set into a numerical formula.

Sizes and shapes that may be installed conveniently in wiring channels have been sought in design of auxiliaries. Since a choke coil is included, a characteristic alternating-current coil hum is inherent in fluorescent auxiliaries, although it varies considerably from time to time. The hum originates from the magnetic action in the choke coil elements and is aggravated when these vibrations are transferred to the supporting frame or metallic wiring channel. By mounting on soft rubber, the hum is reduced to a minimum.

In industrial interiors with a specified machine arrangement, the general lighting system can best be arranged with respect to machine layout and structural features. In factories having bulky and specialized machinery and in rolling mills where large machine frames may get in the way of the light, it is likely any plan of general lighting will be ineffective because of the obstacles. Therefore, even though general lighting is brought to its maximum efficiency, there always will be areas where operations will call for a higher degree of visibility. It would, of course, be uneconomical and beside the point to raise the general lighting level to favor just these few critical areas. It is more desirable to put more light on the critical areas and leave the general level of illumination where it is satsfactory for less crtical areas. This tailor-made lighting supplements the general lighting, but should not supplant it.

As was brought out in the preceding discussion on supplementary lighting units, considerable skill is required in the proper placing of these units for maximum benefits. Table I shows some tasks where supplementary lighting is greatly to be desired. While each individual installaton is different, certain recommendations cover a group of such installations. Table II gives the lighting recommendations for some of the more common supplementary lighting problems.

Yard Lighting — To facilitate night work and provide protection, the area about factory buildings—especially loading and unloading platforms—frequently must be adequately lighted. Floodlighting projectors of the right type, properly placed, in many cases serve the purpose. Projectors should be mounted 30 to 40 feet high to reduce length of shadows and minimize glare. A low-level of illumination should be directed over entire yard for safety and a higher level at critical places. Lots near buildings may be lighted eco-

(*Please turn to Page 66*)

Plating Flexibility

Layout produces finishes in nickel, bright nickel, black nickel, copper, chromium, rhodium, gold, clear or black anodized aluminum without back-tracking, with short work movement and in small area

■ WHEN Spencer Lens Co., 17 Doat street, Buffalo, opened its new mechanical parts plant at Cheektowaga, N. Y., it added approximately 102,000 square feet of floor space to its manufacturing facilities. New structure is first of a number of projected units to be built on a 25-acre tract at this location. Space is provided for automatic and hand screw machines; for milling, drilling and fine turnings and other machining operations; for plastic molding and sheet metal fabrication (described in STEEL, Nov. 27, 1939, p. 49). This plant also features a most complete polishing, plating and enameling department. In addition, ample space is provided for tool and die making, shop maintenance, material storage, cafeteria, first aid, engineering and production offices.

Wide Variety of Work Handled

Finishing department handles an exceptionally wide variety of metals and finishes as it handles parts for all sorts of still projection equipment, microscopes, microscope accessories and other scientific instruments. While about 75 per cent of the parts are made of brass, a large number are of aluminum, steel and other materials.

Not only are production parts finished for appearance and resistance to corrosion, but also a number of working parts are chromium plated to give a hard surface which prevents wear and subsequent excessive clearances between parts. In addition, many steel tools are chromium plated to increase their wear resistance.

Due to the extreme variety of parts handled, finishing is not done on a continuous basis but in lots varying from a few items up to several hundred units. All told, there are more than 17,000 different items which are electroplated in this plant.

Also, a wide variety of finishes is applied. Electroplated finishes include copper, gold, black nickel, rhodium, bright nickel, chromium. Some parts are given a satin black finish in a sulphate-dip bath. Aluminum parts are given a clear or black anodized surface. The black finish on aluminum is a new development, an extremely hard coating that penetrates the surface to give a black finish that is extremely wear resistant.

In addition to the electroplated finishes, a number of dip and spray finishes are applied to a variety of parts including sheet-metal cases and similar items. Also a special department is maintained for finishing scales where the recessed markings are filled in, baked and the finish lacquer coat applied.

Entire finishing department extends along south side of the new parts plant which measures 210 x

Fig. 1. (Upper)—Polishing room with 8-foot exhaust fan and dust separators in rear

Fig. 2. (Lower)—Finishing line for producing hard black surface on aluminum parts for optical equipment

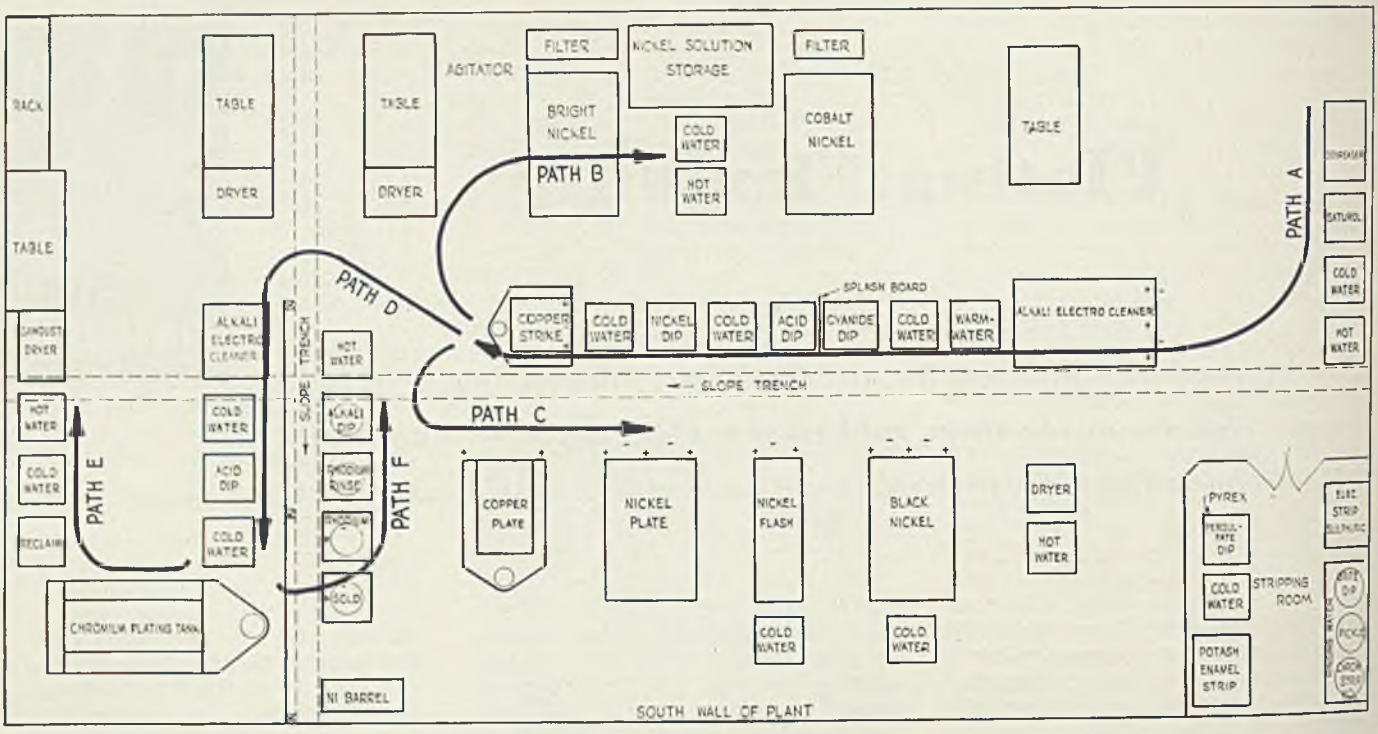

Fig. 3—Layout of general plating section showing the various paths work may follow in receiving the many different finishes and combinations of finishes which can be produced here

410 feet. Polishing room, Fig. 1, is in the extreme southeast corner with plating room immediately adjoining. Next to this is the enameling room. Parts thus pass from the polishing direct to plating or on to the enameling rooms for finishing.

In all of the finishing departments as well as throughout the entire plant, exceptionally good lighting facilities are provided. Corrugated glass skylights supply an abundance of daytime illumination with 45 to 48 footcandles being furnished for night operations by a combination mercury-Mazda lighting system. Each of the mercury-Mazda units contains 400 watts of mercury lamps and 450 watts of Mazda lamps to provide balanced lighting. Spaced on 20-foot centers throughout the working area, these fixtures afford ample illumination for the most critical work and help assure quality in the finishing department.

Fig. 1 shows the exceptionally well laid out polishing room with two dust separators in the back of the room connected to a suction system which includes an 8-foot fan. This efficient ventilating system assures spotlessly clean working conditions in a department in which much dust usually accumulates. Ducts lead from each of the grinding and buffing spindles, Fig. 1. Each polishing spindle is a double unit with a grinding or buffing wheel on each end of the shaft.

At the present time, the exhaust system and two rows of polishing spindles extend along the south side of the room next to the windows at right in Fig. 1. Provision has been made for future plant expansion when additional machines will be placed just north of those present. Then ventilating ducts can be extended to the new machines like the one duct at left center in Fig. 1, which is extended to a belt sander, the only machine at present in the third row. Thus future additions can be made without disturbing any of the present equipment. Of course, suction system has maximum capacity ample for needs of all equipment that can be placed in the area available.

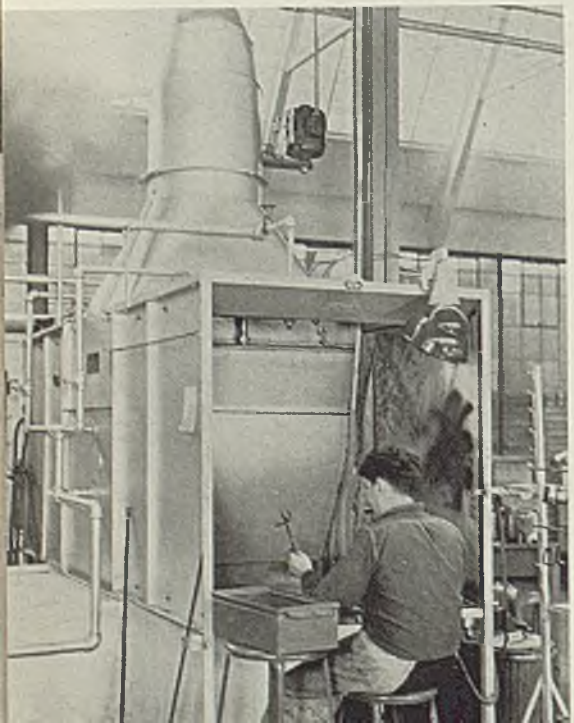

Fig. 4—One of four double spray booths in enameling department. Water wash backwall removes deposited overspray and exhaust system takes away that which would contaminate the air

Equipment in polishing room includes eight buffing and six hand polishers in addition to three belt sanders and one disc sander. A small booth is provided in the polishing room where four electrically heated glue pots are used in resurfacing the polishing wheels. This operation consists of turning the polishing wheel with its face immersed in a bath of glue, after which the abrasive is applied by rolling the wheel in a box of emery of the desired grade.

Seven grades of emery in a nearby steel container are heated electrically to keep moisture out. Likewise, sand used on abrasive wheels is protected against moisture by storing it in similar steel containers, also electrically heated. After the wheels have received their application of abrasive, they are dried in electric oven at 100 degrees Fahr. and stored in a nearby area until wanted.

From the polishing room, all parts to be electroplated, except those made of aluminum, first receive a copper flash followed by at least one-quarter of a thousandth-inch thick coat of nickel as a base for subsequent finishes. Then gold, rhodium or chromium is deposited on top of the nickel. All brass as well as steel parts are given this preliminary treatment.

One of the first installations to produce Alumilite finish is found in this new plant. The lineup of tanks and plating equipment is seen in Fig. 2. Alumilite is a new development, an extremely hard black finish on aluminum surfaces produced by a

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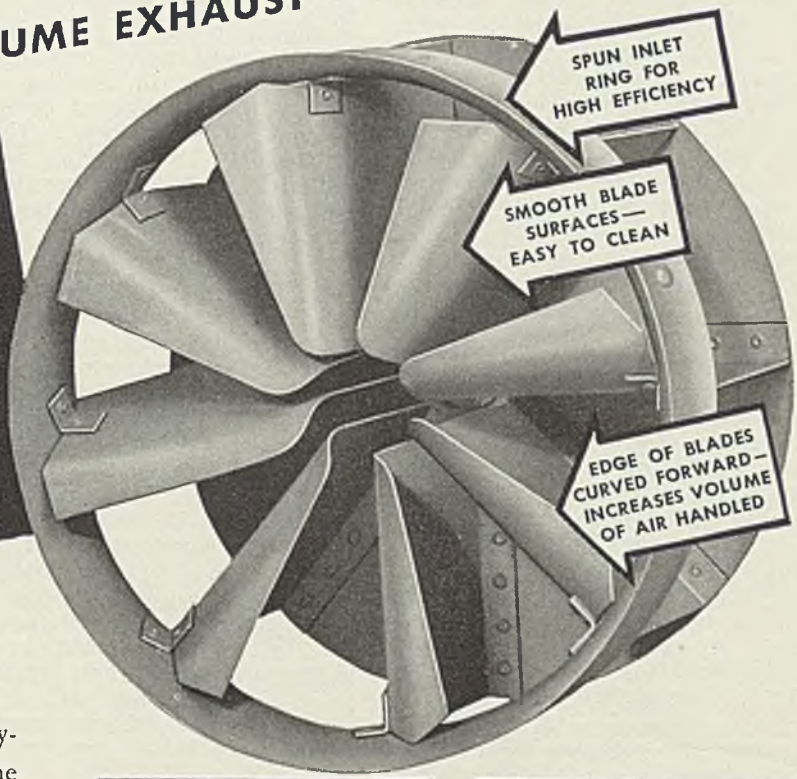

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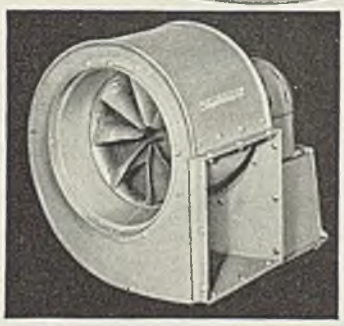
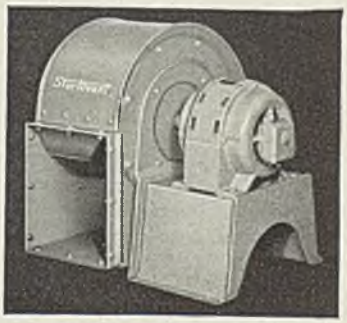


Rexvane Vent Set showing cone-shaped inlet, assuring smooth air flow, and straight radial blade rotor.



Sturtevant Rexvane Vent Set, motor side, showing beaded air-tight housing construction and rugged, light-weight motor mounting.

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combination of electrical and chemical treatment. Most black finishes on aluminum quickly become unsightly after a small amount of wear has worn through the coloring to show the light base metal. The Alumilite process first hardens the surface by combined chemical and electric treatment and then colors this hardened surface a deep black, giving a finish so deep and hard that it does not wear off.

The first bath in this process is a cleaner, heated to 160 degrees Fahr., followed by a rinse. Next step is to harden the surface electrolytically in an acid solution which is held to plus or minus 2 degrees of 72 degrees Fahr. As the temperature here is quite critical, the bath is watched carefully and the automatic controls frequently checked.

This is followed by two rinses. The next bath is heated to 120 degrees Fahr. and is a penetration dip. After being rinsed, items go into a coloring bath followed by cold rinsing and hot rinsing baths.

As seen in Fig. 2, all this equipment is arranged in a line down the north side of the plating room. Most of the work handled consists of small parts, usually hooked on racks, Fig. 2, before entering the lineup. With bath arranged in straight line, there is no possibility of parts not receiving correct sequence of operations. Also, this greatly facilitates operations as all units are completely accessible.

Exhaust ducts seen in Fig. 2 effectively remove vapors from baths which otherwise would contaminate atmosphere of the room. Similarly, other ducts connected with exhaust system remove all vapors and gases from other plating equipment here. This assures excellent working conditions and is an aid to maintaining the extremely high quality necessary on these parts.

Fig. 3 shows layout of all plating equipment except the Alumilite line in Fig. 2. Also much floor space is provided for storage of parts before and after plating. In addition, a number of tables are available for racking and unracking parts. View of general plating equipment diagrammed in Fig. 3 is shown in Fig. 5. A unique arrangement of tanks permits maximum efficiency in handling an extremely wide range of production finishes. This involves a Y-system which allows almost any sequence desired yet which necessitates only a short movement and in-line operations for most of the work.

Referring to Fig. 3, at extreme right will be seen degreaser, emulsifying bath, hot and cold water rinses. Just to left and in the center is the main cleaning line, designated by path A, which starts with an alkali electrocleaner unit.

From the end of this line, flow of parts advances to various sections according to final finish desired. Path B takes material to baths for application of bright nickel plate. Path C is followed by parts to be given a copper plate, heavy nickel or a black nickel finish. All of these tanks, in which incidentally the largest volume of parts is handled, are seen at lower center, Fig. 3. Some have individual rinse tanks immediately adjoining them.

Parts to be chromium plated follow path D and path E. Path D also branches out so those parts to be rhodium or gold plated take path F.

From Fig. 3, it is evident that layout of plating equipment and rinse tanks have been made with extreme care to assure maxim efficiency in all types of elec plating finishes. In any case, work traverses the minimum tance, is not subject to usel backtracking, nor does work in a one line interfere with other ope tions.

Also included in the plating ro is a stripping booth seen at lower right in Fig. 3. Here equ ment is provided for removal electroplated and enameled finish from parts.

Floor of electroplating room made of acid-resisting concrete wi wood platforms over all worki aisles. Sloping trenches shown dotted lines in Fig. 3 lead to acid-proof drain going to the sewe This provides convenient means f draining all tanks.

Automatic Boilers Used

Hot water for making up electr plating solutions and for keepin them at working temperature come from a 1000-gallon storage tan in the boiler room. This in tur is heated by two 176-horsepowe boilers, employing a heat ex changer. Boilers are completely automatic, even starting and stop ping without an attendant. They generate steam at 10 pounds pres sure, using oil as fuel.

Enameling deparment is in an adjoining room. Equipment here includes a row of four double spray booths down the center of the room, providing stations for eight operators. Fig. 4 shows operator working in one of these double booths. Booths have water wash curtains to take away overspray. At east end of room is a large dip tank containing enamel for sheet-metal parts. Also, provision is made for holding the pieces before baking while excess material drips off.

Along south side of room are two large gas-fired ovens of the truck type which operate around 350 degrees Fahr. Along the north side of the room are two more ovens of the same type as these and also four electric ovens for fast drying. These operate between 200 and 350 degrees Fahr. One of these latter units is quite large, the other three being smaller and so adapted to handling knobs and similar small parts.

All ovens as well as the dip tank are connected to an exhaust system which assures maximum drying efficiency and prevents any accumulation of solvent vapors. An exhaust system also is provided for the spray booths, as shown in Fig. 4.

An outstanding feature of entire finishing department is the provision made to keep it clean. See Fig. 5. The excellent working conditions resulting are reflected in the high quality work produced.

Fig. 5—View of general plating section. Note exceptionally clean appearance and well arranged layout detailed further in Fig. 3

Metals Sessions Feature Annual Meeting of A.I.M.E. in New York

■ A PROGRAM of particular interest to the metals industry is being arranged by the American Institute of Mining and Metallurgical Engineers for its 152nd meeting at the Engineering Societies building, New York, Feb. 12-15. Subjects covering a wide range will be discussed at sessions sponsored by the Iron and Steel and Institute of Metals divisions.

From the all-institute point of view, several features of the annual meeting command interest. These include a general session on the afternoon of Feb. 12 on mineral economics; the business meeting on the afternoon of Feb. 13; the annual banquet at the Waldorf-Astoria hotel on the evening of Feb. 14 at which time important medals and honorary awards will be made; and several special luncheons, dinners and social events.

Highlights of the Iron and Steel division meetings are sessions on chemistry of steelmaking, control of surface qualities of steel, carbon and low-alloy steels, diffusion and decomposition in austenite and austenitic stainless steels; a series of committee luncheons; and the Howe memorial lecture.

The Institute of Metals division will conduct sessions on recrystallization, copper and silver alloy systems, alloys of cobalt and general physical metallurgy. Other events will be the annual lecture, several committee luncheons and the annual dinner at the Biltmore hotel on the evening of Feb. 15.

Program details are as follows:

IRON AND STEEL DIVISION

Chemistry of Steelmaking

"Slag-Metal Relationships in the Basic Open-Hearth Furnace," by Karl L. Fetters and John Chipman, Massachusetts Institute of Technology, Cambridge, Mass.

"Refractive Indices of Basic Open-Hearth Slags," by Michael Tenenbaum and T. L. Joseph, University of Minnesota, Minneapolis.

"Formation of Inclusions in Steel Castings," by Walter Crafts, John J. Egan and W. D. Forgeng, Union Carbide & Carbon Research Laboratories Inc., Niagara Falls, N. Y.

