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# NEXT WEEK...

Longer-Lived Abrasives Increase Cutting Efficiency

Use of Oxygen in the Open Hearth

Carbides in Powder Metallurgy

Prepared Atmospheres for Processing Metals

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# As the EDITOR

# Showdown—Now or Later?

As this is being written, developments in the coal strike are clouded by uncertainty. The miners have left their jobs. John L. Lewis has ignored the anti-strike injunction issued by a United States District Court at the request of the Justice Department. The government seems determined to exhaust every legal resource to win this latest contest with Czar Lewis.

How long this determined attitude will be maintained is an open question. Some competent Washington observers are convinced that after a brisk skirmish over legal technicalities, Messrs. Truman and Krug will toss the ball to Steelman, who will give in to Lewis to the extent of a 15 per cent or more increase in miners' wages. There are others who, believing that President Truman feels he has paid in full all obligations he inherited from the preceding administration, are convinced that he will wage a strong fight against Lewis.

Time alone will determine which of these predictions is correct. Meanwhile, most Americans are not as much concerned with the technicalities of the contest as they are with the major principles that are involved in it. They know that the heads of many unions are waiting on the sidelines to see how Mr. Lewis makes out. They know that if he wins substantial wage increases, then every other union leader will seek similar gains. It will be very easy for the public to conclude that this latest attempted hold-up by Mr. Lewis calls for a real showdown, and the time for appeasement has passed and that it is necessary now and at whatever cost to re-establish the sovereignty of the rights of the people over the demands of a selfish and impatient minority.

The results of the last election were a strong indication that voters are fed up with reckless union tactics. It is quite possible that the temper of the people at long last has reached a point where a showdown on these recurring soft coal emergencies would be highly beneficial to the nation.

Such a showdown doubtless would be painful from a short-term standpoint. It would entail considerable inconvenience, acute human suffering and great monetary losses. However, the long-term aspects would be attractive. The abuse of power by minority pressure groups that has been mounting unchecked since 1932 would be curbed effectively.

If the voice of the public is not heeded in a showdown now, then the next Congress will be forced to enact drastic anti-strike legislation. VIEWS

# the NEWS

= 0 T E E L, == November 25, 1946

**THE PRICE OF FREEDOM:** One of the best sermons we have read on the duty of the individual in the present situation was voiced by C. E. Wilson, president of General Motors, at a meeting of the Economic Club of Detroit. He said:

With liberty and freedom comes individual responsibility. Are we now willing to pay the price for the freedoms we want?

"Freedom and liberty does not mean anarchy or laissez faire, nor does it mean something for nothing or that the government owes each of us a living unless we ourselves will make the effort to earn one.

"It does mean that every citizen should be willing to make the effort through education, experience and work to make a social contribution in proportion to the social rewards he expects to get. It does mean that as individuals we should apply to ourselves the same measuring stick we use in appraising others. It does mean a respect for the laws of the country until those laws are changed by a majority vote of the citizens. It does mean tolerance and patience and respect for the rights of others. ... It does mean that we've got to stop quarreling and go to work."

If a substantial portion of the nation's 140 million people would accept these responsibilities today, most major national problems could be solved in a few months. —p. 52

**PROGRESS IN METALS:** Visitors to the National Metal Congress held in Atlantic City last week were impressed by the high quality of technical papers, the wide scope of activities covered by them and by the evidence afforded by many exhibits at the National Metal Exposition that the time lag of a product from research laboratory to production line is much shorter than it was before the war.

Observers also noted that mechanical, electrical, hydraulic and pneumatic methods of work-handling, clamping and unclamping, station-to-station transfer and conveyorization have made as much progress in mass production welding, heat treating and other "metallurgical" operations as in the machining of inetals. Time-cycle controls, to make such operations automatic and to eliminate uncertainties of the human element, also appear to have become firmly established in welding, cutting and heat treating procedure.

The convention and show afforded the 20,000 visitors a realistic view of postwar progress in metals. —p. 38

**DOING THE IMPOSSIBLE:** Industry is teeming with curious stories indicating the extent to which management will go to keep up production. From many districts one hears reports of expediters haunting retail hardware stores on the chance of finding a few dozen urgently needed bolts and nuts. Shipments of parts by air express no longer are a novelty. Some manufacturers now accept as a part of their routine duty the difficult task of hunting for materials for their parts suppliers. If a purchasing agent has to buy steel of improper width, the plant manager will send it out to another plant for slitting to the correct dimensions.

By means of these and other expedients, many manufacturers are performing miracles in maintaining production at a high level. In fact, in some plants where the problem of materials and parts is being licked, output is being held down by scarcity of qualified workers. —p. 51

SIGNS OF THE TIMES: Manufacturing sites in Los Angeles are becoming scarcer, forcing industrial companies to seek locations in the orange groves and farm lands of the surrounding countryside. Numerous eastern corporations are purchasing land for new plants (p. 56) near Pomona, Riverside, Oxnard, San Bernardino, Ontario, Redlands and Santa Ana. . . Crucible Steel Co. of America has announced a \$30 million construction program (p. 54) to diversify its products, consolidate operations and improve operating practices. Approximately 40 per cent of the expenditure will go for facilities to produce hot and cold-rolled steel sheets and strip in coils. . . . Many iron, steel and nonferrous metal products are included in the list of commodities that may be considered in reciprocal trade negotiations scheduled for next April (p. 46) between the United States and 18 other nations. . . . National Metal Trades Association has adopted a resolution favoring repeal of the Wagner Act (p. 48) and support of legislation which protects the right of every worker to deal with his employer by collective bargaining through any agency he chooses, to deal with his employer directly if he chooses, to participate in a strike or not as he chooses, to go to and from his work unmolested and to enjoy equality under the law and protection of minority rights, and which provides for the control in the public interest of monopolistic activities of all groups, whether employer or employee. . . . Bright spot in the otherwise troubled automobile industry is the favorable position of dealers. They are prospering (p. 51) by virtue of good profits on sales of new cars and parts and on a heavy volume of repair work. . . . Stretching steel longer and thinner while it is being rolled will be a major innovation in the world's first continuous seamless tube mill now being built at the Lorain plant of National Tube Co. "Stretch reduction" (p. 96) is achieved by introducing tension by increasing the relative speeds of the rolls in successive stands more than is required merely to roll pipe wall to smaller diameter. . . . A fire brick, dislodged from the wall of a 1300-foot long annealing furnace in a Michigan malleable iron foundry, became wedged between the sidewall and conveyor line, halting operations. A plant guard (p. 52) fired a few shots at the wedged brick from his 38-caliber pistol, breaking it up so that the conveyor line was freed in a few minutes.

E.C. Aho EDITOR-IN-CHIEF



# **Ryerson Guide Data** with Alloy Steel from Stock

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# Steel Rate Cut as Miners Walk Out

Ingot operations drop 8 points immediately to 83.5 per cent of capacity. Expectations are the rate will fall to 50 per cent within two weeks should miners' strike be prolonged. Mills' coal stocks range from eight to 30 days

STEELMAKING operations were immediately adversely affected last midweek when members of the United Mine Workers' union, by the thousands. failed to report for work as their leader, John L. Lewis, stood pat in his deflance of the government and a federal court injunction by failing to order his followers to continue on the job in the coal pits after the walkout deadline. Wednesday midnight, Nov. 20.

Even before the strike deadline more than 140,000 miners in 13 states were voluntarily idle, and expectations are coal mining will be at a virtual standstill throughout the country by the first of this week unless unexpected developments bring about a truce or cancellation of the walkout.

With coal stocks below normal the steel industry began immediately to curtail operations. Steel mill coal inventories are reported to range from eight to 30 days at capacity output. Last week the national ingot rate was estimated around 83.5 per cent of capacity, but expectations were that by the beginning of this week it would be down sharply with plans under way in some districts to reduce operations quickly. Some observers predicted the national ingot rate would be down 25 points this week and within two weeks would drop to around 50 per cent of capacity.

These drastic cuts were necessitated by the need to conserve coal as far as possible, since fuel will be needed to keep furnaces warm for an indefinite period. Blast furnaces were ordered banked on a wide scale and plans called for sharp curtailment of coke production. Finishing mill operations will be affected correspondingly, depending upon the length of the strike.

General manufacturing operations will be quickly affected if the strike in the mines is prolonged. With steelmaking operations drastically curtailed, manufacturing industry, for months operating on short steel supplies, will find it impossible to maintain operating schedules with steel supply shrinking to a dribble. Shortage of coal at power plants will further add to the difficulty of maintaining normal manufacturing activity.

The issues in the latest coal labor controversy are confused. Actually Lewis' demands upon the government, which has been operating the mines since the strike last spring, had not been specifically stated prior to the strike. Average work-week in the coal mines in recent months has been 42.4 hours, with weekly wages averaging \$62.37. Lewis claims that the union's contract with the government, which he now has undertaken to set aside, subjects the miners to a 54hour week. However, while some mines offer the opportunity to miners to work a full 54-hour week, no miner can be required to work that long unless he desires to do so.

Miners' pay last was raised on May 29 of this year when the government signed a contract with the union granting a wage increase of \$1.85 per day, calculated to be 18½ cents an hour for straight time, with overtime in addition. It also gave other concessions. Now Lewis is said to be asking that the work-week be cut to 40 hours without loss of "take-home" pay. This would mean the miners would get for a 40-hour week \$76.25, the same amount some of them now receive under the government contract for working a 54-hour week.

Early last week the government went



#### JOHN L. LEWIS

to federal district court for the District of Columbia and obtained a temporary injunction restraining Lewis from carrying into effect his signal to the miners to walk out on strike Nov. 20. This action was taken on direct order of President Truman who seemed determined to have a "showdown" with Lewis.

The argument centers around the differences of view as to the terms of the contract between the miner's union and the government. Secretary of the Interior Krug, in charge of the mines for the government, insists Lewis' notice terminating the agreement constitutes a breach of obligations assumed by the United Mine Workers for the period of government operation. Lewis, on the other hand, holds the contract with the government carried forward contracttermination procedure included in the union's prior contracts with the private owners of the mines. Attorney General Clark backed up Secretary Krug, holding that the latter's interpretation of the government contract was correct and that it applies for the duration of government control.

Just what further action will be taken by the government and Lewis in the controversy was uncertain late last week. That the government would press legal action against the mine union leader appeared certain. The temporary injunction expires Nov. 27 but Lewis can take action to press it to a conclusion prior to that time. As regards the government, it is pointed out that even if Lewis should wriggle out of the present legal entangle-

ment he possibly may face criminal action for violation of section 6 of the Smith-Connally War Labor Disputes Act. This latter law makes it illegal for anyone to strike a government-possessed plant, mine or facility. Another possibility was that union funds might be frozen, thus cutting off aid to the striking miners.

Speculation ran high all last week as to the ultimate outcome of the miners' strike. No one in authority was disposed to guess as to the duration of the walkout in event it took place though steel and industry leaders were preparing for a prolonged tieup. Curtailment of railroad train operation was ordered by the government and brownouts of cities were proposed as coal stock conserving measures.

That the situation was replete with political implications was sensed in informed quarters. Talk was even heard of widespread sympathy strikes by labor generally. This talk was inspired by the voiced support of both the American Federation of Labor and the CIO of the miners' position. Spokesmen for both labor organizations expressed opposition to the government's moves in its controversy with Lewis.

At the same time, some observers were inclined to view the miners' strike as the opening gun in a concerted drive by labor generally for higher wages, the coal strike settlement being utilized by other unions as the pattern for their wage demands over coming months. This would be especially true in the case of the steelworkers whose contract with the steel producers expires early next year.

The situation prevailing at the various steel producing centers last week as reported by STEEL's district editors follows:

#### **Coal Supplies Comfortable**

Detroit - Supplies of coal at plants of utilities and steel mills are comfortable, ranging from 24 days at the Ford Rouge plant on up to three months or more. It must be remembered, however, that at this time of the year stocks are built up to carry through the winter months when water shipments are suspended; hence any protracted coal strike would cause a major retrenchment in this area.

Foundry coke continues in tight supply. Ford has been supplying a number of foundries with coke from the Rouge ovens, but last week stopped shipments on these accounts as a conservation The larger foundries have measure. only 7-14 days supply on the ground.

#### Valley Plants Closing

Youngstown - Steelmaking operations were hit hard in this district almost



JULIUS A. KRUG

immediately upon calling of the coal strike. Leading producers took steps at once to curtail operations since their fuel stocks were below normal and indications at last midweek were that ingot operations for the district in the week ended Nov. 23 would not exceed 75 per cent, a drop from 91 at the start of the week. This week a drop to possibly 50 per cent is in prospect.

Youngstown Sheet & Tube Co. by the end of last week had banked three blast furnaces, taken off five coke oven batteries, shut down all 11 open-hearth furnaces and the bessemer converter at its Campbell works. At its Brier Hill plant it planned by the end of the week to cut coke production 40 per cent, bank a blast furnace at that point and shut. down three open hearths. Its Hubbard blast furnace was scheduled to be banked Sunday, Nov. 24.

Finishing mill operations of the company in the district were expected to be cut 60 per cent some time this week.

Republic Steel Corp. was understood to be planning to bank four district blast furnaces at once, as well as cutting off production at seven open hearths and a bessemer converter. Coke operations of Republic also were scheduled for drastic curtailment.

## Curtailing at Pittsburgh

Pittsburgh - Leading steel producers bere began to curtail primary steel operations immediately upon outbreak of the coal strike. Should the work stop-

(Please turn to Page 148)

# STEEL DISTRIBUTORS

# Co-operation Urged by Speaker At Steel Warehouse Convention

American Rolling Mill executive says all industry groups must work together to vitalize the postwar economy. Broad range of subjects pertinent to steel distribution discussed at meeting. Grandy re-elected president and executive secretary

EMPHASIZING the close relationship between steel producers and steel distributors, Bennett Chapple, assistant to the president, American Rolling Mill Co., Middletown, O., speaking at the fifth annual convention of the Steel Products Warehouse Association in Detroit, Nov. 14-15, stressed the need for all industry groups to work together to vitalize the hard-won ideals of liberty and private enterprise in the postwar economy.

Mr. Chapple, who was the principal speaker at the annual banquet attended by 200 steel distributors and mill executives, headed an imposing list of speakers appearing on the convention program. He was introduced at the banquet by Arthur H. Allen, Detroit editor of STEEL.

That the 'War Assets Administration will adhere to its present price policy, with possible adjustments only where price advances are made by the steel industry as a whole, was the statement made by W. H. Kelley, director of metal sales for WAA, speaking on "Surplus Steel Disposal Problems." He indicated that sizable inventories of steel will be sold in the next three months and where there are more offers to buy than there are carloads of steel to sell, WAA will follow its policy of drawing names from a hat.

In the discussion following Mr. Kelley's address it was announced a meeting of the Surplus Advisory Committee for steel warehousemen would be convened in the near future.

Following Mr. Kelley, E. L. Wyman, head of the Warehouse and Surplus Materials Section of OPA's Iron & Steel Price Branch, made an "off the record" talk on the ending of steel price controls.

Featured on the program was an address by Dr. Neil H. Jacoby, professor of finance, School of Business and vice president of the University of Chicago, who spoke on "Economic Policies for Business Independence." In his talk he indicated possible lines of government planning policy to maintain consumer buying power within the framework of a free, competitive market.

Henry P. Fowler, general counsel

and manager of the Trade Association Department, United States Chamber of Commerce, closed the afternoon program with an address on "Trade Association Objectives in a Free Economy." He stressed the development of self-discipline and "self-leadership" by trade associations in opposition to the "big government" idea, better labor-management relations, and a more complete public relations policy to acquaint laymen with the problems and accomplishments of intlividual trade associations.

At the business meeting on Nov. 14, the association adopted a resolution favoring a "hold-the-line" price policy, denouncing "unwarranted" price advances to take advantage of current shortages. It also adopted a resolution favoring an early Trade Practice Conference between steel mills and steel warehouses.

Addresses presented at the business session included, "An Analysis of Warehouse Operations," by John F. Drake, accounting counsel; "An Analysis of Steel Distribution," by Daniel J. Ryan, assistant secretary; and the "Annual Report," by Clayton Grandy, president-executive secretary, reviewing the association's accomplishments during the past year.

Attendance at the meeting was record-breaking. Clayton Grandy was reelected president and executive secretary for 1947.

Other national officers elected for the coming year were: Phillip P. Brown, Reliance Steel Division, Detroit Steel Corp., Detroit, first vice president; M. S. Phillips, the Lake Erie Steel & Blanking Co., Cleveland, second vice president; S. E. Hokin, Hokin Steel & Tin Plate Co., Chicago, secretary; and Harry Resnick, the Universal Steel Co., Cleveland, treasurer.

Four trustees-at-large elected are: Phillip P. Brown, Detroit; S. E. Hokin, Chicago; Bernhard Gordon, Caine Steel Co., Chicago; and S. M. Friedman, the Nottingham Steel Co., Cleveland.

# Present, Past and Pending

### SHARON STEEL MAY ACQUIRE BRAINARD STEEL CORP.

WARREN, O.—Sharon Steel Corp., Sharon, Pa., may acquire control of Brainard Steel Corp., Warren. Brainard stockholders are to meet Dec. 6 to consider approval of sale of assets to Sharon through exchange of stock.

#### MACHINE TOOL INDUSTRY'S SHIPMENTS INCREASE

CLEVELAND—October shipments of the machine tool industry totaled \$28,935,000, the National Machine Tool Builders Association estimated. This is a \$3,467,000 increase over September. New firm orders declined to the second lowest monthly level of the year, while unfilled orders shrank 2.4 per cent.

### LUKENS PLANTS HIT BY SCRAP SHORTAGE

COATESVILLE, PA.—Because of a shortage of ingots resulting from lack of sufficient scrap and pig iron to sustain steelmaking operations, Lukens Steel Co.'s mills and supporting shops will operate only four days this week. Scrap receipts by the company have been only 35 per cent of normal recently.

#### GENERAL MOTORS CAR OUTPUT RATE GAINS

DETROIT—General Motors weekly output of passenger cars cleared the 30,000 mark for the first time since V-J Day during the week ended Nov. 16, and total production of cars and trucks reached 41,517. This rate is 76 per cent of the average weekly production for the 1941 model year. Strikes in suppliers' plants are down to 30.

#### TIMKEN BOOKS LARGE JOURNAL BEARING ORDER

CANTON, O.—Timken Roller Bearing Co. has booked an order for 4000 journal bearings for 500 refrigerator express cars to be built for the Railway Express Agency. The order is said to be the largest of its kind ever placed. The bearings will weigh 62 pounds each and have inside diameter of  $5\frac{1}{2}$  in.

#### U. S. STEEL ARGUES DELIVERED PRICE CASE

PHILADELPHIA—Hearing of the United States Steel Corp.'s argument supporting its request for Federal Trade Commission permission to allow the corporation's subsidiaries to quote the same delivered prices as competitors was scheduled for hearing Nov. 22 in Circuit Court here.

# Technological Progress Highlighted



#### A. L. BOEGEHOLD New president, American Society for Metals

WITH special trains converging daily on Atlantic City from the nation's industrial centers, the twenty-eighth National Metal Congress, Nov. 18-22, rolled up total attendance estimated at more than 20,000.

The congress, embracing technical sessions staged by the American Society for Metals, the American Institute of Mining & Metallurgical Engineers, the American Welding Society, and the American Industrial Radium & X-Ray Society, emphasized recent important developments in metals and alloys and their treatment, as well as new methods of fabrication and non-destructive testing and inspection.

Typical of such materials are various high-tensile heat resisting alloys which in turn are making possible such developments as gas turbines.

Some idea of the scope of the congress can be gained from subjects picked more at less at random from the technical program. In addition to high-temperature alloys, those dealt with in detail were: Magnesium alloys; nonferrous alloys; treatment of tool steels, including effect of subzero temperatures; crystal structure; sleeve bearing metals; electronic inspection; welding and cutting; research applications of radiography; and internal exploration of metal parts by means of supersonic echoes.

Paralleling the technical program of ASM in the huge Municipal Auditorium

Scores of papers covering latest developments in steel and metalworking industries presented at sessions of major technical societies participating in Atlantic City meeting. Exposition attracts thousands

was the National Metal Exposition. It was impressive to find, along the aisles of the exposition, practical examples of the materials and methods whose theoretical aspects had been discussed in the meetings of the societies. This proved beyond question that progress from research lab oratory to production line is a matter of months rather than years.

Even casual observation of the exhibits made it clear that mechanical, electrical, hydraulic and pneumatic methods of work-handling, clamping and unclamping, station-to-station transfer and conveyorization have made fully as much progress in mass production welding, heat treating and various other "metallurgical" operations as in other machine shop operations. Time-cycle controls play important roles in making such operations automatic.

### **ASM Sessions**

Annual meeting of the American Society for Metals on Wednesday morning provided that group with a new official family. A unanimous ballot was cast and A. L. Boegehold, head of metallurgy, Research Laboratory Division, General Motors Corp., Detroit, became president for the coming year upon retirement to the board of trustees of Charles H. Herty Ir., assistant to vice president, Bethlehem Steel Co. Francis B. Foley, superintendent of research, Midvale Co., Philadelphia, was installed as vice president, and William H. Eisenman was re-elected secretary. Two new trustees, elected to serve for two years, are Arthur E. Focke, research metallurgist, Diamond Chain & Mfg. Co., Indianapolis, and John E. Dorn, associate professor of physical metallurgy at University of California.

The meeting was followed by the Campbell Memorial Lecture with the subject "The Effect of Changes in Condition of Carbides on Some Properties of Steel." The speaker, James B. Austin, assistant director of Research Laboratories, United States Steel Corp., Kearny, N. J., is well known for his work in thermodynamics or heat flow in metals.

Studded with many new features, the



DR. C. H. HERTY JR. Retiring president, American Society for Metals

largest ASM technical program in years presented those attending the congress with a choice of sessions sharply competitive in interest. In the crowded sessions on high-temperature alloys, their development, stress rupture and creep properties, and structural variations, were discussed. Papers on metallurgy of stainless steels and five lectures on inspection instruments — the cyclograph, reflectoscope, direct-reading spectrometer, strain gage, etc.—the latter a part of the congress' newly established evening lecture courses, were singled out for special attention by many members.

Presentation of four awards was made at the annual ASM dinner at the Traymore Hotel on Thursday.

Alumni of 12 technical schools and universities met at their traditional luncheons, all held simultaneously on Thursday. Five Canadian chapters of ASM also held their annual luncheon at midweek, with "friends of Canada" in the U. S. invited to meet Canadian members. The American Gas Association breakfast on Wednesday presented an opportunity for gas men, industrialists and manufacturers to meet editors of metallurgical magazines in an informal get-together.

#### **AWS Sessions**

Throughout the week, members and guests of the American Welding Society heard 80 technical papers prepared by welding engineers. Subjects ranged from electrode composition to the more complicated analysis of residual welding stresses. Typical of the pioneering spirit and youthful outlook of the entire industry was the summarization, "New Frontiers in Welding" by Wendell F. Hess, head of the welding laboratory at Rensselaer Polytechnic Institute and retiring president of AWS.

This year's Adams lecture by Dr. Hess, and high point of this program, pointed out the many new frontiers for application of welding, as well as the fruitful fields for exploration and research.

New national officers of AWS were inducted at the society's business session Friday afternoon. L. W. Delhi, vice president, Hunt, Mirk & Co., San Francisco, was installed as the society's president for 1946-47. Harold O. Hill, assistant chief engineer, Fabricated Steel Construction, Bethlehem Steel Co., Bethlehem, Pa., took office as first vice president, and G. N. Sieger, president and general manager, S-M-S Corp., Detroit, as second vice president.

Medals and prizes were presented and honorary memberships conferred during the annual dinner on Nov. 21. These were: The Lincoln Gold Medal to II. E. Kennedy of Berkeley, Calif.; the Samuel Wylie Miller Memorial Medal to James F. Lincoln of Lincoln Electric Co., Cleveland, and awards and cash prizes for "best paper" contests.

## AIME Sessions

That metallurgists are engaged in an intensified study of aluminum and magnesium alloys was evidenced by the opening sessions of the Metals Divisions of the American Institute of Mining & Metallurgical Engineers, which held their annual fall meeting at Hotel Claridge, Atlantic City, Nov. 18-20. Over 300 members and guests registered.

Key address on the program, the 1946 annual lecture, was that of Dr. W. Hume-Rothery, noted physicist and theoretical metallurgist of Oxford University, Oxford, England. He spoke to a crowd which taxed the capacity of Hotel Claridge's Cambridge Hall on "Electrons, Atoms, Metals and Alloys."

Dr. Hume-Rothery indicated to the audience of mining and metallurgical engineers that alloys of the future may be worked out on paper by what he called "equilibrium diagrams of combinations" made possible by wartime atomic research.

We know," he said, "that metals should be ten times as strong as they are," and went on to say that science is making a bid to understand the "why" of structural weakness through study of the arrangement of atoms in the solid metal, seeking to establish how the various arrangements affect the alloys properties.

Another important feature was a symposium on Effects of Multiaxial Stresses on Metals, sponsored by the two units of AIME. Joint sessions also dealt with magnesium alloys and oxide films. W. F. G. Swann, Franklin Institute, Philadelphia, was the principal speaker at the annual fall dinner of the Institute of Metals and Iron & Steel Divisions.

A. Hultgren and B. Herrlander, Swedish scientists, discussed veining or subboundaries in ferrite in one of AIME's many interesting sessions.

Another paper indicating the deep interest in study of light metals was one presented by G. Ansel, Dow Chemical Co., Midland, Mich., with J. P. Doan of the same company as co-author. "Some Effects of Zirconium on Extrusion Properties of Magnesium-Base Alloys Containing Zinc" concluded that zirconium's outstanding effect is to greatly increase the extrudability of magnesium-zirconium alloys, particularly those of high zinc content.

The two divisions of AIME did not hold an election during the week, but reaffirmed the nomination of Clyde Williams for president, to become effective in March, 1947. Other officers will move up a notch as in the past.

#### AIRX-RS Sessions

The sixth annual meeting of the



L. W. DELHI New president, American Welding Society

American Industrial Radium & X-Ray Society took place during the last three days of the National Metal Congress. Headquarters of the society was at the Seaside Hotel and all meetings were held in the ballroom. Leslie W. Ball of Naval Ordnance Laboratory, White Oak, Md., was general chairman. In all, 20 papers on such subjects as "Quantitative Measurement of Penetrating Radiation," "Commercial and Research Applications of Radiography" and "Nondestructive or Allied Methods" were presented.

One of the most important functions was the 1946 Mehl Lecture by Herman E. Seemann, Eastman Kodak Co. His subject, presented on Thursday afternoon following the annual meeting, was "Photographic Aspects of Industrial Radiography."

New officers installed during the annual meeting were Al F. Cota of A. O. Smith Corp., Milwaukee, as president to succeed Kent Van Horn; Don McCutcheon of Ford Motor Co., Detroit, as vice president; and Dana W. Smith, Glenn L. Martin Co., Baltimore, as treasurer. Philip D. Johnson continues as secretary of the society.

## **Digest of Technical Papers**

Digests of Technical papers presented at the convention sessions of the American Society for Metals follow:

Pole Figures of the Effect of Some Cold Rolling Mill Variables on Low Carbon Steel, discussed by John Karl Wood Jr., Bausch & Lomb Optical Co., Rochester, N. Y., provided listeners with a quantitative picture of the orientation effects produced in cold-rolled low carbon sheet steel by changing, one at a time, some of the controllable variables in mill dimensions and techniques. Some of the variables included total reduction at the end of each pass, roll diameter, intermittent pass versus a continuous pass and a tension on the strip.

The pole figure data presented were plotted in terms of the (110) family of poles. They were obtained from x-ray diffraction patterns using a technique developed by the author. With this technique, it was possible to use a relatively large number (112) of pole positions in each pole figure. Thus the pole figures of this work were plotted from more complete information than that usually given.

Two sets of pole figures were plotted. One was plotted in the specimen or rolling-cross rolling plane, and the other set was plotted in the normal-cross rolling plane with the edge of the specimen on a diameter of this figure. The pole density was plotted in four densities—

# NATIONAL METAL CONGRESS

# dense, medium, light and zero.

Apparent Influence of Grain Size on the High-Temperature Properties of Austenitic Steels, by C. L. Clark, research metallurgical engineer, Steel & Tubes Division, Timken Roller Bearing Co., Canton, O., and J. W. Freeman, research engineer, department of engineering research, University of Michigan, Ann Arbor, Mich., discussed results obtained from an investigation undertaken to determine effect of variations in grain size on the high-temperature strength characteristics of austenitic steels. Four different steels were considered. Their relative high-temperature properties were evaluated on the basis of short-time tensile, creep and stress-rupture tests at temperatures varying up to 1800° F.

The authors showed that too broad generalizations cannot be drawn with respect to the influence of grain size variations on the high-temperature properties. The 18-8 alloy behaves as expected in that the coarser grain structure is superior at the more elevated temperatures with the magnitude of the differences, due to grain size, being of a relatively low order of magnitude. With the three remaining steels, however, the finer grained structures were greatly inferior in their high temperature load carrying ability over certain portions of the temperature range. This was shown to be due to the appearance of an as yet "unknown" phase. On the other hand, these finer grained steels possessed a much higher hot ductility to fracture under the more prolonged fracture times. For each of the steels the choice of the proper grain size, therefore, depends on the proposed operating temperature, and the relative importance of strength and suitable hot ductility to fracture under prolonged time periods. 0 0

Tempering of High Alloy Tool Steels, prepared by George A. Roberts, chief metallurgist, Arthur H. Grobe, research metallurgist, and Christian F. Moersch Jr., metallurgical department, Vanadium-Alloys Steel Co., Latrobe, Pa., presented complete tempering data for eight highalloy tool steels (three high-speed steels, three cold-work die steels and two hotwork die steels) for the range of 200 to 1300° F and 0.1 to 100 hours. At least four quenching temperatures were used for each steel, the authors pointed out. Also a limited amount of tempering data were obtained for two other hot-work die steels.

Various methods of presenting the data were used but Hollomon and Jaffe's method of plotting the rockwell C hardness versus the parameter T (c+log t) was considered the best-to present all



CLYDE WILLIAMS Renominated as president, American Institute of Mining & Metallurgical Engineers

of the tempering data for one steel from one quenching temperature on a single curve.

The effect of quenching temperature upon the quenched hardness of the eight high-alloy tool steels was also discussed. . . .

Changes in Size and Toughness of High Carbon-High Chromium Steels Due to Subzero Treatments, the work of L. E. Gippert, metallurgical department, and G. M. Butler Jr., director of research, Allegheny Ludlum Steel Corp., Dunkirk, N. Y., dealt with three types of high carbon-high chromium die steels. These were reported to expand considerably when given a subzero treatment after hardening before tempering. Hardnesses of rockwell C-67 to 68 were developed. According to the authors, holding at room temperature for 24 hours before cold treatment causes somewhat lessened expansion, but tempering at 300° F almost entirely nullifies the effect of subsequent cold treatment. Izod impact tests revealed no excessive brittleness when allowance was made for the increased hardness.

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Chromium-Oxygen Equilibrium in Liguid Iron, by Hsin-Min Chen, metallurgical department, Carnegie-Illinois Steel Corp., South Works, Chicago, and John Chipman, head, department of metallurgy, Massachusetts Institute of Technology, Cambridge, Mass., was based on a thesis submitted by Hsin-Min Chen in partial fulfillment of requirements for

the degree of Doctor of Science at MIT. Experiments were described in which liquid iron-chromium alloys, containing up to 20 per cent chromium, were brought into equilibrium with accuratelycontrolled gaseous mixtures of water vapor and hydrogen. Relationship between the ratio of water and hydrogen and the equilibrium chromium content of the bath was used to determine equilibrium constants, and free energy changes in the reactions. These were studied in crucibles of chromite and of chromic oxide, and a method was developed for the manufacture of the latter.

At 1595° C, chromite is the stable solid phase in equilibrium with melts containing less than 5.5 per cent chromium. while at higher percentages Cr. O, becomes the stable phase. The oxygen content of the metal depends upon the ratio of water vapor to hydrogen in the gas phase and the chromium content. For any given water-hydrogen ratio, the oxygen in the bath increases with increasing chromium content. This signifies that chromium decreases the activity of oxygen in liquid steel. Effect was explained by postulating the existence of chromous oxide in solution in the metal. On this assumption the concentrations of oxygen associated with chromium and with iron are calculated.

The results obtained for reaction were shown to be in excellent agreement with calculated figures obtained by extrapolation of results at lower temperatures on the reduction of Cr.O. by hydrogen to form solid chromium. Since the calculation involves the assumption that liquid iron-chromium alloys obey Raoult's law for ideal solutions, the agreement gives strong evidence of the validity of this assumption.

Effect of temperature on reactions was established by calculations based upon extrapolation of the low temperature data. Variation of oxygen content of the melt with temperature was approximated by calculations of somewhat less certainty, and the results were presented in graphs and tables covering the range 2800 to 3200° F. .

#### .

Constitution of the System Indium-Tin, by F. N. Rhines, staff, W. M. Urquhart, research assistant, and H. R. Hodge, former research assistant, metals research laboratory, Carnegie Institute of Technology, Pittsburgh, was presented as a restudy of the alloy system of indiumtin by means of precision thermal methods and, for the first time, by metallographic means. Earlier investigations of Valentiner and of Fink, Jette, Katz and Schnettler were confirmed in most respects. There is a eutectic at 48.7

(Please turn to Page 113)

# Metalworking Industry's Earnings Position Improves in Third Quarter

INCREASE in the metalworking industry's third quarter rate of operations was accompanied by improvement in reports of net earnings.

Indicative of thus, a survey of 50 metalworking companies representing a broad cross-section of the industry showed that 34 of them reported better net earnings in the relatively uninterrupted third quarter than in the second quarter of this year. Compared with the strike-ridden first quarter, the third quarter was far more favorable for earnings, 45 of the companies showing greater net profits in the third period than in the first. Compared with the third quarter of 1945, the third quarter of 1946 was more profitable for 40 of the companies.

However, poor earnings in the first two quarters of 1946 offset third quarter earnings to a great enough degree that for the first nine months of 1946 only 23 of the 50 metalworking companies showed greater aggregate net earnings than in the corresponding period of 1945. In fact, four of the 50 companies showed net deficits in the first nine months of 1946 whereas none had deficits in the corresponding period of last year. For a number of companies the task in the third quarter of 1946 was to offset deficits caused by interruptions to production in the first two quarters.

The improved financial showing for the first nine months of 1946 compared with the first nine months of last year was to a great degree the result of freedom in 1946 from the federal excess profits tax, which ended with 1945.

The financial statements do not reflect a true picture, however, of actual operations, for the application by a number of companies of carryback tax credits or the use of postwar reserves tend to obscure unsatisfactory operating results.

Net earnings and losses of the 50 companies are summarized in the accompanying table.