"Equilibria in Liquid Iron with Carbon and Silicon," by Lawrence S. Darken, United States Steel Corp., Kearny, N. J.

"Solubility of Nitrogen in Liquid Fe-Cr and Fe-V Alloys," by R. M. Brick, Yale university, New Haven, Conn., and J. A. Creevy, Stanley Works, New Britain, Conn.

"Heat Capacity of Iron Carbide from 68-298 Degrees K. and the Thermodynamic Properties of Iron Carbide," by Harry Seltz and Cyril Wells, Carnegie Institute of Technology, Pittsburgh, and Hugh J. McDonald, Armour Institute of Technology, Chicago.

"Thermochemistry of the Pig Iron Blast Furnace," by Julian M. Avery, Arthur D. Little Inc., New York.

Control of Surface Qualities of Steel

"A Survey of Factors Affecting Surface Quality of Semifinished Steel," by H. B. Emerick, Jones & Laughlin Steel Corp., Pittsburgh.

"Pouring Practice Variables and Their Individual Effect on Ingot Surface," by W. A. Saylor, Carnegie-Illinois Steel Corp., Pittsburgh.

"Influence of the Chemical Composition of Steel on Freezing, Heating, Scaling and Rolling Characteristics," by Gilbert Soler, Timken Roller Bearing Co., Canton, O.

"Effect of Mold Surface on Bloom or Slab Surface," by T. J. Woods, Republic Steel Corp., Cleveland.

Recrystallization

Joint Session with Institute of Metals

"Some Observations on the Recrystallization of an Iron-Nickel Alloy," by George Sachs and Joseph Spretnak, Case School of Applied Science, Cleveland.

"Crystal Orientation in Silicon Iron," by J. T. Burwell, United States Steel Corp., Pittsburgh.

"X-Ray and Microscopic Study of Imperfection Recrystallization Textures," by Norman P. Goss, Cold Metal Process Co., Youngstown, O.

Carbon and Low-Alloy Steels

"Precipitation Hardening of a Complex Copper Steel," by J. W. Halley, Inland Steel Co., Chicago.

"Tensile Strength and Composition of Hot-Rolled Plain Carbon Steels," by C. F. Quest, University of Minnesota, Minneapolis, and T. S. Washburn, Inland Steel Co., Chicago.

"Effect of Composition and Steelmaking Practice on Graphitization Below the A_1 of Eighteen 1 Per Cent Plain Carbon Steels," by Charles R. Austin and Maurice C. Fetzer, Pennsylvania State college, State College, Pa.

Diffusion and Decomposition of Austenite

"Rate of Diffusion of Carbon in Austenite in Plain Carbon, Nickel and Manganese Steels," by Cyril Wells and Robert F. Mehl, Carnegie Institute of Technology, Pittsburgh.

"Crystallography of Austenite Decomposition, I—Martensite Transformation," by Alden B. Greninger, Harvard university, Cambridge, Mass., and Alexander R. Troiano, University of Notre Dame, Notre Dame, Ind.

"Crystallography of Austenite Decomposition, II—Products of Subcritical Transformation of Austenite," by Alden B. Greninger, Harvard University, Cambridge, Mass.

Austenitic Stainless Steels

"Elastic Properties of Cold-Worked Austenitic Stainless Steels," by Russell Franks and W. O. Binder, Union Carbide & Carbon Research Laboratories Inc., Niagara Falls, N. Y.

"Effects of Temperature of Pretreatment on Tensile Deformation Characteristics of an 18-8-Type Stainless Steel," by Charles R. Austin and Carl H. Samans, Pennsylvania State college, State College, Pa.

Tuesday, Feb. 13

NOON

Luncheon meeting, executive, Iron and Steel division.

Luncheon meeting, Blast Furnace and Raw Materials committee.

Wednesday, Feb. 14

NOON

Annual luncheon, Iron and Steel division.

Thursday, Feb. 15

NOON

Luncheon meeting, executive committee, Open Hearth Conference.

Luncheon meeting, Committee on Physical Chemistry of Steelmaking.

Luncheon meeting, Bessemer Steel committee.

4 P. M.

Howe memorial lecture: "Slag Control," by Charles H. Herty Jr., Bethlehem Steel Co., Bethlehem, Pa.

INSTITUTE OF METALS DIVISION

Recrystallization

"Recrystallization Texture of Aluminum After Compression," by Charles S. Barrett, Carnegie Institute of Technology, Pittsburgh.

"Plastic Deformation and Recrystallization of Aluminum Single Crystals," by J. A. Collins, E. I. duPont de Nemours & Co., Wilmington, Del., and C. H. Mathewson, Yale university, New Haven, Conn.

"Effect of Cold Work Upon Hardness and Recrystallizing Behavior of Pure Platinum," by E. M. Wise and R. F. Vines, International Nickel Co. Inc., New York.

"Damping Capacity Changes During Recrystallization of Alpha Brass," by John T. Norton, Massachusetts Institute of Technology, Cambridge, Mass.

"Variation of Internal Friction with Grain Size," by Clarence Zener and R. H. Randall, College of City of New York, New York.

"Correlation of the Deformation and Recrystallization Textures of Rolled 70:30 Brass," by R. M. Brick, Yale university, New Haven, Conn.

"Recovery and Recrystallization in Long-Time Annealing or 70:30 Brass," by S. E. Maddigan and A. I. Blank, Chase Brass & Copper Co., Waterbury, Conn.

Copper and Silver Alloy Systems

"Copper-Rich Alloys of the Copper-Nickel-Phosphorus System," by D. K. Crampton, H. L. Burghoff and J. T. Stacey, Chase Brass & Copper Co., Waterbury, Conn.

"A Metallographic Study of Internal Oxidation in the Alpha Solid Solutions of Copper," by Frederick N. Rhines, Carnegie Institute of Technology, Pittsburgh.

"An X-Ray Study of the Silver-Lead and Silver-Bismuth Systems," by Haim H. Chiswik and Ralph Hultgren, Harvard university, Cambridge, Mass.

Alloys of Cobalt

"The Cobalt-Nickel-Silicon System Between 0 and 20 Per Cent Silicon," by Arthur C. Forsyth and R. L. Dowdell, University of Minnesota, Minneapolis.

General Physical Metallurgy

"An Electron Diffraction Study of Anodic Films," by R. A. Harrington and H. R. Nelson, Battelle Memorial institute, Columbus, O.

"Determination of Orientation by Etch Pits," by Charles S. Barrett and L. H. Levenson, Carnegie Institute of Technology, Pittsburgh.

Wednesday, Feb. 14

4 P. M.

Institute of Metals annual lecture: "Acceleration of Rate of Corrosion by High Constant Stresses," by Edgar H. Dix Jr., Aluminum Co. of America, Pittsburgh.

Thursday, Feb. 15

NOON

Luncheon meeting, executive committee, Institute of Metals division.

EVENING

Annual dinner, Institute of Metals division, Biltmore hotel

Suspended Grinder

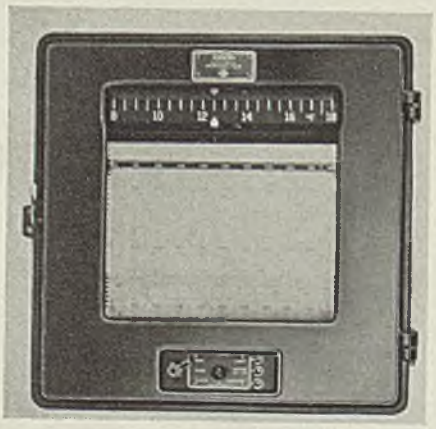
■ Sawyer Electrical Mfg. Co., 5715 Leneve street, Los Angeles, has developed an aerial suspended grinder totally enclosed to prevent grinding dust from entering motor. Motor is two-pole polyphase design with no commutator brushes or centrifugal switches. Motor efficiency is high

and power pullout is over twice rated capacity. Bearings are of standard double-shielded, factory-lubricated type and rotor is integral part of shaft. Grinder also is available in portable types. Motor is 220-volt 3-phase 60-cycle with speed in all cases, except high-speed gear drive machine, of 3600 revolutions per minute. High-speed unit drives at 5400 revolutions per minute.

Recording Controller

■ Foxboro Co., Foxboro, Mass., announces a series of potentiometer recording controllers which incorporates improved detecting mechanism, new integral recording and control mechanism, and a new control system to provide maximum flexibility of use. Open-and-shut action and throttling action, with or without automatic reset, are available in air-operated models.

A single calibrated detecting cam is said to sense deflections of galvanometer pointer of less than 0.0001-inch without lost motion. By positioning a friction roller, cam positively determines movement of integral slide-wire contact, recording and control actuating carriage. Integral recording and control mechanism co-ordinates measuring, recording and controlling operations. Slide-wire contact, recording pen and cam follower actuating control cam are assembled as a unit on same rigid carriage. Guaranteed accuracy is ¼ of 1 per cent of scale range.



Controller is highly accessible since entire mechanism can be pulled forward out of case and every moving part removed or replaced. Antivibration rubber-cushioned mountings can be used within case.

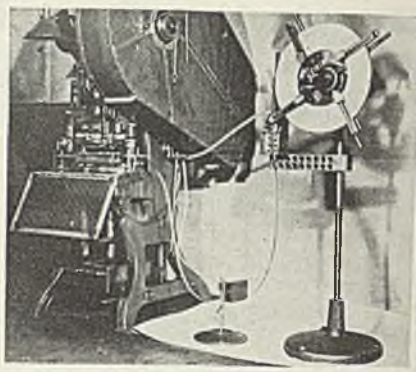
Vernier Control on Transmission Units

■ Link-Belt Co., 307 North Michigan avenue, Chicago, announces all sizes of its P. I. V. gear variable-speed transmission are now equipped with vernier control which can be supplied with either 7½ to 1 or 30 to 1 ratio and two hand wheels—one for direct control and the other for vernier. Vernier control is said to

provide fine sensitivity required for true micrometer adjustments of speed, and to be suitable for synchronizing speeds of two machines, justifying for shrinkage and expansion of such products as textiles and paper, controlling feeders, weighing operations, obtaining exact register, controlling overlay of wire-covering on wire producing machinery, etc.

Stock Reel

■ J. A. Honegger, Bloomfield, N. J., offers Simplex stock reel for stamping. Reel is actuated electrically by a solenoid pulling a pawl lever to engage a ratchet wheel attached to reel. Pawl arm is returned to its original position by a spring. Overrunning of stock reel is said to be prevented by usual friction washers on reel. Sensitive actuating mechanism of switch can be mounted on



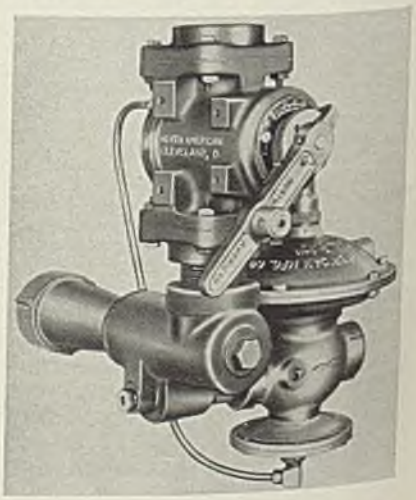
a separate base or directly on reel stand.

Pull-type feed is made possible by sensitive counterbalanced actuating switch in conjunction with solenoid, for the only resistance to pull of feed arm is friction in stripper and weight of switch arm, a matter of inch-ounces. Reel will handle coils up to 200 pounds and, with a suitable solenoid, up to 300 pounds.

Air-Gas Control

■ North American Mfg. Co., 2910 East Seventy-fifth street, Cleveland, announces Air-Gas Ratiotrol for control motor operation which produces an air-gas mixture of constant proportion, making both fluids interdependent while passing through aspirator and atmospheric regulator respectively. Control valve has adjustable port that can be set to insure effective control of air over whole motor operating range together with an external by-pass to furnish air at blower pressure to an auxiliary diaphragm on atmospheric regulator when control motor goes to shut-off position. Force from this diaphragm closes off all gas flow to burners at this point, which is said to eliminate over-riding of temperatures at low temperature settings.

Part of energy in air stream aspirates gas so that a fixed relationship is in existence at all times between quantities of the two fluids flowing. A number of rods of different diameters for varying area of



nozzle and throat of aspirators are available for each size of Ratiotrol, so a large degree flexibility can be obtained by substitution. Within limits, changes in capacities, corrections for piping resistances, etc., can thus be made without exchanging or repiping of any equipment.

Fork Trucks

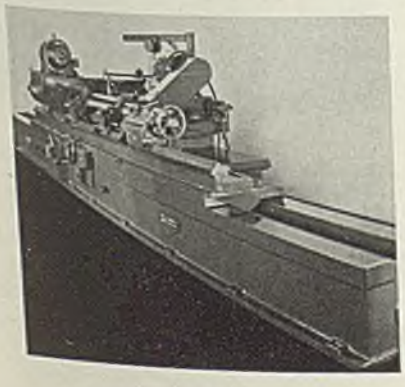
■ Baker-Raulang Co., 2168 West Twenty-fifth street, Cleveland, announces Type KM (nontelescoping,) and Type KMH (telescoping) fork trucks available in capacities of 4000 and 6000 pounds and powered by 4-

cylinder Hercules industrial gasoline engines designed for continuous operation at high power output and rubber mounted to reduce vibration. Heavy-duty industrial-type transmission and clutch are used, gearbox providing two speeds forward and two reverse. Hydraulic brakes on drive wheels and all controls of automotive type are provided.

Lifting and tilting motions are accomplished by hydraulic system. Control valves permit control of speed at all times. Travel speeds are normally governed to 7 miles per hour, but higher speeds are available if desired. Lifting speeds are up to 30 feet per minute and lowering speeds to 75 feet per minute. Forks may be had in any length desired. With standard overall height of 88 inches and permitting entry into a boxcar, nontelescoping truck has a fork lift of 70 inches and telescoping model up to 124 inches.

Cylindrical Grinder

■ Farrel-Birmingham Co. Inc., Ansonia, Conn., has developed Type TT cylindrical grinder having a travel-

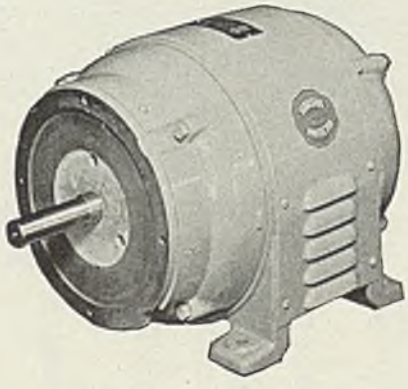


ing work table, fixed grinding wheel unit and a sensitive reversing mechanism which permits grinding up to shoulder of shaft. Traveling work table running on inverted V-ways is superimposed on front bed. Once set, traverse and reversal of traveling work table are automatic and require no further attention.

Handwheel and clutch for moving traveling table by hand, handwheel control for hand-feed of grinding wheel and electric controls for rapid in-and-out movement of wheelhead are provided. Work table drive is said to have steady travel and smooth, accurate reverse. Table is driven by an adjustable-speed reversing motor through a two-speed drive with double helical gears.

Motor End-Shields Facilitate Mounting

■ U. S. Electrical Motors Inc., 200 East Slauson avenue, Los Angeles, offers motors with unimount end-shields having a flat surface to facilitate mounting of pumps and other



directly driven equipment and magnetic brakes. Shields eliminate necessity for an adaptor, protect motor and conserve space. They can be assembled on either end of motor and can be used to mount a footless motor to a machine frame if desired.

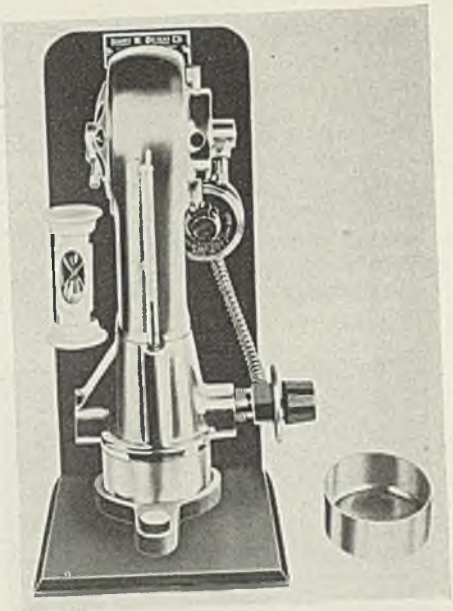
Shields are available in a number of standardized outside diameters, mounting-machine fits, and bolt circles, as well as unmachined so user can fit own unit.

Moisture Teller

■ Harry W. Dietert Co., 9330 Roselawn avenue, Detroit, announce Moisture Teller taking a sample pan 3¾ inches in diameter and 1¼ inches in depth. Bottom of pan is made of 500-mesh monel filter cloth.

Sample pan containing sample to be dried is placed under heated air outlet of device. Air, being above steaming point of water, causes moisture contained in sample to be flashed to steam and blown through bottom of pan. It is claimed sample is dried to constant weight in one minute for many materials.

Pan containing sample is light and

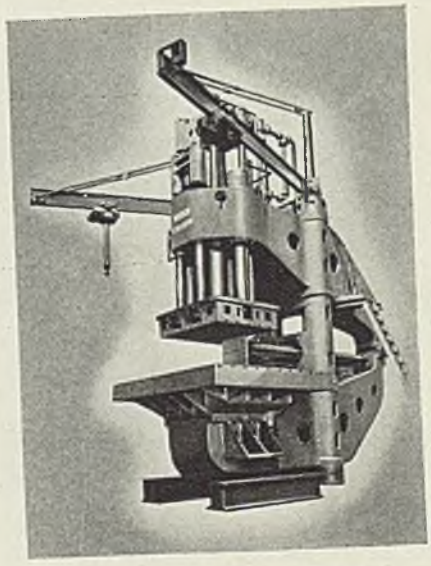


may be weighed on analytical balance for accurate moisture determinations. Temperature of drying air is automatically controlled by adjustable thermostat.

Hydraulic Flanging Press

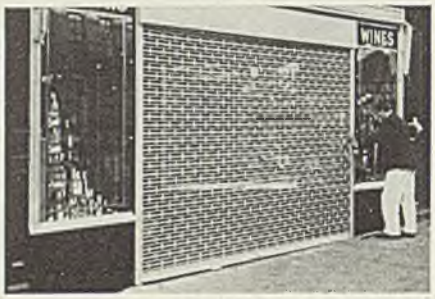
■ Watson-Stillman Co., Roselle, N. J., has developed an overhung-gap type hydraulic flanging press to make work accessible. Model W-S pictured has three single-acting moving-down cylinders of 1000, 250 and 250 metric tons capacity respectively to total 1500 metric tons rated capacity for the press.

Two pullback cylinders are of 51 metric tons capacity each, and horizontal double-acting cylinder has capacity of 250 metric tons capacity. Stroke of main cylinders is 59 inches; that of horizontal cylinder, 6 feet 7 inches. Moving platen is 6 feet 6¾ inches x 8 feet 2⅜ inches; bottom platen is 12 feet 5⅝ inches x 14 feet 9 inches and horizontal ram face is 19¾ x 24 inches.



NEW METAL PRODUCTS

■ The butterfly design rolling grille made by Cornell Iron Works Inc., Thirty-sixth avenue and Thirteenth street, Long Island City, N. Y., consists of twisted metal links power-riveted to flat spacing bars with 5/16-inch round rods running

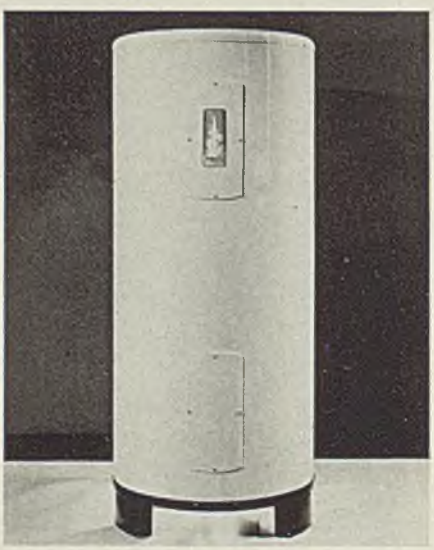


through the perforated ears of the links and forming the hinges. This allows structure to coil closely overhead around a horizontal pipe shaft which contains the counterbalancing springs.

Sizes up to 125 square feet are available with hand chain or hand crank. Electric motor drive is used with larger sizes.

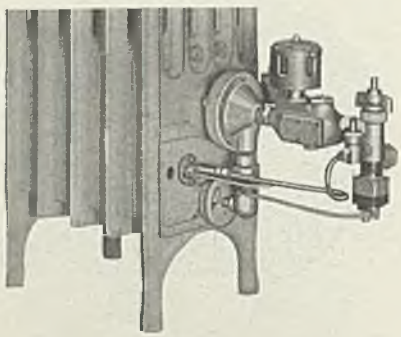
Design illustrated is made in galvanized steel, aluminum, bronze, nickel silver, or stainless steel. Locking is accomplished by chuting two bars horizontally, waist high, into holes in the metal side guides, combined with a cylinder lock which can be operated from either side.

■ The "Master" Hotpoint electric water heaters of Edison General Electric Appliance Co. Inc., 5600 West Taylor street, Chicago, feature a new beauty of design due to elimination of every unnecessary seam or angle. Entire tank, including the top, is finished in white Calgloss.



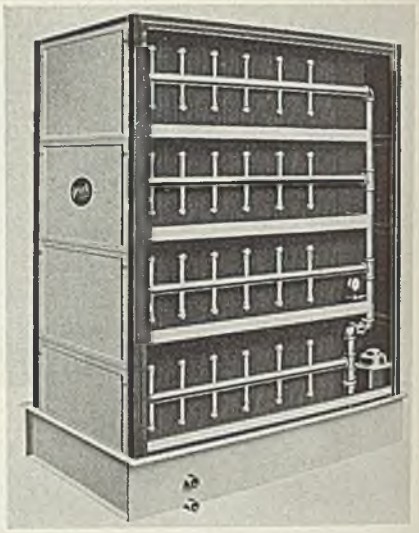
The rounded edges of top fit smoothly over the body, and front panels are absolutely smooth without cracks or crevices to catch dust and dirt. This heater is available in 30, 40 and 50-gallon sizes with Monel or galvanized tanks, single or twin unit type. Heating is by Calrod hairpin unit and Thermosnap assures utmost economy and automatic operation.

■ An automatic control and safety pilot for their line of gas-steam radiators which is available with or without room thermostat is announced by Automatic Gas Steam Radiator Co., 301 Brushton avenue, Pittsburgh. Either natural or artificial gas may be used as fuel. Control is available in both vented and unvented types and operates automatically without boiler, water pipes, coal, ashes or janitor service. A constant burning pilot and a positive safety pilot are incorporated. It is impossible to obtain a flow of gas to the burner in the absence of a pilot flame.



Valve is actuated manually with the reset button and pilot flame ignited. Within a few seconds the valve will remain open, but it will snap closed in event of failure of pilot flame, giving, it is claimed, 100 per cent shut-off.

■ Type MC dehumidifier combining advantages of an air washer with flexibility of a dry finned-coil air cooling unit is announced by York Ice Machinery Corp., York, Pa. Combined effect of finned coils and water sprays, being full air washing with multiple finned coils similar to those used in dry coil units, results in efficient cooling and dehumidifying. This combination also has advantage of being able to cool air adiabatically as an air washer only, during periods of low wet bulb. Since it is built up with standard finned coil sections and panelled exterior casing, this dehumidifier is said to be easily assembled. Sectional nature of this equipment makes a great number of arrangements possible to fit space available and cooling load to be handled.



■ The new 2½-yard, 54-B, diesel-powered convertible shovel, dragline, clamshell, lifting crane of Bucyrus-Erie Co., South Milwaukee, Wis., has a husky quarry-type boom, wide outside dipper sticks, welded heavy-duty dipper and positive independent crowd. The 54-B shovel front end is the same type as used on the 4, 5 and 6-yard shovels, yet the machine is so compact that it comes within clearances of most U. S. standard gage railroads and can be shipped without major dismantling. Clearances are reduced and the center of gravity lowered by combining roller path and swing rack in the truck frame casting.

Entire right side of the cab is free of machinery and a roomy cross-aisle between engine and main machinery provides ample space for

making adjustments easily and quickly. Ratchet type chocking brakes provide quick free move-up for either dragline or shovel, with automatic locking against the push-back of the digging action. For dragline work on soft ground, extra-large tapered "swamp cats" are available.

Welded Oil Well Casing

(*Concluded from Page 47*)

in the second class of job procedure.

Running a welded casing consumes only slightly more time than required for threaded and coupled casing. On the other hand, installation of a welded string requires a smaller crew. When calculating savings, this additional running time is neglected as it would be offset by the smaller crew. Thus saving due to use of welded casing resolves itself into difference between cost of plain-end casing and cost of threaded casing minus the cost of welding.

In first case mentioned above, cost of 2933 feet of 7-inch outside-diameter 22-pound threaded and coupled casing totaled $3095.19. Cost of same amount of casing of plain end type for butt welding totals $2630.90, a saving of $464.29.

Cost of welding is figured at $57.53 including $34.80 for three welders, $8.70 for overhead, $8.32 for weld metal, $2.71 for cost of power, $3 for mileage of welding trucks to and from location.

Total net saving thus is $406.76, $5.90 per joint of casing or $0.139 per foot of casing.

In the second case where oil company hires the welding to be done, saving on cost of pipe is same as above, $464.29, but cost of welding is $90, giving a net saving of $374.29, $5.43 per joint of casing or $0.1276 per foot of casing.

Savings Greater For Larger Casing

Of course, saving per foot of casing is influenced by average length of casing. To realize the maximum saving, an oil company should install casing made up of joints as long as practical as this means fewer welds. Casing length can hardly exceed 40 feet, however, because a longer length cannot be pulled in an ordinary derrick. Figuring cost of 10¾-inch, 40.5-pound casing shows a net saving per foot of $0.2479 in first case and $0.2247 in the second case. This greater net saving per foot with a larger pipe is due to the fact that mill prices for plain end pipe are 15 per cent less than for threaded and coupled pipe regardless of pipe size. Thus dollars and cents saving becomes higher for larger sizes of casing, whereas the cost of welding does not increase proportionately.

Figure total saving in a well. The typical oil well in Kansas near Ellis county utilizes 350 feet of 10¾-inch string and 3200 feet of 7-inch string, which at $0.2247 per foot for the first and $0.1276 per foot for the second would total $78.65 and $408.32 respectively, a total saving per well of $486.97.

On a deeper well requiring 1100 feet of the larger diameter pipe and 3400 feet of the 7-inch string, savings are $247.17 and $433.84 respectively, making a total per well of $681.01.

Because of the increased joint strength and savings possible, increased adoption of welded casing strings is expected. However, the art is yet new so intensive study may bring many improvements in the near future.

Hard-Facing Rod

■ Haynes "93" hard-facing rod, a new alloy welding rod for hard-surfacing wearing parts, is announced by Haynes Stellite Co., Kokomo, Ind., unit of Union Carbide & Carbon Corp., 30 East Forty-second street, New York. Rod is recommended for severe abrasion, accompanied by moderate impact.

Rod is of a ferrous composition and contains more than 40 per cent of chromium, molybdenum, cobalt and other alloying elements. It has a tensile strength of about 43,000 pounds per square inch and a hardness, as deposited by oxyacetylene welding, of 62 Rockwell C. When deposits are heat treated by heating to 1950 degrees Fahr., and then air-cooled, hardness reaches 66 to 67 Rockwell C.

Shipyard Handling Unit

(*Concluded from Page* 44)

angular shape was made possible by welding.

Crane machinery, control panel and operator's control are housed in an all-welded steel cab located on the rotating platform. All motors are provided with solenoid brakes and full magnetic controls to give positive brake operation and accurate control over crane's movements.

Fig. 1 shows one of the 20-ton screw-luffing cranes with the 125-foot boom in horizontal position. The luffing screw in this view appears at the extreme upper right in its housing which extends from extreme right of revolving structure diagonally up to the top of the triangular boom. In Fig. 2 the boom has been lifted by operating the luffing screw which pulls down top corner of the triangular boom base. The lower two corners of boom base being pivoted, far end of the boom thus is raised. The screw-luffing mechanism absorbs tremendous stresses when lifting a 20-ton load near the end of the boom.

Triangular shape of the boom, found most suited for the use of the screw-luffing principle, is shown clearly in Fig. 3. Some of the details of the unusual design employed in fabricating this boom also are visible in Fig. 3. Note the light yet sturdy construction employed for many members, formed by joining two L-sections using small welded crossmembers at frequent intervals. Plate reinforcements also will be noted at many joints.

A good view of one of the 35-foot luffing screws and the housings for them is shown in Fig. 4. Each screw is motor driven, the drive of one of the units being shown already mounted on one of the welded steel housings in upper center of Fig. 4.

Entire weight of the rotating structure is supported upon a system of rolled-steel wheels. Fig. 5 shows two of the turntables being assembled. Hoists, trucks and other component parts of the cranes also are shown in this view taken on the assembly floor of the machine shop at Dravo Corp.'s Neville Island plant near Pittsburgh.

Direct Rolling Of Strip

(*Concluded from Page* 50)

forced through it to remove heat.

Roll pressures required on these mills are extremely light, running only a few hundred pounds per inch in width. Operation of this small surfacing roll somewhat parallels a boiler tube. As is well known, boiler tubes operate many months, 24 hours per day, with temperatures from 2500 to 3500 degrees Fahr. on one side and with circulating water on the other.

Most of our efforts up to the present have been with brass. However, sample heats of copper, aluminum, low-carbon steel and silicon steel have been rolled, giving as good results as with brass. Much work is being done in this direction at this time. The great difficulty due to segregation has been eliminated in brass. Gages as low as 0.015-inch have been rolled in one operation. Strip has been rolled at 500 feet per minute with sufficiently good gages for rerolling.

With new rolling surface described, roll cost has become an insignificant factor. The physical properties, surface and grain structure of the various brasses are normal after a 50 per cent cold reduction and suitable annealing. See accompanying micrographs. Much work remains to be done on heavier gages and on other metals and alloys.

Industrial Illumination

(*Concluded from Page* 56)

nomically with RLM Dome reflectors, two-way refractors, or other conventional outdoor units mounted at least 50 feet high. To facilitate work of patrolling night watchmen, narrow-beam projectors at the corners of yards and at 300-foot intervals will throw a ring of light around a yard. To avoid glare and reduced visibility, these projectors should be pointed in one direction only. If there is no patrol, units may point toward each other and the distance between poles doubled. Same purpose may be accomplished by placing projectors on roofs and directing them to boundaries, particularly to entrances near railway sidings and other unguarded places. Light should never be directed toward buildings unless entire building is well floodlighted because glare may prevent watchmen inside building from seeing approaching trespassers.

(To be continued)

Zinc Output Increased Despite Larger Imports

■ Zinc production in the United States in 1939 amounted to 538,198 net tons, an increase of 17.77 per cent over 1938, but 8.72 per cent under 1937. Highest monthly production was 57,941 tons in December; lowest, 39,450 tons in June, according to American Zinc Institute Inc., New York.

Reduction of 20 per cent in duty on slab zinc and zinc ore, effective Jan. 1, 1939, caused much apprehension and held down domestic production until outbreak of war in Europe interfered with imports. The year's imports of slab zinc totaled 29,463 tons, compared with 7017 tons in 1938. Total foreign zinc entering consumption, including withdrawals from bond, was 59,952 tons, against 11,915 tons in 1938.

Domestic slab zinc shipments totaled 598,972 tons, an increase of 51.43 per cent over 1938 and 5.22 per cent over 1937. Slab zinc stocks in smelters' hands Dec. 31, 1939, were 65,995 tons, compared with 126,769 at the start of the year.

Steelmen Expect 10% Increase In Tin Plate Buying for 1940

CHICAGO

■ DOMESTIC tin plate buying in 1940 will compare favorably with amount sold in 1939, while overall demand may show an improvement of 8 to 10 per cent this year, it was indicated by steel men attending the thirty-third annual convention of National Canners association, Canning Machinery & Supplies association, National Food Brokers association and numerous related groups here, Jan. 21-26.

Sentiment of canners, largest consumers of American tin plate, showed improvement over a year ago. Carry-over pack this year was less and prices are more satisfactory. Showing of tin plate sales in 1940 will be determined by crops, and consequently, the magnitude of the pack.

Need for increased merchandising of canned products was stressed. Retiring President Walter L. Graefe, National Canners association said: "The canning industry, as I see it, has a two-fold task to perform. Its first job is to learn what consumers want; its second is to give consumers all available information about the industry, its problems, its policies, and its products. I have faith enough in the industry and enough confidence in the character of its products to believe that consumer education will make more and better customers for us."

Industry Up-To-Date

With respect to the setting up of standards and the labeling of its products the canning industry has kept abreast of the times and has met the changes required with a minimum of protest and confusion, E. J. Cameron, director, Washington research laboratory, National Canners association stated.

Considerable interest was aroused by Major Paul P. Logan, army industrial college, who addressed the canners on the war department's mobilization plan. During the past 15 years, he said, over 50,000 industries have been surveyed, and at present over 10,000 factories are allocated for wartime production. Some of these are very large, he pointed out, citing General Motors as one example of a single allocation.

The amazing part of the industrial mobilization work, Major Logan stated, has been the intense spirit of patriotism of the country's businessmen and their unselfish and unlimited co-operation. One large eastern company prepared a factory plan for wartime operation which cost them over $20,000 in engineering time and actual blueprints.

Under the government's allocation system the full capacity of an industrial plant is listed at 250 points when working three shifts. No matter what its importance, however, it cannot be allocated for war production beyond 200 points. Generally, no allocation will go beyond 125 points, or 50 per cent of productive capacity, insuring continued production and sales of peacetime products and a quicker return to normal after the war.

Twelve industrial states east of the Mississippi and north of the Ohio rivers produce 66 per cent of the nation's manufactured products, but will be called on to produce 86 per cent of the war load. Pennsylvania produces 9½ per cent

but will produce 24 per cent of the war load.

Speaking on "The Co-operative Era in Business and Government," Judge J. Harry Covington, National Canners counsel, suggested: "If the area of governmental action is to be kept within reasonable limits, the industry must make an earnest and continuing effort to solve its own problems. Within the legally permissive scope of trade association activity, much may be done. Indeed it is essential these days that the industry solve for itself those problems common to its members, if the legislative solution with its regulation and the consequent burdens of governmental bureaucracy are not to come."

Dr. Neil Carothers, dean, school of business administration, Lehigh university, Bethlehem, Pa., said: "So far as we can judge the matter now, we should be able to avoid going to war. If we do, what effect will the war have on our economic situation? The answer is that it will not very greatly affect us either way.

"In September the whole country seemed to think that we would have another war boom of the feverish and bloated type we had in 1916. That is most unlikely. On the other hand, the subsiding of the little boom last fall created widespread fear of a war depression. That also is most unlikely. The war will stimulate trade and industry in many ways. It will kill industry and trade in many other ways. The net balance should be in our favor."

TNEC Steel Hearing

(*Concluded from Page* 18)

They have not demonstrated the close relation that exists between the prices of iron and steel and the general level of prices of other goods."

Professor de Chazeau resumed the stand Friday to present the justice department's analysis made from returns to questionnaires sent to 59 steel companies. Study covered heavy structural shapes, plates, sheets and strip, incorporated 18 tables for each product.

The professor said the justice department and federal trade commission undertook to study the distribution of shipments of selected products and a more detailed examination of certain price characteristics for some of them.

Project was undertaken, he said, because no data were available for any recent period showing geographical distribution of steel products nor the magnitude of such pricing phenomena under the basing point system as freight absorption, phantom freight, mill net prices received, extent to which basing point formula of pricing was observed, or relative importance of extras in steel prices.

Walter B. Wooden, assistant chief counsel for federal trade commission, took charge of the hearing when consideration of the basing point system started. First steel witnesses called were Mr. Fairless and Avery C. Adams, U. S. Steel vice president. Mr. Fairless asked that he be questioned on policy and that Mr. Adams be allowed to answer basing point questions.

Mr. Adams told the committee the basing point system is a simple method of quoting delivered prices which results in competition of many geographically separated steel producers at markets for each of the diversified products of modern steel mills.

It is not, he testified, a price-fixing medium, nor does it result in high prices, nor does it stifle price competition. Rather it extends benefits of such competition to all consumers.

The U. S. Steel study prepared by Dr. Yntema includes a thorough study of the basing point system, illustrated with charts and diagrams, which was to be presented to the committee.

Committee expects to conclude the steel hearings early this week.

Steel Consumption Exceeds Purchasing

Orders Also Trailing Shipments; Output Extends Drop

MARKET IN TABLOID ★

Demand
Unchanged; buying slow, shipments active.

Prices
Steady; definite trend lacking in scrap.

Production
Down 3 points to 81½ per cent.

■ STEELMAKING continues to moderate steadily as backlogs shrink under the influence of a restricted volume of orders. Ingot production last week dropped 3 points to 81½ per cent, with further curtailment indicated in some districts this week.

The present situation is the direct opposite of that prevailing last quarter, when buying was well in excess of consumption and shipments. Finished steel deliveries and operations of metalworking plants are making a much more favorable showing than is indicated by mill bookings, but appearance of heavier orders awaits absorption of a larger share of tonnage on hand or due against previous commitments.

One exception to this circumstance is pipe, business in which compares favorably with that a month ago. However, pipe did not figure in anticipatory buying last quarter to the extent that prevailed in other products. Of note in the tubular market is placing of 16,000 tons of line pipe by Sohio Pipe Line Co.

Likelihood is seen that buyers will restrict subsequent purchases more closely to early needs. Finished steel prices are steady, but higher levels are not imminent, and while export demand gradually has increased since last September, it appears improbable mills will be so crowded with foreign business as to interfere seriously with domestic deliveries. How soon steel users will be required to become more active buyers remains problematical, although there are expectations that backlog reductions will be accompanied by at least a moderate upturn in purchases within another 30 days. Inquiries have appeared from some automotive interests for additional requirements which are counted on to be placed shortly. Ford is reported preparing to buy steel for 100,000 cars, probably closing on this material next week.

Slowness with which automobile assemblies are responding to seasonal influences, which commonly result in a downward trend at this time, reflects the generally satisfactory situation with respect to retail sales and dealer stocks. Motorcar production last week totaled 106,400 units, a decline of 2145 from the week before but comparing with 89,200 units a year ago. Small gains were shown by Chrysler and Ford; independent makers were practically unchanged and General Motors accounted for most of the reduction.

Unfavorable weather throughout the country is retarding outdoor construction work and inquiries for fabricated shapes and concrete reinforcing bars still lag, but orders are moderately heavier. Shape awards are headed by 3000 tons for a bridge, Jacksonville, Fla.; 2000 tons for a TVA dam in Kentucky; 1500 tons for a Philadelphia navy yard building; 1500 tons for an air corps hangar, Denver, and 1050 tons for naval depot magazines in Nevada.

Tin plate demand remains seasonally light, with output holding at 69 per cent. Opinion expressed at the recent convention of canners that 1940 tin plate business will be possibly 10 per cent ahead of 1939 allows for little change in domestic demand, with the margin accounted for by improved export sales.

Pig iron shipments have receded markedly in some areas, largely resulting from reduced needs of steelworks and consumption of material in stock. Foundry operations are well sustained, however, in many instances comparing favorably with the December rate. Export inquiries are heavier, particularly from Scandinavian countries.

Scrap markets are slow and prices have yet to follow a definite trend. The weather has been a strengthening factor, but this is offset by light demand from consumers. Stronger prices at Pittsburgh, while not indicative of the situation throughout the country, raise the composite 21 cents to $17.59. This is the first upturn in the composite in nearly four months.

Railroad purchases again are small. Outstanding are orders from Chile for 21 locomotives. A few thousand tons of rails have been placed by domestic roads, but freight car buying is scant.

Most steelmaking districts curtailed schedules last week, exceptions being unchanged rates of 80 per cent in eastern Pennsylvania, 94 at Birmingham, 83 at St. Louis and 74½ at Cincinnati. Reductions included 4 points to 78 at Pittsburgh, 1 point to 91 at Chicago, 16 points to 80 at Wheeling, 3 points to 67 at Buffalo, 8 points to 75 in New England, 4 points to 87 at Detroit, 8½ points to 74 at Cleveland and 6 points to 68 at Youngstown.