# Earnings Position of 50 Metalworking Companies

	Third Qtr. 1946	Second Qtr. 1946	First Qtr. 1946	Third Qtr. 1945	First 9 Mos. 1946	First 9 Mos. 1945
Air-Way Electric Appliance Corp.	\$ 113,029	\$ 35,872	\$ 20,213	\$ 51.737°	\$ 169,114	\$ 156,122
Allis-Chalmers Mfg. Co.	8,499,061*	6,675,476°	2,250,956°	1.280.943	17.425.493°	5.231.888
American Brake Shoe Co.	1,103,295	1,016,891	329,236	486,917	2,449,422	1.834.909
American Machine & Metals Inc.	69,828	96,981	79,088	117,236	245,897	319,633
American Radiator & Standard Sanitary	1 400 010			1000		,
American Stove Co	1,463,819	1,045,397	712,255	1,492,084	3,221,471	3,748,149
Autocar Co	382,091	290,037	3,591	117,178	675,719	661,673
Blaw-Knox Corn	438,047	303,717	521,159	155,094	1,262,923	860,859
Borg-Warper Corp.	000,741	1,025,128	28,936	632,473	1,742,805	2,065,191
Bower Boller Bearing Co	470 597	1,004,020	310,772	985,971	4,152,014	4,514,441
Briggs & Stratton Corp	303 086	565 165	187,521	182,731	927,183	609,918
Caterpillar Tractor Co	1 600 100	1 749 438	240,017	243,519	1,202,068	734,256
Chrysler Corp.	6 997 963	4 805 311	1,001,992	1,070,229	4,394,537	5,267,818
Clark Equipment Co.	1 075 386	609 798	417 6009	0,700,229	10,292,645	23,077,063
Cleveland Graphite Bronze Co	883 790	401 881	918 914	155 747	47,009	1,145,827
Cutler-Hammer Inc.	511 688	346 922	119 703	268 727	1,503,665	963,068
Diamond T Motor Car Co.	264,241	233 544	195 280	263 020	971,010	1,003,111
Eaton Mfg. Co.	865.887	896,316	31 526	483 155	1 702 700	1,342,102
General Cable Corp.	2,342,658	1.222.466	2.231.405°	211 415	1,333,710	2,424,425
General Electric Co.	6,384,288	7.721.401	13.701.580°	11 449 194	404 100	26 949 727
General Motors Corp.	33,816,460	16,320,573	36.124.663*	36,791,784	14 012 370	147 740 167
riolland Furnace Co.	869,197	401,999	70.990°	558 360	1 200 206	052 048
Houdaille-Hershey Corp.	606,193	480,551	269.002°	183,491	817 742	1 088 909
International Business Machines Corp	4,927,216	4,115,460	4.073.310	2.713.016	13,115,986	7 778 539
Kalamazoo Stove & Furnace Co.	167,439°	94,822°	28,373°	67.872	290.634°	422 729
Link Role Co.	253,000	227,700	123,400	128,400	604,100	388,400
Marion Pour Ol 1 0	1,164,253	657,219	372,435	547,272	2,193,907	1.981.800
Maytag Co	30,853	372,175	323,160°	25,258	79,868	135,696
Midland Steel Dead to C	935,933	732,608	399,068	194,052	2,067,609	488,546
Minneapolis Herrica II D	400,146	398,804	268,738	314,382	1,067,688	1,074,993
Mullins Mfr. Co.	1,281,529	977,707	652,959	510,600	2,912,195	2,404,991
National Acme Co	319,996	708,842	687,998°	93,126	340,840	561,268
National Cash Begister Co	101,019	525,534	633,466	278,940	1,860,619	1,140,004
Noblitt-Sparks Industries Inc.	1,057,332	601,613	343,206*	630,151	1,315,739	1,993,712
Packard Motor Car Co	627 700	402,070	447,192*	18,079	253,747	826,405
Pittsburgh Screw & Bolt Corr	435 070	990,900	247,449*	6,051	1,387,316	1,070,500
Simonds Saw & Tool Co	1 011 931	757 998	10,044	110,211	563,659	635,043
Square D Co.	749 347	110 776	956 105	200,230	2,240.055	946,468
Standard Stoker Co. Inc.	205 514	319 877	357 561	100,362	1,010,220	1,183,452
Stewart-Warner Corp.	1.264.583	550 822	149 1109	167 004	1 673 905	1 000,000
Studebaker Corp.	49,030	171 040°	129 760°	607 665	951 770°	2 260 056
Understand Corp.	204.068	359,749	497 490°	97 959°	66 327	410 102
United D di Corp.	346,969	308,786	263,620	563.022	919 375	1 528 535
Tool Corp.	529,463	460,558	244,889	21,705	1.234.910	293,506
Walworth C. Machinery Corp.	553,200	444,092	393.937	77.453	1,391.229	357 929
Westinghouse Til	519,704	888,574	421,509°	134,965	986.769	735,723
Worthington Plectric Corp.	2,854,553	18,382,996	18,724,601°	4,627 653	2,512,948	13,673,825
Yale & Towne Min & Mchry. Corp	2,032,936	1,807,220	1,550,540°	502,821	2,289 616	1,969,816
	194,154	24,167	742,771	201,542	524,450°	774.237

" Net loss.

# Hint of Wage Demands To Be Made In 1947 Comes from CIO Parley

Indications are that CIO leaders feel there should be no settlements next year for less than 20-cent hourly increases in current basic hourly wage rates. One of many resolutions calls for immediate repeal of Smith-Connally labor disputes act

HINT of what wage demands will be made in 1947 by the Congress of Industrial Organizations came out of its eighth constitutional convention last week at Atlantic City, N. J.

On the whole, the convention was peaceful, but all the while the organization's big wage fight for 1947 was developing. Between convention sessions a co-ordinated wage program was studied at meetings of executive boards of the big three CIO unions, the United Steelworkers of America, the United Automobile Workers, and the United Electrical Workers.

There was every indication that the CIO's 1947 wage demands will be as high, if not higher, than those in 1946. Reports circulated at the convention that some influential CIO leaders feel there should be no settlements during 1947 for less than 20-cent hourly increases in current basic hourly wage rates. These same sources indicate that the CIO wage demands for 1947 may aggregate \$2½ billion.

The steelworkers are to draft their demands at a meeting of the union's wage policy committee in Pittsburgh, Dec. 15.

#### Anti-Communist Policy Adopted

One of the first actions in the convention was unanimous adoption of an anti-Communist declaration which the CIO executive board had endorsed as standard policy for the CIO. The feeling existed, however, that the declaration does not end the struggle for power between the CIO's left and right wings, nor does it provide machinery for expansion or removal from office.

Philip Murray, CIO president, addressing the convention, charged that the "unprecedented profits" of industry in 1946 constitute a greater threat to American democracy and way of life than the issue of Communism. He contrasted the profits of business with the income of the American wage earner by declaring that while "staggering profits" of corporations were running this year at a \$15 billion rate, after taxes, as compared with \$5 billion in 1939, the American wage earner's living status "is now \$13.04 per week less than it was in February, 1946."

The convention's 600 delegates unanimously demanded immediate repeal by Congress of the Smith-Connally Labor Disputes Act. This demand was made through adoption of a resolution denouncing the act as "vicious legislation" that has "actually served to encourage strikes."

In other resolutions the convention placed itself on record as against peacetime military conscription; urged immediate enactment of federal, state and municipal legislation providing for fair employment practices and a code of laws to make "anti-Semitism and antiracial acts a crime;" called for liberal-ization of benefits for veterans, reduction of income taxes in lower brackets, equal rights for women both on and off the job, strengthening of laws requiring minimum health and safety standards in employment; opposed poll taxes; asked higher minimum wages and payment of unemployment insurance benefits to persons on strike; reaffirmed the CIO's continued support of a labor extension service program in the Department of Labor; and indicated it will not participate in conferences of the International Labor Organization until the CIO is given equal status in that body with the American Federation of Labor.

## Can Advisory Group Urges Continued Tin Plate Control

Continuation throughout 1947 of controls on tin plate used in the manufacture of food containers was recommended at a meeting of the Can Manufacturers Industry Advisory Committee.

CPA's tin container order (M-81) specifies that 70 per cent of all tin-mill production must be channelled to container manufacturers for packaging perishable food and certain pharmaceuticals. Also, the tin conservation order (M-43) restricts the use of tin to such containers and a number of other essential products.

The M-81 order must be continued in approximately its present form, industry members said, to forestall a serious shortage of packaged foods in 1947. Both orders will lapse when the Second War Powers Act expires on Mar. 31, 1947, CPA said.

The 1947 world supply of tin, according to CPA estimates, will total about 141,600 tons, a 47,200-ton increase over the expected 1946 supply. However, world demand is expected to increase to approximately 190,000 tons next year. During 1946, screened requirements totaled 145,000 tons.

# Grayson Begins Direction Of Apollo Steel Dec. 1

Operation of Apollo Steel Co., Apollo, Pa., after Dec. 1 will be under the direction of Irving Grayson, attorney, Penobscot Bldg., Detroit, and associates. The plant, which includes 11 sheet mills, has capacity of 120,000 tons annually.

Mr. Grayson has disclosed that he has had discussions with Willys-Overland Motors Inc.. Toledo, O.. Bendix Home Appliances, South Bend, Ind., and Maremont Automotive Products Co., Chicago, with a view to Apollo's becoming a source of hot-rolled steel for these companies, or possibly establishing them as sublessees of the plant.

## American Yards Deliver Four Vessels in October

Four new vessels of 48,478 deadweight tons were delivered by American shipyards during October, according to the Maritime Commission. This brings the calendar year's total construction to 83 vessels, totaling 814,360 tons. All were built on the East Coast.

## GOVERNMENT CONTROLS

Lead: All restrictions on imports of lead removed, effective Nov. 18. RFC directed to terminate public purchase of lead from foreign sources except where necessary to tulfil comnitments already made. All privately imported lead will be subject to the 1 1/16th cents per pound tariff. (M-63; CPA-598) Surplus Property: Holder of a CPA urgency cettificate eccentry.

Surplus Property: Holder of a CPA urgency certificate against government surplus property no longer need present it immediately to the War Assets Administration's regional office, or personally search for the material or equipment called for by the certificate. When the material is located, the certificate holder will be notified. Holder of an urgency certificate which has not been satisfied 15 days before its expiration date may immediately apply for an extension. (PR-13; CPA-LD-417)

### NATIONAL HOUSING AGENCY

Premium Payments: Time for filing claims for payment under premium payments regulation 8, covering cast iron soil pipe, has been ertended. For production in excess of quotas during August and September, the claim form may not be filed later than Nov. 30, and even though production fails to exceed quotas a form must be filed as an information return. Except for August and September production, claims must be filed on or before the last day of the month following the month in which production occurred. (PPR-8; NHI-345)

# Component Price Rise Hits Tools

Machinery builders may be forced to increase their prices as costs continue to mount. Industry working on substantial order backlog

BOSTON — Machine tool prices have not advanced the full 20 per cent permitted under the OPA ruling issued several months before the demise of that agency, average overall increase being somewhere between 15 to 17 per cent. Now, however, factors are building up which make conjectural how long further advances can be avoided.

Higher prices, already established in motors and castings, are now being encountered also in acquisition of parts, components and materials. This is bending current price lists for machine tools although most individuals in the industry are reluctant to mark up quotations. They may be forced to do so, however.

At present labor and material costs, the industry, by increased efficiency and sharp corner cutting, is making a dollar go about as far as it can as represented in machine tool prices, and any additional costs will have to be passed on.

The machine tool industry was one of the first to appreciate the cost factor in the postwar period and for this reason prices have been kept below permitted ceilings.

Despite the handicap of large surplus offerings, which unquestionably have retarded some sales of new tools, postwar volume is better than might be expected. Many shops have backlogs for several months with delivery on some lines 14 to 16 weeks. Automatic screw machine deliveries are even more extended. Backlogs with some builders extend through next year. Suitable machine tools of this type are scarce in surplus.

# Increase in Accessories May Affect Tool Prices

Pittsburgh — Prices of machine tool accessories are expected to be raised to the extent cost of these items is increased. Most electrical equipment accessories are quoted separately by machine tool mak-



NEWEST ADDITION: E. W. Bliss Co., Detroit, extended its line of single action hydraulic presses by installing this one of 1500 tons capacity at the General Electric Co. plant in Erie, Pa. This housing type press is shown drawing and piercing 0.025 inch thick stainless steel evaporator plates for home refrigerators, and can be used to produce blanked, stamped, formed, pierced, trimmed, drawn, and embossed parts from sheet metal

ers, but in those instances where electrical motors have been built into the drives, machine tool prices likely will be increased accordingly. The overall increase in accessories represents but a small fraction of total machine tool price.

New machine tool orders continue to tend downward, and most builders are making considerable headway against order backlogs.

## Tool Price Policy Is Seen Tied to Trend of Costs

Cincinnati—There was no general price increase in machine tools manufactured in this district, and none is indicated. The market appears as if controls had been lifted months ago with prices, of course, sensitive to further costs of production.

An increase in the quotations on electrical equipment would, naturally, bring an increase in overall price. Builders of certain types of tools also are reacting to considerable competition from excess tools under present disposal policies.

# Lodge & Shipley Machine Tool Co. Changes Name

The words "machine tool" will be eliminated from the corporate name of the Lodge & Shipley Machine Tool Co., Cincinnati, due to expanding operations of the company, William L. Dolle, president and general manager, announced last week. Henceforth the company will be known as the Lodge & Shipley Co.

Present operations of the company include a Special Products Division as well as the parent Machine Tool Division.

The company, established for 31 years, is internationally known in the machine tool business, primarily for production of lathes. During World War II, the company established its Special Products Division for manufacture of various types of equipment, principally those adaptable for motorized transportation.

# Windows of Washington By E. C. KREUTZBERG Washington Editor, STEEL

Few register as lobbyists under new law but sizable listing is expected by time eightieth Congress convenes. Law fuzzy in some respects but its intent is considered constructive. Designed to bring activities into the open

IN VIEW of the general impression that Washington is fairly crawling with lobbyists, considerable surprise was caused by the small number registered with the clerk of the House under the Federal Begulation of Labbying Act

Federal Regulation of Lobbying Act. Inspection of the file in Room 522, Old House Office Building, discloses that only a couple hundred names have been entered. A check with some of the acknowledged lobbyists who have not registered so far reveals the reason: Lobbyists can work at lobbying only when Congress is in session. There will be a heavy registration in December and the file, by the time the eightieth Congress convenes on Jan. 3, should represent a fair census of lobbyists. As a matter of fact, some of the more highly-paid lobbyists last week were beginning to register, including a representative of an electric power group who reported an income of \$65,000 plus expenses, and a representative of a manufacturers' association who reported an income of \$28,-000 plus expenses. Numerous other lobbyists in the \$10,000 to \$15,000 range also are registering.

While there is general agreement that the law is fuzzy in some respects, its intent is clear. The purpose is to bring lobbyists out into the open. It provides that persons who attempt to influence the Congress for pay must turn in their names and addresses, with data about the collections and expenditures. The act covers lobbyists not only in Washington but those operating anywhere in the country. One purpose is to get on record those propagandists who supply much information, or misinformation, to Congress, and who instigate the many thousands of letters and telegrams which deluge the members when particular legislation is under consideration.

There also is no doubt about the penalty for failure to register and file a financial report; it is \$5000 fine or one year's imprisonment, or both, and a three-year prohibition on lobbying activities.

Some bona fide representatives of trade associations, manufacturers' organizations, labor organizations, etc., seem to think the law is a good one. It merely recognizes lobbying as a legitimate profession, without stigmatizing it in any way. By bringing lobbyists out into the open it automatically places difficulties in the way of many individu-



PLAN GOP PROGRAM: Members of the Senate Republican steering committee meet in Washington to draw a preliminary program for the majority party for the next session of Congress. The program later will be submitted to all the 51 Republican senators. Left to right: Eugene D. Milikin, Colorado; Wayland Brocks, Illinois; Robert A. Taft, Ohio; Styles Bridges, New Hampshire; Wallace H. White, Maine; and Harlan J. Bushfield, South Dakota. NEA photo

als who in the past have collected large sums from industrialists on the basis of alleged friendships and connections. Hereafter, when a business executive is solicited by a lobbyist with mysterious claims of influence he can quickly look him up in the register.

Some of the lobbyists already registered have protested inadequacy of the law. Col. J. T. Taylor, legislative chief for the American Legion, says the law permits many organizations to dodge the requirement of listing donations through the device of collecting "ridiculous amounts for advertising of no value." Col. Taylor also thinks the law should be amplified to force a lobbyist to disclose how many persons he represents. Without such a requirement a lobbyist can greatly exaggerate his influence.

The law is not applicable to persons who appear openly before any committee of Congress but engage in no other activities to secure the passage or defeat of legislative proposals. Exempt also are those lobbyists who work without compensation for lobbying. The act exempts those "organizations formed for other purposes whose efforts to influence legislation are merely incidental to the purpose for which they are formed."

There is a tendency among some of the better informed people not to take advantage of the latter exemption; some individuals whose lobbying activities are clearly of an incidental and sideline character propose to register and thus take no chances of getting some unexpected bad advertising at a later date.

## Federal Employees Alarmed

If the District of Columbia enjoyed the right to suffrage, and had a chance to go to the polls right now, the result would be a Democratic landslide. For rank-and-file Washington does not like the economy medicine which the Republicans are preparing to administer when the eightieth Congress convenes. Already nervous because of dismissals resulting from economies ordered by the seventyninth Congress, government workers and those dependent on their patronage suffer one chill after another as Republicans recite with gusto what they intend to do to bring down the cost of government.

Bad news especially was the estimate of Rep. John Taber (Rep., N. Y.), slated to head the House Appropriations Committee, who called for a slash of 1 million in the number of government employees.

Mr. Taber was not exact in citing details, but it is assumed he has this in Announcing a <u>New</u> 'Automatic High Production Internal Grinder



Bryant High Frequency Wheelhead for speeds up to 100,000 R.P.M.

Simplified, Centralized Operating Controls

Push button

Cycle control

Modern design throughout for intreased efficiency

# Another **BRYANT** Postwar Development

0

The new No. 212 Bryant Grinder is designed to fill the pressing need for greater production per man hour. It is a fully *automatic* internal grinder that requires a minimum of operator attention in fact on many jobs one man can run two machines. Production is higher, more precise and more profitable with this new grinder.

The new No. 212 Bryant roughs and finishes bores from  $\frac{6}{16}$ " to 6" (approx.) in diameter in lengths up to 3 inches. On the smaller bores, it is especially suited to the use of Bryant High Frequency wheel spindles which operate at speeds up to 100,000 r.p.m. The No. 212 design incorporates the superiority of Bryant three point wheel slide suspension and insures maximum rigidity under all conditions. Movements of the machine are hydraulically operated, while the cycle is controlled electrically to facilitate change-over. Sizing is accomplished accurately and automatically by any one of three methods: a plug gage mounted in the work spindle, a diamond tipped bore contact, or controlled by the wheel truing diamond. It roughs and trues and finishes and stops automatically—producing parts with fine work finish to tolerances that insure bores that are straight and round, making the products which you manufacture more desirable because they run smoother and live longer.

0000 000

If grinding figures in your production plan, your move for best results is to—

SEND For The Man From Bryant.



BRYANT CHUCKING GRINDER CO.

SPRINGFIELD, VERMONT, U. S. A.

mind as a further reduction after the wishes of the seventy-ninth Congress have been carried out. That program entails a reduction from 2,300,000 to some 1,650,000 during the present fiscal year. If that figure were to be cut by another million, it would leave 650,000 on the federal payroll; in fact, Mr. Taber said that 500,000 employees ought to be enough to carry on government activities without loss of efficiency. In view of the fact that the Post Office alone has a payroll of between 400,000 and 500,000 people, Mr. Taber's forecast probably is wide of the mark. At the same time, it is taken for granted that the cuts will go deep.

In Washington, where so large a part of the economy depends on jobs with the government, the reduction during the current fiscal year is from 235,000 to 195,000. That is the size of the reduction ordered by the seventy-ninth Congress. Now additional dismissals are being ordered as wartime agencies fold up. About 1000 Washingtonians are due for dismissal from OPA alone by the end of the year. Many Washington homes are due for a gloomy Christmas.

### New Labor Education Service

The Labor Department's new Labor Education Service, authorized by the seventy-ninth Congress, has been organized by Secretary Schwellenbach under labor union supervision. The 10-man advisory committee which he has appointed to "guide and aid" the work of the service consists entirely of labor union representatives—five from the AFL and five from the CIO.

Purpose of the service, says a Labor Department statement, "is assisting unions and universities in organizing classes in the fundamentals of trade unionism . . . . Outlines of courses, and text material, will be available to those who instruct workingmen and women in such subjects as collective bargaining, labor economics, labor legislation, the way in which a union functions, and the human factors in industrial relations. To a union just establishing educational programs for its members, the Labor Education Service will send a staff member to assist with organization problems. Labor school, college, or university wishing to add courses to its curriculum can obtain material from the service." In addition, the service is to serve as a "national clearing-house for information on labor education."

Verne A. Zimmer, as director of the Division of Labor Standards, heads up the new service. Mr. Zimmer came to the department in 1934 after having served New York state as a factory inspector and in various other labor assignments including the post of director of workmen's compensation in New York state.

### For Voluntary Arbitration

The Labor Department's Labor-Management Advisory Committee has gone on record as opposing compulsory arbitration as a method of settling labor disputes. The committee, created at President Truman's labor-management conference in November, 1945, consists of Frank Fenton, American Federation of Labor, Clinton S. Golden, United Steel Workers—CIO, Vincent P. Ahearn, executive secretary of the National Sand & Gravel Association, and Louis Ruthenberg, president of Servel Inc.

The committee, according to Edgar L. Warren, director of the U. S. Conciliation Service, recommends that procedures fcr handling labor disputes should be worked out on a voluntary basis; "industrial peace cannot be established by edict from Washington." The committee felt the Conciliation Service as now set up is functioning adequately and that no new agency should be set up by Congress. The committee agreed that the "fact finding" procedure tried out earlier this year had been discredited by the results in the steel and General Motors strikes.

On the other hand, the committee favors changes in the National Labor Relations Act to improve the rights of employers, but it did not work out any detailed recommendations.

### **Turned Back to States**

While the national employment service operated during the war years by the United States Employment Service was turned back to the states on Nov. 15 in accordance with the will of the seventy-ninth Congress, those who utilize this service will see little evidence of change.

Though the states will operate the employment offices, the whole show will be under the supervision of USES. This by reason of the fact that the federal government now finances the entire cost of operating the employment service, and by reason of the Wagner-Peyser Act of 1933 which created the USES with the aim of establishing employment centers all over the United States.

Considerable controversy attended the formulation of the present setup but those interested in the USES see little likelihood of any substantial revisions by the Republican-dominated eightieth Congress.

Under regulations reached by Secretary of Labor Schwellenbach in conference with state authorities, the local employment centers in the states and territories will form a network that will work under USES directives. Each of them will carry on a 6-point program of: 1—Full placement service; 2—special services for veterans; 3—employment counseling for all workers; 4—labor market information services; 5—occupational analysis; 6—contacts with industrial organizations to determine employment needs.

The best experience of each state will be held up to the other states for emulation, according to Judge Schwellenbach, and all state offices will be notified when there are unfilled jobs in any one or more sections, and a superabundance of labor, by types of skills, in others. USES will be the co-ordinating authority, will steer state operating plans so as to meet national standards, and will allocate funds and see that they are properly spent.

Current plans do not envision any recommendations for cutting down on the fairly large bureaucracy employed in carrying on the employment service. The setup turned over to the states includes 51 state and territorial administrative offices, 1800 local offices and 24,000 employees.

## **Reciprocal Trade List**

The State Department last week issued the list of products, including many iron and steel or other metals and metallic products, that may be considered in reciprocal trade negotiations next April, for possible concessions in tariff duties by the United States.

Trade agreement negotiations are scheduled to begin at that time between the United States and the following: Australia, Belgium, Brazil, Canada, Chile, China, Cuba, Czechoslovakia, France, India, Lebanon, Luxemburg, the Netherlands, New Zealand, Norway, Union of South Africa, United Kingdom, and the U.S.S.R.

Included in the list is a series of items under the following general headings: iron ore and concentrates; iron and steel semi-manufactures, which would include pig iron, iron and steel scrap, hammer roll and mill scale, steel bars; iron slabs; blooms and forms; certain classes of bar iron; certain classes of wire rods; sheets or plates; steel ingots; cogged ingots; blooms, slabs and billets; die blocks or blanks, shapes, molds and castings of steel; steel circular saw blades; tin plate and terne plate.

Under Steel Mill Products, such items appear as structural shapes except sheet piling; rails, fishplates; pipes and tubes except tubes for ball or roller bearings; certain classes of wire and manufactures; castings and forgings, and other items.

# British Steel Consumers Clamor For Tonnage with Supplies Tight

Producers struggling with problem of equitably distributing available material with demand pressing from all directions. Most potent factor in situation is the shortage of fuel. Work stoppages hamper recovery

#### BIRMINGHAM, ENGLAND

IMMEDIATE problem of the steel industry in Great Britain is to maintain supplies to consumers who are constantly clamoring for deliveries.

Although the automobile builders are in the forefro: t as far as consumption of material is concerned there are other users equally anxious to be catered to, as for instance, producers of electrical gear, turbine makers, shipbuilders, colliery owners,

The Ministry of Supply has stated it will seek to improve production by importing more of the richer foreign ores, subsidizing marginal high-cost production and special transport costs, and by using surplus electric furnace capacity to produce carbon steel.

On the other hand, the most potent factor in the situation is the shortage of fuel, which, coming at the beginning of the winter, is a grave matter.

Although the country has suffered no general strike such as would suspend operations altogether, production has suffered much from many small stoppages.

Re-rollers are pressing constantly for increased supplies. 'Mills engaged on small bars, light sections and strip are urgently in need of billets, so much so that production is likely to fall during the next few months unless something can be done to relieve the situation. Though early improvement is desired, the fact appears to be that little change can take place before the summer of 1947. By that time it is hoped that America will be able to spare a larger tonnage. Meanwhile it is obvious that the control is about to make severe cuts in allocations to consumers. New factories will probably have to wait, and exports will certainly be smaller in

# American Observers Report Unique Casting Operations at Principal Swiss Foundries

UNIQUE casting operations are reported by American observers after inspecting one of the two principal foundries in Switzerland, located at Wintarthur, manufacturing diesel engines.



REPRESENT SWEDEN: Upon arrival at La Guardia field, New York, Swedish delegates to the United Nations, Bo Osten Unden (center), minister of foreign affairs, and Axel Gjoeres (right), minister of supply, were greeted by Herman Erickson (left), Swedish minister to the United States. NEA photo first quarter of 1947. Needs in the domestic market are bigger than they have been for many years.

The pig iron position shows little change. Supplies of iron needed in the light castings industry are tight and the position would take on an even more serious aspect if the foundrics were able to absorb more pig iron. As it is they are short of labor, and their own production is therefore limited by force of circumstances.

Production of tin plate is on the increase. It is reported to be at the rate of approximately 15 million boxes per year or just under 75 per cent of the present capacity of the industry. Any substantial increase, however, seems unlikely until the new cold reduction mill comes into operation, and it would therefore appear to indicate that several years may elapse before British manufacture can be brought up to a figure that will compare with the maximum prewar output. A vigorous demand continues for black and galvanized sheets. In regard to the latter very little is being exported as domestic needs are far more urgent.

Reporting on four "tremendous" diesel engines in process of erection, these observers revealed the plant has a foundry for casting engine parts, which has turned out a cast crankshaft for the largest engines, said to be equal to the forged shaft formerly imported for this use.

The plant, that of Sulzer Bros., from these reports, is engaged extensively in development of diesels containing some radical features as compared to the conventional engine of this type. Among these developments is a 2-cycle diesel, with small diesels being produced on a considerable scale. There have also been developed an engine with opposed pistons operating in a single cylinder, and an external crankshaft rotated by a system of levers attached to the pistons from the outer side. The plant also is working on an adaptation of the gas turbine which is said to hold many interesting possibilities.

This report also deals with other outstanding Swiss plants; Brown Boveri & Co. Ltd., at Baden, which is said to be making tuibines and electrical goods, and which is described as self-sufficient except for iron and steel castings purchased from another Swiss factory.

Another foundry, that of George Fischer Iron Works, at Shaffhausen, was mentioned in connection with "the two principal foundries" of the coun!ry. NMTA CONVENTION

# Employer-Employee Relationships Discussed at NMTA Convention

Speakers outline steps they believe management should take to improve relations with labor and restore industrial harmony. Howard Goodman of Goodman Mfg. Co., Chicago, elected president of association

WHILE expressing confidence that the turn of the political tide will bring new legislation that eventually will go far in restoring industrial harmony, speakers at the forty-seventh annual convention of the National Metal Trades Association, Hotel Commodore, New York, Nov. 14-15, suggested measures whereby management, as well as labor, could improve relationships between employers and employees.

Clarence B. Randall, vice president, Inland Steel Co., Chicago, urged careful introspection by management in matters of employee relationships, and emphasized that this is not the time for a "return to old thinking," or a period for denouncing others "until we know we ourselves are right."

He remarked it is always a matter of embarrassment to him to see management do something "under the lash" that it should have done anyway. Management, he said, still has something to fight with and has much to fight for, but it first must be sure that "its own house is in order."

On such premise, he and other speakers outlined steps which they believed management should take in the interest of a better relationship with labor, and also in the interest of a better public understanding.

#### **Goodman Elected President**

Howard Goodman, vice president, Goodman Mfg. Co., Chicago, was elected president of the association, succeeding H. H. Kerr, president, Boston Gear Works, North Quincy, Mass. T. J. Morton Jr., president, Hoosier Cardinal Corp., Evansville, Ind., was elected first vice president, and Joseph L. Kopf, president, Jabez Burns & Sons Inc., New York, second vice president and treasurer.

Mr. Goodman has for about 23 years been associated with the Goodman company, which was founded by his father. Mr. Goodman is a native of Chicago and was graduated from Williams College, Williamstown, Mass., in 1919, after which he took a business course at Harvard University. He has long been identified with the National Metal Trades Association, was a past president of the Chicago branch, and has been a member of the executive committee for five years. Prior to his election as president he was first vice president of the association.

The association also elected five new councilors and re-elected ten others for two-year terms.

Those newly chosen were: H. F. O'Brien, the A. P. Smith Mfg. Co., East Orange, N. J.; W. H. Schomburg, Superior Spinning & Stamping Co., Toledo, O.; A. F. Shafter, the U. S. Mfg. Corp., Decatur, Ill.; H. M. Ramel, Ramsey Corp., St. Louis; and F. Howard Kilberry, Nordberg Mfg. Co., Milwaukee.

Re-elected as councilors were: H. B. Neal, Kinney Mfg. Co:, Boston; Floyd Newton, G & O Mfg. Co., New Haven, Conn.; M. A. Hollengreen, Landis Tool Co., Waynesboro, Pa.; R. W. Gillispie, the Jeffrey Mfg. Co., Columbus, O.; B. W. Charlton, the Bruce-Macbeth Engine Co., Cleveland; S. Owen Livingston, Gallmeyer & Livingston Co., Grand Rapids, Mich.; R. G. Wilson, the Challenge Machinery Co., Grand Haven, Mich.; Walter F. Newhouse, Saranac Machine Co., Benton Harbor, Mich.; C. S. Craigmile, Belden Mfg. Co., Chicago, and H. H. Kerr, retiring president of the association.

Discussions attracted approximately 700 executives in the metalworking field, and highlighted such subjects as management's rights and free speech, government seizure and collective bargaining, foremen, war veterans in industry and "travel time pay."

#### **Presents Grave Problem**

This latter is one of the gravest problems now confronting industrial management, David R. Clarke, lawyer, Chicago, declared. As a result of the interpretation of the Supreme Court in the recent Clements Pottery case as to what constitutes a work-week under the Wage-Hour law, the "travel time pay" may cost industry many millions of dollars, retroactive for years, depending upon the statute of limitations in the various states.

Before taking a step or saying a word, employers, he warned, should first obtain a copy of the Pottery case decision and also copies of instructions issued by the auto workers union, CIO, and by



locals, advising them as to what all how to obtain data that will be helpful to them in pressing their suits for financial redress. Then with this information at hand they should read it, he said, and consult their lawyers and also their tax experts. He urged employers not to sit back complacently and "think you have nothing to worry about; you might, and very likely will be surprised."

While making clear he was not advocating an annual guaranteed wage in the metalworking industries, Mr. Randall urged employers to investigate thoroughly all avenues leading to increasing stability of employment.

In discussing industrial relationships, he suggested closer study and understanding of the supervisory problem; establishment of proper methods of employee redress; a sensible attitude on the seniority question. He also cautioned employers against sending lawyers to the bargaining table to speak for management without management itself being on hand to guide policies. Further, Mr. Randall believed that management should not delegate responsibility to public relations counsels in setting up public policies. Such counselors, he said, can and do provide valuable service, but it is up to management to set the course.

He thought it was a mistake for employers to preach preservation of management as a class; they must sell management to the public as something that implements the public welfare. Employers should see that their problems are understood not only by their employees, but by their employees' families, and by clergymen, editors and teachers and other molders of opinion.

Discussing the trend toward unionization of foremen, Robert M. Ney, director of industrial relations, Baldwin Locomotive Co., Eddystone, Pa., believed that foremen generally do not want to join a union, "but when they do, it is time to put your house in order and not cry for a law or raise a noise about unions."

He reviewed the case of the Baldwin Locomotive Works, whose 500 foremen demanded unionization. The case was fought several years through the courts and ended finally when the union polled but 23 per cent in an NLRB election. He declared: "It took us a long time to wake up but we did awaken finally in time." He called upon management to give fair and equitable treatment to its supervisory force. This, he said, included such positive acts as seeing that foremen and supervisors are paid better than the men they supervise, that they are properly informed first on matters of company policy and that their seniority rights are safeguarded.

Samuel B. Pettingill, former representative from Indiana, a featured speaker at the annual dinner, declared that "the time before the assault of the forces championing socialism begins again should be devoted to a year-round campaign of education on the basic economies of the competitive system."

James D. Arrington, mayor, Collins, Miss., another speaker at the dinner, received a heavy ovation for his homespun philosophy on American life.

Discussing government seizure and collective bargaining, John C. Gall, lawyer, Washington, outlined the pattern of John L. Lewis' contract negotiations over recent years and warned his listeners that "what is happening in coal, can happen to you." He spoke of portalto-portal pay, special welfare provisions, and so forth.

The association favored repeal of the National Labor Relations Act and went on record as willing to support legislation which embodies the following principles: (1) Right of every worker to deal with his employer by collective bargaining through any agency he chooses; (2) the right of worker to deal with employer directly as an individual, if he chooses; (3) right of every individual to participate in a strike or not, as he chooses; (4) right of every individual to go to and from his work unmolested; (5) equality under the law and protection of minority rights; and (6) monopolistic activities of all groups, whether employer or employee, must be controlled in the public interest.

Mr. Goodman, who presented the resolution, pointed out that the record during the 11 years which the National Labor Relations Act has been on the books is one of industrial unrest, increasing dislocation of commerce and hardship and suffering on the part of workers, management and the public.

In the 11-year period just prior to the passage of the act in 1935 there were 11,380 strikes. In the comparable period of 11 years after the passage of the Wagner Act there were 38,521 strikes. Furthermore, Mr. Goodman declared, in the first nine months of this year 3575 strikes resulted in the loss of nearly 100 million man days of production, or more than three times the loss in the whole year of 1945.

Dr. F. Alexander Magoun, associate professor of human relations, Massachusetts Institute of Technology, Cambridge, Mass., said that one of the troubles with labor relations today is that solutions are sought in law. He termed this as psychologically wrong because the urge to dominate leads only to "high handed methods of management, labor and government. Understanding human relations cannot be done by passing laws



JOSEPH L. KOPF

November 25, 1946



CLARENCE B. RANDALL

or establishing steps to a grievance procedure. It can be done, he said, only by arduous personal study on the part of top management which must become competent in handling emotions in its man-to-man relationships with its employees.

Warning that labor unions intend to continue to use collective bargaining to expand into the field of management, Henry W. Jones Jr., president, American Tube Bending Co., New Haven, Conn., declared that such trend means only one thing—joint management of enterprise." This, he said, management should not permit, not only in its own interests but in the public interest.

"Once you lose the management control and operation of your business," he said, "you will suffer an irreparable loss and the industrial progress of this country will be arrested."

Urging leaders of business and industry to combat communism, William R. Schneider, lawyer, St. Louis, declared that Americans will "never regain their boasted freedom or their boasted prosperity as long as we try to continue half socialized and half free." He called for a fair labor relations law, equitable to both management and employee, outlawing of the closed shop, and a balanced national budget.

#### Repeal of Wagner Act Asked

Calling for the repeal of the Wagner Act because "it has been injurious to the rights of free working men and has unfairly destroyed the rights of capital and of management," Sen. Albert W. Hawkes, New Jersey, urged that it be replaced with the enactment of "a fine piece of legislation based on justice and equality and with a fair regard for the rights of employers or workers and of capital, ownership or management." Cautioning that any new labor legislation must not bear the imprints of "ill feeling engendered over the past few years," he said "there is no place for bitterness, vengeance or retaliation."

Mr. Goodman, the new president, stressed that harmony in human relations was essential to sound industrial relations. "By raising morale through good human relations," he said, "you increase worker efficiency. Worker efficiency in turn helps to lower production costs; lower production costs lead toward a more stabilized economy."

Good working conditions, Mr. Goodman emphasized, as well as good wages, are the keystones to industrial progress.

Joseph L. Kopf, president, Jabez Burns & Sons Inc., New York, and newly elected second vice president and treasurer of the association, spoke on misconceptions in industrial relations.

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MAKE A TON OF SHEET STEEL

O FARTHER

By A. H. ALLEN Detroit Editor, STEEL

# **Mirrors of Motordom**

Automobile dealers reaping lush harvest. Sales costs are low, full markup is charged, tradeins are profitable and accessory sales are easy. Factory sales representatives caution situation may change, possibly by next summer

#### DETROIT

AT LEAST one segment of the automotive industry—using the term broadly —currently is reaping a golden harvest of dollars the like of which it has never seen, that is the automobile dealer group. Not only is the fact attested by authoritative opinion among manufacturers, but on the plain face of the situation, the automobile dealer•today would have to be a dolt not to be making money—and plenty.

First, there is the greatest demand for new cars ever known, resulting in sales effort and sales costs being virtually superfluous items. About all that is needed is an order pad, a pencil and a pleasant smile to ward off barking buyers who want their cars in a hurry. Next, all dealers are receiving their full discount or markup, whereas only a few years ago, many retail outlets would trade away the entire discount and even more in excessive used car allowances just to clinch sales. It was almost axiomatic that automobile dealers would lose money on new cars and make it up on used cars and service.

Further on the black side of the ledger is the comfortable position in which dealers find themselves of being able to negotiate trade-in deals and pay the new car buyer several hundred dollars less than the former ceiling price of his old car, then turn around and sell the old car at full ceiling price on the used car lots. On top of this, many if not most dealers have been hanging about every accessory they could acquire on their new cars, all of course, carrying a handsome price and a handsome profit. It is a rare occasion when it is not possible to tack \$250 to \$300 on the price of a new car to cover accessories.

Still another source of good profit is the largest volume of service and repair business ever experienced. War-weary old cars account for much of this, but in addition there seems to have been a tremendous amount of damage to new cars, either through carelessness of their twners or recklessness of drivers still pushing old crates around the streets, or both.

This is not meant to be any indictment of automobile dealers, some of whom doubtless had rough sledding during the war years. Rather it is simply a commentary on the times we live in, and a graphic illustration of how maximum demand and minimum supply can react to produce lush profits.

For example, a large-volume manu-

Automobile Production						
Passenger Cars and Trucks-U. S. and Canada						
Estimates by Ward	d's Automot	ive Reports				
	1946	1941				
January	121,861	524,037				
February	83,841	509,332				
March	140,777	533,878				
April	248,318	489,856				
May	247,620	545,321				
June	216,637	646,278				
July	331,000	468,897				
August	359,101	164,793				
September	342,727	248,751				
October	409,870°	401,369				
Total, 10 mos. 2,501,752 4,532,512						
Estimates for w	eek ended					
Nov. 2	95,427	92,079				
Nov. 9	92,760	90,585				
Nov. 16	94,040	90,990				
INOV. 23	95,500	80,820				
•Preliminary.						

facturer reports one of his dealers in a "fair-size" city currently is showing profits of \$40,000 monthly before taxes. Another dealer, apparently overwhelmed by the amount of money he was taking in, sent a check—in five figures, incidentally —to his factory with the request the money be set aside in a separate fund for advertising and building dealer goodwill, doubtless figuring that by disbursing this amount of money he would actually be saving on his income tax bill. The money was returned to him.

How much farther the gravy train may proceed for automobile dealers probably will determine how soon it will be possible to buy new cars at more reasonable cost, since any early reduction in factory list prices does not appear likely. The first reduction for the average buyer will come when dealers decide to sharpen up their competitive pencils and stretch their allowances on used cars by trading away some of their new-car markup. This has the same effect as a price reduction for the buyer, so developments on this score are being watched carefully. Most factory sales departments now making the rounds of their dealer organization are cautioning their representatives in the hinterlands it will be necessary to "step out and sell" before long, perhaps as soon as next summer. The trouble with this type of warning for many dealers is that it connotes nothing more than stepping up allowances on used cars, since that is the kind of "selling" the average buyer loves best.

#### Breaking the Bottlenecks

Stories of how the automobile industry cracked the bottlenecks of 1945-46 probably will be told for years to come. There are still a few to be cracked but the pressure definitely is lessening. Tales of General Motors' expediters haunting local hardware stores to pick up a few dozen nuts and holts sound ridiculous but they are provable facts. One of the most complicated instances of "parts chasing" is related by Fisher Body Division which was having trouble obtaining enough steel deck lid supports from a supplier. The latter could not locate the necessary steel strip, so Fisher obtained that. Then the supplier discovered he had no rivets, but could make them if Fisher obtained the wire stock. This was finally done, but the manufacturer next discovered he had no washers, of two different sizes. Fisher follow-up personnel managed to buy one size, but found that a washer manufacturer did not have steel to make the other type. Hard digging found some high-carbon steel but it was too wide for the manufacturer's dies, so Fisher arranged to have it slit to proper width by still another company. Presumably Fisher eventually received some deck lid supports.

Out at the Guide Lamp Division of GM where license lamp and rail assemblies for Oldsmobile bumpers were being assembled, supplies of cold-rolled strip ran out so a switch was made to hot-rolled material. In drawing on a punch press, considerable trouble was experienced with cracking, but those pieces which came through intact reached the polishing department with die marks which had to be eliminated. Normally, in the polishing operation, a straight-line automatic polisher was used which was simply a conveyor belt carrying the parts

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#### MIRRORS of MOTORDOM



under a series of buffing wheels. With this arrangement, three men could polish 500 pieces per hour, but it was no go with the hot-rolled steel parts. Four men had to be stationed at separate polishing machines and each piece processed individually. This solved the problem but knocked production down to 30 pieces per hour per man.

#### Sharpshooting Policeman

Topping all these incidents, however, is the story of the sharpshooting policemen at Saginaw Malleable Iron Division of GM. It seems that several of the 1300foot heat treating furnaces used in the malleable sizing cycle on castings at the plant are lined with firebrick which occasionally loosens up under repeated heating and cooling, dislodges a brick and deposits it between the sidewall and the flat cars carrying castings through the furnace. Wedging tightly, the loose brick stops the cars and holds up the entire heat treating line.

With interior temperature around 1700 degrees, it proved no simple task to remove such wedged brick, and to cool the furnace sufficiently to permit a man to enter in an asbestos suit meant a delay of possibly a week. Recently when a loose brick did the wedging act, a plant policeman who must have been a little short of a genius, stood at one end of the

furnace with the doors open, pulled out his 38-caliber pistol and started blazing away at the lodged brick 600 feet inside the furnace. He missed on a few shots but finally a slug found its mark and the brick dissolved in a cloud of dust, permitting the cars loaded with castings to move on down the track.

hauling

Consolidated

### **Raises Labor Costs**

Obviously, all this fol-de-rol to build automobiles is wasteful and time-consuming to the point of being ridiculous. It is one of the reasons why indirect labor costs are so high. Add to these the crippling effect of materials interruptions on assembly lines and the doubling of inspection crews made necessary by the combination of mediocre workmanship and makeshifts in materials, and it is not difficult to see why car manufacturers have been losing money up until six or seven weeks ago. There is general expectation of an early end to "emergency" steps to expedite operations and of a gradual return to somewhere near normal inspection.

#### Wilson on Election

Speaking before the economic club of Detroit last week, C. E. Wilson, General Motors president, said, with respect to the recent election: "While we have chosen the 'right' fork in the road, that only means we have decided to go in the 'right' direction. It does not mean we have arrived at our destination. With liberty and freedom comes individual responsibility. Are we now willing to pay the price for the freedoms we want?

"Freedom and liberty does not mean anarchy or laissez faire, nor does it mean something for nothing, or that the government owes each of us a living unless we ourselves will make the effort to earn one. It does mean that every citizen should be willing to make the effort through education, experience and work to make a social contribution in proportion to the social rewards he expects to get. It does mean that as individuals we should apply to ourselves the same measuring stick we use in appraising others; it does mean a respect for the laws of the country until those laws are changed by a majority vote of the citizens. It does mean tolerance and patience and respect for the rights of others, for in this complicated world, where we are all dependent on each other, we must better learn the art of working together. It does mean that we've got to stop quarreling and go to work.

"If I thought the people of our country would be more prosperous, or would be happier, or could make more progress as human beings under some form of state socialism or communism, then I would be a socialist, too. But history and experience show clearly that they would not. I firmly believe that our country, developed under the liberal principles of its founders, is the greatest country cn earth. I do not mean it is perfect or that it cannot be improved, any more that I would take the position that our present motor cars are perfect and cannot be improved."

#### Ford Changing Tractor Setup

Ford Motor Co. is discontinuing the manufacture of tractors for Harry Ferguson Inc. on or about June 30, 1947, according to announcement made last week, but will continue the manufacture of Ford tractors after that date. Interpreting this official wording of the news release, it means that production of tractors at the Ford Highland Park plant, currently at a rate of about 7500 monthly, will continue after next June 30, but no longer under the direction of Harry Ferguson, who reportedly brought the idea for the tractor to the elder Henry Ford several years ago and on the basis of oral agreements persuaded him to establish manufacturing facilities.

After termination of the present arrangement, tractors and implements will be distributed through independent distributors and dealers and not through Ford branches.

# Which "Surplus" TOCCO Machine fits *your* induction heating job?

# Let us help you decide.

We maintain complete records of every TOCCO machine ever sold. We can tell you the date it was shipped from our factory . . . the job for which it was originally designed . . . and complete specifications of the unit as it was shipped.

If you intend to buy a Government Surplus induction heating unit, be sure to consult us first because, whether you buy a new TOCCO machine from us or a used "Surplus" unit from the War Assets Administration, we want to make sure that it is the right TOCCO unit for your particular requirements.

Contact us so we can tell you how adaptable any "Surplus" machine is to your particular job. We are authorized dealers for Government Surplus TOCCO Equipment and can facilitate your purchase.

THE OHIO CRANKSHAFT COMPANY DEPT. 5 · CLEVELAND 1, OHIO



November 25, 1946

# ACTIVITIES

# Crucible Steel Company Plants To Be Improved

40 per cent of \$30 million program will go for expansion and improvement of finishing facilities

A \$30 MILLION program to diversify its products, consolidate operations and improve operating practices has been launched by Crucible Steel Co. of Amcrica, New York.

Approximately 40 per cent of the expenditure will go for facilities to produce hot- and cold-rolled steel sheets and strip in coils. The new rolling mills are designed primarily for production of hot and cold-rolled stainless and other alloy steel sheets and strip, but the equipment may be utilized also for producing carbon steel sheets, strip and light plates.

The company now operates facilities for producing a limited tonnage of tool, specialty alloy and stainless steel sheets on its hand rolling mills but has no facilities for mechanized production of wide steel sheets. The installation also will permit the company to increase its output of specialty steel sheets by transferring some of its production of stainless steel sheets to the new rolling mills.

Greatest portion of the expenditure will be made at the company's Midland, Pa., Works. There at a cost of \$20,-850,000 the company will make improvements including installation of hot- and cold-finishing mills, bar and billet mill, 21 by-product coke ovens, and other new facilities.

At the company's Halcomb and Sanderson Works, Syracuse, N. Y., will be a \$3,300,000 program that will include a new melt shop, and new equipment to increase capacity of cold-finishing facilities.

At the Park Works, Pittsburgh, the company plans to spend \$3,100,000 for improvements that will include two bar mills and a new specialty mill for rolling shapes and flats.

Improvements at the Spaulding & Jennings Works, Jersey City, N. J., are estimated at \$1,600,000.

In addition, the program includes rehabilitation of the Spring Works at Pittsburgh, acquisition of sites and construction of warehouses at Philadelphia and Chicago, purchase of additional barges, and other miscellaneous improvements. Cost of this portion of the program is



ANNIVERSARY HIGHLIGHT: An important event when SKF Industries Inc., Philadelphia, observed its 25th year of service to the railroad industry was an inspection of the company's new production line for journal box manufacture. Among the many people making the inspection were the following who were watching a box undergo a porosity test: Percy Keller, left, assistant general sales manager of the Budd Co., Philadelphia; R. P. Johnson, vice president of Baldwin Locomotive Works, Eddystone, Pa.; and A. W. Holbrock, Philadelphia representative of American Car & Foundry Co.

estimated at approximately \$1,150,000. The entire program is expected to be completed by the end of 1948.

# Ohmer Corp. Purchased By Rockwell Mfg. Co.

Rockwell Mfg. Co., Pittsburgh, has purchased Ohmer Corp., Dayton, O., Col. Willard F. Rockwell, chairman and president of the Rockwell company, has announced. The Ohmer Corp., founded in 1898, manufactures taximeters, fare registers for street cars and busses and cash registers. It will continue to operate as the Ohmer Corp., subsidiary of Rockwell with plant and headquarters in Dayton.

J. Allen Harlan, who has been president of Ohmer for the past year, will remain with the new ownership as vice president. N. J. Kenny, formerly assistant to the president of Rockwell Manufacturing, has been elected president of the Ohmer Corp. by the reorganized board of directors, members of which are: Colonel Rockwell, chairman; N. J. Kenny; W. F. Rockwell Jr.; J. A. Harian; E. W. Meyers; F. J. Schnacke; and M. J. Carl.

Officers of the company, in addition

to Mr. Kenny and Mr. Harlan, are: W. F. Rockwell Jr., vice president; and E. W. Meyers, secretary-treasurer.

# Broden Firm Changes Name To Wean Equipment Corp.

Broden Construction Co., Cleveland, manufacturer of strip steel and wire mill equipment, has changed its name to Wean Equipment Corp., President R. J. Wean has announced. The change was made, Mr. Wean said, to identify more readily its ownership and products.

The company's physical properties include a plant on Lakeland Blvd. in Euclid, O., and the buildings, machinery and facilities originally furnished by Reconstruction Finance Corp. to meet Broden's wartime needs. These facilities give the Wean corporation over 50,000 square feet of building area, equipped with modern machine tools, cranes and assembly area for manufacture of steel mill equipment.

Officers of the corporation, in addition to Mr. Wean, are: R. J. Wean Jr., exccutive vice president; J. R. Paisley, secretary and general manager; F. J. Keller, vice president; and George J. Ridgeway, assistant secretary.

# ACTIVITIES

# BRIEFS...

# Paragraph mentions of developments of interest and significance within the metalworking industry

Barium Steel Corp., New York, has acquired full control of Cuyahoga Spring Co., Cleveland, manufacturer of steel wire coil springs, wire forms and patented wire clips.

American Foundry Equipment Co., Mishawaka, Ind., has changed its name to American Wheelabrator & Equipment Corp.

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Bituminous Coal Institute, Washington, has announced that full-scale operational tests of the combustion apparatus and fly ash separators for a revolutionary coal-burning railroad gas turbine will be conducted at the Kaiser steel mill, Fontana, Calif. The tests will be made in co-operation with Northrop-Hendy Co., a subsidiary of Northrop Aircraft and Joshua Hendy Machine Works.

Riley Stoker Corp., Worcester, Mass., has re-established its sales engineering office in the Park Bldg., Pittsburgh.

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Johnstone Foundries Inc., Grove City, Pa., newly organized, has contracted with Meehanite Metal Corp., New Rochelle, N. Y., to manufacture Meehanite castings.

All-State Welding Alloys Co. Inc., White Plains, N. Y., has added two new nickel-silver welding rods to its line of low-temperature welding and brazing alloys and fluxes.

Vitreous Steel Products Co., Cleveland, has been elected to associate membership in the American Washer & Ironer Manufacturers' Association, Chicago.

Farrel-Birmingham Co. Inc., Ansonia, Conn., has reopened its Chicago branch office, located at 120 South La Salle St., Room 542.

National Supply Co., Pittsburgh, has sold its Carnegie, Pa., plant to Taylor Forge & Pipe Works, Chicago. Operations of the Carnegie plant will be transferred to National's Ambridge, Pa., plant.

Tomlinson Industries Inc., Cleveland, has been formed to consolidate Tomlinson Steam Specialty Co. and Tomlinson No-Drip Faucet Co., both of Cleveland.

Detroit Sales Engineering, Detroit, recently acquired a new production plant in Detroit, which adds 20,000 square feet of floor space to the company's facilities.

Auer Register Co., Cleveland, has purchased a one-story building in that city which it had previously leased and will continue to use the facility for manufacture of heating registers and similar equipment.

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Greene, Tweed & Co., New York, will vacate its New York works on or about Dec. 1 and will incorporate all its facilities in its North Wales, Pa., plant.

Fischer & Porter Co., Hatboro, Pa., manufacturer of variable area-type flow rate instruments, has changed its trade name from Rotameters to Flowrators.

General Motors Corp., Detroit, is negotiating with the Navy for a long-term lease of the \$10 million diesel engine plant in Cleveland which it operated during the war.

B. F. Goodrich Co., Akron, has completed arrangements with Peruvian interests for construction of a tire and tube factory in Lima, Peru, to be completed late in 1947. The plant will have capacity for manufacture of about 50,000 tires and tubes annually.

Lincoln Electric Co., Cleveland, has purchased for \$75,000 a 50-acre plot in Cleveland which may be used in the future for a new plant site.

Howell Industrial Truck Co., Cleveland, has acquired a building and land in Cleveland, part of which will be used as a testing ground for its trucks.

John Paul Taylor, St. Joseph, Mich., publisher, in co-operation with the Smoke Prevention Association, is publishing a book entitled "Proceedings of the 1946 Smoke Prevention Conference," containing all the technical and general papers of the association's conference.

Philadelphia Heating Division, Philadelphia, Gar Wood Industries Inc., has moved its offices, showroom and warehouse to 1317 North Broad St., Philadelphia 22.

Brown Instrument Co., Philadelphia, has developed a new signalling device which sounds an alarm when predetermined processing temperatures, levels or pressures are reached. The device, to be marketed under the name of Air-O-Larm, will provide either audible or visual warnings.

American Can Co., New York, celebrated the opening of its enlarged research laborato y at Maywood, Ill., on Nov. 20, coincident with the 40th anniversary of the founding of its research division.

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N. Ransohoff Inc., Cincinnati, producer of metal cleaning equipment and foundry cleaning mills, has been acquired by John R. Strauss, who has purchased a controlling interest. New officers are: Nathan Ransohoff, president; John R. Strauss, vice president and treasurer; and Richard C. Wiger, secretary and general manager.

Lecce-Neville Co., Cleveland, has developed a new lightweight alternator for the electrical generating system of automobiles.

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Di Machine Corp., Chicago, division of Diebel Die & Mfg. Co., recently completed a new factory in Chicago, which will increase the company's capacity for presses, tools, dies, stampings, etc.

Defiance Machine Works, Defiance, O., has named Edmund Burke Co., Toledo, O., as machine tool distributor for the northwestern Ohio area.

Pullman-Standard Car Mfg. Co., Chicago, has begun construction at its Car Works plant in Chicago of two new-type cars for the Chicago Rapid Transit Co. Each car is to be composed of three articulated units and will have a seating capacity of approximately twice that of a conventional car.

National Acme Co., Cleveland, recently began shipment to Sears, Roebuck & Co., Chicago, of the company's order of 1 million carpenter's bit braces. The total order is said to involve more than \$2,500,000.

Seiberling Rubber Co., Akron, has been released from its contract to lease the former Continental Motors plant at Garland, Tex., which it had planned to convert to tire and tube production.

Monsanto Chemical Co., St. Louis, has received CPA approval for estimated \$4 million expansion of its Monsanto, Ill., facility. The program involves five separate projects: Enlargement of chlorine and laboratory facilities; new facilities for production of miscellaneous chemicals; enlargement of facilities for manufacture of wood preservatives; and expansion of the plant's boiler house. WEST COAST

# Surplus Tool Shipments Increase

More equipment being moved into Los Angeles area. Expected to result in demand cut of 20 to 25 per cent. Steel shortage persists

#### LOS ANGELES

INCREASING shipments of WAA surplus machine tools and other industrial equipment into the Los Angeles area by dealers are expected to cut present demand 20 to 25 per cent between now and the end of reconversion.

Prime reason for much of this concentration of surplus goods lies in the fact that the majority of tools now in southern California are for nonferrous metalworking such as highlighted the area's war boom. Demand, however, has swung toward ferrous metal operations. Hence the call for tools suitable for metals other than aluminum, magnesium and plastics.

"Nobody will be hurt by this trend," one representative dealer said. "There have been a few cancellations and there will be a few more, but delivery dates already have been reduced from 14 to 18 months a year ago to about 3 to 6 months now on orders to private concerns.

"Much of the WAA equipment here now is obsolete. Much of it is adaptable only for nonferrous work. While there are surplus machines available, of course, many manufacturers will buy them if only for the reason that they can get quick delivery."

## Light Sheets Are Big Bottleneck

Light sheets continue to be the big bottleneck in steel fabrication in Los Angeles. One maker of construction equipment and air conditioning units using an average of 7000 tons a year has been forced to set ahead many of its own delivery dates pending speedup in raw material shipments.

The chamber industrial committee reported last week:

"As we see the problem there are three ways of increasing the local supply of steel sheets: By developing further sheet production here; by stimulating recognition on the part of eastern mills supplying this market; by obtaining further increases in CPA allocations here."

Mr. O'Brien said the department is "active in the development of a new sheet steel mill to be built in Los Angeles with a capacity of 50,000 tons of 9 to 26 gage sheet per year."

Manufacturing sites are becoming



GET-TOGETHER: An inspection tour of the Kaiser company's Fontana steel works at Fontana, Calif., afforded the opportunity for a get-together of Jack L. Ashby, left, general sales manager of Kaiser Co. Inc.; T. R. Mullen, center, president of the American Institute of Steel Construction and president of Lehigh Structural Steel Co., New York; and Francis M. Rich, vice president in charge of operations of the Kaiser company

scarcer in Los Angeles and this has forced a growing invasion of the surrounding country, with orange groves and farm lands beginning to lose ground to industrial plants and to residential and commercial districts serving expanding populations.

A few companies representative of this trend are Hazel-Atlas Glass Co. and Bendix Aviation's Radio Division which have bought land near Pomona; Salsbury Motors, Northrop Aircraft Corp. subsidiary, is in its new plant in the same area; Fairbanks-Morse has purchased Pomona Pump Co.; Sylvania Electric Products Inc.; will assemble radios in Riverside; Allis-Chalmers is planning to erect a plant at Oxnard.

The Merchants & Manufacturers Association of Southern California last week issued a warning to managements that in cases where employees are not provided voluntary disability benefits by Dec. 1 they will be blanketed into the state disability program under terms of the Unemployment Insurance Act.

"Weekly sickness disability benefits identical with those already available for unemployed workers were set up under an amendment to the act as a scheme for cash benefits for workers incurring disabilities off the job," a bulletin on the same subject from the Los Angeles Chamber of Commerce points out.

The new state benefits are to be financed by placing 1 per cent of employee earnings, in the \$3000-yearly wage bracket, into a separate disability fund. According to Harold W. Wright, manager of the chamber:

"It is evident that better protection with approximately equal cost is obtainable through voluntary retention of private insurance plans as effective in the past.

"The commission is ready to approve voluntary plans and many insurance carriers already have submitted policy forms. Carriers will be able to write acceptable voluntary policies at rates ranging from slightly below to slightly higher than the 1 per cent deduction employces would have to contribute to the state fund. Because employees are barred from paying more than 1 per cent, excessive rates may be absorbed by employers."

# Steel Prices Holding in Pacific Northwest Area

### SEATTLE

Removal of OPA controls has as yet resulted in no violent repercussions in the steel market in this area. Local plants have not raised prices, while jobbers and fabricators await action by eastern mills.

The general tendency is to hold price levels although some adjustments are inevitable because of higher scrap prices and a possible wage revision when labor contracts are opened for negotiation.

Some steel operators feel that OPA ceilings were unjust to them and they may seek higher income but they are inclined to follow the general trend of the market.

One of the smaller plants points out that during the war reinforcing was frozen at 2.80c, below the level prevailing in the open market in 1937-38 when it was 2.95c base. Early this year an increase to 3.00c was allowed. Now it is 3.03½c, a level entirely out of line with greatly increased costs today, it is stated. However, this firm expects to establish the same price schedules as fixed by the two leading producers. Bending, trucking and other phases of production need to be revised upward, this statement adds.

Rolling mills have been unable to maintain top production, the major plant being reduced 25 per cent because one furnace was shut down because of lack of scrap. The smaller mill lost about 700 tons due to plant breakdown and delay for repairs. Backlogs are of considerable size and new business is being carefully scrutinized for first quarter, regular customers and emergency jobs receiving preference.

Fabricators are making the best of a bad situation. Inventories are so depleted that much attractive business is being declined as deliveries cannet be guaranteed. Mill allocations are inadequate, all shipments now coming by rail. Thousands of tons of material are still aboard ships. It is stated the small allocations of wide fiange beams constitute the present bottleneck.

### Narrows Bridge Postponed

Washington state announces that bids for the Narrows Bridge, originally set for September, have been indefinitely postpened on account of the steel situation. This project will involve about 17,000 tons.

Washington state director of highways, C. B. Shain, announces that several large state bridges, ranging from \$½ to \$2 million are either obsolete or in such a state reconstruction in the near future is imperative.

Seattle's city light steam plant, idle since 1938, has gone into production to augment the peak demand for power in the Pacific Northwest, supplied by a pool. Industrial activity, particularly aluminum plant operations, has increased the demand for power in this area. The Northwest pool includes 11 major systems in Washington, Oregon, Montana, Idaho and Utah.

# Western Steel Price Policy Seen Awaiting Decision on Rail Rates

Recent action of U.S. Steel in establishing Geneva, Utah, as base for shapes and plates directs attention to application for lower freight to coast. Spread now exists between Geneva and West Coast quotations

### SAN FRANCISCO

WESTERN railroads' decision on the request cf Geneva Steel Co, for a reduction in rail rates from the Utah shipping point to West Coast cities is awaited with more than usual attention.

The reason is that Geneva now has posted two Utah base quotations—one on sheared plates, the other on standard structural material—which are higher than prices at West Coast ports for the same items, after freight rates and shipping charges are added.

At this writing Columbia Steel Co. has not made any changes in its prevailing prices despite the fact that its quotations are \$2 to \$3 a ton less than the Geneva prices, plus freight. It is unlikely that Columbia will make any adjustment until U. S. Steel, its parent, announces its policy on price adjustments as a result of decontrol.

#### Railroads' Attitude Indefinite

Geneva has asked for rate reductions averaging about \$4 a ton. The new rate would be \$8 a ton on shipments from Utah to the West Coast. The railroads have given no definite indication of their attitude on the request nor has any indication been made when action will be taken. Some quarters do not expect a decision until after the Interstate Commerce Commission rules on the request of the nation's railroads for a general rate increase.

In its recent announcement of price changes, Geneva Steel Co. established Geneva, Utah, as a basing point for sales of standard structural shapes within the range of sizes, grades, finishes and specifications currently produced at Geneva.

The delivered price at Geneva for standard structural shapes, the announcement said, will be \$2.525 per hundred pounds in carload lots.

This announcement follows a similar one last month which established a base delivered price of \$2.675 on sheared plates.

Meanwhile scrap prices in San Francisco have been increased \$2.50 a gross ton over former OPA ceilings. The \$2.50 increase applies to all major classes except machine shcp turnings and No. 3 dealer bundles which were raised \$1 a ton.

The West Coast, which is experiencing a severe scrap shortage, is likely to continue to be a scarcity area, however, despite the price adjustment.

Steel observers here believe there is little scrap in "hiding" in dealers' yards, and that supplies in the "country" are so far below normal that the price increase is unlikely to give mills all the material they need.

In a review of the scrap shortage situation, E. W. Thomas, purchasing agent, Bethlehem Pacific Coast Steel Corp., pointed out that one factor in the present scarcity was the heavy shipments of scrap away from this area in the latter months of the war.

These shipments, to eastern consuming areas, virtually cleaned out the huge stockpiles of scrap that had been built up as a result of shipyard operations. When the end of the war halted shipbuilding, West Coast steel mills found new production of scrap ended and all of the backlog gone. Since then they have had to depend on current production of scrap, which has been insufficient to maintain full operation.

Mr. Thomas joined with others in urging that haste be made in breaking up surplus ships. That source is now the main hope of ending the scrap drought.

# Some Contracts Placed for Columbia Basin Project

#### SEATTLE

Bureau of Reclamation has placed several major contracts for important projects including the Columbia Basin and other irrigation and power jobs in this area. Three transformers have been awarded Westinghouse Electric Corp. at \$159,166, to be installed as part of the equipment for the last of nine generators composing a main unit of the Grand Coulee project. Other contracts placed include: Four 13,000-volt 65,000 hp motors to Westinghouse, \$1,652,671; two motors, General Electric, \$874,361; six pumps, Pelton Waterwheel Co. and Byron Jackson Co., San Francisco, at \$1,062,975.

# Men of Industry



LEE MULLEN

Lee Mullen has been appointed general manager of sales, Globe Steel Tubes Co., Milwaukee. Mr. Mullen has been with the Globe company since 1943. Previously he had been with Sharon Steel Corp., Sharon, Pa., Republic Steel Corp., Cleveland, and Pittsburgh Steel Co., Pittsburgh.

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Carl R. Sare has been elected president and director, Morrison Engineering Corp., Cleveland, O. He had been vice president of the company. Prior to joining Morrison, Mr. Sare was a production executive with American Steel & Wire Co., Cleveland, subsidiary of United States Steel Corp. He began his career as a service engineer for A. M. Byers Co., Pittsburgh, and later served as a sales engineer with Jones & Laughlin Steel Corp., Pittsburgh.

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Stuart F. Brown, director of exports, American Brake Shoe Co., New York, has left for a trip through South America, Panama and Cuba. He is scheduled to return in March. J. F. Vallet and W. J. Mohr, the company's resident regional managers in Latin America, will travel with Mr. Brown. Homer Parsons has been appointed assistant director of exports for American Brake Shoe Co. Mr. Parsons, who has been in the export field for 19 years, had been a sales representative for the company's export department since August, 1945.

Northern Ohio chapter, Institute of Scrap Iron & Steel Inc., announces the election of the following officers: President, Abner L. Cohen, M. Cohen & Son Co., Cleveland; first vice president, Jack Levand, Luria Bros. & Co., Cleveland; second vice president, Manly R. Burgin, Summer & Co., Cleveland; treasurer,

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RAY A. OBRECHT

Browne A. Shapero, Max Friedman Co., Cleveland; and secretary, Joseph B. Horwitz, Joseph B. Horwitz Co., Cleveland. Chairman of the executive committee will be David C. Holub, D. C. Holub & Co., Akron.

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#### Ray A. Obrecht has been appointed head of the newly formed process engineering department, Progressive Welder Co., Detroit. Mr. Obrecht has been with the company for the last 7 years.

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John H. Boyd has been placed in charge of the new Atlanta sales engineering office, Lebanon Steel Foundry, Lebanon, Pa. Mr. Boyd had been with the engineering sales department in the firm's main office since his recent release from the Army.

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Herbert L. Stroud has been named to represent Moore Corp., Joliet, Ill., in parts of Missouri, Illinois, Indiana and Kentucky. Harry J. Schedler has been appointed district manager in Milwaukee for the Moore firm. Mr. Stroud had been supervisor of federal construction work at points in the South for Moore during the war. Mr. Schedler had been in charge of the Mcduflow Division, Milwaukee branch, Minneapolis-Honeywell Regulator Co., Minneapolis.

H. J. Leisenheimer has been appointed director of export sales, Hydraulic Press Mfg. Co., Mt. Gilead, O. Mr. Leisenheimer was executive vice president, specializing in the development of foreign trade, Cleveland Tractor Co., Cleveland,

H. S. Nickell has been appointed factory manager of Detroit sales engineering, Briggs Mfg. Co., Detroit. He will

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HOWARD M. DASCHBACH

be in charge of operations at the company's experimental plant, Detroit, as well as the recently acquired production plant in that city. During the war, Mr. Nickell was in charge of all experimental work at the Briggs Outer Drive plant in Detroit. Recently he had been plant manager in charge of the company's Custom Division.

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Howard M. Daschbach has been appointed traffic manager, Columbia Steel Co., San Francisco, west coast subsidiary of United States Steel Corp. Since 1943, Mr. Daschbach has been traffic manager of Geneva Steel Co., Geneva, Utah, another United States Steel subsidiary. In his new position he will be traffic manager for both subsidiary companies. Mr. Daschbach joined the U.S. Steel organization as a routing clerk in Pittsburgh for American Steel & Wire Co., Cleveland. He became assistant traffic manager for American Steel & Wire in 1932. When the traffic department was merged with U. S. Steel's office in Pittsburgh, he became assistant to the general traffic manager. In 1940, Mr. Daschbach was made president of Ohio Barge Line, another U. S. Steel subsidiary.

Herbert L. Whittemore, mechanical engineer, National Bureau of Standards, Washington, has retired after 29 years of continuous government service. Mr. Whittemore, an authority on the testing of engineering materials, had been chief of the engineering mechanics section since 1918. In recent years, he carried on a program of testing components for prefabricated houses, studying possibilities for placing the mechanical design of small houses on a rational basis. Mr. Whittemore contributed extensively to engineering journals in the field of engi-

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## MEN of INDUSTRY

neering mechanics. For his basic research in oxyacetylene welds, and his success in promoting the use of fusion welding, he was awarded the James Turner Morehead Medal in 1928.

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Howard M. Irwin has been appointed general sales manager, Adams-Rite Mfg. Co., Glendale, Calif. Mr. Irwin had been sales and advertising manager, South Equipment Corp. of California, Los Angeles, for the last 2 years.

American Brake Shoe Co., New York, has elected the following four of its division executives vice presidents of the company: John S. Hutchins, president, Ramapo Ajax Division; William T. Kelly Jr., president, Engineered Castings Division and Kellogg Division; Thomas W. Pettus, president, National Bearing Division; and Joseph B. Terbell, executive vice president, American Manganese Steel Division. Mr. Hutchins has been with American Brake Shoe Co. for 21 years, mainly in sales work. He was named vice president of the Ramapo Ajax Division on Jan. 1, 1944, and was elected president of the division in September, 1945. Since December, 1945, he has also been chairman of the board of Canadian Ramapo Iron Works Ltd. Mr. Kelly joined American Brake Shoe in 1928, and was the company's general purchasing agent for several years before becoming president of the Kellogg and Engineered Castings Divisions. He is vice president of Canadian Ramapo Iron Works Ltd., and a director of Dominion Brake Shoe Co. Ltd. Mr. Pettus, president of the National Bearing Division since February, 1945, had worked for the company successively as sales representative, sales manager, priorities administrator, vice president and executive vice president of National Bearing Division. Mr. Terbell has been with various divisions during his career with

the company, mainly in sales work. In 1940, he was promoted from a district sales manager's position to vice president of American Manganese Steel Division, and in December, 1945, to executive vice president. Since January of this year, he has also been a director of Dominion Brake Shoe Co. Ltd.

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Thomas A. Knowlton has joined the Labor & Industrial Relations Counseling Division, National Foremen's Institute Inc., Deep River, Conn. He will make his headquarters at the New York offices of the institute. Until recently, Mr. Knowlton had been director, Disputes Division, New York Regional War Labor Board.

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Robert M. Field, who recently resigned as an officer and director of various subsidiaries of United States Steel Corp. to become vice administrator for Washington staff operations, War Assets Administration, has been appointed acting associate administrator to replace Brig. Gen. Don G. Shingler, recently recalled to active Army duty. James A. Mollison, former deputy administrator for aircraft disposal, WAA, has been appointed acting vice administrator for Washington staff operations. John H. Carey, former associate deputy administrator for aircraft disposal, has been named acting deputy administrator, Office of Aircraft Disposal. As acting associate administrator, Mr. Field will be concerned with surplus property sales, and will act as vice chairman of the special advisory committee to WAA Administrator Robert M. Littlejohn.

Norman M. Ramler has been appointed central district sales manager, with headquarters in Chicago, Warco Sales Co., representing Warren City Mfg. Co., a subsidiary of Federal Machine & Welder Co., Warren, O. The area to be serviced

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HOMAS W. PETTUS



JOSEPH B. TERBELL

from this new Chicago office includes Illinois, Iowa, Minnesota and northwestern Indiana south to Indianapolis. Working with Mr. Ramler as sales engineers will be Gilbert R. Krug and Cecil E. Novinger. Prior to joining the Warco Sales Co., Mr. Ramler spent 4 years as representative for the midwestern territory, Clearing Machine Corp., Chicago. Before that, he was production engineer with Edward Katsinger Co., Chicago. Messrs. Krug and Novinger were both with Clearing Machine Corp. in engineering and sales.

William Lotter has been appointed assistant to A. H. Brodbeck, director of research, American Stove Co., Cleveland. Mr. Lotter will be<sup>3</sup>in charge of research development of heavy duty cooking equipment. He was chief engineer of the Cleveland Division of the company, and has been with the firm since 1929. During the war, Mr. Lotter was actively concerned with the engineering and production of primary and secondary cowl assemblies for the P-47 Thunderbolt.

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Charles S. Allen Jr. has been placed in charge of the recently re-established Pittsburgh sales engineering office, Riley Stoker Corp., Worcester, Mass. Mr. Allen has been in sales engineering work with the company for more than 6 years.

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L. H. Billing has been appointed district manager of the newly created sales territory consisting of Wisconsin, upper Michigan and parts of Iowa, Falk Corp., Milwaukee. He had been production manager for the company since 1941. He joined the firm 20 years ago. B. C. Bugbee has been named production control manager for the Falk Corp. Mr. Bugbee has been with the company 5 years, and was assistant to the works manager since 1944.

James J. Nance has been elected executive vice president and a director, Edison General Electric Appliance Co. Inc., Chicago. Mr. Nance had been serving on the staff of Charles E. Wilson, president, General Electric Co., Schenectady, N. Y. For many years, Mr. Nance was with Frigidaire Division, Dayton, O., General Motors Corp., Detroit. He also held marketing and administrative positions with Zenith Radio Corp., Chicago, and Easy Washing Machine Corp., Syracuse, N. Y.

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C. F. Borden has been appointed assistant general sales manager, and R. L. Asquith, product sales manager, tubular and specialty products, Iron & Steel Division, Oakland, Calif., Kaiser Co. Inc. Mr. Borden will also continue as Oakland



## MEN of INDUSTRY

district sales manager for the organization. Before he joined Kaiser in 1945, Mr. Borden was with Columbia Steel Co., San Francisco, and Geneva Steel Co., Geneva, Utah, both subsidiaries of United States Steel Corp. Mr. Asquith was at one time with Oil Well Supply Co., Dallas, Tex., another subsidiary of United States Steel. After his return from duty with the Navy in 1945, he joined the Kaiser organization.