COMPOSITE MARKET AVERAGES

	Jan. 27	Jan. 20	Jan. 13	One Month Ago Dec., 1939	Three Months Ago Oct., 1939	One Year Ago Jan., 1939	Five Years Ago Jan., 1935
Iron and Steel	$37.09	$37.07	$37.09	$37.18	$37.62	$36.36	$32.58
Finished Steel	56.10	56.10	56.10	56.10	55.90	56.50	54.00
Steelworks Scrap..	17.59	17.38	17.46	13.88	21.45	14.77	12.03

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

COMPARISON OF PRICES

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

Finished Material

	Jan. 27, 1940	Dec. 1939	Oct. 1939	Jan. 1939
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.25c
Steel bars, Chicago	2.15	2.15	2.15	2.25
Steel bars, Philadelphia	2.47	2.47	2.47	2.57
Iron bars, Terre Haute, Ind.	2.15	2.15	2.13	2.15
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.225	2.275	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.00	2.15
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.20
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.00	2.15
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.20
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.50	2.45

Semifinished Material

Sheet bars, Pittsburgh, Chicago.	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods, No. 5 to 9/32-inch, Pitts.	2.00	1.98	1.92	1.92

Pig Iron

	Jan. 27, 1940	Dec. 1939	Oct. 1939	Jan. 1939
Bessemer, del. Pittsburgh	$24.34	$24.34	$24.34	$22.34
Basic, Valley	22.50	22.50	22.50	20.50
Basic, eastern, del. Philadelphia	24.34	24.34	24.34	22.34
No. 2 foundry, Pittsburgh	24.21	24.21	24.21	22.21
No. 2 foundry, Chicago	23.00	23.00	23.00	21.00
Southern No. 2, Birmingham	19.38	19.38	19.38	17.38
Southern No. 2, del. Cincinnati	22.89	22.89	22.89	20.89
No. 2X, del. Phila. (differ. av.)	25.215	25.215	25.215	23.215
Malleable, Valley	23.00	23.00	23.00	21.00
Malleable, Chicago	23.00	23.00	23.00	21.00
Lake Sup., charcoal, del. Chicago	30.34	30.34	30.34	28.34
Gray forge, del. Pittsburgh	23.17	23.17	23.17	21.17
Ferromanganese, del. Pittsburgh	105.33	105.33	105.33	90.25

Scrap

Heavy melting steel, Pittsburgh	$18.75	$18.50	$23.15	$15.60
Heavy melt. steel, No. 2, E. Pa.	16.50	17.60	20.00	13.25
Heavy melting steel, Chicago	16.50	16.50	19.25	13.75
Rails for rolling, Chicago	18.75	19.75	21.90	17.75
Railroad steel specialties, Chicago	18.50	19.90	21.75	16.00

Coke

Connellsville, furnace, ovens	$4.75	$4.75	$4.75	$3.75
Connellsville, foundry, ovens	5.75	5.75	5.80	5.00
Chicago, by-product fdry., del.	10.50	10.50	10.50	10.50

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

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

Sheet Steel

Hot Rolled

Pittsburgh	2.10c
Chicago, Gary	2.10c
Cleveland	2.10c
Detroit, del.	2.20c
Buffalo	2.10c
Sparrows Point, Md.	2.10c
New York, del.	2.34c
Philadelphia, del.	2.27c
Granite City, Ill.	2.20c
Middletown, O.	2.10c
Youngstown, O.	2.10c
Birmingham	2.10c
Pacific Coast points	2.60c

Cold Rolled

Pittsburgh	3.05c
Chicago, Gary	3.05c
Buffalo	3.05c
Cleveland	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.37c
New York, del.	3.39c
Granite City, Ill.	3.15c
Middletown, O.	3.05c
Youngstown, O.	3.05c
Pacific Coast points	3.65c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast points	4.00c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.80c
Pacific Coast	4.50c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.35c	3.95c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	24.00	35.00
Cold strip	22.00	22.50	32.00	52.00

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c
Philadelphia, del.	2.15c
Boston, delivered	2.46c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, Pa.	2.10c
Sparrows Point, Md.	2.10c
Claymont, Del.	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast points	2.60c

Steel Floor Plates

Pittsburgh	3.35c
Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	3.95c

Standard Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast points	2.70c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Bars

Soft Steel

(Base, 20 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Duluth	2.25c
Birmingham	2.15c
Cleveland	2.15c
Buffalo	2.15c
Detroit, delivered	2.25c
Philadelphia, del.	2.47c
Boston, delivered	2.52c
New York, del.	2.49c
Gulf ports	2.50c
Pacific Coast points	2.75c

Rail Steel

(Base, 5 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Detroit, delivered	2.25c
Cleveland	2.15c

Buffalo	2.15c
Birmingham	2.15c
Gulf ports	2.50c
Pacific Coast points	2.75c

Iron

Chicago, Terre Haute	2.15c
Philadelphia	2.37c
Pittsburgh, refined	3.50-8.00c

Reinforcing

*New Billet Bars, Base**

Chicago, Gary, Buffalo, Cleve., Birm., Young., Sparrows Pt., Pitts.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

*Rail Steel Bars, Base**

Pittsburgh, Gary Chicago, Buffalo, Cleveland, Birm.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

**Subject to a deduction of 25 cents per 100 lbs. in lots of 20 tons or over of one size, in lengths of 30 feet or over, for shipment at one time to one destination.*

Wire Products

Pitts-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard and cement coated wire nails	$2.55
(Per pound)	
Polished fence staples	2.55c
Galv. barbed wire, standard 12½ gage two-point hog, 80-rod spool $2.88; two-point cattle, 80-rod spool	$2.70
Annealed fence wire	3.05c
Galv. fence wire	3.30c
Woven wire fencing (base C. L. column)	67.00
Single loop bale tie, (base C. L. column)	56.00

To Manufacturing Trade

Base, Pitts. - Cleve. - Chicago-Birmingham (except spring wire)

Bright bess., basic wire	2.60c
Galvanized wire	2.65c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.

Cut Nails

Carload, Pittsburgh $3.85

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.65c	3.35c
Chicago	2.65c	3.35c
Gary, Ind.	2.65c	3.35c
Detroit	2.70c	*3.45c
Cleveland	2.65c	3.35c
Buffalo	2.65c	3.35c

* Delivered.

Alloy Bars (Hot)

(Base, 20 tons or over)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.70c
Detroit, delivered 2.80c

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

4100 0.15 to 0.25 Mo. 0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni. 1.10
5100 0.80-1.10 Cr. 0.45
5100 Cr. spring flats 0.15
6100 bars 1.20
6100 spring flats 0.85
Cr. N., Van. 1.50
Carbon Van. 0.85
9200 spring flats 0.15
9200 spring rounds, squares 0.40
Electric furnace up 50 cents.

Strip and Hoops

(Base, hot strip, 1 ton or over; cold, 3 tons or over)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.10c
Detroit, del.	2.20c
Philadelphia, del.	2.42c
New York, del.	2.46c
Pacific Coast points	2.70c
Cooperage hoop, Youngs., Pitts.; Chicago, Birm.	2.20c

Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown 2.80c
Chicago 2.90c
Detroit, del. 2.90c
Worcester, Mass. 3.00c

Carbon	Cleve., Pitts.
0.26—0.50	2.80c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass. $4 higher.

Commodity Cold-Rolled Strip

Pitts.-Cleve.-Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.35c

Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00

Cents per pound

Angle bars, billet, mills	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, for full containers additional 10%.

Carriage and Machine

½ x 6 and smaller	68.5 off
Do. larger, to 1-in.	66 off
Do. 1⅛ and larger	64 off
Tire bolts	52.5 off

Stove Bolts

In packages with nuts separate 72.5 off; with nuts attached add 15%; bulk 83.5 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts	60 off
Plow bolts	68.5 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
6-inch and less	67	70
⅞-1-inch	64	65
1⅛ and larger	62	62

Hexagon Cap Screws

Upset, 1-in., smaller ..... 70.0 off

Square Head Set Screws

Upset, 1-in., smaller ..... 75.0 off
Headless set screws ..... 64.0 off

Piling

Pitts., Chgo., Buffalo	2.40c
Gulf ports	2.85c
Pacific coast ports	2.90c

Rivets, Washers

Structural, Pittsburgh, Cleveland, Chicago	3.40c
½-inch and smaller, Pitts., Chi., Cleve.	65-10 off

Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

In.	Steel Blk.	Steel Galv.
½	63½	54
¾	66½	58
1—3	68½	60½

In.	Iron Blk.	Iron Galv.
¾	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

	Steel Blk.	Steel Galv.
2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½
9 and 10	64½	55
11 and 12	63½	54

	Iron Blk.	Iron Galv.
2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

	Steel Blk.	Steel Galv.
1 to 3, butt weld	67½	
2, lap weld	60	
2½ to 3, lap weld	63	
3½ to 6, lap weld	65	
7 and 8, lap weld	64	
10-inch lap weld	63½	
12-inch, lap weld	62½	

	Iron Blk.	Iron Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

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

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½"O.D.	13	$ 9.72	$23.71
1¾"O.D.	13	11.06	22.93
2" O.D.	13	12.38	19.35
2¼"O.D.	13	13.79	21.68
2¼"O.D.	12	15.16	.....
2½"O.D.	12	16.58	26.57
2¾"O.D.	12	17.54	29.00
3" O.D.	12	18.35	31.36
3½"O.D.	11	23.15	39.81
4" O.D.	10	28.66	49.90
5" O.D.	9	44.25	73.93
6" O.D.	7	68.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1 "O.D.	13	$ 7.82	$ 9.01
1¼"O.D.	13	9.26	10.67
1½"O.D.	13	10.23	11.79
1¾"O.D.	13	11.64	13.42
2" O.D.	13	13.04	15.03
2¼"O.D.	13	14.54	16.76
2¼"O.D.	12	16.01	18.45
2½"O.D.	12	17.54	20.21
2¾"O.D.	12	18.59	21.42
3" O.D.	12	19.50	22.48
3½"O.D.	11	24.62	28.37
4" O.D.	10	30.54	35.20
4½"O.D.	10	37.35	43.04
5" O.D.	9	46.87	54.01
6" O.D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$45.00-46.00
4-in., Birmingham	48.00-49.00
4-in., Chicago	56.80-57.80
6-in. & over, Chicago	53.80-54.80
6-in. & over, east fdy.	49.00
Do., 4-in.	52.00

Class A Pipe $3 over Class B Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Young., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young., Buffalo, Birm.	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to $\frac{9}{32}$-inch incl. (per 100 lbs.) $2.00
Do., over $\frac{9}{32}$ to $\frac{47}{64}$-in. incl. 2.15
Worcester up $0.10; Galveston up $0.25; Pacific Coast up $0.45.

Skelp

Pitts., Chi., Youngstown, Coatesville, Sparrows Pt. 1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$4.50- 4.75
Connellsville, fdry.	5.00- 5.75
Connell. prem. fdry.	5.75- 6.25
New River fdry.	6.25- 6.50
Wise county fdry.	5.50- 6.50
Wise county fur.	5.00- 5.25

By-Product Foundry

Newark, N. J., del.	11.38-11.85
Chicago, outside del.	10.50
Chicago, delivered	11.25
Terre Haute, del.	10.75
Milwaukee, ovens	11.25
New England, del.	12.50
St. Louis, del.	11.75
Birmingham, ovens	7.50
Indianapolis, del.	10.75
Cincinnati, del.	10.50
Cleveland, del.	11.05
Buffalo, del.	11.25
Detroit, del.	11.00
Philadelphia, del.	11.15

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	16.00c
Toluol, two degree	25.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c

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

Phenol (less than 1000 lbs.)	14.75c
Do. (1000 lbs. or over)	13.75c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	6.75c

Per ton, bulk, f.o.b. port

Sulphate of ammonia	$28.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$24.00	$24.50	$23.50	$25.00
Birdsboro, Pa.	24.00	24.50	23.50	25.00
Birmingham, Ala.§	19.38	....	18.38	24.00
Buffalo	23.00	23.50	22.00	24.00
Chicago	23.00	23.00	22.50	23.50
Cleveland	23.00	23.00	22.50	23.50
Detroit	23.00	23.00	22.50	23.50
Duluth	23.50	23.50	....	24.00
Erie, Pa.	23.00	23.50	22.50	24.00
Everett, Mass.	24.00	24.50	23.50	25.00
Granite City, Ill.	23.00	23.00	22.50	23.50
Hamilton, O.	23.00	23.00	22.50	....
Neville Island, Pa.	23.00	23.00	22.50	23.50
Provo, Utah	21.00	....	....	....
Sharpsville, Pa.	23.00	23.00	22.50	23.50
Sparrow's Point, Md.	24.00	....	23.50	....
Swedeland, Pa.	24.00	24.50	23.50	25.00
Toledo, O.	23.00	23.00	22.50	23.50
Youngstown, O.	23.00	23.00	22.50	23.50

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

Delivered from Basing Points:				
Akron, O., from Cleveland	24.39	24.39	23.89	24.89
Baltimore from Birmingham	24.78	....	23.66	....
Boston from Birmingham	24.12	....	....	....
Boston from Everett, Mass.	24.50	25.00	24.00	25.50
Boston from Buffalo	24.50	25.00	24.00	25.50
Brooklyn, N. Y., from Bethlehem	26.50	27.00	....	....
Canton, O., from Cleveland	24.39	24.39	23.89	24.89
Chicago from Birmingham	†23.22	....	....	....
Cincinnati from Hamilton, O.	23.24	24.11	23.61	....
Cincinnati from Birmingham	23.06	....	22.06	....
Cleveland from Birmingham	23.32	....	22.82	....
Mansfield, O., from Toledo, O.	24.94	24.94	24.44	24.44
Milwaukee from Chicago	24.10	24.10	23.60	24.60
Muskegon, Mich., from Chicago, Toledo or Detroit	26.19	26.19	25.69	26.69
Newark, N. J., from Birmingham	25.15	....	....	....
Newark, N. J., from Bethlehem	25.53	26.03	....	....
Philadelphia from Birmingham	24.46	....	23.96	....
Philadelphia from Swedeland, Pa.	24.84	25.34	24.34	....
Pittsburgh district from Neville Island	‡Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	25.31	25.31	24.81	25.81
St. Louis, northern	23.50	23.50	23.00	....
St. Louis from Birmingham	†23.12	....	22.62	....
St. Paul from Duluth	25.63	25.63	....	26.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $28.50, base; $29.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$22.50	Lake Superior fur.	$27.00
Pitts. dist. fur.	22.50	do., del. Chicago	30.34
		Lyles, Tenn.	26.50

†Silvery

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

Bessemer Ferrosilicon†

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

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

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

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	55.10
Birmingham, Ala.	47.50

Ladle Brick

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

Dry press	$28.00
Wire cut	$26.00

Magnesite

Domestic dead - burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

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

Chrome brick	$50.00
Chem. bonded chrome	50.00
Magnesite brick	72.00
Chem. bonded magnesite	61.00

Fluorspar

Washed gravel, duty pd., tide, net ton	$25.00-$26.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail.	22.00
Do. barge	22.00
No. 2 lump	22.00

Ferroalloy Prices

Ferromanganese, 78-82%, lump and bulk, carlots tide., duty pd. $100.00
Ton lots 110.00
Less ton lots 113.50
Less 200 lb. lots 118.00
Do., carlots del. Pitts. 105.33

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 32.00
Do., 26-28% 39.50

Ferrosilicon, 50% freight allowed, c.l. 69.50
Do., ton lot 82.00
Do., 75 per cent 126.00
Do. ton lots 142.00
Spot, $5 a ton higher.

Silicomanganese, c.l., 2½ per cent carbon, 103.00
2% carbon, 108.00; 1%, 118.00
Contract ton price $12.50 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 2.00-2.10

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 11.00c
Do., ton lots 11.75c
Do., less-ton lots 12.00c

67-72% low carbon:

	Carloads	Ton lots	Less ton
2% carb.	17.50c	18.25c	18.75c
1% carb.	18.50c	19.25c	19.75c
0.10% carb.	20.50c	21.25c	21.75c
0.20% carb.	19.50c	20.25c	20.75c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do, less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls $2.25
Do., less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50
Do, spot 145.00
Do, contract, ton lots 145.00
Do, spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do, spot 160.00
Do, contract, ton lots. 160.00
Do, spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do, ton lots 8.00c
Do, less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract, freight allowed, lb. spot carlots, bulk 7.00c
Do., ton lots 7.50c
Do., less-ton lots 7.75c
Do., less 200 lbs. 8.00c
Spot, ¼c higher.

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.50
Do., smaller lots 2.60

Vanadium Pentoxide, contract, lb. contained $1.10
Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 84.00c
Do., spot 89.00c
88% chrome, contract 83.00c
Do., spot 88.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ¼-in., lb. 14.00c
Do., 2% 12.50c
Spot ¼c higher

Silicon Briquets, contract carloads, bulk, freight allowed, ton $69.50
Ton lots 79.50
Less-ton lots, lb. 3.75c
Less 200 lb. lots, lb. 4.00c
Spot ¼-cent higher.

Manganese Briquets, contract carloads, bulk freight allowed, lb. 5.00c
Ton lots 5.50c
Less-ton lots 5.75c
Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, bulk, gross ton $97.50
Do, spot 102.50
34-40%, contract, carloads, lb., alloy 14.00c
Do, ton lots 15.00c
Do, less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60
Do, 100-200 lb. lots 2.75
Do, under 100-lb. lots 3.00

Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant 80.00c

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars: Carbon	Cold Drawn Bars: SAE 2300	Cold Drawn Bars: SAE 3100
Boston	3.98	4.16	5.16	3.85	3.85	5.66	3.81	4.78	4.86	3.46	4.13	8.63	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	5.23	3.51	4.09	8.59	7.19
Philadelphia	3.85	3.85	4.35	3.55	3.55	5.25	3.55	4.55	4.75	3.51	4.06	8.56	7.16
Baltimore	3.95	4.05	4.45	3.70	3.70	5.25	3.55	....	5.05	....	4.05	....	....
Norfolk, Va.	4.15	4.25	....	3.90	3.90	5.45	3.75	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	6.40	4.20	4.40	4.50	3.42	3.75	8.15	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.75	3.35	3.65	8.35	6.95
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.72	3.20	3.75	8.15	6.75
Detroit	3.43	3.43	3.68	3.60	3.65	5.27	3.43	4.50	4.84	3.40	3.80	8.45	7.05
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.37	4.67	3.45	4.00	8.50	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.35	4.30	4.85	3.50	3.75	8.15	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.60	4.95	5.00	3.83	4.34	8.84	7.44
Milwaukee	3.63	3.73	3.73	3.68	3.68	5.28	3.48	4.43	4.98	3.54	3.88	8.38	6.98
St. Louis	3.62	3.72	3.72	3.47	3.47	5.07	3.38	4.32	4.95	3.61	4.02	8.52	7.12
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	.	5.00	...	4.30	....	....
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	....	5.25	....	4.31	....	....
Chattanooga	3.80	3.90	3.90	3.85	3.85	5.68	3.65	....	4.40	....	4.39	....	....
Tulsa, Okla.	4.44	4.54	4.54	4.33	4.33	5.93	4.24	....	5.71	....	4.69	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.88	3.40	. .	4.75	. .	4.43	....	....
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	4.80	5.00	4.60	....	....
Houston, Tex.	4.05	6.20	6.20	4.05	4.05	5.75	4.20	...	5.25	....	....	....	....
*Seattle	4.00	4.00	5.35	3.40	3.50	5.75	3.95	6.50	4.75	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	4.75	....	5.75	....	....
Los Angeles	4.15	4.65	6.45	4.00	4.00	6.40	4.30	6.50	5.25	....	6.60	10.65	9.80
San Francisco	3.50	3.70	6.00	3.35	3.35	5.60	3.40	6.40	5.15	....	6.80	10.65	9.80

	SAE Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.18	7.50	6.05	5.80	7.90
New York (Met.)	4.04	7.35	5.90	5.65	....
Philadelphia	4.10	7.31	5.86	5.61	8.56
Baltimore	4.10	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.10	5.65	5.40	7.50
Pittsburgh	3.40	7.35	5.95	5.50	7.60
Cleveland	3.30	7.30	5.85	5.85	7.70
Detroit	3.48	7.42	5.97	5.72	7.19
Cincinnati	3.65	7.44	5.99	5.74	7.84
Chicago	3.70	7.10	5.65	5.40	7.50
Twin Cities	3.95	7.45	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.82	7.47	6.02	5.77	7.87
Seattle	5.85	....	8.00	7.85	8.65
Portland, Oreg.	5.70	8.85	8.00	7.85	8.65
Los Angeles	4.80	9.40	8.55	8.40	9.05
San Francisco	5.00	9.65	8.80	8.65	9.30

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds, except 0-1999 pounds (hot rolled sheets only) in New York; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland, Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in Birmingham.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Kansas City and St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 300-4999 in San Francisco, Portland; any quantity in Twin Cities; 300-1999 in Los Angeles.

Galvanized Sheets: Base, 0-1499 pounds in New York, 150-1499 pounds in Cleveland, Milwaukee, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-4999 in Portland, Seattle, San Francisco; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, St. Louis, Tulsa; 1500 and over in Chattanooga, Philadelphia; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, Jan. 25

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports	£ s d	Continental Channel or North Sea ports, gross tons: Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	$23.94	6 0 0	$29.82	3 10 0
Basic bessemer	.....	.....	19.59	2 6 0
Hematite, Phos. .03-.05	24.94	6 5 0	.....	.....
Billets	$29.43	7 7 6	$31.95	3 15 0
Wire rods, No. 5 gage	45.39	11 7 6	61.34	7 4 0
Standard rails	$37.90	9 10 0	$48.99	5 15 0
Merchant bars	2.18c	12 5 0	2.91c	7 13 0
Structural shapes	1.98c	11 2 6	2.92c	7 13 6
Plates, †¼ in. or 5 mm.	2.11c	11 17 6	3.75c	9 17 6
Sheets, black, 24 gage or 0.5 mm.	2.78c	15 12 6	3.52c	9 5 0°
Sheets, gal., 24 ga., corr.	3.23c	18 2 6	4.62c	12 3 0
Bands and strips	2.18c	12 5 0	2.77c	7 6 0
Plain wire, base	3.47c	19 10 0	3.04c	8 0 0
Galvanized wire, base	4.14c	23 5 0	3.61c to 3.66c	9 10 0 to 9 12 6
Wire nails, base	.....	.....	5.52c	9 5 0
Tin plate, box 108 lbs.	$ 6.28	1 11 6	.....	.....