W. C. Erkert, director and purchasing agent, Keystone Steel & Wire Co., Peoria, Ill., has been appointed director of purchases for the company. F. A. Little has been appointed purchasing agent for the firm. Mr. Little was a Keystone sales representative in the Minneapolis area for 4 years, and then district manager of the Chicago office before becoming assistant purchasing agent in 1941.

Dr. Raymond C. Benner, consulting engineer, formerly director of research, Carborundum Co., Niagara Falls, N. Y., is in Germany, acting as consultant on the matter of reparations.

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Monroe Rooks, former motor truck branch manager at New Orleans, International Harvester Co., Chicago, has been transferred to the firm's Birmingham general line branch as manager. He succeeds P. H. Baker, who will establish his own dealership at Macon, Ga., handling International Harvester Equipment. R. E. Solberg, former assistant manager of the company's order and distribution department, has resigned to become an International Harvester dealer at Elk Point, S. D.

Sol Predeger has rejoined the Purchasing Division, Garod Radio Corp., Brooklyn, N. Y. His activities will include purchasing of components for the firm's radio, phonograph and television products. Mr. Predeger had previously been with the company for 5 years. William B. Tolsch has also joined the company's Purchasing Division.

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Henri M. Mare has been appointed assistant general manager, C. J. Tagliabue Division, Brooklyn, N. Y., Portable Products Co:p., Pittsburgh. Since 1932 Mr. Mare had been assistant director of research, Philip Carey Mfg. Co., Cincinnati.

F. W. Anderson, Precision Grinding Wheel Co. Inc., Philadelphia, was elected president of The Keystoners at a recent meeting of the organization in Philadelphia. The Keystoners is made up of about a hundred factory representatives

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who sell to industrial supply and hardware supply houses and industries throughout the eastern portion of the country. Other officers elected by the organization are: Vice president, **B. F.** Butterfield, Greenfield Tap & Die Corp., Greenfield, Mass.; secretary, **R. D. Casey**, Lamson & Sessions Co., Cleveland; and treasurer, Harry A. White, Yale & Towne Mig. Co., New York.

Martin Fleischman, metallurgical engineer, Steel & Tube Division, Timken Roller Bearing Co., Canton, O., has been awarded an honorable mention certificate in the first annual Materials and Methods Award for outstanding achievements in applying war-born knowledge of materials and their processing to the manufacture of peacetime products. Mr. Fleischman received the award certificate at a presentation dinner in Atlantic City, on Nov. 20, during the National Metal Congress and Exposition.

Leland Steiner, assistant superintendent of maintenance, Steel & Tube Division, Timken Roller Bearing Co., Canton, O., has been elected a director of the Association of Iron & Steel Engineers, Pittsburgh, for the year 1947. Mr. Steiner joined the Timken company in 1925, in the electrical department of the Steel & Tube Division, and was promoted to superintendent of the department in 1938. He has been assistant superintendent of maintenance since February, 1945.

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Paul J. Lalonde has been transferred from chemical research activities to engineering service and development for the electrotypers' and stereotypers' industry, Hanson-Van Winkle-Munning Co., Matawan, N. J. Dr. Otto Kardos has been appointed research electrochemist for the study of plating solutions for the firm. D. Gardner Foulke has joined the H-VW-M technical staff as a process electrochemist.

W. C. Snyder Jr. has resigned as president and director, Continental Foundry & Machine Co., East Chicago, Ind. J. H. Briggs, president of H. M. Byllesby & Co., Chicago, has been elected a director of Continental. M. G. Sternberg, executive vice president, has been appointed a member of the executive committee.

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The Allegheny Ludlum award, a newly adopted form of recognition for service and achievement among executives and employees of Allegheny Ludlum Steel Corp., Pittsburgh, has been presented by Hiland G. Batcheller, company president, to the following four men: Vere B. Browne, vice president in charge of re-

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search and a member of the board; Walter M. Patterson, manager of the electric furnace department at the company's Brackenridge, Pa., mill; David P. Bartell, chief chemist at Brackenridge; and Walter Miscosky, of the Brackenridge chemical laboratory. Mr. Browne and Mr. Patterson received individual awards, each of which consists of the "president's medal", a certificate, and a \$1,000 cash award. Mr. Bartell and Mr. Miscosky divided the third award for their joint accomplishments in reducing the time required to determine the chemical analysis of alloy steels.

Edward C. Huerkamp, sales manager, Lighting Division, Westinghouse Electric Corp., Pittsburgh, has received the James H. McGraw Award Manufacturers Medal for 1946, in recognition of his contributions to the lighting equipment branch of the electrical industry. Mr. Huerkamp has been with the Lighting Division of the Westinghouse company for 18 years, and has been sales manager since 1939.

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Edgar M. Hastings, chief engineer, Richmond, Fredericksburg & Potomac Railroad Co., has been nominated as the 1947 president of American Society of Civil Engineers. The nomination, tantamount to election, will be confirmed by the membership, and Mr. Hastings will take office at the society's annual meeting in New York in January. Mr. Hastings became a member of the society in 1910. He served as its vice president in 1943 and 1944, and was president of the Virginia Section for 2 years. Mr. Hastings joined Richmond, Fredericksburg & Potomac Railroad in 1903, and has been chief engineer since 1922. -0-

W. E. Griffiths has been elected president, American Alloy Inc., Chicago, a corporation recently organized to warehouse stainless steel and other alloy steel specialties. Mr. Griffiths had been assistant manager of flat rolled steel sales for Allegheny Ludlum Steel Corp., Brackenridge, Pa. Paul C. Sandmeyer has been appointed manager of the American Alloy firm's new warehouse. Mr. Sandmeyer was manager, Stainless Steel Division, Jessop Steel Co., Washington, Pa. He also had been with the Stainless Steel Division, Carnegie-Illinois Steel Corp., Pittsburgh, subsidiary of United States Steel Corp.

John H. Van Uum will remain president and treasurer of Cuyahoga Spring Co., Cleveland, recently acquired by Barium Steel Corp., New York. Mr. Van Uum founded Cuyahoga Spring Co. in 1906. David R. Jones, president, Geometric

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## MEN of INDUSTRY



FRANK L. MAGEE Appointed vice president, Aluminum Co. of America, Pittsburgh, noted in STEEL, Nov 18 issue, p. 78.

Stamping Co., Cleveland, has been elected chairman of the board of the Cuyahoga firm. The board of directors, in addition to Mr. Van Uum and Mr. Jones, will be composed of J. A. Sisto, chairman of Barium Steel Corp.; Rudolph Eberstadt, president of Barium; Albert Detwiler, executive vice president of Cuyahoga Spring Co.; and Robert C. Hardy and Jules R. Breuchaud, directors of Barium Steel.

Earl L. Shaner, president, Penton Publishing Co., Cleveland, and editor-inchief of STEEL, has been appointed to the Information Committee, Committee

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# OBITUARIES ....

John K. Calder, 65, industrial engineer who is credited with putting into operation many industrial phases of the Soviet Government's Five-Year Plan, died at his home in Detroit, Nov. 16. As chief construction supervisor for Bryant & Detwiler Co., Detroit, he was in charge of construction of the Ford River Rouge and Willow Run plants. In recent years, he had supervised all Ford construction by Bryant & Detwiler. Mr. Calder, who was hired by Russia in 1928, completed within 4 years such projects as the tractor plant at Stalingrad; a tractor plant at Chelyabinsk: the second largest blast furnace in the world at Magnitorgorsk, Siberia; the Salta bridge plant; and a copper smelting plant at Balkash. Around each of these projects he helped build a complete, modern city.

John D. Williamson, for 23 years New York district manager, SKF Industries Inc., Philadelphia, died recently at his home in Ramsey, N. J. He had resigned from the firm last August, due to ill health. Mr. Williamson joined the com-

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E. A. BERTRAM Appointed manager, Industrial Division, National Radiator Ca., Johnstown, Pa., noted in STEEL, Nov. 18 issue, p. 79.

for Economic Development, New York. Fowler McCormick, chairman of the bcard, International Harvester Co., Chicago, has been named to CED's research and policy committee.

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Vernon M. Drew, research director, Fruehauf Trailer Co., Detroit, has been loaned by the company to the Committee on Economics of Motor Vehicle Size and Weight of the Highway Research Board. The committee is undertaking a scientific survey to determine what would be the most economic vehicles on the most economic roads. Mr. Drew also will be a member of a subcommit-

pany in 1918, and since 1923 had been manager of the New York district, which embraces the city of New York, southern New York, and northern New Jersey.

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Frederick William Brehmer, 66, founder and p-esident, F. W. Brehmer Machine & Tool Co., Cincinnati, died at his home in that city, Nov. 11. He founded the firm 35 years ago. Mr. Brehmer was a member of American Society of Tool Engineers.

William F. Arndt, 65, president and general manager, Coolerator Co., Duluth, died in Chicago, Nov. 17. He had been president of the firm since 1930.

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Herman C. Nelson, district sales manager, Bliss & Laughlin Inc., Harvey, Ill., died recently in Rock Island, Ill. He had been with the company for 12 years.

Dr. Sanford A. Moss, 74, consulting engineer, Aircraft Gas Turbine Division, River works, Lynn, Mass., General Electric Co., died at his home in Lynn recently. He was noted for his pioneer



JOSEPH P. SIMON Appointed district manager, Philadelphia territory, Cutler-Hammer Inc., Milwaukee, STEEL, Nov. 18 issue, p. 78.

tee which will begin a series of meetings Nov. 18 to produce a concrete program for planned research on the subjects involved. Mr. Drew has been with the Fruehauf company for 6 years, in research directly related to vehicle design and production.

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Hubert K. Bishop, a former deputy commissioner, Public Roads Administration, has joined American Road Builders' Association, Washington, as manager of the County Highway Officials Division and the Municipal Division, succeeding Maj. John A. Long who resigned last summer.

work on aircraft superchargers and gas turbines. In 1938, at the age of 65, Dr. Moss retired, but the day of the Munich pact returned voluntarily to resume work as a consulting engineer for General Electric.

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W. J. Phillips, 56, who had been a salesman for the Pittsburgh warehouse, Jones & Laughlin Steel Corp., for 25 years, died recently. Mr. Phillips joined Jones & Laughlin at its Pittsburgh works in 1911, and transferred to the Warehouse Sales Division in 1921.

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**R. E. Post,** 79, for the last 10 years manager of the Washington office, Fairbanks, Morse & Co., Chicago, died in Washington, Nov. 13. Mr. Post was originally with E. & T. Fairbanks & Co., and joined Fairbanks, Morse & Co. in 1923, when the two organizations were merged.

John Wesley Hays, 47, factory superintendent of one production line, Waukesha, Wis., plant, Crittall-Federal Inc., died recently at his home in Waukesha.

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Fig. 1-Progressive 5-stage forming of split bushing, left to right: (1) Sample of stock, (2) after blanking, (3) after oil grooving (inner face) (4) after first forming, (5) after semiforming and (6) after final forming

Fig. 2-Press equipped with 13-station die for manufacture of more elaborate split-type tubular products

Fig. 3-Special high-speed machines face and chamfer both sides of bushings and bearings simultaneously

Fig. 4-Formed part made on progressive dies ready for cutting off operation

Fig. 5-Pilot rolling mill for nonferrous strip


# STAMPED BUSHINGS

BRASS and bronze bushings and bearings, steel bushings and spacers, and brass ferrules are "kicked out" of an assorted group of stamping machines at National Formetal Co., Cleveland, in prodigious quantities. Although weekly production of standard sizes of split-type steel and bronze bushings—primarily the subject of this discussion —runs into 200 tons, tolerance limits of plus or minus 0.001-in. on the inside diameter, and close to 0.0005-in. on the outside diameter.

The market for steel and bronze bushings is broad and varied. Split-type bushings of these materials are found on transmissions, axles and piston pins, connecting rods and steering knuckles of automobiles and trucks. They are widely used in pumps of all kinds; electric motors and generators; tools; fans and blowers; in diesel engines; laundry machinery; locomotives; industrial machinery and trucks; lawn mowers; vacuum cleaners, and hoists, to name only a few.

In order to become components of products named, all bushings first must pass muster as precision parts. With progressive dies of from 3 to 13 stations, conceived and built as a guaranty of accurate final form, the stamping press becomes a Cinderella of almost flawless workmanship.

Separate batteries of presses, ranging in capacity from 15 to 150 tons, cut off and continuously form strip fed to them at National Formetal. They make brass and bronze bushings in sizes from ¼-in. ID to 5-in. OD in nine graduated sizes. Range of sizes in steel is even greater. Steel bushings are made of cold-rolled low carbon stamping stock. Diversity of types is shown by parts in Fig. 7.

The not-so-simple but least elaborate of Formetal's dies is a 3-station setup so synchronized that a new length of metal fed in through the stock guides is cut to blank size Intricate and highly accurate progressive dies make stamping press a volume producer of tubular-shaped bushings and bearings. Steel and bronze are worked interchangeably on most setups

and accepted by a special pick-up die while final forming and ejection of a completed bushing is going on. After the cut-off, the upper die carries the piece to the semiforming die where it is partially formed or given a Ushape. Piece then moves to the next station for final rounding and sizing. Formed part is seen emerging from dies in Fig. 4.

Some products run off in this manner on 70 ton presses with 3-station dies are a large steel spring eye bushing for heavy trucks and spacer tubes for conveying equipment. Dimensions of the steel bushing are 1¼ in. OD, 4 in. long, and about 0.125-in. thick. Production of the spring eye bushing is 1200 to 1500 per hour. During the company's participation in production for war there was another 4-in. job going through the plant. This was a burster bomb tube which served as a sleeve or flange on the bomb. This meant important savings of time and money as the part formerly was made from standard tubing machined to final dimensions.

Another 3-station die setup is used to make a water ferrule or insert for the honeycomb type water jackets of diesel engines manufactured by Cleveland Diesel Engine Division of General Motors Corp. This ferrule,  $3/8 \times 7/16 \times 1$  in. long, is turned out at the rate of 3000 pieces per hour on Formetal's machines. Thirty-ton punch presses



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are used and procedure is the same as that employed for all 3-stage stamped bushings and bearings. This consists of blanking, first forming and final forming. These machines also have been used to make rollers of NE 4630 steel for roller chain. Of the four sizes of rollers produced, the heaviest and largest are 11/16-in. wide and 0.687-in. OD, but facilities available permit handling up to 1<sup>1</sup>/<sub>8</sub>-in. lengths, 3-in. widths and maximum wall thickness of <sup>1</sup>/<sub>8</sub>-in. The strip material for these jobs comes with a rolled edge.

Dies for 3-station operation are so designed that they will accommodate brass, bronze or steel interchangeably provided stock does not exceed dimensional limits. Production of lighter parts in any of the three metals is the same, about 3000 per hour. Where size of bushing or roller necessitates a change of dies, changeover is accomplished in less than 3 hours. Three-station dies used will produce split-type tubular products from 11/16 to 1<sup>1</sup>/<sub>8</sub> in. OD, and 13/16 to 3 in. widths of stock with thickness from 0.070-in. to about 0.250-in.

Progressive forming with 5-station dies is illustrated in Fig. 1. The company works bronze on 5-station progressive dies which produce about 4000 pieces per hour, an automatic feed on the 75-ton Bliss press shown in Fig. 8 being of considerable help in establishing such a rate. Dies are so arranged that blanking does not take place until the third station is reached; grooving the strip for oil pockets and hole punching are the first and second operations. Following blanking comes semiforming, then final forming.

Seven-station or "F" dies are employed at Formetal for progressive manufacture of bushings in sequence as follows: (1) Stamping, (2) chamfering, (3) trimming, (4) stop, (5) first forming, (6) intermediate forming and (7) final forming. A coining operation for size is included. Position 4 on the 7-station die set is the key to its success. After trimming at station 3, the surplus left in the next blank becomes the stop determining its length. The blank is firmly held throughout all operations until the piece arrives at the last station and is (*Please turn to Page* 104)

Fig. 6-Essential components of 7-station or "F" die. F die's core (front, center) plays key part in accurate forming

Fig. 7—These parts show versatility of stamping with progressive dies. Note contrast between tubular-shaped parts and large ring of heavy section at right center. Ab extreme left, rear, is deep-drawn stamping for instrument case

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Fig. 8—Automatic feed and 5-station dies permit this 75-ton Bliss press to attain rate of 4000 picces per hour New method of piercing rail sections reduces time involved as sections up to 39 ft in length are drilled for reinforced switch points, frogs and crossings

# Production Urilling Rail Sections

RAPIDLY increasing sizes and weights of rails used by the railroads, as well as the tendency toward longer switches to provide for ever increasing speed of railroad travel, make it necessary for the manufacturer to use larger, more flexible and more efficient machinery. An example of this type of machinery is the special drilling machine built by Moline Tool Co. of Moline, Ill. and installed in the Ramapo Ajax plant of American Brake Shoe Co., Chicago.

This machine utilizes 40 universal joint driven spindles and is applied to the drilling of rail sections up to and including the 131 lb size in lengths up to 39 ft. Not only are the rails drilled but also the reinforcing bars (or "D" bars) are drilled in the positions that they will occupy in the completed assembly after riveting or bolting to the rail. Although it has various other uses, the principal product for which this machine was designed is the reinforced switch point, used by all railroads in various lengths, sizes of rail and amount

of reinforcing.

Built in two sections, each having a drilling area of 121/2 ft by 2 in., the machine is in reality two separate units, each complete with motor drive for the spindles and with motor driven hydraulic feed pump. The two sections are integrated into the one machine in such a way that the supporting member on which the spindle units are mounted is continuous throughout its length. This results in the spindles all advancing or withdrawing simultaneously as the hydraulic traverse or feed takes place.

It is possible to run the spindles of one section of the machine only, if desired, as spindles on each half are driven by one motor. A four-speed, quick-change gear box is incorporated in the spindle drive mechanism for each half of the machine.

The machine is equipped with 40 spindles which are



Fig. 1 (top)-Overall view of HU-68 drilling machine as installed in Ramapo Ajax plant, Chicago. Worker is operating loading mechanism controls to place rail assembly in fixture. Rails are rolled from machine to receiving table at right after drilling. Photo-electric protective device is mounted on floor at end of muchine Fig. 2 (bottom)-Drilling machine in operation. Work supports between power rolls have raised assembly into position for drilling. Push button station controls right half of machine, a similar station is located at other end for other half

rotated by splined drivers in the upper portion of the sliding carriage which moves on vertical ways. As there are 24 of these drivers in each half of the machine, it is a relatively simple matter to shift a spindle unit from one driver to another, the angle at which the universal joints must operate being held to a minimum. Of the 40 spindles, 38 are rated for 1 5/8-in. drills on 4 in. minimum centers and two are rated for (Please turn to Page 101)

# 20-Million-Volt BETATRON

RELATIVELY simple, safe and economical source of very high frequency, high penetration x-rays, a new 20million-volt betatron installed recently at Picatinny Arsenal is demonstrating its possibilities in industrial radiography involving thick section steel and other heavy metals.

Because the unit was tied up in censorship in connection with the Office of Scientific Research and Development, and in the Manhattan project, very little has been published on it. As a result, industry has been handicapped in learning of the machine's tremendous possibilities for improving inspection and research methods.

After several years of work at the University of Illinois, Dr. D. W. Kerst, inventor of the betatron came to the conclusion that a 20-million-volt unit was the best size for industrial radiography. Smaller units lacked the needed penetrating power and sharp focus. Larger sizes became unwieldy with little added gain in heavy section industrial radiography.

On the basis of these findings, Dr. Kerst was authorized by the OSRD to develop a machine suitable for industrial

use. Allis-Chalmers Mfg. Co., Milwaukee, helped to design and build this first commercial unit which was later used somewhere on the Manhattan project. Subsequently Allis-Chalmers built several more betatrons for army installations and furnished the main magnet with auxiliary equipment on a number of other applications. The latest unit at Picatinny Arsenal, N. J. was designed for x-raying loaded shells on an automatic conveyor system.

The betatron simply considered is a two-winding transformer with a stream of electrons for a secondary winding. It has a low voltage heavy conductor primary and a large shell-type steel core. The primary coils are mounted on the center leg of the 3-legged core, the same construction found in many transformers.

The secondary high voltage winding, instead of being made up of the hundreds of thousands of turns of very small wire, which would be necessary to produce 20 million volts is replaced by a simple doughnut-shaped vacuum tube. Projecting into the tube is a sturdy filament and a tiny platinum target.

In a transformer, a voltage fed into the primary winding induces a flux in the iron core, which in turn causes electrons to travel through the turns of the secondary winding, resulting in a voltage appearing across the secondary terminals.

In the betatron, there is no secondary winding, but when a rich supply of electrons is shot into the vacuum inside the doughnut from the filament, the (Please turn to Page 92)

. . . . now being employed to "look through" loaded shell at Picatinny Arsenal possesses singular advantages for industrial radiography. Once a laboratory instrument exclusively, this source of very high frequency x-rays has deep penetrating power, sharp focus and speed required to inspect thick section steel, bronze and other heavy metals

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Fig. 1-Exposure chart for 20-millionvolt x-ray with Eastman industrial film, type A, 0.040-in. front lead screen, density of 2

Fig. 2-Comparative exposure times required for various commercial sources of x-radiation, assuming same film technique and film densities

Fig. 3-Capacitor bank and auxiliary equipment in betatron power and control cubicle, Picatinny Arsenal, N. J.

Fig. 4-Shop view of betatron and control panel installation at Picatinny Arsenal, N. J.

Fig. 5-Closeup of betatron magnet with yoke raised



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November 25, 1946 /TEEL

4 DAY

1 DAY 124 HOURS

30

10 Mil

EXPOSURE TIME

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(3)

. . . . is designation applied to latest shielded-arc electrode for automatic welding. Composite structure is heavily fluxed to form crucible arc, and flexible enough to be fed into arc from a reel. Sound, fine-grained welds made at great speed

RECOGNIZING the need for incorporating an arc-enclosing crucible formation with the shielding and energizing essentials of the perfect automatic welding electrode, National Cylinder Gas Co. research engineers have developed a new electrode with these characteristics.

In order to understand the importance of the crucible factor in the electrode it is necessary to study closely the remarkable structural features of the electrode, to be identified as the Shield-O-Matic. Construction includes a metallic framework extending outward from the core wire, through a thick coating of flux, to the periphery of the electrode. This framework consists of fin formations on the core wire, around which are helically wrapped a plurality of fine wires.

At each point where the wires contact the fins on the core wire there is an interlocking that eliminates any possible slipping or unwinding of the wound wires. Spaces between the fins and the spaces between the wires are filled with flux, giving the core wire a continuous, seamless tube coating of flux.

Small areas of the helically wound wires protrude through the flux coating to provide means for conducting the welding current from the outer surface of the electrode to the wire core within. This grid construction firmly anchors the flux coating to the wire core, providing an electrode that will undergo extreme flexing and bending without any breaking away of flux. This also provides that the electrode can be fed into the arc from a reel, in the same simple manner as bare electrode automatic welding of the past.

The composite structure of the electrode further provides for the conduction of unusually high welding currents. The major portion of the current is conducted through the central area of the wire core, but each of the fin members also conducts welding current, thus creating about the central core welding are an aggregate of miniature arcs that merge to form a compound arc. Fig. 1 illustrates the four stages in processing the electrode.

The Crucible Arc: Actually, the (Please turn to Page 82)

- Fig. 4—Adaptor-held electrode in operation on 1-in. thick plate. Deep penetration is insured, yet flare is minimized
- Fig. 5—Typical fixture for making longitudinal seams on both flat and cylindrical shapes. Note reel-feeding of electrode

Fig. 6—Fixture for welding both longitudinal and circumferential seams in hot water tanks

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November 25, 1946



(Above) Tensile specimens (0.505) before and after destruction, and free-bend specimens before and after tests
Fig. 1—Four stages of processing electrode. Left to right: Core rod, after deep grooving, helically wound with fine wires, and completed electrode sheathed in flux
Fig. 2—Schematic of crucible welding arc process
Fig. 3—Closeup of adaptor designed for attachment to all types of equipment. Electrode feeds through straightening rolls, and down through contact jaws

MIATURE

AUTOMATICALLY MAINTAINED

FINISHEC SLAG

FEED ROLLS

SHIELD-O-MATIC ELECTRODE -

CURRENT CONTACT JAWS

WELD

CRUCIBLE INCLOSED AR

AC. \*\* DC WELDING CURRENT THE PROBLEM of increasing production of steel springs to meet greater demands of civilian and industrial users, despite shortages of materials and personnel, has been largely solved by improved methods of fabrication and heat treating at the plant of William and Harvey Rowland Inc., Frankford, Philadelphia.

Today, in addition to springs for automobiles, trucks, trailers and motorcycles, the company makes springs for highly specialized industrial installations. There are many sizes and shapes, from a single foottreadle spring weighing  $1\frac{1}{2}$  lb to one made of 10 leaves of 5 x  $\frac{3}{4}$  spring steel weighing 470 lb. The latter is designed for use on the rear end of a prime mover.

The manufacturing process begins with the shearing of the leaves from flat rolled steel and trimming to finished shape, either blunt diamond, long diamond, French, round or special. In some cases, shearing and trimming is done in one operation.

Then center and clip bolt holes are punched and the leaves are forge heated for eye forming, stub and long tapering, hot punching, center cupping and nibbing, and finally, forming of wrapper leaves. With certain types of jobs it is possible to hot punch five holes simultaneously.

At this point comparatively new heat treating

SHORTCUTS

equipment enters the process. Forming and hardening is done on one heat. Heated to  $1650^{\circ}$  F, the spring leaves are removed from the furnace and placed in a cambering machine which performs the operations of forming and quenching simultaneously. This machine is either the 2-head see-saw type or the 6-head pinwheel type shown in Fig. 4. The pinwheel machine automatically bends spring leaves up to 8 in. wide, 7/16-in. thick and 81 in. long, after they are heated to required temperature by furnace shown in background.

Dimensions of this combination oil quench and cambering unit are generous. Top of each wing when vertical is 67 in. above the floor, while the tank Spring leaves sheared from flat-rolled steel are heat treated uniformly and simultaneously quenched and cambered in semiautomatic furnaces and machines which have increased plant's output 15 per cent

bring Manufacture

in which wings revolve below floor level is 19 ft long, 8 ft wide and 7 ft deep and holds 6000 gal of quenching oil. The oil is circulated by a pump at the rear which discharges the hot oil into an outside sump tank from which it is pumped through an evaporative cooler and back into the quenching tanks. Oil starts through the cooler at  $150^{\circ}$  F and flows to the quench tanks at  $120^{\circ}$  F.

The large pinwheel machine modeled after smaller Rowland machines, but incorporating many improvements, has been further modernized with the addition of a Stewart hardening conveyor furnace and a quench tank conveyor which removes the leaves after quenching. The heating, cambering, quenching and stacking of the spring leaves on skids is semiautomatic with three operators. One loads the furnace conveyor at the far end. One removes the heated leaves from the side door and places them in the pinwheel fixture, which, at the touch of a button, cambers the leaf and carries it down into the quenching oil. At the same time a leaf in the opposite side of the pinwheel is automatically released onto the conveyor and carried out of the tank to the third operator who places it on a skid.

This equipment doubles production on some leaf sizes and triples it on others over the former method. One plate is quenched every 10 to 60 sec and speed is only limited by the time required to cool the leaves





/TEEL

By WALTER F. WHITEMAN Chief Engineer William and Harvey Rowland Inc. Philadelphia

Fig. 1—End view of pinwheel cambering machine and quench tank with new hardening conveyor furnace in background, right. Platform in foreground catches spring leaves as they emerge on conveyor from quench

Fig. 2—Draw furnace with traveling conveyor handles up to 5000 lb of spring leaves per hour

Fig. 3—Discharge end of conveyort where the tempered spring leaves are removed. Six ft wide and 40 ft long, conveyor is driven by a variable speed worm gear reducer which can increase its travel from 5½ to 22 ipm

Saur



#### below 300° F in the oil,

The Stewart furnace shown in Fig. 4 is 18 ft long by 11 ft wide and will handle 88 in. long leaves through the charging door. The conveyor of five chains is heat resisting alloy and completely enclosed in the furnace. With a variable speed drive the leaves can be kept in the furnace from 2 to 65 min, depending on the time required to bring them up to the 1600° or 1700° F as required. The plates are removed endwise through the side door which is 15 in, wide. Heat is supplied by eight Hauck proportioning oil burners, which not only provide close control of temperature, but atmosphere as well. Air is supplied to the burners by the blower at 24 oz air pressure.

Charging and soaking zones are automatically controlled by two of the latest type Brown electronic air line recording controllers, with Brown Radiamatic air cooled pyrometers instead of thermocouples.

The two zones are controlled independently by Brown controllers with four large Hauck burners in the charging zone and four smaller ones in the soaking zone. Correct proportions of burners, combustion space and flue spacing has been designed into the furnace to maintain uniform temperatures and atmospheres at all points in the furnace near the conveyor and work level.

After quenching and cooling to under 300° F, the leaves are put on a conveyor passing through a draw furnace. The company's draw or tempering furnace, shown in Fig. 2, was built by Stewart Furnace Division of Sunbeam Corp., Chicago. It is an overfired, oilburning, traveling-hearth conveyor type with 2-zone Leeds & Northrup Micromax control. Inside dimensions are 7 ft wide by 45 in, high by 28 ft long.

Fig. 3 shows the discharging end of the conveyor where the spring leaves are removed. This conveyor, shown in Fig. 4, is 6 ft wide by 40 ft long, of Link-Belt Co. design and driven by a LinkBelt variable speed worm gear reducer. Conveyor speed can be increased from 5½-in. to 22 ipm, allowing a time cycle for the charge inside the furnace to range between 61 min for ¾-in. steel to 15 min, if desired, for ¼-in. steel.

#### **Uniformity Important Factor**

Uniformity is the most important factor in design of a draw furnace for leaf springs. Most spring leaves are of the tapered type-heavy in the center and tapered down to a thin section at either end. If the temperature in the furnace is not right, across the full width of the conveyor, the thin section of the spring will have a different hardness than the thicker middle section. Uniformity in Rowland's direct-fired Stewart furnace is achieved by the proper spacing of burners and tangential firing along the roof. This arrangement spreads the flame and allows the gases to expand uniformly across the full width and length of the furnace. The combustion space above the load is another important factor, especially with an oil-fired installation. This space has to be high enough to provide heating with convected heat rather than with radiation. Another equally important factor is the number and location of the vents.

There are eight Hauck proportioning oil burners, four on each side of the furnace, properly staggered. Four burners in the charging zone, two on each side of the furnace, are controlled by an L & N indicating controller. On the discharging end or "soaking zone," the other four burners are turned up or down as required by the control, shown at the near end.

Each burner is equipped with its own oil shut-off valve, oil filter, pressure regulator, and pressure gage. Oil is circulated around the furnace by a small pump (in back of drive mechanism) and heated by two electric heaters, one on each side of the furnace near the middle, which are automatically controlled with thermostats. A visual thermometer in the Fig. 4—Six-head pinwheel cambering machine and heating furnace, both designed to handle the largest spring leaves made

pipe provides a check on the oil temperature. Sixteen-ounce air pressure supply is furnished by a Spencer blower, and air in the pipes passes over the furnace flues, heating it for efficient combustion.

Hot gases of combustion from each burner are forced upward against the roof arch and follow it to the opposite side, down and back to the same side through the work and under the conveyor to flues near the sides of the conveyor, and between the burners. Uniform heat distribution of between 850 to  $1100^{\circ}$  F, as required, can be attained and held to plus or minus 5° F. The furnace will temper up to 5000 lb of spring leaves per hour with a maximum of approximately 15 gph fuel consumption.

Leaves next are tested for brinell hardness on a Gogan production machine, and hand fitting subassembly operations are performed where necessary. These include riveting clips, anchors, pads, etc., to respective leaves; assembling wrappers to main leaves; and pressing in and reaming bushings.

In the main assembly, all leaves are graphited, if required; leaves and inserts of various kinds are clamped together on a special air-operated vise table; the centerbolt is inserted and its nut tightened with an air-operated impact wrench; the spring is bulldozed and tested for free height; clips, spacers and bolts are installed with an impact wrench; the spring is painted black or wiped with graphite; bronze threaded bushings are hand chased; load and height are tested when required; and the springs are packed and marked for shipment or sto:age.

#### Circular Slide Rule Uses Contrasting Color Scales

Pocket-size convenience is combined with precision of a 12-in. slide rule in a simplified circular rule 4½-in. in diameter, developed by American Hydromath Co., New York. Accuracy of rule is said to be enhanced by locating most-used scales in contrasting colors close to the edge, so that each is actually 12½-in. long.

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### Engineering News at a Glance

"ICED" PIPES: Among other uses for electric welding equipment is that for thawing frozen water pipes. Some manufacturers discovered this equipment offers advantages over other means because it is self-regulating, and can be controlled accurately. However, in applying welding equipment for this application, R. F. Wyer of General Electric Co. suggests that strap-type clamps of copper having ample section to carry several hundred amperes be used. Cable should never be wrapped around pipes as a connection since it may cause hazardous sparking. While proper current for thawing pipes was established as between 200 and 500 amp, time needed to complete the work varies greatly according to such factors as size, length and location of iob.

SMOOTH MOVEMENT: Special cam devices keep pin wire moving at even tension in a German pin-making machine, described in a British report, recently turned over to the Office of Technical Services, Washington. Reciprocating actions of the primary feed, straightener and gripper feeds, which carry the wire through the pin machine, assure an even pull. Smooth movement of the wire prevents the appearance of spiral marks on the pins and permits high-speed operation. In one German plant, maximum production of straight pins with 130 machines totaled 15 tons per 48-hour week.

**GLASS TUBING BY THE MILE: Eight** hundred miles of glass tubing per month, enough for a million fluorescent lamps, are turned out by the 100-ton furnace. Westinghouse Electric Corp. operates in its huge glass plant at Fairmont, W. Va. In addition, a second furnace of 32-ton capacity turns out 1200 miles of small diameter tubing in a like period for flares that seal the interior assembly of incandescent and fluorescent lamps to their glass bulbs. The company made its debut in glass manufacturing four years ago, when it built the two-milliondollar plant to help overcome an acute wartime shortage of glass.

COMPUTES FREQUENCIES: Problems involving frequency, inductance and capacity are solved quickly with the Calculaide frequency computer devised by American Hydromath Co. in New York. It correlates in one setting natural frequency and wave length of a circuit comprising a coil and condenser with the physical dimensions of the coil and the capacity of the condenser. The computer's range covers frequencies of 400 kc to 150 megacycles and wave lengths of 2 to 600 meters. It handles condenser capacities between 3 and 1000 microfarads. Device performs calculations with coils of ¼ to 5½-in. diameter, ¼ to 10 in. in length, 2 to 150 turns per inch of No. 10 to 35 gage wire, whether enameled, single or double silk covered, or single or double cotton covered.

"LIGHT" WIRE: Weight up to 200 lb in the Consolidated Vultee B-36, huge bomber recently unveiled to the public, is saved through use of a new electrical wire developed by United States Rubber Co., New York. An aluminum conductor and a fire-resistant insulation, known as Neolay, is used in the manufacture of the wire. Insulation consists of a layer of glass to insure circuit integrity and synthetic rubber applied by a special dipping process. More than 140,000 ft of this wire is used in the electrical system of the plane,

EQUALIZER BAR: Soon to see service in the steamlined passenger cars of a major railroad, is a new forged equalizer bar 30 to 50 per cent lighter in weight then conventional types because of its I-beam section construction. Developed by Canton Drop Forging & Mfg. Co., Canton, O., in connection with one of the nation's leading car builders, the equalizer provides strength and safety only found in parts of much greater cross sectional area. Manufacture of the bar is made possible by the use of huge drop hammer equipment and closed impression dies that control grain flow and metal structure.

STEAM BY ELECTRICITY: Electricity is used to generate steam for pressures up to 200 lb per square inch, and in volume up to 2 boiler horsepower in a new type boiler currently manufactured by Livingstone & Co., Boston. It employs solid rods for electrodes, using the water between them as the resistance element. Low water danger is eliminated because, in the absence of water to make contact between electrodes, no current is passed, therefore no steam is generated. Development is said to be ideal for laboratory installations.

ALCOHOLIC DROUGHT: At wartime peak, synthetic rubber production alone required 330,000,000 gallons of alcohol annually, and other outlets took 270,-

000,000, according to Arthur D. Little Inc., Cambridge, Mass. This demand was supplied principally by fermentation of grains in both industrial and beverage alcohol plants. Now rubber is made from alcohol in only one plant, which probably will close when natural rubber supplies and prices are satisfactory, or when petroleum-based butadiene is available in requisite quantities. Alcohol production for 1946 is estimated at 75,000, 000 gallons, with the remainder of this year's consumption quota of 150,000,000 gallons, consisting of 20,000,000 gallons from Cuba at 65 cents per gallon, and the rest from reserves.

"PLASTIC" AUTO: Six-cylinder Darrin car, designed by Howard Darrin of Los Angeles, features a 2-section laminated Fiberglas body, weighing 60 lb. Entire front section forward of doors including cowling, fenders and hood, head and parking light wells is formed of onepiece laminate. Turtle deck including rear fenders is another. Four layers of Fiberglas cloth bonded with a resin are laid up wet in large female plaster of Paris molds. Each section is laminated by photo sensitive sunshine catalyst technique and cured in sunlight. Three transverse braces are molded into forward section-aluminum tubing in inboard edge near doors, steel tubing for forward brace and cotton fiber for center brace.

POWER PLANT INFO: Production of two useful power plant and process instrumentation auxiliaries, suspended during the war years, was resumed recently by Parker Appliance Co., Cleveland. One of these, a draft gage manifold value is designed to simplify the problem of blowing out draft lines in multipointer draft gage installations. The other auxiliary is a pressure snubber of improved design which eliminates gage line fluctuations that produce excessive gage wear and inaccurate readings.

SUPER SPEED: Planes will fly normally either at speeds below 600 mph or above 800 mph—at least until more scientific data become available to permit steady flight in the transonic gap, according to John. P. Victory, executive secretary. National Advisory Committee for Aeronautics, Washington. Really high-speed flight, he stated recently, may require extremely thin airfoils, perhaps of such radical form as diamond or double-wedge shapes, circular arcs or other unconventional sections. In order to reach super-

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#### ENGINEERING NEWS

sonic speed, a plane must pass through the transonic speed range in which air flows over some portions of the plane at a speed lower than speed of sound, and over other portions at a speed higher than that of sound. This mixture of subsonic and supersonic air flow occurs between 600 and 800 mph, and presents enormous difficulties of stability, control, lift, structural strength and power required. Planes will fly regularly in this speed region only with difficulty because of the effect of these rapid fluctuations on the balance or trim of the craft.

TO MAKE CASTINGS: Recent addition of a gray iron foundry department in the plant of Reed Mfg. Co., Erie, Pa., is expected to produce all the castings required by the company in the manufacture of its bolt and pipe thread dies. A 500-lb capacity electric furnace is being used as the melting unit. Production of the department is estimated roughly at 2000 castings per day with this equipment.

TRUCKING STUDY: Through a nation-wide study of all major truck-using industries for the past 6 years, White Motor Ce., Cleveland, developed a detailed system that enables all users of motor trucks to increase transportation efficiency. Plan is based on the control of three factors which the study of large and small fleets revealed as basic to the efficient use of trucks. These are: Correct application of truck for the job, improved maintenance and better selection and training of drivers. Complete instructions and the material for putting the system into effect were prepared by White. Benefits derived from system include lower cost per mile, reater dene dabil ty, longer truck l.fe, lower maintenance cost and reduced accident rate as well as reduced driver turnover.

MORE SERVICE: Recent purchase of Flask Lifting Machine Division of Champion Foundry & Machine Co., Beardsley & Piper Co., Chicago, is now in position to offer efficient, high volume machines for all phases of mold production, it was learned here. The flask lift or push-off machine reverses the general practice of pattern draw. Instead of dropping the pattern away from the mold, the flask and mold is lifted away from the pattern. Patterns, drawings and patent rights in the negotiation were transferred to Beardsley as well as the right to continue use of the Champion name.

SOLVED BY METALLURGY: Metallurgy worked hand in hand with plastics during the war when General Electric Co. designed a serviceable plastics binocular housing for the Navy. A number of die-cast aluminum fittings had to be molded into the two tranfer-molded pieces. Metallurgy alloyed the aluminum as closely as possible to the contraction and expansion characteristics of the plastics material. This did away with the possibility of these metal inserts cracking away from the plastic under arctic or tropical conditions. Although housing walls were unusually thin for molding in inserts, they proved to have better mechanical strength than the original design.

REMOVES CARBON: Paint, grime, carbon, gums, heat-hardened resins and heavy dirt are removed effectively from steel and other ferrous metals without scraping by a noninflammable cleaner introduced recently by Turco Products Inc., Los Angeles. Carbon and paint stripping qualities of the product result from a combination of two cleaning agents, an alkaline solid and a direct-action liquid solvent. Cleaner is used with a water solution and a simple hot tank, preferably with air agitation, to penetrate and "wet out" deposits on the metal.

"DE-NICKELED" STEEL: Japanese prewar steels were processed by methods similar to those used in the United States and England, but their low sulphur and phosphorus content indicated greater refinement, a report in the hands of the Office of Technical Services, Washington, states. During the war, when nickel became a critical alloying element in Japan, subsitute steels with little or no nickel were used. The phosphorus and sulphur content increased, an indication that the Japs were unable to obtain good grades of pig iron. Most of the pig iron used in making acid open-hearth steel was imported from Manchuria.



OUTPUT of this huge veteran boring mill shown in the plant of Dominion Engineering Co. Ltd., Lachine, Quebec, now rivals that of modern equipment since its rejuvenation through use of Cone-drive gearing supplied by Michigan Tool Co. of Detroit. By reconverting the table drive gearing to the new gearing, rather than replacing it with gearing of the former type, the 35-ft mill now is able to make much heavier cuts, and operates more smoothly-in spite of the heavier bites. Reconversion job was so successful that the company is already planning to incorporate the same type drive in its 20 ft mill

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Fig. 1 (left) — Catalytic cracker attached to this Westinghouse Ammo gas furnace breaks down anhydrous ammonia gas into nitrogen and hydrogen for dry atmosphere

Fig. 2 (below) — Some stainless steel parts after hardening in cracked ammonia atmosphere



hardening

Bright finish is retained in hardening process using cracked ammonia atmosphere to eliminate moisture and prevent any oxidation of the surface chromium

IN heat treating stainless steel by conventional methods, parts come out of the treating process almost black because of the oxidation of the surface chromium. A lengthy cleaning process is involved in bringing parts back to their original brightness, adding to the cost of production.

In parts on which very close tolerances must be maintained, the cleansing process very often will alter dimensions with the result that the working tolerances must be changed to compensate for loss of tolerance in cleaning.

Under the direction of George J. Oswald, manager of the metallurgy laboratory of National Cash Register Co., Dayton, O. a process of heat treating stainless steel parts was recently developed to turn out parts with the same brightness and dimensional accuracy they possessed when they went into the heat treating furnace. Basis of this process is the Westinghouse Ammo gas furnace which was designed for hardening tools that do not need to retain original brightness. Using one of these furnaces as a starting point, the laboratory worked on a cracked ammonia atmosphere that would give a dry atmosphere.

The Ammo gas furnace has a catalytic cracker attached. Process developed at Dayton calls for running anhydrous ammonia gas through the cracker where it is broken down at 1650° F into nitrogen and hydrogen. These two gases form an atmosphere composed of 75 per cent hydrogen and 25 per cent nitrogen; atmosphere is bone dry and has a dew point of about 650°F. This latter fact is most important because even a trace of moisture in the atmosphere used for heat treating stainless steel will produce oxidation in the part being treated.

Parts to be heat treated are placed in a tray, pushed into a preheat or purging chamber, subjected to the previously described atmosphere for 5 min. Prior to treating, parts must be thoroughly cleaned to remove all traces of grease and moisture.

After 5 min in the preheat chamber the tray is pushed into a heating chamber where the temperature is maintained at 1800 to 1900°F. The exact temperature of this heating section will vary according to the degree of hardness required. In this process parts are heat treated to required hardness; they are not treated above and then dropped back to the degree of hardness that is desired.

When the tray of parts is pushed into the heating zone from the preheat cham-

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ber, the temperature of the heating zone drops. Before the heat treating process can be said to be under way, the temperature of this heating zone must be brought up to the predetermined temperature.

On the average it takes approximately 25 min. for the temperature to rise to the required heat treat point. When that temperature is reached, parts are allowed to soak in the heating zone for 15 min.

#### **Electric Furnace**

#### (Continued from Page 71)

Shield-O-Matic arc is a miniature electric furnace which, to be efficient, must operate within a crucible. It is of utmost importance to realize that if the arc is not confined within a crucible formed by the flux, the phenomenon of a shielded arc cannot be complete. The crucible is formed by providing sufficient thickness of flux, of a given analysis, which will be consumed during welding at a retarded rate as compared to the core rod. For each given diameter of core rod it is important that a given depth of crucible be formed and maintained, as the thicker the flux the deeper the crucible, and vice versa.

When the inner wall of the inverted crucible is subjected to the intense heat of the arc, the larger portion of the flux is generated into a gas. The pressure which is developed by these expanding gases makes them leave the open end of the crucible with sufficient force to move the molten base metal from under the arc to form a second upright, mating crucible referred to as the weld crater. The greater the pressure developed within the crucible, the deeper the weld crater for a considered current density, and hence, the greater depth of weld penetration into the base metal. Generally it is desired that the fusing action penetrate the base metal as far as possible so that more base metal will be converted into weld metal.

That portion of the flux not converted into vapor and gas forms small globules which collect on the rim of the crucible. These globules then transfer across the are to form a layer of slag covering the weld. This fluxed slag is an important factor in controlling the quality of welding. The volume of slag must be sufficient to completely shield the weld metal from the atmosphere at that point which is beyond reach of the shielding gases. The slag also retards the solidification of the weld metal, thus providing more time for impurities to float to the upper surface of the weld where they are absorbed by the slag. See Fig. 2 for schematic diagram of welding process.

Weld Quality: Welds made with this equipment have unusually high strength

They are then returned to the preheat or purging chamber which now becomes the cooling area.

Parts cool for about 30 min. or until temperature drops to around 300°F. Time required to bring the temperature down depends on size and design of parts. Parts with dense masses of metal will take longer to drop this temperature than parts having a greater metal surface exposed. The cooling is exclusively by

and ductility. The quality of welds is exceptionally uniform. The uniformity is due in greater part to the unique construction wherein the fluxing agents and the metallic parts of the electrode are combined into a single product. By this construction, the flux is always fed in the exact quantity required for the volume of metal fused. It is impossible for the operator to feed too little or too much flux.

Welds made by this process are usually of finer grain. Although very high welding currents are used, the actual heat input required to complete welding is considerably less than with some methods which weld at slower speeds. Thus residual stresses and distortions in welded products are proportionately reduced.

Thousands of products, which in the past were welded manually can now be economically welded by this flexible automatic process. Products fabricated from light gage sheet and strip, such as automobile parts, railroad car sides and roofs, structural shapes, light gage tanks and tubing are viewed as ideal for Shield-O-Matic application. The process is said to be equally efficient when used for welding heavy plate products, such as stills, cracking towers, etc. for oil industry; pressure vessels of all types; ships and barges, locomotive weldments, and heavy machinery parts and bases.

While the new electrodes can be used in practically all types of welding, present plans of the maker, Hollup Corp., Chicago, a division of National Cylinder Gas Co., call for production of only those electrodes required for welding low and medium carbon steel, and low alloy high strength steels.

History of Development: The full story of the new automatic welding electrode can best be told by briefly reviewing first the history of arc welding.

In theory, are welding can be traced back to the electric furnace. Metal to be melted in the electric furnace was placed between two carbon electrodes in the path of an electric current. While not so considered then, this has come to be recognized as the earliest effort to melt metal with an electric arc.

The first actual effort, however, fol-

radiation. The only requirement in hardening stainless steel is to drop it below the critical temperature, about 1200°F, within 5 min.

When temperature of parts is 300°F, tray is removed from the cooling chamber, and the hardening process is completed. Tray is then reloaded with new parts, pushed back into what has just served as a cooling chamber and the process is repeated.

lowed soon after arc lights were introduced. Less than a decade later these pioneer beginnings were to lead to the development of two systems of arc welding,

In 1881, DeMeritens set up the first experiments, joining parts of a battery plate by lead welding with a carbon arc. From there N. V. Bernardos went on to perfect and patent a carbon are welding process in May of 1887. Shortly thereafter the carbon electrode of the Bernardos system was replaced by a metal electrode, introducing the Slavianoff method. This latter system grew in popularity until today it is quite impossible to mention a metal fabricating industry that does not use the Slavianoff, or metal are, method.

Industry generally was slow to sense the possibilities of arc welding, and because it took years to develop the necessary electrical equipment, it was not until the years of 1918-1926 that industry made any widespread use of arc welding.

Electrodes: With the stage set historically for adoption of arc welding, the development of the metallic arc welding electrode should be reviewed.

Since the maintenance of the welding arc depends upon a gas or an ionized vapor to conduct the current between the tip of the electrode and the metals welded, a vapor-producing flux is vital for arc stability.

The only stabilizing element on the surface of the early electrode was an uncontrolled amount of lime, and/or iron oxide, which was a residue from the drawing process and not an addition to improve arc maintenance. This produced a nonuniform, erratic arc. It had another drawback. Its manual use required exacting skill, since a very short arc was necessary to increase the density of the ionized vapor and hence provide better conduction of the welding current.

Because of this exactness required in manual operation, automatic welding proved more practical with the lime drawn electrodes so that a very large percentage of the wire came to be used with automatic welding equipment.

This advancement in improving the stability of the arc, which resulted in higher quality welding by automatic



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Economical because it runs on excess steam from your plant boilers, because it can be operated by unskilled, low-cost labor, and because it requires very little maintenance. Trouble-free because of the simplicity of its construction. There is no boiler, fire-box, electric motor, generator, or internal combustion engine on a Porter Fireless. There are few working parts, and the reservoir never needs replacement. Actual experience shows that users of Porter Fireless Locomotives save up to 50% of their switching costs.

H.K.POBTER COMPANY.Inc.

DISTRICT OFFICES IN FRINCIPAL CITIES

PORTER LOCOMOTIVES:

Diesel, Diesel-Electric, Fireless Steam

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Equipment

SPRINGS:

Coil and Elliptic Springs for Railroad

Vocuum-Pressure Equipment for Impreg-nating Ties, Timbers, and Electrical Windings,

DEVINE IMPREGNATORS:

83

NOW THAT TIMKEN SEAMLESS TUBING IS COMING INTO WIDER USE ...

#### —more costs are being beaten down!

If you haven't investigated, you will be surprised at the number of times the answer to an intricate or high cost machining problem has been found in Timken Alloy Steel Seamless Tubing.

Look beyond raw material costs. Compare final costs of the finished parts produced from both types of stock. Savings through use of tubing come from the elimination of drilling, reduced boring, minimum scrap loss and shortened production cycles. All of these advantages can be had without sacrificing machinability.

To find out how much might be saved on the tubular parts you make, why not talk to a member of the Timken Technical Staff. He is thoroughly familiar with the methods and techniques used in the Timken Roller Bearing factories — world's largest users of seamless mechanical tubing. He will gladly make a Job Analysis of your machining problem, then work with your own production people in producing the job on your present equipment to secure maximum savings with top quality of the finished part. And that quality of the finished part is *better*. Write today.



#### STEEL AND TUBE DIVISION The Timken Roller Bearing Company, Canton 6, Ohio

SPECIALISTS in hot rolled and cold finished Alloy Steel Bars for forging and machining applications as well as a complete range of Stainless, Graphitic and Standard Tool Steel analyses. Also Alloy and Stainless Steel Seamless Tubing for mechanical and pressure tube applications.

BYEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

means, was terminated abruptly by the introduction in 1926 of an entirely new type of manual welding electrode which revolutionized the welding industry. This electrode came to be generally known as the shielded-arc electrode.

Prior to this development, fluxes were used primarily for stabilizing the arc, controlling the deposit rate of the electrode, reducing weld spatter, etc. The welds produced by many of these electrodes were low in ductility and resistance to fatigue and impact due to the presence of oxides and nitrides formed in the molten metal from the surrounding air. The development of the shielded-arc electrode was the first attempt to perform the welding action in an atmosphere void of nitrogen and oxygen.

Thus, for the first time in welding history, electric arc welds could be produced whereby the physical properties of the weld metal were equal to or better than the base metal.

Research on Automatic Electrodes: With the introduction of the shielded electrode for manual welding, electrode research laboratories immediately launched an intensive program to perfect a shielded-arc electrode for automatic welding. In attempting to solve this problem two general approaches dominated the research: To provide a satisfactory shielding medium, and to energize a continuously moving electrode.

During the past 20 years several developments appeared incorporating one or both of these objectives. Typical was a plain round core wire wrapped or braided with fabric or fine wire impregnated with flux. A second group of developments impregnated the flux in a plain notched or grooved core wire. Another method to appear used a bare core wire and introduced the flux separately.

But a third important stride toward perfection of the automatic arc welding process was taken when the advantages of enclosing the arc within a crucible formed by a cylindrical wall of flux surrounding the core were recognized.

Caking Diesel-Electric Components

#### ... in gas-fired convection heated oven helps railroad shop to handle five times as many heavy motors in same floor space

USING gas-fired convection heated oven, Great Northern railway shops at St. Paul are baking diesel generators and diesel-electric motors up to 3 tons in 8 hours instead of 16 hours formerly required. Such baking is necessary after equipment is cleaned, or following vacuum impregnation or dipping and spraying with varnish.

Manufactured and installed by Despatch Oven Co., Minneapolis, oven makes it possible to bake at one time two 3-ton motors or generator armatures measuring 36 in. in diameter and 38 in. long. Small motors are baked on the average of 4 hours compared to the old steam-heated brick oven's time of 8 hours. Six 1ton armatures,  $18 \times 36$  in. are baked in a single load. These huge loads are handled with a traveling crane and a rail-mounted oven dolly.

Oven, shown in the accompanying photograph, is 6 ft wide, 10 ft long and 7 ft high. It is heated by a 500,000 Btu Despatch air heater externally mounted on top of oven to conserve floor space. Baking capacity is increased with the new oven until the shop now handles five times as many heavy traffic motors in the same amount of floor space as it did before. Two batches or loads are handled easily now in two shifts where only one load was possible before. The day crew takes out a finished batch in the morning and reloads; the night crew takes out a batch in the afternoon and reloads.

The night shift sets the oven to shut itself off when the baking is finished letting fans run until morning to cool the load. Convection heat and automatic controls demand little or no attention from the operators and insure uniform temperatures throughout the baking period at all points in the oven. Engineers at the Great Northern shop, testing the oven at six different places with six thermocouples, found that the heat did not vary more than  $4^{\circ}$  F at any point.

Although the coil and armature oven is built to allow processing at temperatures up to 500° F, baking of the Great Northern electrical equipment is usually done at from 265-290° F. With the oven's wide heat range, the shop is now prepared for baking the new silicon varnishes if they are used.







#### WITHOUT STEEL WIRE ROPE-CONSTRUCTION WOULD DEPEND ON SLOW, COSTLY LABOR OF MEN AND BEASTS

Without steel wire rope, construction would still be done by slow, costly, antiquated methods. Use of these old methods would prevent the undertaking of present-day projects of great magnitude. Construction jobs, of necessity, would be small and local. The burden of all the heavy work would still be placed upon men and beasts.

Today, huge machines of steel perform the miracles of construction you see all about you. They work easily, swiftly, irresistibly, yet seemingly without effort. Strong, sinewy, flexible, steel wire rope controls and transmits their tremendous power.

Tomorrow the work of moving mountains, filling valleys, damming rivers, dredging channels, building bridges, erecting buildings will go forward at an even faster pace. Larger, more powerful machines controlled by wire rope will enable greater marvels of engineering achievement — thanks to wire rope, such as the Precisionbilt ropes made by Jones & Laughlin Steel Corporation from J&L Controlled Quality steel.

JONES & LAUGH

STEEL CO

JONES & LAUGHLIN STEEL CORPORATION PITTSBURGH, PENNSYLVANIA

CONTROLLED QUALITY STEELS

#### WITH ROPES OF STEEL

Biggest earth moving job, 75 million cu. yds., forming 2 mile embankment will be involved in building Garrison Dam on the Missouri River above Bismarck, S. D. Dirt will all be handled by big shovels, scrapers and earth movers, directed and controlled by steel wire rope.

First skyscraper (12 stories) was Home Insurance Bldg., Chicago, erected 1888.

World's highest buildings all in U.S. — Highest is Empire State with 102 stories towering 1,250 feet. There are 55 buildings over 500 feet high in New York and 10 other cities, which would have been impossible to erect without wire rope.

World's. 2nd largest air field, 1,600-acres, is the new Greater Pittsburgh airport, now under construction by the Board of Commissioners of Allegheny County, Pennsylvania. Only New York's Idlewild Field, also under construction, will be larger. Pittsburgh field will be completed in 1948 at a cost of \$25 millions. More than 3,000,000 cubic yards of earth and rock will be moved with powerful steel-built equipment, most of it controlled by steel wire rope. Pittsburgh airport with 8 runways 150 ft. wide, 6,000 to 9,600 feet long, will load 30 planes at one time, handle planes in and out every 30 seconds.

1,607,000 miles of the 3½ million miles of roads, streets and alleys in U.S. are paved. 200,000 new irrigated farms and reclamation of drought areas on 10,000,000 acres are projects of U.S. Bureau of Reclamation. Those already authorized by Congress will

employ 400,000 workmen.

Notable bridges of United States are Golden Gate over San Francisco Bay, a suspension bridge with channel span of 4,200 feet; the Huey P. Long, over the Mississippi River at New Orleans, a cantilever bridge with channel span of 3,524feet; the Bayonne over Kill Van Kill River, New York City, a steel arch bridge with channel span of 1,675 feet; the Castleton over Hudson River, in New York State, a simple truss bridge with channel span of 1,008 feet; and the Martinez at Suisun Bay, California, a vertical lift bridge with a horizontal clearance of 291.5 feet.

Largest concrete dam in world is Grand Coulee, in Washington, 550 feet high, 4,173 feet long and creates a lake 151 miles long.

Preforming wire rope reduces strains as wire and strands are bent and permanently set into helical shape they take in the finished rope. This makes a very flexible, "relaxed" rope which is easier to handle and longer wearing. When cut, preformed wire rope does not ravel. Wires broken in service lie flat, do not catch worker's hands and clothing. For more information about J&I. Permaset Preformed Wire Rope write Publicity Manager, Jones & Laughlin Steel Corporation, Pittsburgh 30, Pa.

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By WILLIAM H. SPOWERS JR. President Spowers Research Laboratories Inc. New York

Hot-Uip

SOME years ago a large zinc producer in this country made inquiry as to why zinc sheets were not used in this country for roofing, it being a well-known fact that in many European countries the use of solid zinc sheeting for roofing was extensive.

The answer was simple. Zinc sheets cannot be successfully used for roofing purposes in any climate where corn can be grown. Naturally the expansion and contraction resulting from the varying climatic conditions of this territory is too severe for sheet zinc. Any such roofing would tear or buckle in such extreme temperatures.

The producer was concerned because of the many criticisms of the galvanized roofing then on the market. He was told that the criticisms were justified and that the reason for the dissatisfaction was the extremely light coats on standard sheets. He went to South America and examined the roofs which had been in service for many years. Many of the South American farmers were induced to exchange their old corrugated roofing for new.

The old roofs were brought back to this country. Upon examination it was found that even after years of exposure the old roofing still had more zinc on it per square foot than the new roofing given in exchange.

The reason for this was twofold. On one hand active competition had influenced sheet manufacturers to lighten the zinc gain; and on the other, the demand of fabricators for sheets that would double seam without flaking, had forced the manufacturer to reduce the weight of coat because this was the only way then known to obtain adequate ductility.

) ractice

> Recently attempts have been made by interested parties to set standards for weight of coat on roofing sheets. But these standards (admittedly the highest obtainable with present equipment and technique) are substantially less than the wire galvanizer supplies. Why does the sheet manufacturer not produce as heavy and substantial a zinc coat as is applied by other branches of galvanizing? The explanation is as follows:

Batches of sheets are piled vertically on either side of a rack which is lowered into the tank of sulphuric acid. This rack is activated by rocker arms which constantly raise and lower the sheets in the acid and at the same time toss them

Fig. 47 (below)—Typical galvanizing plant showing complete unit for zinc coating sheets

Jallanizing



Fig. 48 (right) — Modern type galvanizing machine for zinc coating surface of steel sheets

Fig. 49 (below)— Acid vats of plunger type in which sheets are pickled



from side to side. Such a procedure if followed would result in some of the sheets sticking together thus preventing the acid from reaching all the surface area. However, the sheets must be kept separated and many plants effect this separation by placing sand on the top edges. Theoretically the sand works its way between the sheets and keeps them apart enough to allow entrance of acid.

So empirical is this procedure, that every sheet has to be inspected by hand before being stored in water. Hydrochloric acid must be used as a flux wash before the sheets enter the galvanizing kettle. This flux wash then must perform two functions: First, that of fluxing steel work, second, that of a cleaning acid to complete the function that sulphuric did only imperfectly.

But in using this active acid as an adjunct to the cleaning process there is accumulated on the surface of the sheet a layer of iron salts which effect a widening or thickening of the alloy structure when the sheet enters the zinc. The stronger this active flux the more iron salts, and the more iron salts the thicker the alloy structure.

Thus, is used at the outset of the sheet

galvanizing process a procedure long since discarded in other branches of the art in favor of the neutral flux technique, the changeover in each case resulting in savings in dross and tighter bonds.

Because the kettle installation is universally so small, high heat (in some cases up to 2000°F) is applied at the ingo end. The sheets passing through the machine carry so much of this heat as to actually maintain the outgo end at the same temperature as the ingo. The kettle, as generally installed, is only large enough to hold the galvanizing machine which includes a series of driven rollers





Fig. 50—Flan of semicontinuous and continuous galvanizing lines showing sequence of operation

held in a frame. The latter guides and propels the sheets downwards and upwards through a square pot or kettle. So small is this kettle, in some cases, that the bottom of the machine is at times in actual contact with the dross. Again, so great is the agitation of the zinc within the kettle, because of the heat travel and the sheets in transit that the dross is often piled deeply at the outgo end.

Because of this violent flow within the zinc large quantities of dross are held in suspension and, as before stated no ductile coat can result by galvanizing in drossy zinc.

In an endeavor to remedy this state of affairs within the bath some potnen actually thrust sticks of sappy wood into the molten zinc. Their purpose in doing this is based on the theory that the boiling resulting from the water in the wood will "clean" the zinc.

In most sheet plants second-grade galvanized sheets, known as "seconds", are made (not to speak of re-runs) due to dross "warts."

Many "seconds" are made in this operation because of the use of sal ammoniac plus sawdust or bran for making the volatile flux, Except for dusting on pipe fittings, sal ammoniac has been entirely eliminated in every modern galvanizing plant. The use of this material results in "flux spots," the bane of every sheet galvanizer's existence.

After the sheets pass through the exit rolls of the galvanizing machine, they are carried on endless chains to the cooling racks, and thence to the inspector's table for individual examination.

The foregoing, therefore, accounts for the necessity, under present conditions, of maintaining low-weight coat standards. Iron salts, floating dross, active acid flux, sal ammoniac, tiny kettles—all these things produce thick alloy layers and result in brittle coats.

The solution of these troubles is apparent in light of the developments in zine coating practice in other fields.

Why not abandon the old-fashioned galvanizing machines and design one which will enable the sheets to travel through the upper portion of the kettle? Why not build an installation of sufficient capacity and length, one which may be heated from the upper portions of the sides and which will maintain a drossfree galvanizing area, to afford this travel?

Wire manufacturers do not make carloads of wire seconds. Pipemakers do not produce carloads of pipe seconds. Galvanizing shops do not turn out carloads of range boiler seconds. Then why should carloads of sheet seconds arise as a result of the coating process? And by the same token ductile coats can be obtained.

#### Semicontinuous Galvanizing Line

Several galvanizing installations considered modern in the early 40's, have been converted to semicontinuous coil lines through which coils are fed separately.<sup>69</sup> By this arrangement the initial cost of a welding unit, looping towers and other subsidiary equipment have been eliminated. The semicontinuous galvanizing line includes a payoff reel, cleaning tank and spray, scrubber, acid dip, galvanizing machine, cooler, washer, dryer, a looping table, shear, gage table, leveler, tension reel and piler. A complete installation is shown in Fig. 50.

The fully continuous line for hot galvanizing coils which will vary to some extent according to individual requirements, is a comparatively new development. In this line are two pay-off reels, pinch rolls, a welding machine, looping

tower or pit, an alkali and hot water scrubber, an acid dip, galvanizing machine, cooling conveyor, looping tower, water spray and dryer, loop table, shear, gage table, leveler, tension reel and piler. The line extends approximately 250 ft. The galvanizing pot can be operated at a constant speed to assure uniform coating. The cleaning system includes either a tank of hot alkali, trisodium phosphate, or other cleaning or wetting agents, or a scrubber where the cleaning solution is sprayed on the strip with a circulating system and with revolving brushes for brushing the top and bottom surfaces. The hot water scrubber is for the purpose of removing any carryover of cleaning solution or sludge.

The acid dip is either a concentrated hydrochloric dip or a long tank of a diluted solution. The latter is recommended since the longer tank provides a better preparation of surface and minimizes the quantity of acid salts carried over to the galvanizing pot.

The galvanizing machine with two sets of bottom rolls affords long travel between the flux and the bottom rolls. This arrangement provides for uniform heating of the strip and ample time for the flux to leave the surface of the steel. The first pair of rolls squeezes off the flux and as long as the other pair remains clean, an ideal coating is secured. If only a single pair of rolls were used in the bottom of the machine the flux would dirty them and lead to off-grade coatings.

The strip leaves the exit rolls vertically and continues its upward course for 15 to 18 ft. This allows ample time for the coating to set and also provides more room for changing exit rolls while the strip is in the machine.

When heavy coatings are being applied at high speeds, a runback of the molten

<sup>&</sup>lt;sup>(5)</sup> "Progress Towards Continuous Galvanizing" by E. A. Matteson, a paper presented before the American Zinc Institute Inc. and the Galvanizers Committee, 1944.

Size "O.T." Lectromelt Furnace with roof swung aside in charging position.

Lectromelt MELTING FURNACES MELTING ECONOMY

The saying, "There is more than meets the eye," is especially true of a Lectromelt Furnace. The 50% of the equipment that is out of sight in the Transformer Room is also responsible for the large savings in power and electrodes and the precision quality control of a Lectromelt. The special Lectromelt transformer equipment and patented counterbalanced winch system are the major factors in the inside story of melting economy.

THE IDE INSIDE INSIDE STORY OF

Lectromelt's top charge feature assures economy through faster charging and more production per man hour. Top charge furnaces are available in capacities ranging from 100 tons down to 250 pounds Write for complete information.

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Pittsburgh 30, Pennsylvania, U. S. A.



zinc may result. To remedy this condition, it may be more advantageous to provide a refrigerating system as a means of setting the coating rapidly.

#### 20 Million Volt Betatron

#### (Concluded from Page 69)

magnetic flux acts on them in much the same manner as if they were moving inside the turns of wire. Actually the betatron is made with a small air gap in the center leg of the core. This allows the doughnut and a specially designed circular steel pole piece to be inserted. As the magnet is energized, the flux surrounding this circular pole piece builds up and acts to keep the electrons in a circular orbit at the same time accelerating them.

In the 1/720-sec that all of this takes place the electron stream races around the inside of the doughnut several hundred thousand times, nearly approaching the speed of light. At the peak of their speed a pulse of current from an electronic circuit in the betatron control upsets the magnetic field and the electrons spiral off and collide with the tip of the small target.

At this terrific speed, the energy which the electrons give up in the collision with the target creates a rich supply of very high frequency x-rays which emerge through the walls of the doughnut. While it would be theoretically possible to accomplish almost the same results by building a transformer with a 20-millionvolt secondary winding, and to apply this voltage across the terminals of a high voltage x-ray tube, it would be impossible as in actual practice the problems of insulation alone would be insurmountable.

Betatron Radiography: When higher voltage x-ray equipment is used a number of particular advantages are realized. Higher accelerating voltage produces higher frequency (lower wave length) xradiations. The radiation of any x-ray machine contains some intensity of every wave length above the minimum wave length (which is determined by the accelerating voltage used). The distribution of this band of frequencies is important since the absorption of the xradiation in metal is dependent on the frequency.

The rate of absorption is very high for low voltage x-ray and it decreases with increasing voltages until a minimum absorption is passed and it then rises again. Thus, if the radiation of an x-ray machine includes wave lengths of minimum absorption, the penetration of that radiation is maximum. In the case of the 20million-volt betatron, the richest portion of the most useful x-rays are found in Continuous galvanizing lines are designed to operate at 400 fpm. Continuous installations operating at normal speeds produce about 6 tons an hour. Strip

the band slightly below 10 million volts. The minimum absorption in iron occurs in the neighborhood of 7 million volts. Thus, the 20-million volt choice for peak x-ray voltage provides the greatest source of radiation right where it is needed most.

Higher peak voltage x-rays have more absorption, and naturally less x-ray efficiency, than the voltages in the neigborhood of 20-30 million. Operation of the betatron at a lower voltage shifts the richest radiation spectra below the point of minimum absorption, resulting in considerably less efficiency from the standpoint of speed and film density.

The 20-million-volt betatron is not practical where the majority of the work is of a thickness less than 3 or 4 in. The maximum practical thickness for betatron x-ray inspection has yet to be determined. Up to the present time material 20 in. thick has been x-rayed with complete success. As yet, we have not worked on heavier sections.

The focal spot of the betatron is smaller than the head of a pin in size and most of the rays emerged in a cone-shaped zone. The cone is of sufficient size so that the standard 14 x 17 in. film will be well covered at 8 ft from the target with nearly uniform density on the film. Material can be examined within 3 ft of the betatron target without serious film density variations.

By placing the film at some distance behind the object to be inspected the enlargements can be made on the film directly. This is a real advantage where clearances must be checked on internal mechanisms inside a heavy section. We have found that enlargements up to at least three diameters are entirely practical.

Betatron radiation has what is known as absolute sensitivity. This means that the size of the minimum detectable flaw with a given film setup does not depend on the total thickness of the specimen being x-rayed. High contrast films will show flaws 1/32-in. deep (in the direction of the x-ray beam) and 2 mils wide through any thickness of steel as yet tested (12 in.) for such minute flaws. The position of the defect inside the specimen has no effect. Because of the low rate of absorption, high contrast films are recommended with the 20million-volt machine: 1. Industrial type "M"; 2. industrial type "A"; 3. no screen.

The films, Eastman or equivalents, are listed in order of increasing speed and

heavier than 18 or 16 gage is considered maximum at present for continuous galvanizing.

(To be continued)

graininess. With any of these films, the flaws mentioned are detectable. Where the specimen has extreme variations in thickness and where detection of 1/16-in. flaws is adequate, lower contrast films such as industrial type "F" Eastman or equivalent can be used.

In using all of these films a lead screen 40 mils thick should be placed directly in front of the film in contact with it. In no case is it necessary to block around the edge of an irregular object. Placement of lead behind the film casette is not needed for thicknesses of less than 12 in. No shielding is necessary to prevent back scattered radiation since x-rays of this intensity produce secondary radiation in the same direction as the primary rays except for very thick sections. While a greater density for a given time exposure can be gained by placing 10 or 20 mils of lead immediately behind the film, detail is noticeably poorer and is not recommended.

Fortunately, there is little radiation from the sides and back of the betatron so that only a few feet of protection are required for the operator in an adjacent area. In direct line with the beam, 4 to 6 ft of concrete may be required depending on distance of wall from unit.

Any plant planning on using a betatron should plan on a separate section of the building or isolated building for the device as distance would not provide enough shielding as it does in lower voltage work. The control circuits are designed to be used with interlocking controls to eliminate the possibility of anyone being left in the area while the betatron is in operation. Control equipment should be protected from excessive dust.

The betatron will not be a low price machine, although engineers say it will compete with present 1 or 2-million-volt x-ray equipment. Its big advantage is the speed with which x-rays can be made. Cost for power is very little (30 kva during exposure). Instead of x-raying one out of 50 or 100 or more units in heavy equipment production it is said that the betatron will make it economically pratical to x-ray every piece produced.

Made with lime soap, a new grease being produced by Texas Co., New York, is said to be heat stable and resistant to both water and oxidation. Listed as Star grease No. 0, it is suitable for factory lubrication of tractor track rollers and other applications requiring a soft, waterrepellant, nonseparating grease.

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Division of NATIONAL STEEL CORPORATION Executive Offices, Pittsburgh, Pa.

# How to produce better finish stainless steel sheets





Extensive experience proves that stainless steel sheets have superior finish when annealed in a CARBOFRAX silicon carbide muffle. Several factors make this possible.

The atmosphere required for better

finish is readily maintained. The sheets are quickly and evenly heated. High thermal conductivity of a CARBOFRAX muffle (11-12 times greater than fireclay) insures that. Temperature control is easy and accurate.

Less oxide or scale forms on the sheets. The cold rolled finish is retained. This effects considerable reduction in pickling time. Consider what this alone can mean to you.

Fuel consumption shows little or no increase with a CARBOFRAX muffle versus open firing. The high heat conductivity of this muffle plus the ability to burn the fuel more efficiently with such a structure provides the explanation. Long muffle life is assured by outstanding resistance to elevated temperatures, cracking, and spalling. Refractories and maintenance costs are thereby minimized.

During annealing, sheets are supported on specially designed CARBOFRAX rails. Their use protects the bright finish ... eliminates scratching and marring.

Call on our engineers to discuss a CARBOFRAX muffle for your operation. It can be used in stainless steel strip just as well as in sheet furnaces. Simply drop a post card to Dept. J-116 The Carborundum Company, Refractories Division, Perth Amboy, N. J.