British ferromanganese $100.00 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d		French Francs		Belgian Francs		Reich §§Mark
Fdy. pig iron, Si. 2.5	$21.54	5 8 0(a)	$17.65	781	$27.12	800	$25.33	63
Basic bess. pig iron	20.25	5 1 6(a)	.....	...	24.41	720	27.94	(b)69.50
Furnace coke	5.84	1 9 2	5.09	225	10.51	310	7.64	19
Billets	33.42	8 7 6	25.58	1.132	29.15	860	38.79	96.50
Standard rails	1.81c	10 3 0	1.55c	1,545	2.06c	1,375	2.38c	132
Merchant bars	2.28c	12 16 0††	1.43c	1,434	2.06c	1,375	1.98c	110
Structural shapes	2.03c	11 8 0††	1.40c	1,395	2.06c	1,375	1.93c	107
Plates, †¼-in. or 5 mm.	2.05c	11 10 6††	1.82c	1,815	2.42c	1,610	2.29c	127
Sheets, black	2.87c	16 2 6§	2.15c	2,154‡	2.85c	1,900‡	2.59c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	3.32c	18 12 6	2.85c	2,850	4.58c	3,050	6.66c	370
Plain wire	3.20c	18 0 0	2.00c	2,000	3.00c	2,000	3.11c	173
Bands and strips	2.41c	13 11 0††	1.59c	1,588	2.18c	1,450	2.29c	127

†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. 5s rebate to approved customers. (b) hematite. °Close annealed. ††Rebate of 15s on certain conditions.

**Gold pound sterling not quoted. §§Last prices, no current quotations.

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, No. 1.	16.50-17.00
Bos. dock No. 1 exp.	15.00-15.50
New Eng. del. No. 1	15.50
Buffalo, No. 1	17.00-17.50
Buffalo, No. 2	15.00-15.50
Chicago, No. 1	16.50
Chicago, auto, no alloy	15.00-15.50
Chicago, No. 2 auto	13.00-13.50
Cincinnati dealers..	14.00-14.50
Cleveland, No. 1....	17.00-17.50
Cleveland, No. 2....	16.00-16.50
Detroit, No. 1	†13.00-13.50
Detroit, No. 2	†12.00-12.50
Eastern Pa., No. 1..	17.50-18.00
Eastern Pa., No. 2..	16.50
Federal, Ill.	14.00-14.50
Granite City, R. R..	15.00-15.50
Granite City, No. 2.	14.00-14.50
Los Angeles, No. 1..	16.00-16.50
Los Angeles, No. 2..	15.00-15.50
L. A., No. 1 f.a.s.	17.00-18.00
L. A., No. 2 f.a.s.	16.00-17.00
N. Y. dock No. 1 exp.	14.50
Pitts., No. 1 (R. R.).	19.50-20.00
Pittsburgh, No. 1 ..	18.50-19.00
Pittsburgh, No. 2 ..	16.50-17.00
St. Louis, R. R.	15.00-15.50
St. Louis, No. 2	14.50-15.00
San Francisco, No. 1	16.50-17.00
San Francisco, No. 2	15.50-16.00
Seattle, No. 1	14.50-15.50
Toronto, dlrs., No. 1	11.00
Valleys, No. 1	17.50-18.00

COMPRESSED SHEETS

Buffalo, new	15.00-15.50
Chicago, factory	15.50-16.00
Chicago, dealers	14.00-14.50
Cincinnati, dealers..	13.50-14.00
Cleveland	16.50-17.00
Detroit	†13.50-14.00
E. Pa., new mat.	18.00
E. Pa., old mat.	14.00-14.50
Los Angeles	13.50-14.00
Pittsburgh	18.50-19.00
St. Louis	11.50-12.00
San Francisco	13.50-14.00
Valleys	17.00-17.50

BUNDLED SHEETS

Buffalo, No. 1	15.00-15.50
Buffalo, No. 2	13.00-13.50
Cleveland	13.50-14.00
Pittsburgh	16.50-17.00
St. Louis	10.00-10.50
Toronto, dealers	9.75

SHEET CLIPPINGS, LOOSE

Chicago	10.50-11.00
Cincinnati dealers..	9.50-10.00
Detroit	†9.25- 9.75
St. Louis	9.50-10.00
Toronto, dealers...	9.00

BUSHELING

Birmingham, No. 1..	14.00
Buffalo, No. 1	15.00-15.50
Chicago, No. 1	15.00-15.50
Cincin., No. 1, deal.	11.50-12.00
Cincinnati, No. 2...	5.00- 5.50
Cleveland, No. 2	11.50-12.00
Detroit, No. 1, new.	†12.50-13.00
Valleys, new, No. 1	16.50-17.00
Toronto, dealers	5.00- 5.50

MACHINE TURNINGS (Long)

Birmingham	6.00
Buffalo	10.50-11.00
Chicago	10.00-10.50
Cincinnati, dealers..	6.50- 7.00
Cleveland, no alloy.	10.50-11.00
Detroit	†7.50- 8.00
Eastern Pa.	12.00-12.50
Los Angeles	4.00- 5.00
New York	†7.00- 7.25
Pittsburgh	12.50-13.00
St. Louis	7.50- 8.00
San Francisco	5.00
Toronto, dealers...	6.50
Valleys	11.50-12.00

SHOVELING TURNINGS

Buffalo	13.50-14.00
Cleveland	11.50-12.00
Chicago	10.00-10.50
Chicago, spcl, anal.	12.50-13.00
Detroit	†9.50-10.00
Pitts., alloy-free	14.00-14.50

BORINGS AND TURNINGS
For Blast Furnace Use

Boston district	†5.65- 6.00
Buffalo	11.00-11.50
Cincinnati, dealers..	5.00- 5.50
Cleveland	11.00-11.50
Eastern Pa.	10.50-11.00
Detroit	†7.50- 8.00
New York	†7.00- 7.50
Pittsburgh	12.00-12.50
Toronto, dealers...	6.00

AXLE TURNINGS

Buffalo	17.00-17.50
Boston district	†9.50-10.00
Chicago, elec. fur.	16.00-16.50
East. Pa. elec. fur..	16.50-17.00
St. Louis	10.50-11.00
Toronto	6.00- 6.50

CAST IRON BORINGS

Birmingham	8.50
Boston dist. chem...	†9.00- 9.25
Buffalo	11.00-11.50
Chicago	9.50-10.00
Cincinnati, dealers..	5.00- 5.50
Cleveland	11.00-11.50
Detroit	†7.50- 8.00
E. Pa., chemical	14.50-15.00
New York	†7.00- 7.50
St. Louis	6.00- 6.50
Toronto, dealers...	6.00

RAILROAD SPECIALTIES

Chicago	18.25-18.75

ANGLE BARS—STEEL

Chicago	18.50-19.00
St. Louis	15.50-16.00

SPRINGS

Buffalo	20.00-20.50
Chicago, coil	19.50-20.00
Chicago, leaf	18.00-18.50
Eastern Pa.	23.00
Pittsburgh	23.00-23.50
St. Louis	17.25-18.50

STEEL RAILS, SHORT

Birmingham	17.50-18.00
Buffalo	22.00-22.50
Chicago (3 ft.)	19.00-19.50
Chicago (2 ft.)	19.50-20.00
Cincinnati, dealers..	20.50-21.00
Detroit	†19.50-20.00
Pitts., 3 ft. and less	23.00-23.50
St. Louis, 2 ft. & less	19.50-20.00

STEEL RAILS, SCRAP

Birmingham	15.50
Boston district	†14.00-14.50
Buffalo	17.50-18.00
Chicago	16.25-16.75
Cleveland	21.00-21.50
Pittsburgh	22.00-22.50
St. Louis	16.00-16.50
Seattle	18.00-18.50

FROGS, SWITCHES

Chicago	16.00-16.50
St. Louis, cut	15.50-16.00

ARCH BARS, TRANSOMS

St. Louis	15.50-16.00

PIPE AND FLUES

Chicago, net	11.00-11.50
Cincinnati, dealers..	11.00-11.50

RAILROAD GRATE BARS

Buffalo	12.00-12.50
Chicago, net	10.50-11.00
Cincinnati, dealers..	9.00- 9.50
Eastern Pa.	15.00
New York	†12.00-12.50
St. Louis	11.50-12.00

RAILROAD WROUGHT

Birmingham	15.00
Boston district	†9.50-10.00
Eastern Pa., No. 1..	18.00-18.50
St. Louis No. 1	12.50-13.00
St. Louis, No. 2	15.00-15.50

FORGE FLASHINGS

Boston district	†11.25-11.50
Buffalo	15.00-15.50
Cleveland	16.00-16.50
Detroit	†12.00-12.50
Pittsburgh	16.50-17.00

FORGE SCRAP

Boston district	†7.00
Chicago, heavy	19.00-19.50

LOW PHOSPHORUS

Cleveland, crops	22.50-23.00
Eastern Pa., crops..	22.00-22.50
Pitts., billet, bloom, slab crops	24.50-25.00

LOW PHOS. PUNCHINGS

Buffalo	20.00-20.50
Chicago	19.00-19.50
Cleveland	18.50-19.00
Eastern Pa.	22.50-23.00
Pittsburgh	22.50-23.00
Seattle	15.00
Detroit	†13.75-14.25

RAILS FOR ROLLING
5 feet and over

Birmingham	17.50
Boston	†15.75-16.00
Chicago	18.50-19.00
New York	†17.50-18.00
Eastern Pa.	21.50-22.00
St. Louis	18.00-18.50

STEEL CAR AXLES

Birmingham	19.00-20.00
Boston district	†16.00-16.50
Chicago, net	20.50-21.00
Eastern Pa.	22.00
St. Louis	18.50-19.00

LOCOMOTIVE TIRES

Chicago (cut)	19.00-19.50
St. Louis, No. 1	16.50-17.00

SHAFTING

Boston district	†18.50-18.75
New York	†18.00-18.50
Eastern Pa.	23.00-23.50
St. Louis, 1¼-3¾"...	17.50-18.00

CAR WHEELS

Birmingham, iron	19.00-20.00
Boston dist., iron	†14.50-15.00
Buffalo, steel	21.50-22.00
Chicago, iron	17.00-17.50
Chicago, rolled steel	18.50-19.00
Cincin., iron, deal...	17.00-17.50
Eastern Pa., iron	20.00-20.50
Eastern Pa., steel..	22.00-22.50
Pittsburgh, iron	19.50-20.00
Pittsburgh, steel	23.00-23.50
St. Louis, iron	16.75-17.25
St. Louis, steel	17.00-17.50

NO. 1 CAST SCRAP

Birmingham	16.00
Boston, No. 1 mach.	†15.00-15.25
N. Eng. del. No. 2..	14.00-14.50
N. Eng. del. textile	18.25-18.75
Buffalo, cupola	17.00-17.50
Buffalo, mach.	18.00-18.50
Chicago, agri. net..	13.50-14.00
Chicago, auto net..	15.00-15.50
Chicago, railroad net	14.00-14.50
Chicago, mach. net.	14.50-15.00
Cincin., mach. deal..	16.50-17.00
Cleveland, mach.	20.00-21.00
Detroit, cupola, net..	†14.50-15.00
Eastern Pa., cupola.	20.50-21.00
E. Pa., No. 2 yard..	16.00-16.50
E. Pa., yard fdry...	17.00-17.50
Los Angeles	15.50-16.00
Pittsburgh, cupola..	18.50-19.00
San Francisco	15.50-16.00
Seattle	16.00-16.50
St. Louis, breakable	14.00-14.50
St. Louis agri. mach.	17.00-17.50
St. L., No. 1 mach...	17.50-18.00
San Francisco	16.00-17.00
Toronto, No. 1 mach., net dealers	15.50

HEAVY CAST

Boston dist. break..	†15.00-16.00
New England, del...	15.00-15.50
Buffalo, break	15.00-15.50
Cleveland, break, net	15.25-15.75
Detroit, auto net..	†15.50-16.00
Detroit, break	†11.00-11.50
Eastern Pa.	18.00
Los Ang., auto, net.	14.50
New York break...	†14.50-15.00
Pittsburgh, break ..	16.00-16.50

STOVE PLATE

Birmingham	11.00
Boston district	†11.00-11.50
Buffalo	13.50-14.00
Chicago, net	9.00- 9.50
Cincinnati, dealers..	9.00- 9.50
Detroit, net	†9.00- 9.50
Eastern Pa.	15.00
New York, fdy.	13.00
St. Louis	11.50-12.00
Toronto dealers, net	11.50

MALLEABLE

Birmingham, R. R..	17.50
New England, del...	20.00-21.00
Buffalo	17.00-17.50
Chicago, R. R.	18.50-19.00
Cincin., agri., deal..	14.00-14.50
Cleveland, rail	22.50-23.00
Eastern Pa., R. R. ..	21.50-22.00
Los Angeles	12.50
Pittsburgh, rail	20.50-21.00
St. Louis, R. R.	16.50-17.00

Ores

Lake Superior Iron Ore

Gross ton, 51½ %
Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbessemer	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbessemer..	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract.	9.00-10.00

Foreign Ore (Prices nominal)

Cents per unit, c.i.f. Atlantic

Manganiferous ore, 45-55% Fe., 6-10% Mn.	14.00-15.00
Swedish low phos.	14.00
North African low phos.	14.00
Spanish, No. African basic, 50 to 60%..	14.00
Chinese wolframite, short ton unit, duty paid	$23.75-24.00
Scheelite, imp.	$24.00-25.00
Chrome ore, 48% gross ton, c.i.f.	$26.00-28.00

Manganese Ore

Including war risk but not duty, cents per unit cargo lots.

Caucasian, 50-52%..	48.00-50.00
So. African, 50-52%	48.00-50.00
Indian, 49-50%	nom.
Brazilian, 48-52%..	46.00-48.00
Cuban, 50-51%, duty free	61.20

Molybdenum

Sulphide conc., per lb., Mo. cont., mines	$0.75

—The Market Week—

Sheets, Strip

Sheet & Strip Prices, Page 70, 71

Pittsburgh—Sheet and strip specifications have moderated somewhat, and open spaces are beginning to appear in backlogs. Business is about 50 per cent of capacity. Sheet mills are operating near 75 per cent of total capacity, indicating active units are at 85 to 90. Some automotive inquiries have been received, but as yet there is little indication of the extent of spring purchases. Pressure for lower prices on automotive sheets so far has been slight.

Cleveland—Orders have made little progress toward catching up with shipments, but better business from automotive interests is in early prospect. Absorption of tonnage remaining to be shipped against old commitments also will be followed by renewed buying on the part of many users, since consumption continues relatively active. Deliveries are improving steadily, with shipments still heavy.

Chicago — Sheet and strip buying is steady but comparatively light. Heavier orders are looked for within the next two to three weeks. Automotive and farm equipment requirements continue substantial. Additional automotive orders are expected to be placed within a few weeks.

Boston—Narrow strip mill operations continue near capacity, with orders close to 65 per cent of shipments. Demand, following recent improvement in buying, has leveled off. Although makers of automobile parts are well stocked in many instances, there has been some gain in business from the automotive trade. Sheet buying is slow, consumers and distributors operating largely on inventories.

New York — Specifications from electric refrigerator manufacturers are being stepped up, and in general sheet consumption is still active. Manufacturers' stocks, as a result, are not large; jobbers' stocks, however, are fairly sizable. Mill deliveries are easier at around four weeks in most cases, both with respect to hot and cold-rolled sheets.

Narrow cold strip demand has leveled off, following recent slight improvement in buying. Orders are close to 65 per cent of shipments which are heavy. Mill operations are maintained, and, although backlogs are lower, enough tonnage is on books to hold production for several weeks at least.

Philadelphia—Both hot and cold sheet deliveries average around four weeks. Where galvanized sheets can not be had in stock, de-

liveries are offered in about four to five weeks. Certain specialties are even more extended. Casket makers, now at the height of their production season, are consuming considerable tonnage of long ternes, practically all against orders placed last fall, at which time deliveries were far extended. In general, sheet demand is a little more active; however, shipments still substantially exceed orders.

Buffalo—The lag in buying so far had not had any serious effect on production. Heavier orders are expected soon, with the automotive industry counted on for renewed purchasing early in February.

Cincinnati — Sheet business is up to about 55 per cent of capacity, compared with shipments of 80 per cent or better. Automotive purchasing reflects heavy commitments made last quarter, but inquiries point to better buying in February and March.

St. Louis—While producers have been cutting heavily into unfilled orders, production is maintained at the best rate in recent months. Deliveries are much freer, and there has been a moderate lag in specifications from certain consumers. Some new bookings are reported, principally in enameling stock, black and galvanized.

Toronto, Ont.—Sheets continue in active demand. Shipments are heavy against contract but no sheets are available for spot shipment. Producers are confirming current prices to the end of the quarter, but beyond March are stipulating price on delivery. First half bookings are heavy.

Detroit—Ford Motor Co. is reported preparing to buy steel for 100,000 cars, probably placing orders next week. Orders have been light for several weeks, and while backlogs can sustain active mill operations a few more weeks, some concern is being expressed over failure of new business to develop, especially in sheets and strip. Reports circulated here of price concessions on certain sheet grades arose out of misinterpretation of the spread maintained by hand mills under continuous mill products.

Plates

Plate Prices, Page 70

Boston—Plate buying is light and spotty, less-car-lot orders predominating. Deliveries have improved and on more common widths of medium black plates are back to normal. Specified projects, including tanks, are few. Boiler and structural shops buy in small lots only. Railroads have not materially increased specifications, but shipbuilding requirements tend upward. Miscellaneous industrial orders are light.

Philadelphia—Orders are 50 to 60 per cent of shipments, with deliveries now available within a week to ten days in most cases. Ship releases are rather light. Pusey & Jones, Wilmington, Del., still are negotiating on about 5500 tons of steel for two maritime commission boats now on order. New York Shipbuilding Corp., Camden, N. J., is figuring on two cruisers, on which bids close late this month and which require several thousand tons of steel.

San Francisco — No award has been made on 2000 to 5000 tons for a wind tunnel at Moffett Field, Calif., on which Consolidated Steel Corp. is low. Awards totaled 11,800 tons, bringing the aggregate to date to 12,180 tons, compared with 2678 tons for the same period a year ago. Bids are expected to be called for soon on 6000 tons for replacement work in connection with a Los Angeles aqueduct.

Toronto, Ont.—Inquiries are increasing, with mills booked well forward. Specifications for ship plates are expected soon. Canadian plants will not be able to handle all the orders on this account, and there now seems to be some doubt that any large tonnage will be available from Great Britain, thus most orders will go to the United States. Plate mills are operating at capacity.

Plate Contracts Placed

650 tons, three oil barges, afloat, Ohio river, Standard Oil Co. of Ohio, to Dravo Corp., Pittsburgh.

Bars

Bar Prices, Page 70

Cleveland—Orders continue relatively light and are insufficient to prevent a further recession in backlogs. Delivery occasionally is a factor in placing spot business, but in most cases buyers have comfortable inventories and are not pressing for shipment. Unfilled tonnages and active consumption point to a comparatively heavy movement of bars through the quarter.

Boston — Leading consumers of carbon steel bars continue to operate largely on inventories, and new buying is slow. Jobbers' specifications are also lighter, warehouses filling a substantial part of current demand. Consumption is well maintained, however. Dullness in alloys is less apparent, with deliveries on some sizes and finishes still close to six weeks. Machine tool builders, forgers of small tools and airplane shops are active consumers of alloys.

Chicago — Bar production continues heavy, but buying shows no improvement at about 50 per cent of shipments. Automotive and farm equipment requirements are outstanding. Little change in demand is thought likely until next month. Meanwhile deliveries are improving as backlogs shrink.

New York—Most sellers of carbon bars are quoting deliveries in about three weeks, schedules being generally better. Consumption continues active and there is still pressure for shipment. Cold-drawn bars are available in three to four weeks, with schedules on alloy bars more extended.

Philadelphia — Commercial bar shipments are now available from several mills in two or three weeks; certain sellers, however, still cannot do much under four to five weeks. Consumption is reasonably well sustained on practically all grades. Small forgers are busy in production of hand tools and other equipment, while most of the large forgers are well engaged in ship work.

Buffalo — Backlogs provide the chief support to bar mill operations. A few inquiries are appearing, but buying holds below shipments. Orders on hand and in prospect are expected to continue active production through the quarter.

Pipe

Pipe Prices, Page 71

Pittsburgh — Pipe orders so far this month are close to the rate a month ago. Increased demand for oil country goods has offset declines in mechanical and pressure tubing and orders for standard pipe have reappeared after suspension during the inventory period. Unfavorable weather, restricting construction work, has affected standard pipe demand somewhat. Prices are steady except for occasional weakness in some resale markets.