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### with SQUARE D Starters

DETROIT

They are simply designed. Magnet coils, contacts and overload relays can be changed quickly, without disturbing external connections. They are compact, yet afford generous wiring space and easy-to-reach terminals. Installation and inspection are faster and easier. And—completeness of line (both A. C. and D. C.) means the right starter for any given application.



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Employs Stretch Principle

#### In Steel Tube Production

STRETCHING red-hot s'eil longer and thinner while it is being rolled will be a major innovation of the world's first continuous seamless tube mill now being built at the Lorain, O. plant of National Tube Co. Experimental work toward this improvement has been completed and was made the subject of a recent report by the Stretch-Reducing Mill Committee of this United States Steel Corp. subsidiary's technologists and engineers.

Operation of "stretch reduction" requires the introduction of tension by increasing the relative speeds of the rolls in successive stands more than is required merely to roll pipe wall to smaller diameter. Application of this principle not only permits substantial reduction of wall thickness of the tube, but also provides a means for making exceptionally large diameter reductions with relatively few roll passes.

Increased speed differential between the rolls in successive stands produces tension in the portion of the tube between stands. The magnitude of this tension, which acts in the direction of the tube axis, is sufficient to stretch the tube between stands, resulting in thinner wall and greater length. Thus the stands are rolling the tube wall continuously thinner, while it is also being reduced in diameter.

Conditions inherent in the process serve to limit the maximum size of tubing which can be sufficiently stretch-reduced to about 3 in. outside diameter. On the other hand, practically all the factors controlling wall reduction favor the production of small diameter sections, making the process attractive for the manufacture of standard pipe 2 to 3/8-in. diameter with walls ranging from 0.2 to 0.08-in., or most of the common types of household pipe.

Conventional method of tube manufacture begins with an initial piercing operation, in which an opening is made lengthwise through a solid round bar. Then comes the high mill, which reduces wall thickness and lengthens the piece; recling, to perfect the pipe's surfaces, and finally the sizing rolls, in which the tube is rolled to desired diameter and length.

In the new continuous seamless mill there are really two new processes following the initial piercing operation, which remains unchanged. The high mill and reeling processes are replaced by "rolling on the bar," which is entirely new in this country, although used on several European mills immediately before World

.

War II and years ago at Ellwood Works of National Tube. After the tube has been rolled on the bar and the bar removed, followed by reheating, the stretch-reducing operation begins. Unlike the conventional seamless mill, which moves its product sidewise through the several steps and requires at least two reheating operations, the continuous mill

#### Describes Production of High Silicon Pig Iron

Special methods of processing and casting high silicon pig iron are discussed in a book published recently by Keokuk Electro-Metals Co., Keokuk, Iowa. Illustrated with many photographs and seven oil paintings, the book, "Electro Silvery", also contains considerable technical data relating to foundry and steel plant applications for the iron.

will operate as a straight-line production unit.

For more than six years National Tube Co. has been using the stretch-reducing principle in the manufacture of buttweld pipe. The comprehensive development program for the continuous seamless mill was inaugurated about a year ago to determine the exact nature of the factors which characterize the process. A series of controlled rollings was conducted on a 16-stand mill and a smaller 8-stand sizing mill. Approximately 450 tubes of various diameters and walls were processed under a wide range of rolling conditions.

The novel feature of the stretch-reducing process is its ability to reduce the diameter of a hot tube while simultaneously reducing its wall thickness without the use of a mandrel. The amount of wall reduction which can be produced by this method is principally controlled by the factors which determine the tension or pull applied to the tube.

Considerable flexibility is required in the selection of roll speeds. Different speed ratios between successive stands are required not only for each condition of diameter and wall reduction, but also for incremental adjustments in roll speeds which must be made to compensate for slippage and similar indeterminate factors encountered in the reducing process. The simplest and most effective means of meeting this requirement is the use of individual motor drives for each stand. By means of variable-voltage control, the delivery speed of the mill can be adjusted without affecting materially the relative speeds of the individual stands; yet the speed of any stand can be varied by the adjustment of the motor speed.

The amount of wall reduction produced under a specific set of mill conditions can be varied within limits by changing the relative speed ratios of the consecutive roll stands. In this manner, finished tubes of a given diameter but of several wall thicknesses can be produced from the same entering shell sizes with no change in the mill setting except adjustments of the several drive motor speeds. With the stretch-reducing process area reduction can be varied either by changing the overall reduction in diameter of the tube through the addition or removal of roll stands, by changing the amount of wall reduction through adjustment of roll speed ratios, or by a combination of both.

General improvements planned by National Tube will give the Lorain plant advantages over existing facilities. In addition to the continuous seamless mill, there will be an entire new bessemer steel plant, including three converters and auxiliary equipment; three new batteries of 59 coke ovens each, plus auxiliary equipment including new coal handling equipment; one of the world's largest and most modern pipe warehouses; new blooming, bar and billet mills; and changes necessary to permit the concentration at Lorain of all National Tube's buttweld and galvanizing facilities.

#### System Makes Possible 635 Different Trusses

Stock truss system under which details, calculation, cutting lists and layout diagrams are supplied for use by steel fabricators has been developed by Engineering Associates, Seattle, Wash. With no further engineering, the fabricator using the system can produce 635 different roof trusses, it is said.

Although not intended to cover all types of special roof designs, the system does provide a stock truss for the majority of buildings which are designed for uniform roof and ceiling loadings, states the Seidelhuber Iron & Bronze Works of Seattle, who have been granted a license to fabricate the trusses.

Use of arc welding in the fabrication is said to eliminate much excess weight. No welding during erection is necessary unless by choice of architect or engineer. Trusses are delivered to the job in one, two or three pieces, according to span length, and bolted or riveted together.



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TENSION TESTING of Chain Links

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LINKS of Robbins' Wedglok design were found to be capable of withstanding a loading of almost the maximum capacity of a 300,000 lb tensile strength machine in a recent series of tests. The tests to determine point of failure and maximum tensile strength were conducted for Wagner Engineering & Service Co., Milwaukee, by Ladish Drop Forge Co., Cudahy, Wis., on a Baldwin Southwark hydraulie testing machine.

The 1½-in. links, one of which is shown in Fig. 2 prior to assembly, were fitted with U-shaped fixtures passing through opposite ends of links, welded and shaped to produce sufficient gripping for the loads required. Of the first two links tested, one failed at 247,500 lb in the link section and the other at 274,500 lb in the lock section. Both of the links had a brinell hardness number of 241 in four areas of various cross sections. Microstructure was fine grained and uniform at link section adjacent to failure in first link tested.

An analysis of one of these links



showed a metallurgical composition as follows:

Carbon	0.40	Nickel	0.27
fanganese	1.20	Chromium	0.29
hosphorus	0.014	Molybdenum	0.15
ulphur	0.030	Silicon	0.44

At a later date, two additional links were tested by the same procedure. These tests were witnessed by O. G. Munkwitz of the American Bureau of Ships. Both of the links survived a loading of 295,000 lb with no indication of failure. First link was found to have brinell hardness numbers of 269 and 255, while the readings on the second were 269 and 285. Micrograph samples taken from the surface of each link showed a fine grained uniform structure.

Both links had essentially the same chemical analysis, as may be seen in the following data:

Carbon	0.42	0.42
Manganese	1.27	1.26
Phosphorus	0.018	0.016
Sulphur	0.028	0.025
Silicon	0.55	0.52
Nickel	0.35	0.37
Chromium	0.45	0.45
Molybdenum	0.10	0.11

Fig. 1 (extreme left)—Assembled link showing Ushaped fixtures for holding link in Southwark hydraulic testing machine

Fig. 2 (left)—Wedglok link prior to assembly. Locking section is in middle

tables and an adequate index also is provided.

#### Booklet Covers Means of Increasing Production

A new booklet published by National Founders Association, Chicago, incorporates proved methods of attaining production efficiency with new angles for increasing productivity.

"The Production Clinic," as it is called, incorporates the foreman's responsibility, good tool placement, training, supervision, wages, and industrial relations among other items, presenting them so that they can be used in discussions.

#### Industry's Debt to Chemistry

What Industry Owes to Chemical Science, cloth, 372 pages, 5½ x 8½ in.; published by Chemical Publishing Co. Inc., Brooklyn 2, N. Y., for \$5.

Volume contains contributions of 53 experts in as many fields of industry. The idea originated from a series of articles in a British magazine during World War I, which later was expanded and rewritten to bring its language within the understanding of the general reader without special chemical knowledge.

The reader need not be a chemist, physicist, engineer or college student to understand the accomplishments of chemistry, the most mysterious but supremely logical science. There is hardly an industry which has not used with advantage its inventions and discoveries.

#### **Carbon Steel Heat Treating**

Heat Treatment of Carbon Steels, by F. Johnson; cloth, 204 pages, 5<sup>1/2</sup> x 8<sup>1/2</sup> in.; published by Chemical Publishing Co. Inc., Brooklyn 2, N. Y.

This is the first of a series of four volumes on mechanical and heat treatment of metals and deals almost exclusively with carbon steels. Others will cover alloy steels, cast iron and nonferrous alloys; surface hardening processes; furnaces and pyrometry.

Volume is well illustrated, sketches,



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Here at Weatherhead we maintain the largest staff of engineering personnel of any firm in our industry. Our 125 "prospectors for perfection" are involved in a ceaseless research program of creating, trying and testing all our products. Three typical examples of our intensive research are as follows:

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3. Flexible hose assemblies are actually operated under 3,000 pounds per square inch pressure, again testing the durability of this product.

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#### ATTENTION DESIGN ENGINEERS

You can benefit most by calling Weatherhead while your product is in early design stages. A thorough study of your products can often result in improved performance, simplified serviceability, and sovings in assembly time and labor.

REHOUSE CO. a Memo to our Customers Steel War 1830 N. KOSTNER AVE. CHICAGO 39, ILL. TELEPHON BELMONT 4266 CABLES "GENSTEEL" CHICAGO In normal times Gensco supplies hundreds of companies with all of their steel requirements . . . today, of course, demand far exceeds the supply. Gensco representatives frequently lend their helpful assistance by suggesting the use of alternate steels which, in many cases prove to be practical or even better suited than the steels normally used in your operations. Ask them to assist you. If we cannot supply the desired steel it is quite possible, as in the case of many of our customers, that you may have steel in your plant which is not processed in usable shapes for economical production. Let the Gensco man in your territory explain how this steel may be converted into usable widths, lengths and edges at Gensco. COLD ROLLED STRIP STEEL . COILS AND STRAIGHT LENGTHS . SHEET STEEL COLD FINISHED BARS . SHAFTING . ROUND EDGE FLAT WIRE ROUND WIRES . TEMPERED AND ANNEALED SPRING STEEL STEEL BALLS DRILL ROD . FEELER GAUGE . SHIM STEEL . GENERAL STEEL WAREHOUSE CO., INC. 1830 North Kostner Avenue, Chicago 39, Illinois • Belmont 4266 Minneapölis 11 100-17th Ave., North Cherry 4457 Milwaukee 2 208 E. Wisconsin Ave. St. L'ouis 5 Cincinnati 17 56 E. Mitchell Ave. Plaza 1470 New York 17 441 Lexington Ave. Vanderbilt 6=2750 9301 Bonhomme Rd. Wydown 1368 **Broadway 7629** /TEEL

#### **Production Drilling**

(Concluded from Page 67)

14-in. drills on 21/2-in. minimum centers. A screw operated adjusting mechanism with which each spindle unit is equipped makes it possible to move the spindle at right angles to the line of spindle centers by as much as 2 in. A small steel scale on each spindle unit can be used in measuring this adjustment. The lower member of the sliding carriage has, on its front face, two endless steel tapes (seen behind operator's hat in Fig. 2) for right and left-hand measurement, which extend the entire length of the machine and which are adjustable so that the zero point can be set at the desired location.

A row of shaded fluorescent electric lights is mounted on the front of the machine just above the measuring tape and a second similar row is located above and behind the drill spindles to illuminate the work.

When the rail assembly is placed in the fixture, which occupies the lower front portion of the machine, it is laid on a series of power driven rolls which can be rotated in either direction to bring the end of the rail assembly against a stop for location endwise prior to drilling. Then the work supports between the power rolls arre raised into place (Fig. 2), thus lifting the rail assembly into position for drilling. Assembly is clamped in place by arm which exert a horizontal force against the head of the rail and hold base of rail against a series of stationary back stops, all of which are adjustable to accommodate different rail sizes.

A number of spring type vertical clamps move down as the drills advance to hold the work down solidly against the work supports while the drilling proceeds. Coolant is supplied to the drills automatically while a steel pan at floor catches chips and returns coolant to the reservoir which is located below the floor.

After drilling is completed, the work is unclamped and the supports are lowered, permitting it to rest on the power rolls which are rotated to move work out of the machine and on to the receiving table. Power rolls, clamps and work supports are actuated by push button controlled hydraulic power.

It was found that, in the Ramapo Ajax plant, the limited space available prevented loading the work into the machine at one end and out at the other. For this reason the loading mcchanism (shown in illustrations) was set parallel to and at a distance of 3 ft from the front of the machine. The mechanism, controlled hydraulically, is approximately 34 ft long in order to handle 39 ft rail sections.

Structural steel and railroad rail sec-

ICE-TONGS PRIN-CIPLE: Self-aligning and self-adjusting forks on this high-lift truck involve the icc-tong design for handling bins and containers without skids or legs. With this simple welded accessory, designed by a plant foreman, weight of container fixes the grasp. The greater the weight, the tighter the grip. Ends of tongs are tapered to guide bins into position without particu-60 larly close positioning by the truck. Photo courtesy Yale & Towne Mfg. Co., Philadelphia

tions were used for the mechanism, the latter forming a series of parallels upon which the work to be drilled is assembly. As pieces for work assembly are brought to the front edge of the loading mechanism, a set of "turn-over" linkages lays the assembly down in correct position to be loaded into the fixture.

The rail assembly is picked up, carried across the space between the machine and the loading mechanism (Fig. 1.) and placed on the power rolls of the fixture. An automatic safety device is incorporated into the design of the loader. When a beam of light from a pedestal mounting at one end of the machine is interrupted on its way to a photoelectric device at the other end, the loading arms are automatically immobilized, thereby preventing injury to anyone between the mechanism and the drilling machine.

An electric push button station at cach end of the machine provides a dual set of controls for all functions of the machine and fixture. Improper sequence of functions is prevented by safety interlocking. A horizontal bar, running the full length at front of machine slightly above knee height, will stop all functions of the machine and disconnect power from the motors if moved back but a fraction of an inch. Loading mechanism functions are accomplished by hydraulic power from the same pump which furnishes power for fixture operation. These functions are controlled by three small hand levers.

#### New Tools Feature Clamped-on Carbide Tips

Two new types of tools with clampedon, advanceable Kennametal (tungsten carbide) tips which are said to offer operating and maintenance advantages are being produced by Kennametal Inc., Latrobe, Pa. Made with offset and straight shanks, tips of different grades can be interchanged in the same shank, making tools adaptable for machining different types of metals.

Tips for new tools are offered with permanent, molded-in chip breaker, constant in depth, but adjustable in width by varying the amount ground from end, or side cutting edges. Three tool sizes are in production:  $1 \times 1 \times 7$  in.;  $1 \times 1\frac{1}{4} \times 9$  in.;  $1 \times 1\frac{1}{2} \times 10$  in.

A paint brush cleaner furnished with can and brush holder is again on the market after its production was stopped because of the war. A product of Howe Co. of Stony Creek, Conn., the cleaner is said to remove all of the paint through capillary action.

# SUREWELDELECTRODES had to be good to go so far

#### SIZE, SERVICE, SATISFACTION

NCG is recognized as one of the largest organization tions of its kind in the world. It operates 73 manufacturing plants within the United States, offers supply from more than 700 warehouse stocks and service by a vast network of hundreds of independent NCG distributors. For assured satisfaction ir our welding needs . .

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SUREWELD Electrodes are the product of one of the largest and most modern electrode manufacturing plants in the world. This fact in itself speaks volumes for SUREWELD performance. Only thousands of satisfied users could provide the demand to make a plant of such production capacity possible or practical. And no product ever becomes a leader in its field without unusual merit.

The many users that insist on SUREWELD Electrodes give a wide variety of reasons for their firm preference. But the most frequently stated reason is, "Reliably uniform performance". This is not surprising to anyone who has seen the way in which SUREWELD Electrodes are produced. The high-speed, high-precision equipment that WELD carton.

problems.



makes them has no counterpart in the industry. It was designed and built by NCG's Hollup Division engineers. It makes uniformity virtually inescapable. Further, both the metals and the

coatings used in SUREWELD manufacture are held under the most precise laboratory control through every step from mill to the SURE-

For the utmost in welding satisfaction, you too will find it pays to insist on SUREWELD. Hundreds of authorized SUREWELD distributors are ready to serve you. And NCG welding experts are always at your call for able and unbiased assistance in the solution of your welding

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NATIONAL CYLINDER GAS COMPANY 205 W. Wacker Drive . Chicago 6, Illinois

#### Stamped Bushings

(Concluded from Page 66)

cut off. Three essential sections of an F-die may be seen in Fig. 6.

Close tolerances held on all bushings insure proper amount of press fit. In its finishing department the company faces and chamfers bushings, inside and outside where required, to facilitate assembly. This is to avoid sticking, galling, unnecessary friction, etc., when press fitted to bearings. In special high-speed chamfering machines of the type shown in Fig. 3, ends of the pieces are held parallel and both sides are faced simultancously as shown. In this manner output is doubled. Depending upon size of bushing and type of material from which it is made, chamfering machines will turn out from 750 to 1100 bushings per hour each. A new jaw being developed by the company may boost this rate still higher.

Many different sizes of bronze and brass strip are put through the pilot rolling mill in Fig. 5. This aids in maintaining uniform wall thickness; for example, where a customer wants thickness held to plus or minus 0.001-in. The mill rolls strip at maximum of 85 fpm and will take stock measuring up to 6 in. in width.

Company sometimes buys brass or bronze "dead soft" and by cold working in these rolls, builds it up to required hardness, often as much as 65 rockwell or more. Tensile strength too is improved. There are times when split-type bushings are called upon to withstand loads of 50,000 to 75,000 psi. After being rolled to achieve denser structure and higher hardness, the material will not "belmont" or distort when operating as bushing or bearing at high temperatures or conditions accelerating fatigue rate. Another advantage of rolling is that when grooves are embossed, material will not flake off in the region around grooves or at ends when assembled in place.

By changing the upper roll of this mill and replacing the smooth roll with one of a "hobnail" type, operator can put ball indentations in the strip being rolled. These indentations serve as oil reservoirs and increase bushing and bearing life. Ball indentations or oil reservoirs in the bushing help to retain the oil film on surfaces where friction is greatest. They are in contrast with embossed-in oil grooves or holes which aid in distributing the oil.

A 13-station die set, used on the press shown in Fig. 2, is the finest expression of the diemaker's art. In addition to blanking, chamfering, trimming, coining grooves, and a number of forming operations, this die set pierces as many holes as are needed and incorporates, along with its efficient pickup system, a number of stops which absolutely control length. Each section must be made to less than hair's-breadth accuracy, as the slightest error in calculation or in manufacture is compounded by the greater number of stations.

An efficient technical staff, operating under the supervision of Arthur De Kome, chief engineer, includes among others George Collier, general foreman, and Walter Ingiver, tool room foreman. These men are credited with development of dies and special tooling used.

30-Ton Fork Trucks

.... now in blueprint stage

PRESENT day electric-propelled industrial trucks soon may be dwarfed by giants designed to handle large capacities required by expanded industrial volume. Already plans are being made by Automatic Transportation Co. of Chicago, to go into production on a 30-ton fork lift truck for steel mills should the demand for it arise.

Ultimate lead capacities of industrial trucks are limited only by the needs of industry, now that manufacturing and construction methods are capable of building material movers of literally any capacity, according to B. I. Ulinski, Automatic's chief engineer and designer. He pointed out that in 1939 the company built huge 15-ton fork trucks capable of handling four coils of sheet steel in the mills. Ten years ago, the company also built 30ton low and high-lift platform trucks for Hudson Motor Car Co. These sometimes handle loads up to 54 tons, almost double their rated capacity.

The 30-ton trucks, still in use, were

This 15-ton capacity fork truck, said to be the largest of its type ever built, is used by several of the country's largest steel mills, both with forks as shown and with interchangeable ram for handling sheet steel cols

unloading pins which pull heavy dies automatically onto the platform and slide them into place on forging machines. Even these giants, however, are likely to be supplemented, it is pointed out, Trends in the automotive industry are still toward heavier and heavier dies which ultimately may stamp one-piece automobile bodies. equipped with motorized loading and The same trends are evident in the steel industry. Steel mills are being designed to handle larger capacity, and to prevent waste motion in material movement. These trends according to Mr. Ulinski, mean that larger and more efficient trucks will be required.

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Liquid-dry cargo-drilling rigs-derricks. Look over our stock designsor let our engineers design a barge to suit your particular needs.

Pictured here is an all-purpose barge to meet post-war requirements. It can be used for either deck or liquid cargo. Notice the long, plated rakefor swifter, easier towing. Dimensions: 110' x 30' x 7'. Capacity: 450 tons of deck or 3,200 barrels of liquid cargo.



RIVER FRONT, NEW ORLEANS DISTRICT, WESTWEGO; LOUISIANA
## Industrial Equipment







#### Hydraulic Power Unit

Compact, self-contained power unit consisting of electric motor, hydraulic gear-type pump, valves, oil reservoir and controls is offered by Lyon-Raymond Corp., 2965 Madison street, Greene, N. Y. for use with their hydraulic high-lift trucks. Unit, immediate left, is offered with either 1/2 or 3/4 hp motor, choice depending upon capacity of truck, and speed of elevation required. It comes with 25 ft of conductor cable. Self-winding cable reels are extra equipment. A factory-adjusted relief valve in the hydraulic system eliminates danger of overloading.

Steel 11/25/46; Item No. 9961

#### **Testing Machine**

Highly sensitive and adaptable to making transverse tests with equal accuracy and efficiency on various specimens the transverse testing machine built by Steel City Testing Laboratories, 8843 Livernois. Detroit 4, has a capacity of 10,-000 lb. Designated as Model TR-1, machine, immediate left, is supplied with electric motor drive of various voltages. When speed is selected, load is placed on supports and load lever is raised. Reversing this procedure returns ram to original position. Gage with maximum indicating hand remains stationary when specimen breaks. Load is applied automatically. Maximum span is 24 in. and opening is 4 in.

Steel 11/25/46; Item No. 9959

#### **Gas Producer**

Suitable for bright annealing, clean hardening and furnace brazing of medium and high carbon steels, hardening of high speed steels and sintering of high carbon ferrous metals, the Neutralene gas



producing equipment manufactured by Industrial Heating Division of General Electric Co., Schenectady, N. Y., provides for heat treating with decarburization. Basic unit, left below, is a portable assembly, mounted on a single base and interconnected with piping and wiring. Refrigerated gas cooler and activated alumina dryer are furnished for gas drying. Gas analysis may be varied over relatively wide range of various applications. System is said to save about 18 kw hour per thousand cubic feet of gas produced.

Steel 11/25/46; Item No. 9957

#### **Band Saw**

Ability to saw aluminum, cold rolled steel, angle iron, tool steel or cast iron, as well as various other materials, by virtue of its 12 speeds from 85 to 1750 fpm, is claimed for the Cerny band saw marketed by Ermac Co., 5531 South Vermont avenue, Los Angeles 37. Safety in operation is possible as main frame and table come between operator and blade. Shown at center below, specifications of saw are: Capacity of throat, 17 1/2-in.; table to guide, 10 1/2-in.; floor to table, 44 in.; overall height, 72 in.; width, 38 in. and breadth, 20 in. Frame is of cast iron alloy, while 20 x 20 in. table is of ground cast iron alloy. It may be tilted to a 45 degree angle. Four sizes of guide pins are furnished for blades from 1/8 to 5/8-in.

Steel 11/25/46; Item No. 9960

#### **Electric Furnace**

Capable of melting up to 900 lb of bronze or 500 lb of cast iron per hour, the type LFN indirect arc rocking electric furnace, directly below, produced by Detroit Electric Furnace Division,



(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 110.)

## How a New Kind of Lubrication System BOOSTS PRODUCTION, CUTS COSTS



IN THE Tonawanda, New York, plant of Remington-Rand, nationally known manufacturer of business machines and office

equipment – there's a metal shaping department loaded with presses and shears, each containing many expensive bearings. Hand lubrication of such machines was slow and hazardous. Production suffered because machines had to be shut down while oilers worked.

A case in point - a huge press was out of

production *3 hours daily* for lubrication. And because oilers had to use ladders to reach some inaccessible bearings, human error caused a bearing failure that cost thousands of dollars in lost production.

Today, with Alemite Centralized Lubrication Systems, every machine in the department is lubricated in seconds while it keeps on producing. The oiler stands in safety and pumps lubricant into the system at one central, convenient point; a measured amount of grease or oil is highpressured to every bearing; an indicator signals when the job is done; a bearing can't possibly be overlooked. The result no bearing failures — no hazard to workmen — stepped up production — lower lubrication costs.

You, too, may have difficult operating conditions, such as excessive dust, dirt, moisture, working hazards, human error, need for cleanliness, overlooked bearings, that are running up costs. In any case, you'll be interested in what Alemite Systems can do for you. There is an Alemite Centralized System adaptable to almost any type of machine, large or small, new or old.

Have an Alemite Lubrication Specialist demonstrate Alemite Systems right at your desk with transparent working models. Write to Alemite, 1879 Diversey Parkway, Chicago 14, Illinois.



Here's the "Heart" of an Alemite Centralized Lubrication System

Through groups of from 3 to 20 feeder valves, a corresponding number of bearings can be lubricated from one central point while the machine is in operation. A measured quantity of lubricant is high pressured through metal "arteries" to

November 25, 1946

each bearing in the system. An indicator signals when bearing is correctly lubricated. Over-all savings can enable you to amortize an Alemite Centralized System in as little as 3 months. From then on, the savings are pure "velvet."



Centralized Lubrication System.

#### INDUSTRIAL EQUIPMENT

Kuhlman Electric Co., Bay City, Mich. is rated at 150 kw. It has a rocking action which produces automatic stirring. Offered with attached electrode brackets and mechanical automatic electrode control, or with pedestal mounted electrode brackets with hydraulic control brackets with hydraulic control, its melting factors can be controlled by one man.

Steel 11/25/46; Item No. 9958

#### **Coolant Tank and Pump**

Delta Mfg. Division, Rockwell Mfg. Co., 600 East Vienna avenue, Milwaukee 1, announces a coolant pump and tank for use with machine tools. Pump is highly adaptable because flat machined flange permits its use on most wet machine tools. Fully enclosed, double scaled 1/4



hp motor is incorporated to deliver water up to 2 gpm to a 14 ft head or up to 30 gpm at low heads.

Pump has 6-bladed impeller connected directly to motor shaft. Capacity of tank is 16 gal. Settling basin and wire mesh filter screen keep coolant free of chips. Single unit meets needs of single spindle drill press or multiple drill presses up to 8 spindles.

Steel 11/25/46; Item No. 9810

#### Intercommunication Unit

Electronic developments incorporated in model 1100 intercom station manufactured by Executone Inc., 415 Lexington avenue, New York 17, include a new audio-amplifier circuit, alnico speaker, neon pilot lamp, and vinylite insulated moisture-proof interior wiring. Used in a system of 12 stations, unit provides facilities for private, two-way voice communication with any combination of 11 other similar stations. Push-buttons identifying each station enable calls to be originated selectively, without waiting for switchboard connections.

Users of remote or trumpet type stations can also reply to calls remotely without leaving their work to approach their station. An automatic light signals when station called is busy.

Steel 11/25/46; Item No. 9783

#### Stencil Etcher

The E-Z mark etcher, a new device for production marking, is announced by Ideal Industries Inc., 5076 Park avenue, Sycamore, Ill. Through use of a film stencil, it reproduces counterparts of the stencil pattern in 1 to 3 sec on steel, brass, copper, bronze, tin and many other metals.

It is efficient for tools or plates having round as well as flat surfaces. Im-



pressions on stencil may be made by typewriter, pen, pencil, or stylus, and the number of reproductions from a single film can well run to several hundred. Etching fluid is nonaciduous compound, harmless upon contact with hand or body. Depth of markings is controlled by rheostat and time of etching exposure.

Etcher is compact, measuring 9 x 11 x 7<sup>3</sup>/<sub>4</sub>-in. Rated at 15 v amp, 115 v ac, 50-60 cycles.

Steel 11/25/46; Item No. 9781

#### Coil Winder

Saving in production time of concentric coils is claimed for a new model type coil winder manufactured by Continental Electric Co., 650 North Prairie avenue,



Hawthorne, Calif. It comprises nine pair segments, large to small sizes, eight of them adjustable by means of a screw. By referring to a chart which is supplied with head, operator can set segments to proper dimensions for winding under consideration without removing head from the machine. Head makes coils for all types and sizes of single phase motors, from a coil for a 1/20th hp, 24-slot 6-pole stator to coils for a 3 hp, 36-slot 2-pole stator, the latter seven coils to a group. Steel 11/25/46; Item No. 9807

#### Heat Treating Oven

Pull-drawer oven arranged so all superstructure is eliminated and drawers are supported on a puller mechanism set on a wheel-equipped channel iron base frame riding on a track is a recent development of Gehnrich Oven Division, W. S. Rockwell Co., Fairfield, Conn. Puller engages any one or all drawers and is easily pulled or pushed by one man.

Ovens are made with varied specifications, width, depth, height and number



of drawers depending upon nature, size and quantity of products to be heated. Drawers have reinforced grating over shelf area and ride on rollers at rear.

Electric heaters nested at one side and baffled from heating chamber supply heat to oven. Side door permits access for inspection and service. Where oil, gas or steam heat is used, an air heater may be installed on roof, or oil or gas burners may fire into combustion chamber at one side of oven.

Steel 11/25/46; Item No. 9804

#### Foot-Operated Air Valve

National Pneumatic Co., Rahway, N. J., is manufacturing a universal type focoperated valve for controlling passage of compressed air and is designed to control any type of air cylinder. It will apply pressure with pedal depressed, or by a rearrangement of piping, same valve will apply pressure with pedal released.

Operating pedal of valve is shielded to prevent accidental operation which might result in damage or injury.

Pedal travel is short, and action of

(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 110.)

Superdraulic pumps, motors, transmissions, relief valves, check valves, 4-way valves, power units, and high-pressure couplings enable you to utilize hydraulics at its best. Following are descriptions of principal Superdraulic units:

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PUMPS

High-pressure hydraulic pumps-5000 psi, 40 hp with 0 to 12 gpm at 1200 rpm or 0 to 17 gpm at 3500 psi. Here is glant power in a midget hydraulic pump only 101/2" in diameter. Instantly responsive finger volume control gives variable volume and reversible flow. Also available in constant delivery types only 9" In diameter with identical rating. Ideal power for presses, plastics machinery-wherever hydraulic power is required and where spece is at a premium.



Triport hydraulic motors-261/2 gpm at 3500 psi input at 1200 rpm, 19 gpm at 5000 psi input at 1200 rpm. Giant horsepower and giant torque in hydraulic motors of midget size. Sixty-six power strokes per revolution provide high starting torque and turbinesmooth output. Up to 47 hp with lorgue range up to 200 lbs. ft. in either type. Ideal for driving all types of machinery.



Million-speed hydraulic transmissions. Combining the famous Superdraulic variable delivery pump and triport motor, these units provide infinitely variable, turbine-smooth power in minimum space. Up to 200 lbs. ft. output torque, 0 to 1200 rpm (reversible), up to 30 hp output. A perfect transmission for countless industrial applications.

It is almost certain that in their long experience, Superdiaulic engineers have been called upon to solve hydraulics problems similar to yours. They would welcome an opportunity to sit down with you and discuss the application of hydraulic power to your products. In the meantime, send for complete technical descrip-

tions of the above Superdraulic units.

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The Superdraulic Junior Pump, as its name implies, is practically a duplicate of the 40 hp Superdraulic constant delivery pump on a reduced scale. A single bank of eleven plungers delivers 3 gpm at 1800 rpm and 2 gpm at 1200 rpm. This pump is furnished for 5000 psi continuous duty operation.



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valve is instantaneous. Only a light pressure is required to operate valve. All air passages through valve are equivalent to a 1/4-in. diameter.

Steel 11/25/46; Item No. 9786

#### Welding Fittings

Line of stainless steel welding fittings manufactured by Tube Turns Inc., Louisville, includes 180-degree long radius returns, 90 and 45-degree long radius elbows, straight and reducing outlet tees, caps, eccentric and concentric reducers, lap joint stub ends, laterals and crosses, e<sup>+</sup>c. Sizes range from 3/4 through 12 in. Fittings may be had in three grades of stainless steel.

Steel 11/25/46; Item No. 9771

#### **Grinding Wheel**

Grinding wheel said to hold its corners under extremely heavy cuts and perform efficiently in dish and cut shapes is the V-Eight, made by American Emery Wheel Works, Providence, R. I. Its structure gives air cooling for dry grinding and the open cells carry extra coolant when used in wet grinding. The wheel will take a 0.012-in. cut on hard steel with a 60 C rockwell reading withcut loss of corner and grinds satisfactorily high-chromium die steel.

Steel 11/25/46; Item No. 9949

#### **Circuit Breaker**

Four-circuit multi-breaker with both thermal and high-speed magnetic tripping action has been developed by Switch and Panel Division, Square D Co., Detroit. Known as the MO-4 it offers an assortment of branch circuit capacities cf 15, 20 and 30 amp. Two single poles can be converted easily and quickly to a double pole for a two or three-wire circuit.

Handle clearly indicates the three positions, on, off, and tripped. Movement



of handle is all that is necessary to restore current to circuit after cause of short circuit or overload has been located and corrected. It is not possible to restore current as long as trouble exists. *Steel* 11/25/46; *Item No.* 9796

#### Air Drills

Rotor Tool Co., 17825 Euclid avenue, Cleveland, is manufacturing two new small air drills, the Midget type M-850 and the E O-M-1100. The former drill has a capacity of 1/16, 1/8 and 3/16-in. for drilling, light screw driving and nut setting. Weighing but 1 5/8 lb., it has speeds of 1000, 2000, 4000 and 20,000 rpm.

The second type has capacity of 1/4,

5/16 and 3/8-in. for drilling nuts and hex head machine screws in carbon steel. Its speeds are 1050, 1500, 2000, and 3000 rpm. It is equipped with a spade handle and auxiliary side handle for firm control. Both models are offered with double adjustable clutches.

Steel 11/25/46; Item No. 9753

#### Pedal Switch

Constructed of cast aluminum, a new foot pedal switch manufactured by Electronic Controls Inc., 44 Summer avenue, Newark, N. J., is designed to provide reliable power control of equipment, freeing the operator's hands. It features a diamond plate treadle of the nonslip type. Suitable for series circuits only, the switch mechanism is of snap-action type. Power handling capacity is 1000 w at voltages up to 220 v ac or 32 v de. Steel 11/25/46; Item No. 9762

#### Shut-Off Control

Device that stops turbine pumps when the water level drops to a point where the impellers will not pick it up is the latest development of Automatic Control Co., 1005 University avenue, St. Paul 4, Minn.

Mounted in pump house, the device, referred to as the Protectrol, is connected directly into the pump discharge on the pump side of the check valve. It also affords additional protection in that it will not only sound an alarm but will definitely stop the pump should water fail to be delivered for any reason.

The control locks pump out until it is manually reset. Should it be reset without trouble being corrected, pump would again be locked out and alarm sounded again.

Steel 11/25/46; Item No. 9776

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#### Metal Congress' Technical Sessions Cover Wide Range

#### (Continued from Page 40)

per cent tin and 117° C. Four solid phases, according to the authors, occur at 20° C, namely: alpha (0 to 3 per cent tin) beta (14 to 27 per cent tin) gamma (75 to 88 per cent tin) delta (94 to 100 per cent tin). The beta phase is thought to undergo peritectic decomposition at 126° C. The gamma does not undergo peritectic decompositions at 124° C as proposed by Fink, Jette, Katz and Schettler instead it is proposed that gamma may undergo peritectoid decomposition below 80° C. The resistance to deformation in compression in this alloy system reaches a maximum value at about 92 per cent tin.

Carbon Concentration Control was described by E. G. de Coriolis, O. E. Cullen and Jack Huebler, director, metallurgist and engineer, respectively, research department, Surface Combustion Corp., Toledo, O. In this paper the phase rule was applied to all the possible gas compositions which might be used in gas carburizing, and from the results so obtained the most suitable compositions and variations for commercial purposes were determined. Effect of compositions on steel were developed using the ironcarbon diagram as the basis.

The necessary carbon potential, its effect upon steel of varying initial carbon content, limitations as to range of action and other inter-relationships between gas and metal were then brought cut.

Formation and Transformation Studies of Iron-Carbon Powder Alloys, described by John F. Kahles, associate professor of metallurgical engineering, University of Cincinnati, show that very pure steels may be prepared by pack carburizing compressed carbonyl-L iron powder. Also, austenite transformation characteristics of these powder products do not differ markedly from steels made from the liquid state. A TTT diagram for a "powder" steel was shown for a composition of 0.87 per cent carbon. In addition, some interesting trends were presented for the carburization of compressed powdered iron.

A Metallographic Etchant To Reveal Temper Brittleness in Steel was the subject of a paper presented by J. B. Cohen, metallurgist, Miami, Fla, A. Hurlich, metalurgist and M. Jacobson, chemical engineer, metallurgical engineering division, Watertown Arsenal laboratory, Watertown, Mass. Metallographic etchants and procedures capable of differentiating between tough and temper-brittle conditions of steels susceptible to temper embrittlement have been developed. Steels embrittled either by slowly cooling from elevated tempering temperatures or during tempering at intermediate temperatures show a pronounced grain boundary attack when etched in specially developed reagents. In tough condition, the same steels exhibit no grain boundary attack. Steels not susceptible to temper brittleness suffer no grain boundary attack regardless of the tempering cycle. The etchant can be used to determine prior austenitic grain size of alloy steels which can be temper embrittled.

Development of Temper Brittleness in Alloy Steels was discussed by W. S. Pellini, metallurgist, American Brake Shoe Co., Mahwah, N. J., and B. R. Queneau, chief development metallurgist, South Works, Carnegie-Illinois Steel Corp., Chicago. Studied in two steels of different hardenability, the effect of time at temperature in the temper-brittle range was determined and results compared with embrittlement developed in steels while cooling or heating through the same range of temperatures. The effect of microstructure on the development of temper brittleness was determined for one of the steels.

It was found that transformation causing embrittlement in alloy steels is a reversible reaction with a maximum rate of embrittlement at about 950° F. Embrittlement occurs at temperatures as high as 1200° F. A pearlitic microstructure is somewhat less susceptible to temper brittleness than martensite and low temperature bainite. It is suggested that embrittlement is the result of a carbide precipitation from alpha iron.

Changes In Austenitic Chromium-Nickel Steels During Exposures At 1100 to 1700° F were covered in a paper presented by Peter Payson and Charles H. Savage, both associated with Eastern Research laboratory, Crucible Steel Co. of America, Harrison, N. J. A hitherto incompletely identified constituent has been encountered occasionally in austenitic chromium-nickel steels which were exposed for long periods at temperatures between 1100 and 1700° F. This phase, proved to be sigma, occurs along with precipitated carbides and appears to be a transformation product of austenite.

The authors' study of steels of the 302, 311, 309 and 310 types, shows that the formation of sigma from austenite is promoted by the presence of high percentages of chromium, silicon and nitrogen, as well as by the additions of columbium, titanium and zirconium. Generally, long holding periods are required for the formation of sigma. Room temperature, tensile and notch impact data were given for these steels after long exposures at 1400 and 1600° F. A metallographic scheme for identifying sigma in these steels was also revealed. Over 2 per cent silicon in type 310 improves the resistance of steel to carburization at 1650° F.

A Periodic Chart For Metallurgists, developed by Carl A. Zapffe, presented a series of metallurgical alloy systems to show the characteristic patterns that result, to aid in understanding certain

STEEL **CYLINDERS:** Specially designed highpressure steel cylinders used by the armed forces are mass-produced for peacetime uses at the Belleville, N. J. plant of Walter Kidde & Co. A new method of cold drawing and induction heating chromium-molybdenum steel replaces the slower prewar welding technique to produce a one-picce cylinder which is lighter and possesses the same strength and quality as prewar containers. The company also draws smaller size low-pressure cylinders from SAE 1020 steel





principles governing metallurgical phenomena, and possibly to serve as a useful means for predicting characteristics of new alloy systems.

The chart includes the common relationships of the Mendelejeff table and in addition has the following characteristics: (1) Elements are so placed that for any one of them the elements of lesser atomic number depict the number of electrons in that atom. (2) Rearrangement of elements beginning with actinium and including the four newly-discovered elements, neptunium, plutonium, americium and curium leads to a new concept of these elements as a second subtransition or rare-earth series. (3) Separate sectors of the chart contain the B-subgroup series, the transition series and the subtransition series. (4) Analogous properties of the elements appear along radii, diameters, peripheries, and within the separate sectors.

Transformations in Krupp-Type Carburizing Steels by A. R. Troiano and J. E. DeMoss, professor and instructor of metallurgy, respectively, University of Notre Dame. Transformation characteristics of a low-carbon and high-carbon carburizing steel have been investigated. The former is considered to be representative of the core and the latter of the carburized case. Austenitizing temperatures approximating those of commercial practice were employed. An x-ray diffraction method for obtaining critical points in the high-carbon steel and also for determining the carbon content of the austenite in the presence of undissolved carbides is outlined. Possibilities and limitations of the x-ray method are considered. General transformation features are discussed and evaluated in terms of the behavior of other alloy steels.

Effects of Microstructure on the Mechanical Properties of Steel by J. H. Hollomon, captain, Ordnance department, L. D. Jaffe, metallurgist, D. E. McCarthy, corporal, Ordnance department and M.

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DUST REMOVER: Flexible tubing designed to handle air, dust or other light solids under erowded conditions is shown here exhausting dust resulting from drilling of bakelite gage eases. Continuous helical spring which forms the core is spiralstitched into the fabric, so there are no ridges to impede passage of air or to collect solids. Called Spiratube, the noncollapsible tubing is manufactured by Spiratube division, Warner Brothers Co., Bridgeport, Conn.

R. Norton, metallurgist, all associated with Watertown Arsenal laboratory, Watertown, Mass. Study shows that pearlite (plus ferrite) and bainite in the quenched structure of tempered specimens are reflected in lower reductions of area in standard tensile tests. Reduction of area is reduced by severe embrittlement and the fracture of the tensile specimens may become, at least in part, longitudinal rather than transverse. Stress at fracture as determined in simple tension is seldom lowered more than a few thousand psi by changing the structure from unembrittled tempered martensite (while maintaining a fixed tensile strength).

Steels having a tempered martensitic structure have mechanical properties superior to those of steels with other structures. At a given tensile strength they have the highest yield strength, ductility and endurance limit, the greatest toughness under severe conditions, and may endure high stresses for the greatest number of cycles. When these steels do fail, the energy absorbed in fracturing is higher than absorbed by steels with other structures.

Interrupted Quench and Its Practical Aspects by H. E. Boyer, chief metallurgist, American Bosch Corp., Springfield, Mass. High-carbon low alloy steels such as SAE 52100 can be hardened successfully by the martempering method. However, it is necessary to have good equipment and careful control. The detrimental effects of malpractices such as overheating are more obvious when martempering practice is used. Parts austenitized under identical conditions are less likely to crack when oil-quenched to the higher percentages of retained austenite after quenching. Either an atmosphere-controlled furnace or neutral salt bath is satisfactory for the austenitizing operation prior to martempering. However, if an atmosphere-controlled furnace is used, it should possess good circulation, otherwise there may be portions which

will overheat and eventually lead to failure.

Anyone contemplating the installation of equipment for martempering the higher carbon steels should develop the process carefully in their own plant, in order to avoid failures which might ordinarily be charged to some inherent weakness of martempering.

Isothermal Transformation of Austenite by A. Haltgren, professor of metallography, Tekniska Hogskolan, Valhallavagen, Stockholm, Sweden. Various alloy steels have been subjected to isothermal transformation studies with a view to elucidating the mechanisms of the various transformations occurring at different temperatures, and the compositions and constitutions of the transformation products. Most of the tests were made on manganese and tungsten steels.

Mechanisms of growth of bainite as distinct from that of pearlite is discussed and an explanation offered for the carbon enrichment of the austenite during the bainite transformation. Structure and formation of a so-called degenerate bainite are described, and also the formation of cementite plates subsequent to partial pearlite and bainite transformation, and the effect thereof on the succeeding transformation structure.

Experimental Studies of Continuous Cooling Transformations by C. A. Liedholm, chief engineering metallurgist, Curtiss-Wright Corp., Propeller division, Caldwell, N. J. Paper demonstrates engineering information obtained by methods developed or used to supplement S-curves and standard Jominy tests in order to predict and control practical heat treating results or evaluate materials for proposed applications. Experimental procedures are briefly discussed. Supporting data represent a limited selection from laboratory results.

Isothermal transformations preceded by slow cooling have been investigated in the pearlite and bainite regions of SAE 4330 steel. It has been found that pearlite reaction remains practically unaffected by prior slow cooling but the effect of such cooling upon the time to completion in the bainite region is great. Completion of transformation in this region progresses so slowly when the steel has cooled gradually to the isotherm that it is impractical to prevent martensite formation during the final cooling by transformation just above M<sub>\*</sub>.

The Measured Knoop Hardness of Substances and Factors Affecting Its Determination, by Newman W. Thibault, research crystallographer and Helen L. Nyquist, assistant, Research Laboratories, Norton Co., Worchester, Mass., discussed in detail the factors, many hitherto unknown or little realized, which may in-

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fluence the measured Knoop hardness number, especially of hard, brittle substances. As a result of the study, the authors have specified conditions under which they believe a determination of the Knoop hardness number of such substances should be carried out. They presented in tabular form a self-consistent series of Knoop numbers determined in this manner for a variety of materials ranging in hardness from boron carbide down to hardened tool steel of rockwell C-60.5.

Factors Influencing the Pearlitic Microstructure of Annealed Hypoeutectoid Steel, by R. A. Grange, Research Laboratory, United States Steel Corp., Kearny, N. J. The pearlitic microstructure developed by comparable isothermal annealing of each of 12 types of aluminumkilled hypoeutectoid steel was investigated by the author. Its character varied with composition and could be classified in either of two general types: (a) Well formed lamellar pearlite, and (b) "semipearlite" in which many of the carbides are relatively large and nonlamellar.

In the aluminum-killed steels which contained these massive nonlamellar carbides after they had been austenitized at the temperature ordinarily used in practice, well formed lamellar pearlite could be developed by annealing, provided the austenitizing temperature was raised to coarsen austenite grains. In steel which had not been killed with aluminum and was moderately coarse grained at ordinary austenitizing temperatures, the pearlite was always reasonably well formed, even when the steel had been made fine grained by hot forging.

Apparently, the character of pearlite in an annealed steel is somehow controlled by the inter-related factors: Composition, thoroughness of deoxidation, and austenite grain size just prior to transformation. In a number of modern types of steel it appears necessary, if an annealed structure of well formed pearlite is desired, to raise the austenitizing temperature well above that ordinarily used in present commercial practice, at least unless considerable prior cold working is feasible.

Effect of Manganese on the Properties of Cast Carbon and Carbon-Molybdenum Steels, by N. A. Ziegler, W. L. Meinhart and J. R. Goldsmith, research and assistant research metallurgists and engineer in charge of Research Foundry, Crane Co., Chicago. The authors found that increasing the manganese content of these steels develops a gradual increase in the thermal sluggishness and hardenability which is less pronounced than that occurring with molybdenum or nickel additions to chromium steels. Complete suppression of the transfermations on

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Sales Agents: MILLER AND COMPANY, 332 S. Michigan Ave., Chicago 4, Ill. Cincinnati 2, Ohio, 3504 Carew Tower St. Louis 1, Missouri, 407 North Eighth St. relatively slow cooling and marked air hardening are not produced until manganese is raised to about 2 per cent. In this regard, manganese has the greatest effect on the "carbon molybdenum" and "higher" carbon steels.

Raising the manganese content to about 1.5 per cent in "plain carbon" and to about 1.0 per cent in carbon molybdenum steels increased the tensile strength approximately 20 per cent as compared with similar steels containing about 0.5 per cent manganese. A small decrease in ductility likewise occurred. However, the steels with these manganese additions developed almost the highest impact resistance of the group tested. Welding experiments performed indicate no difficulties should be encountered, provided the manganese content does not exceed about 2 per cent.

Relation of Quenching Rate and Hardenability to the Mechanical Properties of Several Heat Treated Cast Alloy Steels, by Charles R. Wilks, Howard S. Avery and Earnshaw Cook, metallurgist, research metallurgist, and consulting metallurgist, respectively, American Brake Shoe Co., Mahwah, N. J. To avoid the handling of unwieldy sections in their study, the authors employed the double endquench test technique to provide quenching rates that correspond closely to those which obtain at the center of plates 2 to 8 in. thick. Tensile and impact properties were determined, with the latter appearing to be more sensitive to structural differences. It is suggested that, for cast steels, accentuated intercellular segregation militates against increased alloying for heavier sections. Optimum mechanical properties seem to be coincident with the minimum hardenability which will produce maximum hardening for any particular rate of cooling.

While the scheduled testing has been essentially completed, the logical extenstons of the research as originally planned were abandoned concurrently with discontinuance of both National Research Council Project NRC-83A and the correlated production of cast tank armor which had motivated the experimental program.

Measurement of Embrittlement During Chromium and Cadmium Electroplating and the Nature of Recovery of Plated Articles, by Carl A. Zapffe, consulting metallurgist, and Eleanor Haslem, research metallurgist, Baltimore. This is the fourth of a series of papers exploring the nature of hydrogen embrittlement as measured by the constant-rate singlebend test and studying embrittlement resulting from electroplating, specifically the chromium and cadmium plating of 17 per cent chromium—1.0 per cent carbon stainless steel wire in the an-



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November 25, 1946

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nealed and also cold-drawn conditions.

Curves were obtained which show the course of embrittlement with increasing plating time, and the remarkable comparison of chromium plating and cadmium plating with one another and with straight hydrogen plating as hydrogenizers of steel.

In studying recovery from embrittlement, a phenomenon was found which corroborates an earlier hypothesis by Zapffe and Faust regarding a double aging effect in plated metal. Some tests preliminary to a subsequent research also were presented to show marked differences in the rates of recovery when plated specimens are aged in different media, such as water, oil, a caustic solution, and dry argon, at the same temperature. For articles heavily plated with chromium, temperature was investigated as a variable in the recovery of ductility.

Practical Importance of Hydrogen in Metal-Arc Welding of Steel, by S. A. Herres, captain, Ordnance Department, Watertown Arsenal Laboratory, Watertown, Mass. According to this speaker, hydrogen derived principally from ingredients in the electrode coating is absorbed by molten weld metal. Porosity, caused by the trapping of gas bubbles in the solidified weld metal, is ordinarily controlled by the relative contents of hydrogen, oxygen, carbon and silicon in the weld metal. Effects of water vapor in controlling porosity and of hydrogensulphur or hydrogen-selenium reactions in producing porosity were illustrated.

Hydrogen retained in solution in solid weld metal may cause localized or general embrittlement. Hydrogen diffusing into the weld heat-affected zone of alloy steels may cause severe embrittlement and cracking in this zone. It was shown that the degree of hydrogen embrittlement is dependent upon the microstructure of the steel and the rate and temperature of straining. Hence, embrittlement probably is caused by a precipitation reaction during straining.

Methods for determining the specific effects of hydrogen-produced porosity and embrittlement on the strength and cracking susceptibility of welds made with a given electrode and welding procedure were discussed. The need for further research to establish the specific influences of carbon and oxygen content and microstructure of steel on hydrogen embrittlement was stressed.

Quantitative Evaluation of Intergranular Corrosion of 18-8 Ti, by Freeman J. Phillips, Carnegie-Illinois Steel Corp., Wood Works, McKeesport, Pa., described a quantitative method for predicting intergranular corrosion of 18-8. Experience has shown that additions of the stabilizing elements titanium and colum-

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bium do not always insure immunity to failure through intergranular corrosion. In 18-8 Ti such corrosion can be attributed to an insufficient amount of carbon combined with titanium, thereby leaving the uncombined carbon free to form chromium carbide during a subsequent sensitizing heat treatment.

It was found that embrittlement test failures could be attributed to an insufficient combination of carbon with titanium. The method developed for predicting this type of failure is based on grain size and chemical composition. Logical explanations can now be offered for hitherto unexplainable embrittlement test failures in 18-8 Ti and 18-8 Cb having Ti/C or Cb/C ratios in excess of the stoichiometric ratio.

Some Special Metallographic Techniques for Magnesium Alloys, by P. F. George, metallurgist, Dow Chemical Co., Midland Mich., was a discussion of some of the specialized methods that have become very useful in magnesium metallography. These include methods for analyzing solid solutions within a single grain; for showing diffusion in magnesium alloys; for determining the orientations of individual grains; for distinguishing micro-shrinkage from fusion voids in solution heat treated metal; for producing good contrast between types of precipitates; etc. Also, a summary of the etchants was made, with their compositions, etching technique and use for the special metallographic techniques described in the paper.

Hardness Testing of Metals and Alloys at Elevated Temperatures, by Frederick P. Bens, research metallurgist, Climax Molybdenum Co. of Michigan in Detroit, described the apparatus which was constructed to obtain the hot hardness of high strength alloys employed for gas turbine blades operating at temperatures up to 1600°F. Principles embodied in this apparatus, designed to operate at temperatures up to 1700°F, were those of the diamond pyramid penetration method of hardness testing. The apparatus was constructed so as to rest on the stage of a standard Vickers hardness machine and to employ the loading device and optical system of this machine. A vacuum chamber protects the test specimen, diamond indenter, and heating element against oxidation that is possible at high temperature.

The Development of a Turbosupercharger Bucket Alloy, by E. Epremian, research laboratory, General Electric Co., Schenectady, N. Y., presented the experimental data obtained in the development of an alloy for this application. The alloys under consideration were those having a cobalt base containing chromium, nickel, tungsten, and molybdenum. A summary was also included of the physical properties which must be considered in evaluating a material for supercharger bucket application with data on the most promising alloy developed in this investigation.

The Stress Rupture and Creep Properties of Heat Resistant Gas Turbine Alloys, by Nicholas J. Grant, assistant professor of metallurgy, Massachusetts Institute of Technology, Cambridge, Mass., reported the experimental results obtained from rupture and creep tests at 1500 to 1800°F and at stresses from 7000 to 15,000 psi in creep and 15,000 to 35,000 psi in rupture on a series of vitallium-base (cobalt-chromium-molybdenum) and nickelchromium-cobalt-iron-base alloys.

The variables studied were the effects of increasing amounts of carbon and nitrogen on the hot strength and ductility of these alloys; the role of heat treatment aging; and the relationship of the stress to the rupture time and to the minimum creep rate measured in both rupture and creep tests. Some of the conclusions derived from these tests include: An important relationship exists between the time at temperature and the resultant ductility at fracture; the carbon alloys are the stronger up to a peak carbon value beyond which the strength decreases; the vitallium-base alloys are much stronger than the nickel-chromium-cobalt-iron-base alloys at rupture stresses at 1500°F but are considerably poorer in creep resistance.

Stability of Austenite in Stainless Steel, by C. B. Post, metallurgist, and W. S. Eberly, metallurgical department, the Carpeater Steel Co., Reading, Pa., was investigated by measuring the change in magnetic permeability of the austenite of a series of stainless steels. Stability of austenite at room temperature was determined for steels having the following alloy content: 13.9 to 24.3 per cent chromium; 7.75 to 20.65 per cent nickel; 0.030 to 0.20 per cent carbon; 0.40 to 3.92 per cent manganese; from zero to 2.40 per cent molybdenum; and columbium and titanium up to 1.0 and 0.50 per cent respectively.

Through the range of analyses investigated, chromium-nickel stainless steels are austeritic and nonmagnetic when annealed by air treating from a temperature of 1830°F or over. At constant cold reduction the tensile strength of substantially stable austenitic stainless steels (those requiring approximately 80 per cent cold reduction to precipitate measurable quantities of pseudo-martensite from the austenite) was found to be a function of the carbon content. An empirical formula was developed to estimate the nickel content required to make a chromium-nickel steel substantially stable.



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## The Business Trend

#### Industrial Pace Remains At Postwar High Level

SUSTAINED high rate of industrial activity enabled STEEL's industrial production index for the week ended Nov. 16 to duplicate the preceding week's high of 158 per cent of the 1936-1939 average of 100.

Previous postwar high mark had been 157 per cent in the week ended Nov. 2 but final figures showed that production in the week ended Nov. 9 had edged up to 158.

However, high production in succeeding weeks is threatened by the bituminous coal shortage that would follow protracted interruption of mining. Even while negotiations relative to a contract were under way between the United Mine Workers and the government, which has been operating the mines, some of the miners walked off the job. Production of 12,795,000 tons of soft coal in the week ended Nov. 9 raised to 464,106,000 tons the aggregate output this year through that date, compared with 496,767,000 tons in the like period of last year.

STEEL—For the past month, steel ingot output has been holding around 91 per cent of capacity, the highest sustained level since the war. This helped October set a new peacetime record for monthly production of ingots.

AUTOS—Also at high level is automobile production. In the week ended Nov. 16 output of passenger cars, trucks and busses was 94,640 units, second highest weekly production figure since the war. The entire car and truck manufacturing picture has so brightened since the end of price controls that next month's planning is being revised upward in fairly important degree, said Ward's Automotive Reports.

BUILDING—October marked the fourth consecutive month in which the volume of building for which permits were issued showed a decline, Dun & Bradstreet Inc. reported. October permits for 215 cities totaled \$170,-491,125, a 3.4 per cent drop from the \$176,492,394 for September.

ELECTRIC POWER—The electric utility industry is now hopeful of being able to supply without interruption all of the electricity requirements of its present and prospective customers, a survey by the Edison Electric Institute shows. However, the electric industry's supply-demand situation is tight and likely will remain so for two more years. Meanwhile, utility managements hope to obtain new generating equipment as fast as their industrial customers are able to add to their productive facilities.

RAILROADS—Operating revenues of railroads were 1.8 per cent higher in October, 1946, than in the corresponding month of last year, the Association of American Railroads estimates. October freight revenues were 15.9 per cent higher and passenger revenues were 38.9 per cent lower than levels of October, 1945.

PRODUCTION—Among recent new production records is that of household vacuum cleaners, the October output of which set a new monthly high. October factory sales were 259,153 units, topping the largest previous monthly outturn of 175,869 in September, 1941.



#### THE BUSINESS TREND





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TEEL

## HELPFUL LITERATURE

#### 1. Chain Hoists

Reading Chain & Block Corp.—36-page il-lustrated catalog No. 60 reveals pertinent in-formation relative to lifting speeds, rated ca-pacity, manpower, weight, cost of multiple gear, screw gear and differential chain hoists. Special section is devoted to selection of chain hoist for particular application.

#### 2. Hydraulic Presses

Rodgers Hydraulic, Inc.—16-page illustrated booklet "Wherever You Need Pulling, Pressing or Lifting Power" deals with outstanding fcatures of Rodgers universal hydraulic press that is portable, light in weight, capable of develop-ing up to 200 tons pressure and adjustable to perform wide variety of jobs.

#### 3. Motor Control

Electric Machinery Mfg. Co.—20-page illus-trated Vol. 7, No. 3 of "E-M Synchronizer" is entitled "The ABC of Synchronous Motor Control" and shows equipment adaptable for this purpose. Selection chart offers guidance in choice of control.

#### 4. Openside Shaper

Rockford Machine Tool Co .-- 4-page illustrated folder "36-Inch Openside Hy-Draulic Shaper" outlines advantages, design, specifica-Shaper" outlines advantages, design, specifica-tions and accessories of the 36-inch openside Hy-Draulic shaper. Unit has hydraulic drive and feed. Quick reversals, stepless adjustment of speed, fine finish and high production are features.

#### 5. Steel Shop Equipment

Steel Factory Equipment Div., Cleveland Wire Spring Co.-36-page illustrated catalog No. 35 gives full information on steel shop boxes, tool and kit boxes, handles, and card pockets, shop trucks, lathe and chip pans, barrels, barrel trucks, cans, steel shelving, racks, lockers, bins and shop stools.

#### 6. Milling Practices

Kearney & Trecker Corp .--- 136-page illustrated "Milling Practices Series" book No. 1 4 divided into seven chapters that cover preparation of machines for operation, job setup, taking cut, disassembling setup, selection and care of cutters and safeguarding of operators from injury.

#### 7. Small Hydraulic Press

Denison Engineering Co.-4-page illustrated bulletin No. 121 presents features of 4, 6 and 8-ton sizes of Multipress self-contained bench type hydraulic press. Wide range of attachments can be used with this versatile machine which can be provided with regulative pressing speeds, automatic cycling controls or vibratory ram action.

#### 8. Carbide Tools & Blanks

Vascoloy-Ramet Corp.---32-page illustrated icchnical catalog "Worlds Finest Carbide Tools and Bianks" lists nearly 500 standard tools and blanks, more than 175 of which are new or improved. Among items listed are shell end mills, solid and tipped boring tools, thread-ing tools, face mill cutter blades, scraper blanks and carbide tinnad scribers and carbide tipped scribers.

#### 9. Steel Mill Equipment

Edgar E. Brosius Co .--- 20-page illustrated bulletin is descriptive of wide range of special Data are given on charging machines, floor manipulators, overhead chargers, goggle valves, clay guns, grab buckets, granulating mills and making pit cover carriage.

#### 10. Micrometers & Gages

Ceorge Scherr Co .--- 8-page illustrated bulletia describes precision measuring equipment inchaing micrometers, dial test indicators, sine har anticonters, dial test indicators, sine bars pocket silde calipers, vernier calipers, hardened solid steel squares, surface gages and telescoping gages. Micrometers are capable of accurate measurement to 0.0001-inch.

#### 11. Universal Vise

Reypo Corp .--- Illustrated data sheet "Universal Ball Vise" deals with universal vise designed for holding work at any desired angle with no dead motion. Unit is adaptable for wide range of applications. Jaws are interchangeable and reversible.

#### 12. Leather Belting

S. R. Sikes Co .- 6-page illustrated folder No. 20M describes notched leather V-shaped belt-ing made in 100-foot lengths for use with metal couplers. Chain link couplers are presented and methods of joining belting are discussed.

#### **13. Surface Treatment**

Parker Rust Proof Co. - 8-page illustrated manual "Bonderite as an Aid in Drawing" describes use of Bonderite prior to drawing to reduce metal to metal contact, prolong tool life, permit faster drawing speeds and deeper draws, reduce material breakage and to give smooth finish to product.

#### 14. Blast Cleaning

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Pangborn Corp.-22-page illustrated catalog "Blast Cleaning Specials Made to Your Measure by Pangborn" shows wide range of Airless Rotoblast methods of cleaning and descaling of flat plates and shapes, springs, assorted heavy parts, cylinder heads, rounds and hexes. In each case, application is discussed under varying circumstances. Standard and special equipment are described.

#### **15. Underground Pipe Conduit**

H. W. Porter & Co.-4-page illustrated fold-H. W. Porter & Co.—4-page illustrated told-er No. 461 provides information on Therm-O-Tile for underground pipe lines. Conduit af-fords permanently dry insulation. Construction details, strength and cost are discussed.

#### 16. Industrial Cut Gears

Industrial Gear Mfg. Co.-272-page illustrated catalog No. 143 presents complete data and prices of spur, bevel, miter, spiral, helical, internal and worm type industrial cut gears in any quantity and made of any material. Generated tooth racks, precision surface grinding, cut sprockets and roller chain are covered also. Engineering data are included.

#### 17. Drill Sharpening

Republic Drill & Tool Co.—24-page illus-trated manual No. G-1 contains detailed data on proper care of twist drills and gives number of pointers on sharpening and web thinning as well as dimensions and angles of proper points for best results.

#### 18, Precision Lathe

South Bend Lathe Works-16-page illustrated catalog No. 77-S presents complete line of practical attachments and accessories for various sizes of South Bend precision lathes, Attachments include telescopic taper, milling, keyway cutting and other types.

#### **19. Concrete Shrinkage Control**

Master Builders Co.—34-page illustrated booklet "The Action of Embcco in Concrete and Mo:tars" discusses shrinkage of concrete and mortar, its influence on durability, prin-cipal factors affecting it, and its control and elimination. Principle of Embeco specially pre-nared metallic agreement in controlling abrick pared metallic aggregate in controlling shrinkage is explained

#### 20. Wire Rope

Macwhyte Co. - 160-page illustrated loose-leaf thumb indexed catalog No. G-15 provides accurate information, tables, data and reference material on wire rope for all phases of industry. Section is devoted to wire rope terms.



#### PRODUCTS MANUFACTURED

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#### 21. Precision Gages

Sturdy Tool & Cage Co.--4-page illustrated catalog "Sturdy" describes company's line of steel, chrome plated, tungsten carbide and Norbide precision gages, jigs and fixtures.

#### 22. High Speed Steels

Latrobe Electric Steel Co.—12-page illustrated fclder describes Desegatized high speed steel which is free from carbide segregations, Recent improvements in process of manufacture are covered.

#### 23. Clad Steels

Lukens Steel Co.—36-page illustrated circular "Lukens Clad Steels" discusses permanence of bond, corrosion-resistance, finish, sizes, weights and fabrication of nickel, Inconel and Monel clad steels. Numerous applications in many industries are listed and pictured.

#### 24. Grinding Wheels

Midwest Abrasive Co.—94-page illustrated booklet "Grinding Wheel Information" covers history of grinding wheels and gives comprehensive explanations of grain sizes, types and fundamentals of grinding wheel operation. Specification data on all types of grinding wheels are included.

#### 25. Mineral Wool Insulation

Industrial Mineral Wool Institute—20-page manual for process engineers and power men presents research data and case histories of industrial applications of mineral wool insulation. Descriptions of various forms of mineral wool insulation are given. "Heat Loss Estimate Sheet" aids in figuring dollar savings of insulated surfaces.

#### 26. Precision Casting

I. Shor—30-page illustrated catalog and data book No. 101A describes precision casting by lost wax process and gives information and prices on all necessary equipment. Setting up shop, mold fabrication, waxing, investing, melting and casting are discussed in detail.

#### 27. Roll Grinding

Norton Co.—54-page illustrated booklet "Roll Grinding" reveals factors affecting roll grinding results. Grinding of hot and cold mill rolls and paper mill rolls is covered. Roll grinding wheel specifications are included.

#### 28. Inventory Control

International Business Machines Corp.—4page illustrated folder form No. 52-3259-1 outlines application of electric punched card accounting machines to inventory control. Typical examples are shown.

#### 29. Arc Welding

Lincoln Electric Co.-48-page illustrated pocket size manual "Fleet Welding" is designed to assist users of arc welding in establishing proper welding procedures and procedure control. Comprehensive tables are included for forming butt, fillet and lap, corner, and edge welds.

#### 30. Wire Rope

Preformed Wire Rope Information Bureau-24-page illustrated bulletin "Preformed Wire Rope-What It is-What It Does" tells story of development of wire rope. In nontechnical language, it tells what preforming process does to wires in rope and effect it has on rope's final service.

#### **31. Machine Tool Drives**

Lima Electric Motor Co.—6-page illustrated folder "Lima Gearshift Drives" deals with line of simple, compact and efficient drives for all types of new or used machine tools or production equipment. Electric motors, pedestal grinders and polishing and buffing lathes are discussed also.

#### 32. Asbestos Protected Cable

Okonite Co.—4-page illustrated bulletin No. OK-2061 describes principal types of Okobestos heat and corrosion resistant wires and cables. Units are insulated with impregnated felted asbestos and designed to transmit electrical power where high temperatures are encountered.

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#### 33. Welding & Cutting Equipment

Modern Engineering Co.-36-page illustrated catalog No. 120 shows, describes and gives applications of complete line of welding and cutting equipment and supplies. Supplementary price list is inserted.

#### **34. Electric Hoists**

Lisbon Hoist & Crane Co.—8-page illustrated pumphlet on Bob-Cat line of electric cable hoists shows details of design and construction of this unit which features lightness in weight, compactness, accessibility of parts, and strength.

#### **35. Electric Power Plants**

D. W. Onan & Sons — 16-page illustrated vest pocket sized folder "Onan Electric Generating Flants presents data on 65 onsie models of electric power plants with capacities ranging from 350 to 35,000 watts. Installation information and maintenance instructions are included.

#### 36. Automatic Turning Machine

Monarch Machine Tool Co.—36-page illuttrated booklet on Uni-Matic universal automatic turning machine describes this unit which consists of headstock and bed that provides for utilizing one, two or three independent Uni-Mat motor driven tool slides.

#### **37. Painting Processes**

Harper J. Ransburg Co., Electric Coating Div.—8-page illustrated tolder "Electrostatic Painting Processes" describes electrostatic spraying and detearing processes that are said to save 75 per cent of paint used and to provide for precision painting and uniformity.

#### 38. Wire Brushes

Independent Pneumatic Tool Co.—4-page illustrated bulletu JE-538 lists Thor wire brushes and gives detailed specifications and prices. Heavy duty brushes in arbor hole adapter and section types, valve guide cleaning brushes, spiral twist wire cup brushes and rotary carbon cleaning brushes are covered.

#### **39. Spectro-Chemical Analysis**

Applied Research Laboratories—19-page technical bulletin "Quantometer Description" contains data on Quantometer direct reading instrument which determines spectro-chemical analysis of properly prepared sample in about 45 seconds. Up to eleven elements can be measured simultaneously.

#### 40. Induction Heating Units

Lepel High Frequency Laboratories Inc.-32-page illustrated catalog "Lepel High Frequency Induction Heating Units" explains advantages of application of induction heating to hardening, annealing, brazing, soldering and melting operations. Variety of equipment for various, requirements is shown.

#### 41. Surplus Government Plant

War Assets Administration 222-page inventory of government owned industrial plants listed by states is indexed by lessees of operators and classified by products or functions. Plants isited are being offered to private enterprise for sale or lease, in whole or in part.

#### 42. Testing Equipment

Steel City Testing Laboratory—Composite of fourteen illustrated data sheets "Testing Instruments" reveal specific information on hydraulic Brinell testing machines, ductility machines tor testing drawing qualities of sheet metal and universal testing machine for tensile, compresion, transverse and shear tests.

#### 43. Drills & Reamers

Whitman & Barnes Div., United Drill & Tool Corp.-202-page illustrated loose leaf thumb indexed catalog No. 100 incorporates technical data and specifications on heavy duty drills, screw machine drills, carbide tipped reamer, etc. Special tools, punches and twist drills are also discussed.

#### 44. Gears

Philadelphia Gear Works, Inc.-56-page illustrated catalog No. 46 lists stock and standard gears of company. Engineering data section of catalog is based on standard practice. Spur, worm, herringbone, planetary, internal, bevel, miter, intermittent, spiral, helical and continuous tooth gears are illustrated and discussed.

#### Steel Price Adjustments Indicate Uptrend Starting

Major steelmaking firms expected to move slowly and are quoting unchanged levels . . . Coal strike threatens to force widespread steel mill shutdowns

STEEL prices showed some signs of rising to higher levels last week as several small producing interests announced upward adjustments in quotations on various products and changes in certain extra lists. Base prices quoted by major steelmaking companies, however, remain unchanged, and indications are they will move slowly in making adjustments.

The market situation last week was complicated by the coal strike which threatens to force widespread curtailment of steelmaking operations over the next week or two.

Five of the smaller independents advanced galvanized sheet prices. No. 10 gage has been established as the base at 3.55c to which is added new extras for gage and coatings. On No. 24 gage, the increase amounts to \$12 a ton. The advances by these companies are understood to be closely in line with proposals made in the past to OPA by the steel industry advisory committee and some interests believe the new prices will eventually be adopted generally.

Other scattered changes include a \$5 increase by an eastern Pennsylvania plate producer, a reported increase in bars by one producer. The Birdsboro, Pa., pig iron producer has advanced all grades \$2 a ton, thus bringing prices in balance with costs. Leading producers of electric furnace silvery pig iron advanced prices \$2 a gross ton on all grades, effective as of Nov. 1.

Continuation of the soft coal strike will bring drastic reduction in steelmaking operations this week. Moving more quickly to conserve fuel than upon occasion of the coal strike last spring, steel producers started curtailing



DISTR	ICT ST	EEL RAT	ES	
Percentage	of Ingot Leading	Capacity Districts	Engage	d
	Week Ended Nov 25	Change	Same 1945	Week 1944
Pittsburgh Chicago Eastern Pa Youngstown Wheeling Cleveland Buffalo		None -2.5 -7 -16 +4.5 +4 -19.5	78.5 91 78 80 90 87 86	92 92.5 95.5 88 91 93 90.5
Birmingham New England Cincinnatı St. Louis Detroit Estimated nation	99 90 87 72.5 89 nal	None None -2 +4.5 -3	95 83 65 68 87	90 90 87 75 88
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immediately following the general walkout of miners last week. Full impact of the strike will not be felt until this week when much sharper curtailment of operations is scheduled. Blast furnace production was affected almost immediately, with one eastern Pennsylvania stack taking occasion to blow out for repairs.

Should there eventually be a new increase in coal prices a further advance in iron prices may result. Until recently most iron sellers were disposed to await developments in the mine dispute, but with one furnace now having already taken action and with nothing definite on the price of coal in early prospect, other producers may advance prices shortly.

With prices of steelmaking scrap steadying at around \$5 above former OPA ceiling levels, activity in metal markets pricewise centered mainly in nonferrous metals. Phelps Dodge Corp. and Miami Copper Co. advanced copper prices two cents a pound to 19.50c, Connecticut valley, while other domestic producers continued at 17.50c and foreign producers at 21.50c. Lead producers raised prices 1.30 cents a pound higher to the basis of 11.65c, East St. Louis. While prime western zinc held unchanged, zinc oxide, lead-free, advanced 1 cent a pound.