Boston—Dullness in the building industry is reflected in slow demand for small-diameter steel pipe. Plumbing supply purchases are limited to fill-in needs. Resale prices in some districts are subject to minor discounts. Cast pipe inquiry is down seasonally. While a few municipalities are beginning to estimate spring requirements, most small towns will not enter the market until after the town meeting

period, when appropriations are made.

Cleveland—Business in tubular products is fairly active, being better sustained than in the average of other steel commodities. This situation reflects the absence of anticipatory buying last fall to the extent prevailing in bars, sheets, etc. Outstanding in oil company purchases is the placing of about 16,000 tons of 12¾-inch pipe for an oil line to be laid in Illinois and Indiana for Sohio Pipe Line Co.

Seattle—Inquiries are developing slowly and no large projects are out. Seattle has received bids for 135 tons of 16-inch cast iron. Spokane is in the market, bids Feb. 1, for 200 tons of 36-inch cast iron pipe, valves, hydrants and 41,000 feet of copper service pipe. Heppner, Oreg., opened bids Jan. 27 for 4000 feet pre-calked cast iron pipe, alternate black steel pipe.

San Francisco — Some improvement in demand for cast iron pipe is noted and movement of carload lots is normal. No awards of size were reported and so far this year 1027 tons have been placed as compared with 1755 tons for the corresponding period in 1939.

Steel Pipe Placed

16,000 tons, 12¾-inch line pipe, 150-mile line between Stoy, Ill., and Hagerstown, Ind., for Sohio Pipe Line Co., subsidiary of Standard Oil Co. of Ohio, to National Tube Co., Pittsburgh, and Republic Steel Corp., Cleveland; Truman Smith Construction Co., Eldorado, Kans., and Sheehan Pipe Line Construction Co., Tulsa, Okla., general contractors.

Cast Pipe Pending

1000 tons, 6 to 12-inch, Phoenix, Ariz.; bids opened.

200 tons, 36 in. and fittings, Spokane, Wash.; bids Feb. 1.

100 tons, 4 to 8 in., open bell, and fittings; bids to Adah Perry, clerk, Pasco, Wash., Feb. 1.

Wire

Wire Prices, Page 71

Pittsburgh—Wire products are moving slightly better, although business continues behind December. Releases of manufacturers' wire are active, and nearness of the spring season is bringing some demand from buyers of merchant products. Considerable hope is held for heavy buying in farm areas thi spring, and automotive needs also are expected to be heavy. Export demand has been good, but financing difficulties have deterred placing of some business.

Cleveland—Wire rod shipments still are receiving strong support from sizable backlogs. Deliveries are improving on this product as well as on manufacturers' wire and merchant items. Orders and production hold below December levels, with consumption relatively brisk.

Chicago — Buying of wire and wire products is spotty. Shipments have been heavy and stocks of some consumers are sufficient to permit them to refrain from additional ordering for the present. Heavier purchasing is expected before the middle of February. Mill backlogs will help to prolong present operations through next month. Automotive and farm equipment interests provide the best source of current demand.

Boston — The upward trend in wire buying has flattened out, although recent moderate gains are maintained. New business is reaching mills at about 65 per cent of shipments, which are heavy. Specifications against old orders are steady and demand is well diversified. Rod producers are heavily booked. Orders for rope are im-

proved and specialties are moving well. Mill operations hold near capacity. Merchant products are slightly more active.

New York—Recent slight improvement in new wire buying is maintained. Additional gains, however, are few and scattered, demand having leveled off. Shipments continue heavy and incoming business is approximately 65 per cent of deliveries. Finishing operations are still near capacity in numerous departments.

Rails, Cars

Track Material Prices, Page 71

Award of 21 locomotives by the Chilean State Railways, 11 of narrow gage, represents the largest export purchase of locomotives in this country in considerable time. Ten standard gage locomotives of the heavy moutain type, went to American Locomotive Co., New York, at more than $1,000,000; six passenger and five heavy mountain type freight units went to Baldwin Locomotive Works, Eddystone, Pa. The latter order amounted to $725,00

Chicago, Burlington & Quincy will place its tenth Zephyr streamline train in service early in 1940, now under construction by the Edward G. Budd Mfg. Co., Philadelphia. Two others are being planned for service between Ft. Worth, Tex., and Denver about midyear.

Car Orders Placed

General Chemical Co., 75 seventy-ton tank cars, to General American Transportation Corp., Chicago.

Car Orders Pending

Alaska Railroad, Seattle; two passenger coaches, 30 freight cars, 10 refrigerator, 10 flat cars; bids soon to purchasing agent.

Chief of army engineers, 30 freight cars; Greenville Steel Car Co., Greenville, Pa., apparently low on 24 box cars, Haffner-Thrall Car Co., Chicago, low on 6 flat cars.

Minneapolis & St. Louis, 10 covered hopper cars.

New York Central, 25 to 40 passenger cars; bids Feb. 6.

United States navy, one box car, one gondola, one or two flat cars, all 50 tons; bids Feb. 9. Bids Feb. 13 on one 12,500-gallon tank car.

Rail Orders Placed

Lehigh & New England, 1090 tons, 590 tons to Carnegie-Illinois Steel Corp., Pittsburgh, 500 to Bethlehem Steel Co., Bethlehem, Pa.

Reading, 4000 tons, divided equally between Bethlehem Steel Co., Bethlehem, Pa., and Carnegie-Illinois Steel Corp., Pittsburgh.

Locomotives Placed

Chilean State Railways, 11 locomotives, including six passenger and five mountain-type freight, to Baldwin Locomotive Works, Philadelphia, ten mountain-type locomotives, to American Locomotive Co., New York.

Oliver Iron Mining Co., Duluth, Minn., reported to have placed several diesel-electric locomotive with American Locomotive Co., New York.

Locomotives Pending

Alaska Railroad, Seattle; two steam locomotives, 800 class; bids soon to purchasing agent.

Tin Plate

Tin Plate Prices, Page 70

Tin plate demand shows little change, with production holding at 69 per cent. General line can specifications are a little heavier, and better releases have been received by mills. Export inquiry is active, and some orders have been closed. British mills have been able to keep up a fairly steady flow of plate to export markets. However, delivery difficulties may divert additional business to American producers.

Shapes

Structural Shape Prices, Page 70

Pittsburgh — Inquiries are fairly active, although only small tonnages are for private work. Largest of new jobs is 4500 tons for the first unit of the new war department building, Washington. Heavier demand in connection with private construction is expected later this quarter.

Chicago — Fabricated shape awards and inquiries are heavier, with a relatively large tonnage pending. Operations of fabricators are unchanged, but unless the recent upward trend in new projects continues, some slackening in schedules is in prospect.

Boston — New construction work is small. Awards of structural steel are under 500 tons, including a 220-ton industrial project at Augusta, Me. Outstanding new inquiry includes a group of buildings for the naval air station, Squantum (Quincy), Mass. Active bridge tonnage is light, Massachusetts closing Feb. 13 on five bridges, all small with the exception of one of medium size, Danvers-Peabody.

New York—Fabricated structural steel bookings in 1939 totaled 1,305,049 tons, against 1,256,639 tons in 1938, the American Institute of Steel Construction reports. Last year's shipments of 1,440,054 tons compare with 1,158,763 tons in 1938. Reporting only jobs of 100 tons or more, STEEL listed bookings totaling 1,165,386 tons last year.

Buffalo—Principal interest in the structural market was centered on the low bid submitted by C. B. Moon Co., Cleveland, on the 3000-ton grade crossing elimination program at Dunkirk, N. Y.

Seattle—Pending business is the smallest in several months. Unstated Portland interests are reported to have been awarded 100 tons or more for four large transmission towers for the Bonneville power line.

Philadelphia—Awards are headed by 1500 tons for a local navy yard building and 950 tons for a plant addition at Seaford, Del. Most of the larger pending jobs are public projects, the principal one being 5000 tons for a government building, Washington.

San Francisco — The structural market was active and 5683 tons were placed, bringing the aggregate to 8731 tons, compared with 6361 tons for the same period last year. Pending business is of heavy proportions and exceeds 56,500 tons.

St. Louis—Cold weather has virtually halted operations at fabricating yards. With new lettings light, the market is the quietest in many months. Fabricators' backlogs are declining, with little business actively pending.

Shape Awards Compared

	Tons
Week ended Jan. 27	15,880
Week ended Jan. 20	10,838
Week ended Jan. 13	17,013
This week, 1939	26,671
Weekly average, year, 1940	13,938
Weekly average, 1939	22,411
Weekly average, December	18,393
Total, to date, 1939	130,449
Total, to date, 1940	55,752

Includes awards of 100 tons or more.

Shape Contracts Placed

3000 tons, Main street bridge, St. John's river, Jacksonville, Fla., to Mt. Vernon Bridge Co., Mt. Vernon, O.

2000 tons, upper and lower lock gates, Kentucky dam, Gravel Switch, Ky., for Tennessee Valley authority, to American Bridge Co., Pittsburgh.

1500 tons, air corps hangar No. 2 and annexes, Denver, for United States

government, to Bethlehem Steel Co., Bethlehem, Pa.

1500 tons, building, navy yard, Philadelphia, to American Bridge Co., Pittsburgh, through Hughes-Foulkrod Co., Philadelphia.

1100 tons, bridge FAP-324-B (1), Woodward county, Oklahoma, to Capitol Iron & Steel Co., Oklahoma City.

1050 tons, naval depot magazines, Hawthorne, Nev., to Bethlehem Steel Co., Bethlehem, Pa.

950 tons, plant addition, Seaford, Del., to Bethlehem Steel Co., Bethlehem, Pa.

725 tons, highway project RC 4091, including grade separations, West Point Military reservation—Cornwall, New York, to American Bridge Co., Pittsburgh; Lane Construction Co., Meriden, Conn., general contractor, $757,050.65.

700 tons, extensions, Columbia Steel Co., Pittsburg, Calif., to American Bridge Co., Pittsburgh.

550 tons, bottling plant for Hudepohl Brewing Co., Cincinnati, to Bethlehem Steel Co., Bethlehem, Pa., through J. & F. Harig Co., Cincinnati, general contractor.

407 tons, reservoir, Fryo Lake dam, Lander, Wyo., to unnamed interest.

310 tons, bearing piles, Consolidated Aircraft Co. plant extension, San Diego, Calif., to Columbia Steel Co., San Francisco.

303 tons, postoffice, Covington, Ky., to West Virginia Rail Co., Huntington, W. Va., through A. Farnell Blair, Atlanta, Ga., general contractor.

275 tons, bridge No. 511-A, for Atchison, Topeka & Santa Fe railway, to Bethlehem Steel Co., Bethlehem, Pa.

240 tons, Lerner Dress Shops building, St. Louis, to Ingalls Iron Works, Birmingham, Ala.

225 tons, addition to building, for Kennebec Pulp & Paper Co., Augusta, Me., to Lyons Iron Works Inc., Manchester, N. H.

185 tons, extension to open-hearth building, for Pittsburgh Crucible Steel Co., Midland, Pa., to Pittsburgh Bridge & Iron Works, Rochester, Pa.

160 tons, rebuilding upper dam, Appleton, Wis., for United States government, to Wisconsin Bridge & Iron Co., Milwaukee.

140 tons, addition, California Portland Cement Co., Colton, Calif., to Bethlehem Steel Co., Los Angeles.

130 tons, crane runway, for Republic Steel Corp. at Warren, O., to American Bridge Co., Pittsburgh.

115 tons, Cuthbert road bridge, Camden county, New Jersey, to Bethlehem Steel Co., Bethlehem, Pa.

110 tons, bridge FAP-22, Dallas county, Texas, to Austin Bros., Dallas.

105 tons, state highway bridge, WPSO-SS-39-25, Albany county, N. Y., to Lackawanna Steel Construction Co., Buffalo; Mullson Construction Co., Buffalo, contractor, $51,174, bids Dec. 28, Albany.

100 tons naval base, Sitka, Alaska, to Standard Steel Fabricating Co., Seattle; materials by Columbia Steel Co., San Francisco.

Shape Contracts Pending

16,595 tons, Pitt river bridge, Central Valley Project, California; American Bridge Co., Pittsburgh, low.

5000 tons, building, war department, Washington, bids Feb. 9; approximately 1000 tons of reinforcing bars also required.

3000 tons, grade crossing elimination, Dunkirk, N. Y.; C. B. Moon Co., Cleveland, low on general contract.

1500 tons, Dookers Hollow bridge, Bessemer, Pa., for Allegheny county.

1300 tons, dam trash racks, bureau of reclamation special occasion bid 891, unstated Texas location, Stupp Bros. Bridge & Iron Co., St. Louis, low bidder.

1200 tons, building 2, Willowbrook, N. Y.; for state.

1116 tons, Illinois state highway bridges; low bidders: Joseph T. Ryerson & Son Inc., Chicago, 735 tons; American Bridge Co., Pittsburgh, 141 tons, Fort Pitt Bridge Works, Pittsburgh, 170 tons; A. F. Anderson Iron Works, Chicago, 70 tons.

1000 tons, housing project, Gary, Ind.

1000 tons, trash racks and stop logs, invitation 694-40-123, Bonneville dam, Oregon; bids Feb. 16.

900 tons, piling, Chicago park district, Chicago.

770 tons, state bridge, West Salem, Ill.

595 tons, also 75 tons plates, superstructure for underpass of Santa Fe and Union Pacific railroads, Arroyo Seco, Los Angeles county, Calif., for state; bids Feb. 8.

500 tons, naval storehouse, Jacksonville, Fla., bids asked.

441 tons, and 87 tons plates, railroad undercrossing, Denver and Adams county, Colorado, for state; general contract to A. S. Horner, 575 South Downing street, Denver.

400 tons, plant addition, Cellulose Corp.,

Amcelle, Md., bids asked.

290 tons, state bridges, Battle Creek, Mich.

270 tons, steel sheet piling, Puget Sound navy yard quay; General Construction Co., Seattle, general contractor.

250 tons, hangar and office building, Portland, Oreg., United Air Lines Transport Corp.; Reimers & Jolivett, Portland, Oreg., low on general contract at $87,583.

236 tons, underpass, Polhemus street, San Jose, Calif., for state; Earle W. Heppel, 494 Delmas avenue, San Jose, Calif., low on general contract at $130,497.

210 tons, additional catenary bridges, Winnetka, Ill., grade separation.

205 tons, bridge 410, Tama, Iowa, for Chicago & North Western railroad.

200 tons, addition to plant, for Mohawk Paper Mills Inc., Cohoes, N. Y.

190 tons, state bridge, Pinckneyville, Ill.

175 tons, truss bridges, state of Missouri.

165 tons, municipal airport hangar, Youngstown, O., for treasury department.

165 tons, manufacturing building, for American Sales Book Co., Niagara Falls, N. Y.

165 tons, library, for Julius Forstmann, Passaic, N. J.

160 tons, playground building, Pittsburgh, for city.

155 tons, state bridge, Lombard, Ill.

150 tons, overpass, North Bethlehem township, Pennsylvania, for state.

150 tons, Atlantic county tuberculosis hospital, Atlantic City, N. J., bids Feb. 14.

144 tons, rebuild Fox river dam, Appleton, Wis.

135 tons, state bridge, route 113, Washington county, Pennsylvania, bids opened Jan. 26.

125 tons, store building, W. T. Grant Co., Denver.

120 tons, beam spans, Espanola, N. M.

115 tons, Thomas A. Edison bridge, Raritan river, Sayreville-Woodbridge, N. J., contract 6, PWA project 1331-F, route 35, section 14, Middlesex county, New Jersey; bids Feb. 9, Trenton, E. Donald Sterner, state highway commissioner.

110 tons, women's gymnasium, for Iowa State college, Ames, Iowa.

Reinforcing

Reinforcing Bar Prices, Page 71

Pittsburgh — Housing projects dominate concrete bar awards and inquiries. The latter are more plentiful than orders. Backlogs still are fairly heavy. Prices are firm on new billet bars, although some rail bar contracts are said to have brought a little less than published prices.

Chicago—Award of 7500 tons for the west substructure of the local filtration plant is expected shortly, general contract having been placed with Michael Pontarelli & Son here. Pending tonnage continues fairly heavy. Orders are headed by 667 tons for a Chicago subway section.

New York—Reinforcing steel buying lags, small lots predominating, although recent purchases include close to 2000 tons for housing projects in northern New Jersey. Inquiry is gradually mounting, pending requirements for highways and bridges being slightly higher. Price shading crops out on larger transactions.

Philadelphia — While reinforcing bar awards are light, 1000 tons is pending for the war department building in Washington, D. C., bids Feb. 9; 150 tons of road mesh for several miscellaneous Pennsylvania state projects, bids Jan. 26; and 100 tons Hoverter housing project, Harrisburg, Pa., bids Feb. 5.

San Francisco—Awards aggregated 1567 tons and brought the total for the year so far to 6624 tons, compared with 10,252 tons for the corresponding period in 1939.

Seattle—Several post offices and other public buildings, up for figures in the immediate future, involve small tonnages of reinforcing bars. Larger projects are in prospect but will not call bids for 60 days or more. Meanwhile rolling mill backlogs are diminishing. Unstated Seattle inter-

ests have taken 100 tons in Washington state building and paving jobs. Business pending includes 130 tons for a quay at Puget Sound navy yard, general contract to General Construction Co., Seattle.

Reinforcing Steel Awards

667 tons, subway, section D-6-B, Chicago, to Inland Steel Co., Chicago; Minder Construction Corp., contractor.

555 tons, naval ammunition buildings, Hawthorne, Nev., to Columbia Steel Co., San Francisco.

454 tons, mesh, highway project RC 4088, Flat Brook-Massachusetts line, Columbia county, New York, to American Steel & Wire Co., New York; Lane Construction Co., Meriden, Conn., contractor, $324,330.80; bids Dec. 6, Albany; award of 140 tons reinforcing bars to Truscon Steel Co., Youngstown, O., previously reported.

357 tons, mesh, highway project RC 4086, Vestal-Binghamton highway, Broome county, New York, to Bethlehem Steel Co., Bethlehem, Pa.; Warren Bros. Roads Co., Cambridge, Mass., contractor, $418,587.65; bids Dec. 6, Albany; award of reinforcing bars to same fabricator previously reported.

285 tons, mesh, highway project RC 4091, West Point Military Reservation, Cornwall, N. Y., to American Steel & Wire Co., New York; Lane Construction Co., Meriden, Conn., general contractor, $757,050.25; bids Dec. 28, Albany; award of 240 tons reinforcing bars, to Truscon Steel Co., Youngstown, O., previously reported.

155 tons, viaduct near Los Gatos, Santa Clara county, Calif., for state, to Gilmore Fabricators Inc., San Francisco.

150 tons, Thomas Jefferson housing, Paducah, Ky., to Laclede Steel Co., St. Louis; George W. Katterjohn, contractor.

140 tons, Abe Lincoln housing, Paducah, Ky., to Laclede Steel Co., St. Louis; McCarthy Construction Co., contractor.

128 tons, mesh, highway project RC 2579, Hoosick-North Hoosick highway, Rensselaer county, New York, to Pittsburgh Steel Co., Pittsburgh; Alaimo & Son, Pittston, Pa., contractor, $120,025.50; bids Dec. 6, Albany.

120 tons, procurement invitation 21441, Minneapolis, to Truscon Steel Co., Youngstown, O.

112 tons, army air corps technical school and hangar, Chanute field, Rantoul, Ill., to Bethlehem Steel Co., Bethlehem, Pa.

108 tons, 25 field officers and 143 company quarters, Hickam Field, T. H., Invitation 6812-40-46, to Bethlehem Steel Co., San Francisco.

100 tons, paving and custodial school, Buckley, Wash., to unstated Seattle interests.

Reinforcing Steel Pending

7500 tons, west substructure, city filtration plant, Chicago. Michael Pontarelli & Son, Chicago, general contractor.

1000 tons, building, war department, Washington, bids Feb. 9; approximately 5000 tons of structural steel also required.

600 tons, housing project, Gary, Ind.

600 tons, power house, for Dupont Co. Clinton, Iowa.

570 tons, 600-man barracks, invitation 6812-40-60, Hickam Field, T. H.; Robt McKee 4700 San Fernando Road, Los Angeles, low on general contract.

522 tons, Highland avenue and Pilgrammage avenue bridges, Los Angeles; J. E. Haddock, Ltd., 357 North Chester avenue, Pasadena, Calif., low on general contract at $760,570.

400 tons, Dutch Point Colony housing, Hartford, Conn.; bids Jan. 25.

400 tons, substructure, East river houses, New York; bids Feb. 1.

364 tons, Thomas A. Edison bridge, Raritan river, Sayreville-Woodbridge, N. J., contract 6, PWA project 1331-F, route 35, section 14, Middlesex county; bids Feb. 9, Trenton, N. J., E. Donald Sterner, state highway commissioner;

Concrete Bars Compared

	Tons
Week ended Jan. 27	3,331
Week ended Jan. 20	6,036
Week ended Jan. 13	8,125
This week, 1939	23,077
Weekly average, year, 1940	7,410
Weekly average, 1939	9,197
Weekly average, December	4,600
Total to date, 1939	58,945
Total to date, 1940	29,641

Includes awards of 100 tons or more.

work also takes 330,659 linear feet reinforcement trusses.

300 tons, wind tunnels, Wright field, Dayton, O.; bids Jan. 25.

300 tons, housing project, McKees Rocks, Pa.; W. F. Trimble & Sons, low.

221 tons, railroad undercrossing, Denver and Adams county, Colorado, for state; general contract to A. S. Horner, 575 South Downing street, Denver.

280 tons, Lyman Terrace housing, Holyoke, Mass.; bids Jan. 23.

200 tons, building, Narragansett Electric Co., Providence, R. I.

175 tons, housing project, Toledo, O.; J. H. Berkbile, low.

175 tons, highway project, route 29, sections 3B, 1C and 2C (widening), 49,500 square yards, 10-inch reinforced concrete pavement, Union county, New Jersey; bids Feb. 9, Trenton, N. J., E. Donald Sterner, state highway commissioner.

150 tons, power house, University of Illinois, Urbana, Ill.

150 tons, road mesh, several miscellaneous state projects, Pennsylvania, bids opened Jan. 26.

130 tons, quay wall, Puget Sound navy yard, Washington; General Construction Co., Seattle, general contractor.

130 tons, grade elimination, Dunkirk, N. Y.

100 tons, viaduct and footbridge, Stonington, Conn.; A. I. Savin Construction Co., low.

100 tons, signal corps laboratory, Ft. Monmouth, N. J.

100 tons, Hoverter housing project, Harrisburg, Pa., bids Feb. 5.

100 tons, highway project, route 6, sections 11B and 12A, (paving), 27,500 square yards, 10-inch reinforced concrete pavement, Essex-Morris counties, New Jersey; bids Feb. 9, Trenton, N. J., E. Donald Sterner, state highway commissioner.

Pig Iron

Pig Iron Prices, Page 72

Cleveland — Sustained movement of foundry coke indicates a steady iron melt. Pig iron shipments are off from the December rate but appear to be less active than consumption, with the difference accounted for by curtailment of stocks accumulated last quarter. Buying is slow, reflecting previous coverage.

Chicago — Shipments have declined further. A decrease of close to 30 per cent, compared with December is indicated. Sellers attribute most of the decrease to steel mill requirements, which have been lessened both because of curtailed operations and increased percentage of scrap use. Stocks of iron in consumers' hands also contribute to lower shipments. Buying is decidedly light. Foundry operations are fairly steady, as indicated by a slight increase so far this month in by-product foundry coke shipments compared with December.

New York — Specifications are spotty, although there is some improvement in the melt and sellers anticipate better buying in February. Most consumers are working on tonnage either in stock or on contract. Export inquiry is more lively, although few outstanding purchases have developed. Most inquiry is from Scandinavia.

Philadelphia—Livelier export demand is noted, particularly from Scandinavian countries. There is also a new inquiry from India for special iron. Purchases, however, are light. Meanwhile, domestic activity is somewhat improved, although the bulk of current needs is being met through old orders. Most sellers anticipate little increase in new buying before late February.

Buffalo—Production is sustained and fairly active, but possibility of a recession is seen unless steelworks' requirements improve. Releases from foundries are in good volume, with leading jobbing plants melting five days a week. Some foundries have fairly large inventories, but in the aggregate no ex-

Behind the Scenes with STEEL

Dog House Comfort

■ In Cleveland last week 300 exhibitors in the Sixth International Heating and Ventilating exposition filled the underground exhibition hall to capacity and drew a restricted crowd of close to 40,000 interested visitors, including the old dog, who was attracted mostly by the super deluxe air-conditioned dog house on display by Bryant heater. Perhaps some of you gentlemen have occasion to use such a handy contraption quite frequently also. It's a dandy.

Sad But True

■ And in Chicago the night spots outdid themselves to amuse the convening National Canners. One jernt, known locally as the El Dumpo, burst forth in print with this sort of thing: "Hominy of you Canners have Bean to El Dumpo? We know you Can Can, but not like our Peaches Can Can-Can! So Turnip today! Our Currant Show may be Corney but if it doesn't Peas you we don't Carrot all because we don't pay much Celery!" A few weeks ago another of their classics read: *Bring Your Wife, or a reasonable facsimile thereof!*

Old One

■ As soon as he got last Monday's issue, V. E. Slater of Cleveland Crane hopped on the phone to give us the correct answer (9 miles) to the problem of the walled city and thereby cop the free Yearbook. But when Tuesday's mail brought so many more honest efforts we just had to break down and scatter a few other copies around to the deserving. F. W. Seper (Colorado Fuel & Iron) mysteriously arrived at an answer of 20 miles, which must be some other city.

New One

■ H. G. Taylor, the Diamond Chain & Mfg. flash who was born with a mathematics book under his arm, wants to donate this one: *A second-hand clothing merchant answering to the name of Cohen, bought 147 garments at a bargain, including coats at $2.45 each, pants at 98 cents, and vests at 49 cents, for a total outlay of $147.00. Now Cohen seldom gets gypped, so how many of each kind of garment did he buy to get the greatest number of complete, three piece suits?* Mr. Taylor didn't give us the answer so we're counting on you.

Dis Is Data

■ Sixty per cent of the entire manufacturing volume in the United States is accounted for by 1800 companies, according to the department of commerce. With about 160,000 establishments all together, that means more than half the business in the country is done by less than 12 per cent of the total concerns. Hey, Miss Jones, wake up and take a survey!

Confucius Say:

■ Man who sit on tack, better off. (The only clean one we know).

60,000 Nuggets

■ We didn't mention it last week but we hope you, too, like our new front cover masthead design as much as we do. You know, all joking aside, you would really be impressed if you could spend a few days around here and get an idea of the amount of thought and work that goes into each one of these issues that arrives so matter-of-factly on your desk each week. The way you—dear reader—are worried about and thought of is enough to cause a tear to drap. Your boss may turn the heat on, your wife may put you in the air-conditioned dog house and your kids may devil the life out of you, but to us, dear, dear reader, you're king. Have a cigar!

SHRDLU

cessive accumulation of iron is noted.

Cincinnati—Shipments have tapered somewhat, compensated partly by reduction in foundry stocks, since the melt is well sustained. A seasonal shrinkage is appearing in operations of certain foundries, with automotive demand for castings less active. Jobbing and machine tool needs are steady.

St. Louis—January shipments are expected to be 10 to 15 per cent below December. Consumption at jobbing foundries has declined, but operations of steelworks, machine shops and the farm equipment industry are well sustained. Pig iron buying is light, with a pickup expected about the middle of February.

Toronto, Ont.—Merchant pig iron sales show little change. Most melters still are well stocked. Bookings this quarter are well below those of closing months of 1939. Spot sales are for lots up to 200 tons. Prices are quoted as at delivery date and nothing is definite as to future quotations.

Scrap

Scrap Prices, Page 74

Pittsburgh — Prices are firmer and brokers are finding it increasingly difficult to cover short orders at recent levels. Mill buying outside the district is reported at $19 to $19.50 for No. 1 steel, although in buying for local accounts brokers have not gone much above $18.50. The weather has been a strengthening factor, cutting down preparation and shipment. Resumption of normal movement over the rivers is likely to be deferred for 30 days. Foundry scrap demand is better, with prices of cast grades stronger.

Cleveland—Cold weather restricts scrap preparation and shipment, though some tonnage is moving on contracts, most orders are well covered. Prices are nominally unchanged here and in the Valley.

Chicago—Prices are substantially unchanged, but recent signs of strength have almost entirely vanished, except that there has been insufficient trading below $16.50 to etablish a price range on No. 1 steel. This figure still represents the last mill purchase and also the price generally received by dealers. Brokers are not anxious to do business at this level.

Philadelphia—While the market in general is easy, scrap in eastern Pennsylvania presents a mixed situation, particularly in melting steel. Recently Bethlehem Steel Co.

bought 1500 tons of No. 1 and No. 2 steel, principally the former, at $17 and $16, delivered, respectively (not local scrap, it was said), while the Reading railroad was able to get more than $18, delivered, along its line.

Another eastern Pennsylvania mill (Coatesville) bought some No. 1 and No. 2 steel at $17.50 and $16.50, although total tonnage was not large, it is understood.

Buffalo — A steadier tone has appeared, partly because the prolonged cold has restricted supplies. Another factor is a $1 increase in the bid of a leading consumer who previously had been offering well below the current range of $17 to $17.50 for No. 1 steel. Steelworks' stocks have been reduced by recent active ingot production.

Detroit—The market is marking time, awaiting decision of mills to buy. They, in turn, are trying to determine whether the current slump in steel buying will be of long duration. At the moment, sentiment is pessimistic and opinion is that steel production may be reduced sharply within the next month. Prices are unchanged.

Cincinnati—Prices are unchanged, although most items, except heavy melting steel, are softer. Recent railroad lists brought slightly less than a month ago. Consumer buying is light, but shipments against contracts are steady. Severe weather has curtailed yard activity.

St. Louis — The market again is quiet, following a recent sale of 10,000 to 12,000 tons of No. 2 steel. Yard operations have been at a virtual standstill, the result of the coldest weather in 15 years. Shipments are unusually light, and with consumers obliged to draw on reserves, they will shortly be in need of more material.

Seattle — Uncertainty over the trade treaty with Japan has not reacted as unfavorably as expected, commercial relations continuing. Japan is placing orders for small tonnages of scrap but exporters find it difficult to obtain space, latest freights quoted for full cargoes, free in and out, being $11.25 while berth lines are asking $11 to $13. No. 1 export is quoted at about $16 here. Rolling mills are out of the market, a small sale to a local mill being reported at $14.

San Francisco—While scrap prices are unchanged the tendency is towards lower levels, which are expected to develop next month. Due to scarcity of bottoms movement of export material to Japan continues slow. It is reported that one interest is loading material now on back orders at $21 a gross ton, f.a.s., while current quotations hold at $17 to $18 for No. 1 heavy melting steel. Dealer prices, delivered yard, on No. 1 heavy melting steel continue to hold at $13.50 to $15.

Toronto, Ont.—Prices are firm, with business somewhat listless. Dealers state mills are taking all steel scrap offered and there is good movement on this account, while foundries and other consumers of iron scrap show little interest. No scrap is coming from rural districts, dealers depending on local sources of supply. Yards, however, are fairly well stocked.

Warehouse

Warehouse Prices, Page 73

Chicago—Sales continue active, a slight increase being noted since earlier this month. January business will be off possibly 5 per cent from December. Improvement is expected about the middle of February and continuing into March.

Philadelphia—Business is off substantially from December, but warehouses look for better demand in February. March and April will be the best months of the year, if the usual trend prevails.

Buffalo—Severe weather has affected business adversely, but the slackening is regarded as temporary. Prices are steady.

Cincinnati—Warehouse stocks are heavier. Sales are in good volume but below November or December. Prices and extras are unchanged.

St. Louis—The prolonged period of severe weather has tended to curtail sales. Some seasonal items are moving well, but activity in adjacent oil fields has been reduced materially.

Seattle—Volume of sales is seasonally normal but will gain momentum

due to better weather about the middle of March. Sheets, plates and shapes are moving reasonably well. Prices are firm at pending levels.

Steel in Europe

Foreign Steel Prices, Page 73

London—(*By Cable*)—Pig iron consumption is increasing in Great Britain and additional basic blast furnace capacity is being made ready. Monthly domestic pig iron consumption of 10,000 tons prevents export sales. The coke and ore situation is satisfactory and Continental deliveries of semifinished steel are improving. British commercial steel users are experiencing difficulties owing to government priority orders. Exports of tin plate are fair.

An advance in British iron and steel prices is expected soon. The advanced prices will not be of advantage to manufacturers as the additional funds will be paid into a general fund administered by the ministry of supply toward meeting extra cost of steel and iron imports distributed by the ministry to domestic users.

Belgium and Luxemburg report exports quieter but mills booked well ahead.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 71

Bolt and nut business remains fairly active, but in some districts the trend is downward and expected to go lower before end of the quarter. Automotive specifications are heavy, and requirements for railroad car building are substantial. Miscellaneous demand is slower, with purchases by jobbers quiet and construction needs off seasonally. Prices generally are steady.

Coke Oven By-Products

Coke By-Product Prices, Page 71

New York—While there has been a slight decline in demand for distillates, buying and shipments of other coke oven by-products are maintained, with seasonal gains noted in a few instances. Lacquer makers still take substantial shipments of distillates. Supplies and demand are better balanced and consumption is absorbing current production without accumulations of stock. Phenol demand is steady, with the plastic industry a leading consumer. Naphthalene is experiencing a seasonal upturn, while shipments and orders for sulphate of ammonia to the fertilizer trade are mounting. Prices are unchanged.

Iron Ore

Iron Ore Prices, Page 74

Cleveland—Appearance of United States Steel Corp., through its subsidiary, Oliver Iron Mining Co., in the open market as a seller of iron ore has come as a surprise move. This development has accompanied disclosure of sale by the Oliver company to the Ford Motor Co. of an estimated 120,000 tons of straight Mesabi ore.

While the price prevailing on the Ford contract has not been officially named, it is reported a reduction of $1.25 a ton was made from the market established earlier this month on a number of sales to other consumers. The market at that time for delivery at lower lake ports was: Mesabi, $5.10 for bessemer and $4.95 for nonbessemer; Old range, $5.25 for bessemer and $5.10 for nonbessemer. The purported cut of $1.25 to Ford would mean a delivered price on Mesabi nonbessemer ore of $3.70.

A revised figure on stocks of Lake Superior iron ore at furnaces and on Lake Erie docks has been issued by Lake Superior Iron Ore association. The new total as of Jan. 1 is given as 35,439,773 gross tons, instead of 37,377,910 tons, noted in the original report. This compares with 40,732,096 tons a month ago and 34,578,849 tons a year ago.

New York—A substantial tonnage of chrome ore, lump, minimum 48 per cent, for metallurgical use, has recently been sold at slightly in excess of $28 per gross ton, c.i.f. seaboard. This points to greater strength in the market than recently indicated.

Equipment

Seattle—Heavy automotive, mine dredging and electrical equipment are in best demand. Several Alaska mining interests have placed contracts for dredging machinery with West Coast plants or are planning such equipment. Purchasing agent Alaska Railroad, Seattle, will open bids Jan. 31 for 10 tons track spikes, wire, gates, valves, mild steel and other items. Spokane received figures Jan. 25 for compressor, electric welder, storage tank and other materials. Tacoma has called tenders Feb. 9 for cone valves and Contractors Equipment Co. is low to Bonneville authority for a crawler power shovel.

Ferroalloys

Ferroalloy Prices, Page 73

New York—While chrome alloys are moving more slowly than last

month, due to anticipatory buying prior to the price advances Jan. 1, there has been a good movement in alloys generally so far this month. Ferromanganese shipments may exceed those in December, as consumers are working off substantial stocks acquired in the second quarter before the $20 price advance which took place Oct. 1. Since that time, ferromanganese sellers generally have held prices unchanged at $100, duty paid, eastern seaboard. Domestic spiegeleisen also had been steady at $32, Palmerton, Pa., for 19 to 21 per cent material, and $39.50 for 26 to 28 per cent material.

Nonferrous Metals

New York—Weakness in metal prices, coupled with reticence on the part of consumers to make forward commitments, continued last week. The move in copper culminated on Friday with the posting by American Smelting & Refining Co. of a 11.62½-cent price for electrolytic. Zinc prices also declined while tin weakened early in the week before recovering part of the losses toward the close.

Copper—All leading producers lowered electrolytic prices to 12.00c, Connecticut, on Monday and maintained that level until Friday when one custom smelter lowered prices ⅜-cent to 11.62½c. All allied product prices, including rolled and drawn products, brass and bronze ingots, and scrap, declined to the 12-cent basis. Statistics were released showing a drop of 157,058 tons in domestic refined stocks during the final five months of the year to a total of only 159,485 tons. Monthly average shipments during the period jumped to 91,463 tons.

Lead—On three of the five full market days several producers balanced or exceeded their daily ore intakes. The market was not affected outwardly by the easier tendency in copper and zinc. Prices held at 5.35c, East St. Louis.

Zinc—Following a prolonged period during which only light sales were reported, producers lowered prices ¼-cent on Monday to the basis of 5.50c, East St. Louis. Although fresh demand was dull, shipments continued fairly heavy.

Tin—Straits spot prices fluctuated between 45.25c and 45.50c in a quiet market.

Antimony—Only routine business was booked at unchanged prices on the basis of 14.00c, New York, for American spot in cases and nominally 16.50c, duty paid New York, for Chinese spot.

Nonferrous Metal Prices

Jan.	Copper Electro, del. Conn.	Copper Lake, del. Midwest	Casting, refinery	Straits Tin New York Spot	Straits Tin New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
20	12.25	12.50	12.00	46.00	44.62½	5.50	5.35	5.75	20.00	14.00	35.00
22	12.00	12.00	11.62½	45.25	44.00	5.50	5.35	5.50	20.00	14.00	35.00
23	12.00	12.00	11.62½	45.25	44.12½	5.50	5.35	5.50	20.00	14.00	35.00
24	12.00	12.00	11.62½	45.25	45.25	5.50	5.35	5.50	20.00	14.00	35.00
25	12.00	12.00	11.62½	45.50	44.75	5.50	5.35	5.50	20.00	14.00	35.00
26	11.62½	12.00	11.62½	45.50	45.12½	5.50	5.35	5.50	20.00	14.00	35.00

*Nominal.

MILL PRODUCTS

F.o.b. mill base, cents per lb., except as specified. Copper brass products based on 12.00c Conn. copper

Sheets

Yellow brass (high) 18.65
Copper, hot rolled 20.62
Lead, cut to jobbers 8.75
Zinc, 100 lb. base 11.00c

Tubes

High yellow brass 21.40
Seamless copper 21.12

Rods

High yellow brass 14.57
Copper, hot rolled 17.12

Anodes

Copper, untrimmed 17.87

Wire

Yellow brass (high) 18.90

OLD METALS

Nom. Dealers' Buying Prices

No. 1 Composition Red Brass

New York .....
Cleveland 7.25-7.50
Chicago 7.75-8.00
St. Louis 7.75-8.00
..... 8.00-8.25

Heavy Copper and Wire

New York, No. 1 .....
Cleveland, No. 1 ..... 9.00-9.25
..... 9.00-9.25

Chicago, No. 1 ..... 9.00-9.25
St. Louis 9.00-9.50

Composition Brass Turnings

New York 7.00-7.25

Light Copper

New York 7.00-7.25
Cleveland 7.00-7.25
Chicago 7.00-7.25
St. Louis 7.00-7.25

Light Brass

Cleveland 3.75-4.00
Chicago 4.50-4.75
St. Louis 4.75-5.00

Lead

New York 4.85
Cleveland 4.37½-4.50
Chicago 4.25-4.50
St. Louis 4.00-4.25

Zinc

New York 3.00-3.25
Cleveland 3.00-3.25
St. Louis 3.25-3.50

Aluminum

Mixed, cast, Cleveland 10.25-10.50
Borings, Cleveland 7.25-7.50
Clips, soft, Cleveland 15.75-16.00
Misc. cast, St. Louis 8.75-9.00

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads .. 12.50
Standard No. 12 aluminum ... 14.50-15.00

Construction and Enterprise

Ohio

CHAUNCEY, O.—Village, N. D. Hines, mayor, contemplates sanitary sewer, sewerage treatment plant and waterworks; cost $170,000; J. J. Morgan, 255 East Broad street, Columbus, engineer; will also soon file WPA application.

CHILLICOTHE, O.—City, H. H. Brown, mayor, W. W. Layman, chairman, utilities commission of city council, plans purchase of plant from Chillicothe Water Co. for $700,000 and install softening apparatus at cost $125,000; plans for latter probably will be completed before purchase of plant.

CLEVELAND—City, deliver and install at Lake road generating station, 12 steel tanks; vertical condensate surge, 28,500-gallon 16 x 18-feet; vertical service water, 16,000-gallon 17 x 10½-foot; vertical city water, 15,000-gallon about 4 x 13-foot; vertical distilled water, 27,000-gallon about 14 x 25-foot; horizontal I D fan bearing water, 900-gallon 5 x 5 x 5-foot, horizontal boiler blow-down, 400 pounds per square inch, 3400-gallon 6 x 14-feet by 6 inches; 3 horizontal flash tanks, 400 pounds per square inch; 300-gallon 3 x 5 feet; horizontal fuel oil, 5000-gallon 6½ x 19½ feet; George C. Oxer, commissioner, division of light and power, city hall; L. A. Quayle, utilities engineer, Auditorium building; Peter F. Loftus, 632 Oliver building, Pittsburgh, consulting engineer.

MT. GILEAD, O.—Village, James P. Bennett, mayor, H. C. Hair, clerk, M. G. McDill, sanitary engineer, plans repairs and additions to plant including Lewis chemical treatment plant to cost about $7000; special election Feb. 20 to raise funds.

OBERLIN, O.—City, H. V. Zahm, city manager, contemplates enlarging present light plant due to increase in kilowatt usage caused by erection of new college building; estimated cost $65,000; engineer not yet selected.

REPUBLIC, O.—Village, C. E. Womer, mayor, George Paden, clerk, contemplates distribution system and elevated tank; estimated cost $78,000; to sell $17,000 bonds; Champe, Finkbeiner & Associates, Nicholas building, Toledo, consulting engineers.

WALBRIDGE, O.—Village, Edward Cavanaugh, clerk, completing plans for sewage plant and pumping station; materials will be purchased jointly by WPA in Columbus and village; cost $96,000.

WEST FARMINGTON, O.—Village, C. C. Creaser, mayor, plans waterworks system; WPA grant of $32,700 approved; C. J. Simon & Associates, Van Wert, consulting engineer; project includes elevated tank; cost $61,000.

Pennsylvania

NEW KENSINGTON, PA.—Plans being prepared for an addition to warehouse; owner Aluminum Co. of America; J. W. Schrieber, Gulf building, Pittsburgh, engineer.

TITUSVILLE, Pa.—Bids are being received for addition to inspection and shipping building on East Spring street; owner Cyclops division, Universal Cyclops Steel Corp.; no date set for closing bids; Rogers Structural Steel Co., Corry, Pa., and L. O. Bouquin Co., 13 West First street, Oil City, Pa., are bidding; plans private.

Michigan

DETROIT—Smith, Hinchman & Grylls, architects, are preparing plans for a factory building in Portland, Mich., for Portland Mfg. Co.

DETROIT—Fullerton Construction Co. has contract for erection of a $11,000 addition to the plant of Detroit Harvester Co.

JACKSON, MICH.—Construction of a new strip mill costing $40,000 is announced by George M. Carter, president, Sheet Aluminum Corp.; plant to be completed in March.

MUSKEGON, MICH.—Michigan Associated Telephone Co. is preparing to spend $110,000 on plant improvements in 1940; H. R. Christianson, general manager.

Alabama

SELMA, ALA.—City, Lucien Burns, mayor, plans construction of storm sewers and extension of water mains.

Maryland

HAGERSTOWN, MD.—City, Richard H. Sweeney, mayor, considering installation of new boilers at municipal light plant; estimated cost $260,000.

District of Columbia

WASHINGTON — Potomac Electric Power Co., Tenth and East streets N. W., has construction budget of $7,230,944 for 1940, excluding the 1939 commitments of approximately $5,500,000, major part of which is to complete installation of the 50,000 kilowatt unit at Buzzard Point plant; approximately 50 per cent of the new budget is for routine extension of lines and improved distribution facilities to serve new customers, remainder for adding special transmission and distribution facilities.

WASHINGTON—Navy department, bureau of supplies and accounts, will receive sealed bids until 10 a.m. Jan. 30, schedule 496, portable air compressor, delivery Key West, Fla., schedule 473, locomotive, 500-horsepower, weight 80 tons, diesel-electric operated, complete with spare parts, delivery Indian Head, Md.; Feb. 2, schedule 495, tractors, gasoline, delivery Quantico, Va., and San Diego, Calif., schedule, 509 welding set, electric, gasoline engine driven, portable, truck mounted, complete with meters and accessories, delivery Key West, Fla., schedule 510, grinder, valve seat, heavy duty, motor driven, complete with motor, vacuum cleaning equipment and spare parts, delivery Pensacola, Fla., schedule 480, 2 lathes, precision, screw cutting, independent power feed and lead, bench type, motor driven, delivery Alameda, Calif., schedule 482, lathe, precision, bench type, hand feed motor driven, delivery Alameda Calif., schedule 483 Grinder universal, motor driven, delivery Alameda, Calif., schedule 489, truck, motor, new, latest model, delivery Seattle, schedule 493, press, drill, multiple spindle, motor driven, delivery San Diego, Calif., Feb. 6, schedule 484, molder, electric, 4 x 6 inches, motor driven, delivery Puget Sound, Wash.

Florida

LIVE OAK, FLA.—REA allotted $21,000 to Suwannee electric co-operative association; will be used to finance completion of first section of rural line as originally designed, and to build 14 miles in Suwannee county.

MIAMI, FLA.—City voted to purchase water distribution system from Florida Power & Light Co.; cost $5,250,000.

North Carolina

WEST JEFFERSON, N. C.—REA approved an application of newly organized Blue Ridge cold storage co-operative to finance building of combination freezer locker and cold storage plant in Ashe county; G. F. Messick, superintendent, Caldwell Mutual, interested.

South Carolina

BAMBERG, S. C.—Edisto electric co-operative has REA allotment of $22,000 for enlargement of rural electrification system in four counties and Bamberg, Allendale, Orangeburg and Dorchester.

WINNSBORO, S. C.—Fairfield co-operative rural electrification association to construct 34 miles in Fairfield county; allotment of $24,000 approved.

Tennessee

KNOXVILLE, TENN.—Southern Bell Telephone & Telegraph Co., Hurt building, Atlanta, Ga., will expend $766,396 in Knoxville area for expansion and improvements in 1940; approximately $500,000 will be for additions and new installations, remainder for repair and construction; work contemplated at Knoxville includes estimates of $210,000 for central office installations and $228,796 for outside plant expansion.

Louisiana

NEW ORLEANS, LA.—Department of public finances receives bid in city office of purchasing agent, Jan. 23 for furnishing fabricated steel columns and girts for incinerator, East Furnace street; all steel; shop coat rust-resisting aluminum before delivery.

West Virginia

Lynchburg, W. VA.—Craddock-Terry Shoe Corp. will erect 2-story building 36 x 160 feet adjoining present warehouse, Ninth street; provide an additional 12,000 square feet of office space.

Virginia

CHILHOWIE, VA.—Vance Co. is seeking cement cylinder manufacturing machines.

RICHLANDS, VA.—Appalachian Power Co., Roanoke, Va., plans erection of transformer station on recently acquired site in Hankins Bottoms; will carry a load of 30,000 volts.

Oklahoma

WETUMKA, OKLA. — Midwestern Engineering & Construction Co., Tulsa, has contract for engineering work on proposed 150-mile rural line; O. Jameson, chairman of board of directors.

Minnesota

KETTLE RIVER, MINN. — Carlton county power co-operative, Tom Ross, secretary, is drawing plans and will be ready for bids about Feb. 15 on construction of a brick powerhouse and 400-kilovolt plant; United Engineering Service, 1406 Lake street W., Minneapolis, consulting engineer.

Texas

DALLAS, TEX.—Dallas Power & Light Co. plans $11,300 improvements to down town underground system.

Kansas

NORTONVILLE, KANS.—City, C. A. Leighton, mayor, is taking bids to Feb. 8, 3 p.m. on construction of wells, 50,000-gallon tank and tower and distribution system; estimated cost $36,000; E. T. Archer & Co., 609 New England building, Kansas City, Mo., consulting engineers.

STERLING, KANS.—City, Robert F. Peart, manager, will hold election Feb. 6, on $198,000 bond issue to finance new power plant building, diesel generating sets, switchboard and new feeder lines; Burns & McDonnell Engineering Co., 107

West Linwood boulevard, Kansas City, Mo., consulting engineers.

South Dakota

FLANDREAU, S. DAK.—Sioux valley empire electric association, L. W. Elifson, president, has awarded contract subject to REA approval to Megarry Bros., St. Cloud, Minn., at $234,568 for rural transmission lines in Brookins, north half of Moody and Lake counties and sub-station at Lone Tree; also contract to Humphrey & Thompson, Omaha, Nebr., at $249,260 for lines in south half of Lake and Moody counties and portion of Minnehaha county; Buell & Winter, 508 Insurance Exchange building, Sioux City, Iowa, consulting engineers.

Nebraska

COLUMBUS, NEBR. — Humphreys & Thompson Co., Omaha, submitted low bid of $84,629 for 17½ miles of 69,000-volt transmission lines between Belden and Winside, for the Loup river public power district; also included is construction of a sub-station at Belden.

FREMONT, NEBR.—City, L. T. Waterman, mayor, has selected Black & Veatch, 4706 Broadway, Kansas City, Mo., for addition of a 3500-kilowatt generator to its present power plant; estimated cost $280,000.

LINCOLN, NEBR.—REA has allotted $30,000 to Lancaster county rural public power district; G. Brink, superintendent, to finance miscellaneous construction and operation.

Iowa

ATLANTIC, IOWA—City, Fred Herbert, clerk, plans construction of a sewage disposal plant under WPA project to cost about $120,000.

BEDFORD, IOWA—City, J. S. Nevius, mayor, is taking bids to Feb. 13, 10 a.m. on extension and improvement of waterworks plant to cost an estimated $36,755; Stanley Engineering Co., Muscatine, consulting engineer.

DENNISON, IOWA—WPA has approved project for extension of waterworks system to cost $20,000; work to start soon.

GLIDDEN, IOWA—REA has allotted $20,000 to Glidden rural electric cooperative, Thomas Connor, superintendent, to finance building of connecting lines for about 100 consumers in Carroll, Green and Sac counties; Stanley Engineering Co., Muscatine, consulting engineers.

JAMAICA, IOWA—City has started work with WPA aid on extension of its water system and erection of a pump house and tank; cost $24,115; Ralph Gearhart, Cedar Rapids, consulting engineer.

POSTVILLE, IOWA—Allamakee-Clayton electric co-operative, Kermit M. James, superintendent, is making survey for 150 additional miles of rural transmission lines in Allamakee, Clayton and Fayette counties; A. W. Grubb, Vinton, consulting engineer.

SIDNEY, IOWA—City, Vernon Johnson, mayor, will hold hearing Feb. 2, 7:30 p.m. on a resolution for construction of sewers and a sewage disposal plant including an Imhoff tank, trickling filters, sludge bed and piping at a total cost of $75,000; Buell & Winter, 508 Insurance Exchange building, Sioux City, Iowa, consulting engineers.

Colorado

FORT COLLINS, COLO.—Poudre valley rural electric association, L. S. Galle, superintendent, is preparing plans and will soon take bids on 219 miles of rural transmission lines; cost $230,000.

PUEBLO, COLO.—Southern Colorado Power Co., W. N. Clark, president, plans addition to its generating plant and improvements during 1940 to double generating capacity; estimated cost $1,000,000.

WRAY, COLO. — City council has passed ordinance authorizing $50,000 in bonds to finance improvement of municipal light plant.

Montana

MISSOULA, MONT.—Homer Johnson, Portland, Oreg., low bidder at $94,250 for construction of 117 miles of rural transmission lines in Missoula, Granit and Powell counties for Missoula electric co-operative, 402 Woody street; J. M. Garrison, state water conservation board, Helena, consulting engineer.

Idaho

MOSCOW, IDAHO—H. D. Powell, is low at $84,000 to board of regents, University of Idaho, for major expansions of heating plant.

Pacific Coast

LOS ANGELES—American Manganese Steel Co. is erecting a steel frame machine shop at 5805 Downey road; cost $7300.

LOS ANGELES—General Steel Co. of America has incorporated to conduct business at 8328 Fountain avenue; certificate issued to D. Edelman.

LOS ANGELES—American Steel & Wire Co. of New Jersey has been recorded in Los Angeles county, with a capital stock of $100,000,000; California agent, Joseph C. Cannon, 308 North Sycamore avenue.

LOS ANGELES—United States Metal Corp., 16 Fremont street, Las Vegas, Nev., has incorporated with 2000 shares no par value capital stock; California agent, Roy S. Gangestead, Associated Realty building, Sixth street.

DAYTON, WASH.—City has started suit to acquire property needed for proposed storage reservoir; project also includes purchase of unstated tonnage of cast iron pipe.

KELSO, WASH.—Cowlitz county public utilities district has petitioned REA for $70,000 for construction of proposed 45-mile power line extension in this county.

NAPAVINE, WASH.—Ben W. Criem, chief construction staff Bonneville authority, announces plans are in preparation and bids will be called soon for proposed $250,000 power sub-station here.

SEATTLE—Parks Canning Co., 468 Colman building; incorporated at $50,000; James W. Parks and associates to process agricultural and sea products.

TACOMA, WASH.—City officials are negotiating with Dr. Paul J. Raver, administrator of Bonneville power project, with reference to a proposed 10-year contract for interchange of power.

VANCOUVER, WASH. — Deeds have been filed transferring 215 acres on the Columbia river near here from the Spokane, Portland & Seattle railway to Aluminum Co. of America on which the latter proposes to erect its plant.

WATERVILLE, WASH.—Douglas county rural electric association expects early allocation of federal funds for erection of proposed 76-mile power line in Douglas county.

YAKIMA, WASH.—Formation of a local improvement district for expansion of domestic water system has been completed in anticipation of proposed expenditure of $37,687 for water mains and installation.

Canada

KAMLOOPS, B. C.—City council plans installation of filtration plant to cost $87,000 and additions to present waterworks pumping equipment. J. F. MacLaren, Gore & Storrie, Toronto, consulting engineer.

PENTINGTON, B. C.—Dominion governments, Ottawa, plans to spend $70,000 on completion of airport here.

FORT GARRY, MAN.—Manitoba Sugar Co. Ltd., Winnipeg, has awarded general contract to Carter-Halls-Aldinger Co. Ltd., Royal bank building, for construction of $1,500,000 factory.

GEORGETOWN, ONT.—Smith & Stone Electrical Mfg. Co. Ltd., College View, will build factory addition to cover 2500 square feet on each of two floors. Bids being received by Kaplan & Sprachman, architects, 305 Dundas street W., Toronto.

HAMILTON, ONT.—R. L. Gibson, general manager, Cub Aircraft of Canada Ltd., announced construction to start immediately on new aircraft factory and storage hangar at Hamilton airport; plans approved by department of transport, Ottawa; plant to be used for construction and assembly of Harlow aircraft.

HESPELER, ONT.—City voted construction of sewage system and installation of equipment to cost $105,000; James, Proctor & Redfern Ltd., 36 Toronto street, Toronto, engineers.

KINGSTON, ONT.—Miscellaneous iron contracts have been awarded to Robert Mitchell Co. Ltd., 750 Belair avenue, Montreal, in connection with plant under construction for Aluminum Co. of Canada Ltd., 1010 St. Catharine street W., Montreal; cost $4,500,000; number of sub-contracts have also been placed; Anglin-Norcross Ltd., Montreal, has general contract.

NEW TORONTO, ONT.—Northern Pigment Co. Ltd., Twenty-second street, has acquired 2½-acre site adjoining its plant here and will erect addition in the spring.

PETERBORO, ONT.—Canadian General Electric Co. Ltd., will build addition to plant here; 1-story, 110 x 150 feet; James M. Lyle, architect, 230 Bloor street W., Toronto.

ST. CATHARINES, ONT.—McKinnon Industries Ltd., Ontario street, has awarded general contract for $15,000 plant addition to Newman Bros., 127 St. Paul street.

TORONTO, ONT.—Canadian Breweries Ltd., 296 Victoria street, has awarded structural steel contract to John T. Hepburn Ltd., 18 Van Horne street, for plant addition; cost $100,000.

TORONTO, ONT.—Morgan Paper Co. Ltd., 925 Dufferin street, will build plant addition at Van Horne street and Gladstone avenue, 1-story, 45 x 150 feet; general contract awarded R. Downey, 89 Gledhill avenue, East York, Ont.

YORK TOWNSHIP, ONT. — Ontario Hydro Electric System, University avenue, Toronto, has purchased large tract on Roselawn avenue and Castlefrank road, and will erect large power station; cost $800,000; to include later six sub-stations.

MONTREAL, QUE.—Alexander Murray & Co. Ltd., 4035 Richelieu street, has awarded general contract to Cook & Leitch, 1440 St. Catharine street W., for factory addition to cost $20,000; T. Pingle & Son Ltd., 485 McGill street, engineer.

STE. THERESE, QUE.—Andreef & Co. 606 Cathcart street, Montreal, will build factory for manufacture of sporting goods; cost $20,000.

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Bids Wanted

Federal Works Agency, Public Buildings Administration, Washington, D. C., Jan. 15, 1940.—Sealed proposals in duplicate will be publicly opened in this office at 1 P.M., Standard Time, Feb. 15, 1940, for additional remodeling of the U. S. P. O., Custom House, and Court House at the corner of Public Square and Superior Street, Cleveland, Ohio. Upon application, one set of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $5 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished, in the discretion of the Commissioner, to builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any sub-contractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Commissioner of Public Buildings, Federal Works Agency.

Federal Works Agency, Public Buildings Administration, Washington, D. C., Jan. 4, 1940.—Sealed proposals in duplicate will be publicly opened in this office at 1 p.m., Standard Time, Feb. 8, 1940, for construction of the U.S.P.O. at Osborn, Ohio. Upon application, one set of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $5 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished, in the discretion of the Commissioner, to builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any subcontractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Commissioner of Public Buildings, Federal Works Agency.

Minerals

STRATEGIC-CRITICAL MINERALS listed by Army & Navy 1-7-39, include aluminum, antimony, asbestos, chromium, fluorite, manganese, mica, mercury, nickel, tin, tungsten, vanadium. Collection of choice specimen of each of these, individually labeled and packed in attractive glass-covered tray, only $10.00, PP. Hill & Jude, Assayers 1219-D, Boulder, Colorado.

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✦ ✦ ADVERTISING INDEX ✦ ✦

Where-to-Buy Products Index carried in first issue of month.

✦ ✦ ADVERTISING INDEX ✦ ✦

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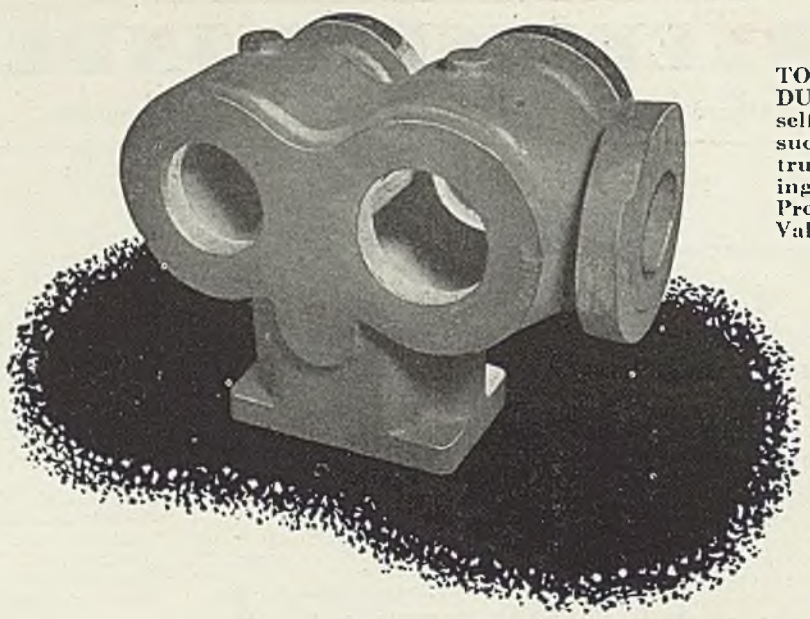

TO SPEED UP PRODUCTION—Give yourself the advantage of such clean, sound, true-to-pattern castings as this Birdsboro Precision Cast Throttle Valve.

Get Assured Delivery, Freedom From Defects, Faster Machining—

Specify BIRDSBORO PRECISION CASTINGS!

Right now is no time to let castings knock your production schedules out of line. With customers clamoring for speed, each minute you can save adds dollars to profits. Every delay means a plant full of headaches.

And that's why more plants than ever are turning to Birdsboro Precision Castings. They know that there will be no waiting for repours—and no returns of castings that just miss being right.

But even more important is the way Precision Castings ride through production. Their trueness-to-pattern cuts layout and machine set-up time to an absolute minimum. In machining, fewer cuts are necessary and uniform metal, free from sand inclusions, makes tools last longer—cuts down machine stoppages. In the finishing department, smooth surfaces and true contours eliminate chipping, grinding or filling operations.

It's surprising how much this freedom from little time-consuming difficulties can mean in speeding production. Even plants in the Middle West and New England find the extra production speed enough to offset freight differentials and pay extra dividends besides.

Why not give your own plant the benefit of these extra advantages. Write today for quotations and early delivery dates on Birdsboro Precision Castings.

BIRDSBORO PRECISION *Castings* MADE BY RANDUPSON PROCESS

Steel Castings · Steel Mill Equipment
Iron Castings · Special Machinery
Hydraulic Machinery · Crushing Machinery
Steel, Alloy Steel, Grain & Chilled Rolls

District Sales Offices: New York and Pittsburgh

BIRDSBORO STEEL FOUNDRY & MACHINE COMPANY

Plants at Birdsboro and Reading, Pa.