STEEL's composite market average on steelmaking scrap eased last week to \$23.58 from \$24.17 while those on finished steel at \$64.45, on semifinished steel at \$40.60 and on steelmaking pig iron at \$27.50 held unchanged.

Estimated national steel production rate dropped 8 points last week to 83.5 per cent, the lowest since mid-June. Shutdowns were gaining momentum steadily as the week closed. Operations slumped 19½ points to 49 per cent at Buffalo, 16 points to 75 per cent at Youngstown, 7 points to 70 per cent in eastern Pennsylvania, 3 points to 89 per cent at Detroit, 2½ points to 90 per cent at Chicago, and 2 points to 87 at Cincinnati. While advances of 4 to 4½ points were made at Cleveland, Wheeling and St. Louis, this trend is expected to reverse itself this week. Other district operations were unchanged.

#### MARKET PRICES

#### COMPOSITE MARKET AVERAGES

				One	Three	One	Five
				Month Ago	Months Ago	Year Ago	Years Ago
	Nov. 23	Nov. 16	Nov. 9	Oct., 1946	Aug., 1946	Nov., 1945	Nov., 1943
Finished Steel	\$64.45	\$64.45	\$64.45	\$64.45	\$64.45	\$58.27	\$56.73
Semifinished Steel	40.60	40.60	40.60	40.60	40.60	37.80	36.00
Steelmaking Pig Iron	27.50	27.50	27.50	27.50	27.50	24.75	23.00
Steelmaking Scrap	23.58	24.17	19.17	19.17	19.17	19.17	19.17

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:— Average of basic pig iron prices at Betblehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Serap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons

#### COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month. Three Months and One Year Ago Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

**Pig Iron** 

Scrap

Heavy melting steel, No. 1, Pittsburgh \$25.00Heavy melt. steel, No. 2, E. Pa.22.00Heavy melting steel, Chicago23.75Rails for rolling, Chicago24.75No. 1 cast, Chicago30.00

#### **Finished Material**

	Nov. 23,	Oct.,	Aug.,	Nov.
	1946	1946	1946	1945
Steel bars, Pittsburgh	2.50c	2.50c	2.50c	2.25
Steel bars, Philadelphia	2.86	2.86	2.86	2.57
Steel bars, Chicago	2.50	2.50	2.50	2.25
Shapes. Pittsburgh	2.35	2.35	2.35	2.10
Shapes, Philadelphia	2.48	2.48	2.48	2.21
Shapes, Chicago	2.35	2.35	2.35	2.10
Plates, Pittsburgh	2.50	2.50	2.50	2.25
Plates, Philadelphia	2.558	2.558	2.558	2.30
Plates, Chicago	2.50	2.50	2.50	2.25
Sheets, hot rolled, Pittsburgh	2 425	2.425	2.425	2.20
Sheets, cold-rolled Pittshurgh	3 275	3.275	3.275	3.05
Sheets No 24 galy Pittshurgh	4.05	4.05	4.05	3.70
Sheets, hot-rolled Gary	2,425	2.425	2,425	2.20
Sheets, cold-tolled Gary	3 275	3.275	3.275	3.05
Sheets No 24 galy Gary	4.05	4.05	4.05	3.70
Hot-rolled strip over 6 to 12-in., Pitts	2.35	2.35	2.35	2.10
Cold-miled strin Pittshurgh	3.05	3.05	3.05	2.80
Bright basic, bess, wire, Pittshurgh	3.05	3.05	3.05	2.75
Wire nalls Pittahurgh	3 75	3.75	3.75	2.90
Tin plate, per base box, Pitisburgh.	*\$5.25	*\$5.25	*\$5.25	\$5.00

\* Nominal.

#### Semifinished Material

Sheet bars, Pittsburgh, Chicago \$	38.00 \$38.00	\$38.00 \$36.00	Coke	
Slabs, Pittsburgh, Chicago	39.00         39.00           39.00         39.00           2.30c         2.30c	39.00 36.00	Connellsville, furnace ovens	\$8.75
Rerolling billets, Pittsburgh		39.00 36.00	Connellsville, foundry ovens	9.50
Wire rods, No. 5 to A-inch, Pitts		2.30c 2.15c	Chicago, by-product fdry., del	15.10

#### STEEL, IRON, RAW MATERIA L, FUEL AND METALS PRICES

Finished sieel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Delivered prices do not include the 3 per cent federal tax on freight. Pricing on rails was changed to net ton basis as of Feb. 15, 1946.

#### Semifinished Steel

Carbon Stoel Ingots: Rerolling quality, stand-ard analysis, \$33, fob mill; forging quality, \$38, Pittsburgh, Chicago, Gary, Cleveland, ard \$38, Birmingham, Buffalo, Youngstown.

Alloy Steel Ingots: Pittsburgh, Chicago, But-falo, Bethlehem. Canton, Massillon, Coates-ville, uncrop, \$48.69.

Rerolling Billets, Blooms, Slahs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, \$39; Detroit, del., \$41.50; Duluth (billets), \$41; Pac. ports (billets), \$51.50 (Andrews Steel Co., carbon slabs, \$41.)

Forsing Quality Blooms, Slabs, Billets: Pitta-bursh, Chicago, Gary, Cleveland, Buifalo, Birmingham, Youngstown, \$47: Detroit, del., \$49:50; Duluth, billets, \$49; forging billets fob Pac. ports, \$59.50.

(Andrews Steel Co., carbon forging billets, \$50 gross ton at established basing points.)

Alloy Billets, Siabs, Blooms: Pittsburgh, Chl-cago, Buffalo, Bethlehem, Canton, Massillon, \$53,43; del Detroit \$60.93; eastern Mich. \$61.93.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Toungstown, 38. (Empire Sheet & Tin Plate Co., Mans-field, O., carbon, sheet bars, \$39, fob mill.)

Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb, 2.05c.

Wire Bods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5- $\frac{1}{2}$  in. inclusive, per 100 lb, \$2.30. Do., over  $\frac{1}{2}$  in. inclusive, per 100 lb, \$2.30. Do., over  $\frac{1}{2}$  in. incl., \$2.45 Galveston, base, \$2.40 and \$2.55, respectively. Worcester add \$0.10; Pacific ports \$0.535, Pittsburgh S'eel Co., No. 5- $\frac{1}{2}$  in., \$2.65; over  $\frac{2}{3}$ , in. \$3. over 31 in., \$3.

#### Bars

Hot-Rolled Oarbon Bars and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago,

Gary, Cleveland, Buffalo, Birmingham base, 20 tons one size, 2.50c; Duluth, base, 2.60c; De-troit, del., 2.635c; eastern Mich., 2.685c; New York, del., 2.86c; Phila., del., 2.88c; Guif ports, dock, 2.885c; Pac. ports, dock, 3.185c (Joslyn Mfg. & Supply Co., 2.55c, fob Chicago.)

**Ball Steel Bars:** Same prices as for hot-rolled carbon bars except base is 5 tons.

Hot-Rolled Alloy Rars: Pittsburgh, Youngs-town, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.921c; De-trolt, del., 3.056c, (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI	("Basic	AISI	(*Basic
Serles	O-H)	Series	O-H)
1300	.\$0.108	4300	\$1.839
2300	. 1.839	4600	1.298
2500	. 2.759	4800	2.326
3000	. 0.541	5100	0.379
3100	. 0.920	5130 or 51	52 0.494
3200	. 1.461	6120 or 61	52 1.028
3400	. 3.462	6145 or 61	50 1.298
4000	. 0.487	8612	0.703
4100 (.1525)	Mo) 0.757	8720	0.757
(.2030)	Mo) 0.812	9830	1.407

• Add 0.25 for acid open-hearth; 0.50 electric, Cold-Finished Carbon Bars: Pittsburgh, Chi-cago, Gary, Cleveland, Buffalo, base, 20,000-39,999 lb, 3.10c; Detroit, 3.15c; Toledo, 3.25c. cago.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 3.625c; Detroit, del., 3.76c; eastern Mich., 3.79c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Spar-rows Point, Buffalo, Youngstown, base, 2.35c; Detroit, del., 2.485c; eastern Mich. and Toledo, 2.535c; Gulf ports, dock, 2.735c; Pacific porta, dock 2.785c. Beinforcing Bars (Rail Steel): Pittsburgh, Chi-cago, Gary, Cleveland, Birmingham, Youngs-

Nov. 23, Oct., 1946 1946

\$29.77 28.00 29.93

29.27 29.27 30.43 28.50

24.88

24.88 28.94 28.50 28.50 33.00 28.61 140.00

\$20.00 18.7518.7522.25

25.00

\$8.75 9.50 15.10

Aug., 1946

\$29.77 28.00 29.93

29 27

29.27 30.43 28.50 24.88 28.94 28.50 28.50 33.00 28.61

140.00

\$20.00 18.75 18.75 22.25

20.00

\$8.75 9.50 15.10

Nov. 1945

\$26,94 25,25 27,09 26,44 27,59 25,75 22,13 26,05 25,75 23,00 25,80 140,00

\$20.00 18.75 18.75 22.25 20.00

\$7.50 8.25 13.75

town, Buffalo, base, 2.35c; Detroit, del., 2.425c; eastern Mich. and Toledo, del., 2.535c; Gulf ports, dock, 2.735c. Iron Bars: Single refined, Pitts., 4.76c; double refined, 5.84c; Pittaburgh, staybolt, 6.22c; Terre Haute, single ref., 5.42c; double ref., 6.76c. 6 76c

#### Sheets, Strip

Sheets, Strip Hot-Rolled Sheets: Pittsburgh, Chicago, Gara, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base, 2.425c; Gran-ite City, base, 2.525c; Detroit, del., 2.56c; New York, del., 2.65c; Phila., del., 2.56c; New York, del., 2.65Sc; Pacific ports, 3.01 (Andrews Steel Co. quotes hot-rolled aher for shipment to the Detroit area on the Mid-dletown, C., base; Alan Wood Steel Co., Cor-shohocken, Pa., 3.00c on hot carbon sheets. Sparrows Point, Md.; Granite City Steel Co., 2.875c, fob Granite City, Ill., 2.775c, fob Grante City, Jill., 2.775 Birmingham.) or

Cold-Bolied Sheets: Pittsburgh, Chicago, Cere-land, Gary, Buffalo, Youngstown, Middletown, base, 3.275c; Granite City, base, 3.375c; De-troit, del., 3.41c; eastern Mich., del., 3.48c; New York, del., 3.615c; Phila., del., 3.48c; Pacific ports, 3.96c. Calvaptical Sheets, No. 41, Dittsburgh, Chi-

Galvanized Sheets, No. 24: Pittsburgh, Chi-cago, Gary, Birmingham, Buffalo, Younstowa, Sparrows Point, Middletown, base, 4.05c; Gran-ite City, base, 4.15c; New York, del. 4.3tc; Phila, del., 4.24c; Paclhe ports, 4.63c. (Gran-ite City Steel Co., 4.50c, fob Granite City, II., 4.40c, fob Gary or Birmingham.)

Corrugated Galv. Sheets: Pittsburgh. Chicam, Gary, Birmingham, 29-gage, per square, 273c. Gary, Birmingham, 29-gage, per square, 2.13c. Culvert Sheets: Pittsburgh, Chicago, Gar, Birmingham, 16-gage not corrugated, copper alloy, 4.15c; Granite City, 4.25c; Pacific poris, 4.635c; copper iron, 4.50c; pure iron, 4.50c; zinc-coated, hot-dipped, heat-treated, No. 24 Pittsburgh, 4.60c.

Aluminized Sheets, 20 gage: Pittsburgh, hol-dipped, colls or cut to lengths 9.00c.

Enameling Sheets: 10-gage; Pittsburgh, Chi-cago, Gary, Cleveland, Youngstown, Middle-town, base 3.20c; Granite City, base 3.30c; Detroit, del., 3.335c; eastern Mich., 3.385c; Pa-cific ports, 3.885c; 20-gage; Pittsburgh, Chi-cago, Gary, Cleveland, Youngstown, Middle-town, base, 3.80c; Detroit, del., 3.935c; eastern Mich., 3.985c; Pacific ports, 4.485c. Electrical Shasts No. 24. Electrical Sheets No. 24:

· ··· ································			
	Pittsburgh	Pacific	Granite
	Base	Ports	City
Field grade	3.90c	4.685c	4.00c
Armature	. 4.25c	5.035c	4.35c
Electrical	4.75c	5.535c	4.85c
Motor	. 5.425c	6 21c	5 5250
Dynamo	6.125c	6.91c	6 2250
Transformer		0.010	0.4400
72	. 6.625c	7.41c	
65	. 7.625c	8.41c	
58	. 8.125c	8.91c	
52	. 8.925c	9.71c	

Cold-Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less, 3.05c; Chi-cako, base, 3.15c; Detroit, del, 3.185c; eastern Mich., del., 3.235c; Worcester, base, 3.25c. (Superior Steel Corp., 4.70c, Pitts.) Cold-Finished Spring Steel: Pittsburgh, Cleve-iand base, 0.26-0.50 carbon, 3.03c. Add 0.20c for Worcester.

#### Tin, Terne Plate

(Maximum nominal tin plate prices permitted (Maximum nominal tin plate prices permitted under OPA; actual market 25 points lower due to contract commitments.) fin Flate: Pittsburgh, Chicago, Gary, 100-lb base box, \$5.25; Granite City, Birmingham, Sparrows Point, \$5.35. Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb base box 0.25 lb tin, \$4.60; 0.50 lb tin, \$4.75; 0.75 lb tin, \$4.90; Granite City, Birmingham, Sparrows Point, \$4.70, \$4.85, \$5.00, respectively.

incham, Sparrows Point, \$4.70, \$4.85, \$5.00, respectively. Tia Mill Black Plate: Pittsburgh, Chicago, Gary, base 29-gage and lighter, 3.30c; Granite City, Birmingham, Sparrows Point, 3.40c; Pa-cific ports, boxed 4.335c. Lang Ternes: Pittsburgh, Chicago, Gary, No. 24 unasorted, 4.05c; Pacific ports, 4.835c. Manufacturing Ternes (Special Coated): Pitts-burgh, Chicago, Gary, 100-base box, \$4.55; Granite City, Birmingham, Sparrows Point, \$4.65.

34.65. Reeding Termes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I. C. 8-lb \$12.50; 15-lb \$14.50; 20-lb \$15.50 (nom.); 40-lb \$20.00 (nom.).

#### Plates

Carbon Steel Plates: Pittsburgh, Chicago, Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.50c; Geneva, Utah, 2.65c; New York, del., 2.71c; Phila, del, 2.558c; St. Louis, del, 2.74c; Bos-ton, del, 2.85c; Pacific ports, 3.085c; Guif ports, 2.885c.

Phila, del., 2.558c; St. Louis, del., 2.74c; Boston, del., 2.86c; Pacific ports, 3.085c; Gulf ports, 2.85c; Gulf correct construction of Birmingham; Central Iron & Steel Co., Harrisburg, Pa., 3.05c, basing points; Lukens Steel Co., Coatesville, Pa., Worth Steel Co., Conshohocken, Pa., 2.75c base.)
Phoer Pintes: Plitsburgh, Chicago, 3.75c; Pacific ports, 4.435c; Gulf ports, 4.135c.
Open-Hearth Alloy Phates: Pittsburgh, Chicago, Coatesville, 2.787c; Gulf ports, 4.308c; Pacific ports, 4.525c.
Cha Steel Plates: Coatesville, 10% cladding; Chad Steel Plates; Coatesville, 10% cladding; Chad Steel Plates; Coatesville, 10% cladding;

Chad Ster Plates: Coatesville, 10% cladding: nickel-clad, 18.72c; inconel-clad, 26.00c; monel-clad, 24.96c.

#### Shapes

Shapes stractural shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.35c; Gen-eva. Utah. 2.50c; New York, del., 2.54c; Phila., del., 2.48c; Pacific ports, 3.035c; Gulf ports, 2.735c. Phoenix Iron Co., Phoenixville, Pa., quotes the equivalent of 2.60c, Bethlehem, Pa., on the equivalent of 2.60c, Buffalo, 2.55c; Pacific ports, 3.235c. Wire and Wire Products

Wire and Wire Products

 

 Wire and Wire Products

 (Fob Pittsburgh, Chicago, Cleveland and Birm-ingham per 100 pounds).

 Wire to Manufacturers in carloads

 Bright, basic or bessemer
 \$3.05

 Spring (except Birmingham)
 \$4.00

 Wire Products to Trade
 \$3.75

 Sandard and cement-coated
 \$3.40

 Wire, Merchant Quality
 \$3.40

 Standard
 \$3.40

 Wire, Merchant Quality
 \$3.305

 Annealed \$\$3.50 Galvanized \$\$3.85

(rob ritisourgh, Chicago, Cleveland, Bi	rming-
ham, per base column,	
Woven fence, 151% gage and heavler	••72
Barb. d wire, 80-rod spool	tt79
Barbless wire, twisted	tt79
Fence posts	74
Bale ties, single loop	724

\*Add \$0.10 for Worcester, \$0.05 for Duluth and \$0.535 for Pacific ports. †Add \$0.30 for Worcester, \$0.535 for Pacific ports. Nichols Wire & Steel, \$4.25; Pittsburgh Steel Co., \$4.10.

\$Add \$0.535 for Pacific ports. \$Add \$0.10 for Worcester; \$0.735 Pacific ports

\*\*Pittsburgh Steel Co., 77. ††Pittsburgh Steel Co., 89.

#### **Tubular Goods**

Welded Pipe: Base price in carloads, threaded and coupled to consumers about \$200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain O.: Gary, Ind., 2 points less on lap weld. I point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Welded						
Steel Iron						
In. E	lk. Galv.	In.	Bik.	Galv.		
3/8	53 30	1/2	21	016		
14 & 1/4 :	56 3716	S	27	7 "		
1/2	601/6 48	1-114	31	13		
14	5316 52	116	35	1516		
1-36	516 5416	2 12	3414	15		
	Lan	Weld				
	Steel		Tr	on		
In. E	lk. Galv	In	Blk	Galv		
2 1	58 4614	11/	20	01/		
214-3	4912	112	251/	779		
314-6	5112	972	271	à		
7-	32 4017	21/ 21/		111/		
9.10	11/ 10	4 10 12	201	1 1 73		
11.12	5017 40	41/ 0	30%	10		
11-12	00 /2 40	0.10	294	1 14		
Boller Tube	as Mat he	9-12		9		
tob Dittahun	s: Net ba	ise prices	per 10	0 feet		
out longth d	sn in carlo	Jad lots, )	minimun	n wan,		
cut length 4	10 24 166	t, inclusiv	e			
0.0	-Sear	niess-	-Elec.	weld-		
U.D.	HOL	Cold	Hot	Cold		
Sizes B.W.G	. Rolled	Drawn	Rolled	Rolled		
17 13		\$9.90	\$9.36	\$9.65		
14" 13	-14111	11,73	9.63	11.43		
11/2" 13	\$10.91	12.96	10.63	12.64		
1%" 13	12.41	14.75	12.10	14.37		
2" 13	13.90	16.52	13.53	16.19		
244 13	15.50	18.42	15.06	18.03		
21/4 " 12	17.07	20.28	16.57	19.83		
21/2" 12	18.70	22.21	18.11	21.68		
24 12	19.82	23.54	19.17	22.95		
3" 12	20.79	24.71	20.05	24.02		
31/2" 11	26.24	31.18	25.30	30.29		
4" 10	32.56	38.68	31.32	37.52		
41/2" 9	43.16	51.29				
5" 9	49.96	59.36				
6" 7	76.71	91.14				

Pipe, Cast Iron: Class B. 6-in. and over, \$60 per net ton, Birmingham; \$65, Burlington, N. J.; \$62.80, del., Chicago; 4-in, pipe, \$5 higher, Class A pipe, \$3 a ton over class B. and over, \$60

Rails, Supplies Standard rails, over 60-lb, fob mill, net ton, \$43.40. Light rails (billet), Pittsburgh, Chi-cago, Birmingham, net ton, \$49.18. Relaying rails, 35 lb and over, fob railroad and having points \$31.533

and basing points, \$31-\$33. Supplies Track bolts, 6.50c; heat treated. 6.75c. Tie plates \$51 net ton, base, Standard spikes, 3.65c

#### **Bolts**, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chi-cago. Additional discounts: 5 for carloads; 10 for full containers, except tire, step and plow bolts

(Base prices advanced 12 per cent, effective July 27, 1946; discounts remain unchanged.) Carriage and Machine 5514 off

72 . 0 and smarter	1/0	OII
Do., and % x 6-in. and shorter63	12	off
Do., % to 1 x 6-in. and shorter 6	51	off
1 % and larger, all lengths	59	off
All diameters, over 6-in, long	59	off
Tire bolts	50	off
Step bolts	56	off
Plow bolts	65	off
Storie Bolts	~~	~~~

In packages, nuits separate, 71-10 off, nuts attached, 71 off; bulk, 80 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

LUU I	18	
Semifinished hex	U.S.S.	SAF
1-in, and smaller		64
12-in, and smaller	62	
14-in1-in.		60
A-in1-in	59	00
146-in -114-in	57	80
15 in and larger	KC	90
Additional discount of 10	dam de 11 1	
Additional discount of 10	for full kegs.	
Hexagon Ca	p Screws	
Upset 1-in., smaller		. 64 of
Milled 1-in., smaller		. 60 of
Square Head	Set Screws	
Upset 1-in. and smaller		. 71 of
Headless, 14-in, and larg	er	. 60 of
No. 10 and smaller		70 of

#### Rivets

Fob Pittsburgh, Cleveland, Chicago, Birmingham

Structural 4.75c 4.75c

#### Washers, Wrought

#### **Tool Steels**

Tool Steels: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; reg. carbon 15.15c; extra carbon 19.48c; special carbon 23.80c; oll-hardening 25.97a high carbon-chromium 46.53c.

w	Cr	v	Mo	Der lb
18.00	4	1		72.49c
1.5	4	1	8.5	58.430
6.40	4.15	1.90	5	62.22c
5.50	4.50	4	4.50	75.74c

#### **Stainless Steels**

Base, Cents per 1b

CHROMIUM NICKEL STEELS

				H.R.	C.R.
	Bars	Plates	Sheets	Strip	Strip
302	25.96c	29.21c	36.79c	23.93c	30.300
303	28.13	31.38	38.95	29.21	35.71
304	27.05	31.38	38.95	25.45	32.46
308	31.38	36.79	44.36	30.84	37.87
309	38.95	43.28	50.85	40.03	50.85
310	53.02	56.26	57.35	52.74	60.50
312	38.95	43.28	53.02		
*316	43.28	47.61	51.94	43.28	51.94
\$321	31.38	36.79	44.36	31.65	41.12
1347	35.71	41.12	48.69	35.71	45.44
431	20.56	23.80	31.38	18.94	24.35
STRAIC	HT CHE	OMUIM	STEEL		
403	23 93	26 51	31 92	22.99	29.21
• • 410	20.02	23.93	28.67	18.39	23.80
416	20.56	23.80	29.21	19.75	25.45
++420	25.96	30.84	36.25	25.70	39.49
430	20.56	23.80	31.38	18.94	24.35
11430F	21.10	24.35	31.92	20.29	26.51
440A	25.96	30.84	36.25	25.70	39.49
442.	24.35	27.59	35.17	25.96	34.62
443	24.35	27.59	35.17	25.96	34.62
446.	29.76	33.00	39.19	37.87	56.26
501.	8.66	12.98	17.04	12.98	18.39
502.	9.74	14.07	18,12	14.07	19.49
	-		TET /201	07. )	
STAINI	ESS CL	AD SIF	Jachingti	n Pa	niste
(FOD P	naludo n	anu	and pic	kling.)	
204	actude at	19 48	20.56		
410		17 31	18.39		
430		17.85	18.94		
4.30		19.48	20.56		
440		30.30			

• With 2-3% molybdenum. i With titanium. † With columbium. •• Plus machining agent. †† High carbon. ‡‡ Free machining.

#### Metallurgical Coke

#### Price Per Net Ton

Beehlye Ovens	
Connellsville, furnace	*\$8.75
Connellsville, foundry	9.25- 9.75
New River, foundry	10.25-10.50
Wise county, foundry	9.00- 9.50
Wise county, furnace	8.50- 9.00
By-Product Foundry	
Kearney, N. J., ovens	14.40
Chicago, outside delivered	14.30
Chicago, delivered	15.30
Terre Haute, delivered	14.80
Milwaukee, ovens	15.10
New England, delivered	15.00
St. Louis, delivered	115.10
Birmingham, delivered	12.20
Indianapolis, delivered	14.83
Cincinnati, delivered	14.00
Cleveland, dellvered	14.00
Buffalo, delivered	14.78
Detroit, delivered	10.10
Philadelphia, delivered	14.60

• Operators of hand-drawn ovens using trucked coal, \$9.35. † 15.68 from other than Ala., Mo., Tens.

#### **Coke By-Products**

Spot, gal, freight allowed east of C Pure and 90% benzol Toluol, two degree Industrial xylol	0maha. 15.00c 22.00s 22.00e
Per pound fob works Phenol (car lots, returnable drums) Do., less than carlots Do., tank cars	11.25e 12.00c 10.25e
Eastern plants, per pound Naphthalene flakes, balls, bbl, to job- bers, "household use"	9.00e

WAREHOUSE STEEL PRICES

Base delivered prices, cents per pound, for delivery within switching limits, subject to established extras. Quotations based on mill prices announced March 1, 1946

	Hot-rolled barn	Structural shapes	Plates	Floor plates	Hot-rolled sheets (10-gage base)	Hot-rolled strip (14-gage and lighter, 6-in. and narrower)	Hot-rolled strip (12-gage and beavier wider than, 6-inch)	Galvanized flat sheets (24-gage base)	Cold-rolled sheets (17-gage base)	Cold finished bars	Cold-rolled strip
Boston New York Jersey City Philadelphia Baltimore Washington Norfolk, Va. Bethlehem, Pa. <sup>e</sup> Claymont, Del. <sup>e</sup> Coatesville, Pa. <sup>e</sup> Buffalo (city) Buffalo (country) Pittsburgh (country) Cleveland (city) Cleveland (city) Detroit Omaha (city, del.) Conststown <sup>e</sup> Middletown, O. <sup>e</sup>	4.356 <sup>1</sup> 4.134 <sup>1</sup> 4.155 <sup>1</sup> 4.1155 <sup>1</sup> 4.114 <sup>1</sup> 4.093 <sup>1</sup> 4.232 <sup>1</sup> 4.232 <sup>1</sup> 4.377 <sup>1</sup> 5.60 <sup>1</sup> 3.50 <sup>1</sup> 3.60 <sup>1</sup> 3.50 <sup>1</sup> 3.50 <sup>1</sup> 3.60 <sup>1</sup> 3.50 <sup>1</sup> 3.60 <sup>1</sup> 3.50 <sup>1</sup> 3.60 <sup>1</sup> 3.50 <sup>1</sup> 3.50 <sup>1</sup> 3.60 <sup>1</sup> 3.50	4.203 <sup>1</sup> 4.038 <sup>1</sup> 4.018 <sup>1</sup> 3.937 <sup>1</sup> 4.031 <sup>1</sup> 4.22 <sup>1</sup> 4.303 <sup>1</sup> 3.70 <sup>1</sup> 5.65 <sup>1</sup> 3.55 <sup>1</sup> 3.5 <sup>1</sup> 3	$\begin{array}{c} 4.203^{1} \\ 4.049^{1} \\ 4.049^{1} \\ 8.875^{1} \\ 3.865^{1} \\ 4.067^{1} \\ 4.262^{1} \\ \hline \\ 8.70^{1} \\ 3.70^{1} \\ 3.70^{1} \\ 3.55^{1} \\ 3.65^{1} \\ 3.55^{1} \\ 3.65^{1} \\ 3.55$	6.039 <sup>1</sup> 5.875 <sup>1</sup> 5.5875 <sup>1</sup> 5.564 <sup>1</sup> 5.563 <sup>1</sup> 5.632 <sup>1</sup> 5.777 <sup>1</sup> 5.55 <sup>1</sup> 5.15 <sup>1</sup> 5.15 <sup>1</sup> 5.15 <sup>1</sup>	$\begin{array}{c} 4.050^{1} \\ 3.856^{1} \\ 3.856^{1} \\ 3.774^{1} \\ 3.64^{1} \\ 3.842^{1} \\ 4.037^{1} \\ \hline \\ 5.575^{1} \\ 3.475^{1} \\ 3.475^{1} \\ 3.475^{1} \\ 3.475^{1} \\ 3.475^{1} \\ 3.475^{1} \\ 3.475^{1} \\ 3.945^{1} \\ 3.955^{1$	$\begin{array}{c} 5.548^{3} \\ 4.375^{3} \\ 4.684^{3} \\ 4.293^{3} \\ 4.423^{3} \\ 4.423^{3} \\ 4.927^{3} \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\$	4.418 <sup>3</sup> 4.275 <sup>3</sup> 4.554 <sup>3</sup> 4.193 <sup>3</sup> 4.332 <sup>3</sup> 4.477 <sup>3</sup>  4.11 <sup>3</sup> 3.750 <sup>4</sup> 3.850 <sup>4</sup> 3.750 <sup>4</sup> 3.985 <sup>3</sup> 4.32 <sup>1</sup> 3.986 <sup>3</sup> 3.986 <sup>3</sup> 3.946 <sup>4</sup> 8.750 <sup>3</sup>	5.725 <sup>14</sup> 5.501 <sup>13</sup> 5.467 <sup>14</sup> 5.865 <sup>14</sup> 5.862 <sup>14</sup> 5.862 <sup>14</sup> 5.20 <sup>16</sup> 5.10 <sup>16</sup> 5.327 <sup>18</sup> 5.10 <sup>13</sup> 5.327 <sup>18</sup> 5.327 <sup>18</sup> 5.10 <sup>13</sup> 5.327 <sup>18</sup> 5.00 <sup>18</sup> 5.296 <sup>16</sup> 4.85 <sup>19</sup> 5.10 <sup>14</sup>	5.0314 4.3834 4.3804 5.1392 5.1182 5.00724 4.55224 4.62515 4.62515 4.62515 4.62515 4.62515 4.62524 4.62524 4.55224 4.55254 4.5554 4.55554 4.55556 5.555656 5.55566566 5.55566666666	4.658 <sup>24</sup> 4.605 <sup>24</sup> 4.605 <sup>24</sup> 4.504 <sup>24</sup> 4.532 <sup>26</sup> 4.532 <sup>26</sup> 4.532 <sup>26</sup> 4.532 <sup>26</sup> 4.532 <sup>26</sup> 4.532 <sup>26</sup> 4.10 <sup>11</sup> 4.20 <sup>21</sup> 4.10 <sup>11</sup> 4.20 <sup>21</sup> 4.10 <sup>11</sup> 4.20 <sup>21</sup> 4.10 <sup>11</sup> 4.25 <sup>12</sup> 4.945 <sup>21</sup>	4.968 5.071 5.074 5.074 5.074 5.074 5.074 5.074 5.074 5.074 5.074 5.074 5.074 5.074 5.074 5.074 5.071 5.074 5.071 5.074 5.071 5.074 5.071 5.074 5.071 5.074 5.0755 5.0755 5.07555555555555555555555
Chicago (city) Milwaukee Indianapolis St. Paul St. Louis Memphis, Tenn. Birmingham New Orleans (city). Houston, Tex. Los Angeles San Francisco Portland, Oreg. Tacoma, Wash. Seattle	3.75 <sup>1</sup> 3.908 <sup>1</sup> 3.83 <sup>1</sup> 4.092 <sup>3</sup> 3.918 <sup>1</sup> 4.296 <sup>1</sup> 3.75 <sup>1</sup> 4.358 <sup>1</sup> 4.00 <sup>3</sup> 4.65 <sup>4</sup> 4.65 <sup>4</sup> 4.65 <sup>4</sup> 4.60 <sup>6</sup> 4.60 <sup>6</sup>	$\begin{array}{c} 3.80^{1} \\ 3.958^{1} \\ 3.88^{3} \\ 4.142^{3} \\ 3.968^{3} \\ 4.346^{1} \\ 3.80^{1} \\ 4.408^{3} \\ 4.408^{4} \\ 4.50^{1} \\ 4.70^{4} \\ 4.185^{7} \\ 4.70^{7} \\ 4.70^{9} \end{array}$	$\begin{array}{c} 3.80^4\\ 8.958^1\\ 3.68^3\\ 4.142^3\\ 3.968^3\\ 4.346^3\\ 3.80^3\\ 4.408^3\\ 4.408^3\\ 4.408^3\\ 4.408^3\\ 4.50^3\\ 5.80^4\\ 4.185^7\\ 5.00^9\\ 5.00^6\\ 5.00^6\end{array}$	$5.40^{i}$ $5.558^{1}$ $5.48^{i}$ $5.742^{3}$ $5.568^{3}$ $6.071^{1}$ $6.153^{3}$ $6.329^{1}$ $5.75^{5}$ $7.05^{4}$ $5.885^{5}$ $6.75^{6}$ $6.75^{6}$	3.4751 3.6331 3.7431 3.817* 3.643* 4.2211 3.675* 4.2831 3.988* 4.95* 4.16* 4.87* 4.87* 4.87* 4.87*	3.951 4.1081 4.1181 4.2923 4.1181 4.2923 4.051 4.055 4.0583 4.0583 5.805 5.805 5.805 5.805	3.850 <sup>1</sup> 4.008 <sup>1</sup> 4.018 <sup>1</sup> 4.192 <sup>3</sup> 4.018 <sup>2</sup> 4.025 <sup>1</sup> 4.563 <sup>1</sup> 5.200 <sup>4</sup> 4.535 <sup>1</sup> 5.000 <sup>4</sup> 4.60 <sup>4</sup>	5.40 <sup>30</sup> 5.558 <sup>313</sup> 5.666 <sup>313</sup> 5.622 <sup>114</sup> 5.746 <sup>114</sup> 5.20 <sup>115</sup> 5.808 <sup>314</sup> 6.385 <sup>115</sup> 6.385 <sup>115</sup> 6.20 <sup>115</sup> 6.40 <sup>116</sup> 6.40 <sup>114</sup>	4 425# 4.583# 4.793# 4.793# 4.593# 5.304# 5.304# 5.81918 6.60° 6.9115 6.82518 6.5518 6.5518	$\begin{array}{c} 4.20^{x_1}\\ 4.358^{x_1}\\ 4.43^{x_1}\\ 4.852^{x_1}\\ 4.522^{x_1}\\ 4.522^{x_1}\\ 4.99^{x_1}\\ 5.079^{x_1}\\ 4.10^{x_1}\\ 6.105^{x_1}\\ 5.783^{x_2}\\ 5.983^{x_2}\\ 6.23^{x_1}\\ 6.23^{x_1}\\ \end{array}$	4,90 5,058 5,060 5,598 5,222 5,465 5,868 7,588

· Basing point cities with quotations representing mill prices, plus warehouse spread,

BASE QUANTITIES 400 to 1999 pounds; <sup>2</sup>400 to 14,999 pounds; <sup>4</sup>any quantity; 600 to 1999 pounds; <sup>4</sup>400 to 8999 pounds; <sup>6</sup>300 to 9999 pounds; <sup>4</sup>400 to 39,999 pounds; <sup>4</sup>ander 2000 pounds; <sup>6</sup>ander 4000 pounds; <sup>4</sup>500 to 1499 pounds; <sup>14</sup>ander 2000 pounds; <sup>14</sup>ander 4000 pounds; <sup>4</sup>500 to 1499 pounds; <sup>14</sup>ander 500 pounds; <sup>14</sup>ander 450

to 1499 pounds; <sup>14</sup>—one bundle to 1499 pounds; <sup>17</sup>—one to nine bundles; <sup>14</sup>—one to six bundles; <sup>19</sup>—100 to 749 pounds; <sup>19</sup>—300 to 1999 pounds; <sup>15</sup>—1500 to 39,999 pounds; <sup>24</sup>—1500 to 1999 pounds; <sup>26</sup>—1000 to 39,999 pounds; <sup>24</sup>—400 to 1499 pounds; <sup>26</sup>—1000 to 1999 pounds; <sup>26</sup>—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds. basel <sup>27</sup>—300 to 4999 pounds.

ORES	Indian and African	Rhodesian	Utah, and Pueblo, Colo., 91c; price
Lake Superior Iron Ore Gross ton, 51½% (Natural) Louver Lake Ports	48% 2.8:1 \$39. 48% 3:1 41. 48% no ratio 31	75         45% no ratio         \$28.30           00         48% no ratio         \$1.00           00         48% 3:1         lump	are subject to established premiuma, penalties and other provisiona. Price at basing points which are also notice of disparge of imported man-
Dld range bessemer	South African (Transval)           44% no ratio         \$27           45% no ratio         28           48% no ratio         \$1           50% no ratio         \$2	Domestic (seller's nearest rail) 40 48% 3:1 \$43.50 30 less \$7 freight allowance. 80 Manganese Ore	dock most favorable to the buyer. Outside shipments direct to con- sumers at 15c to 17c per unit less than Metal Reserve prices.
Eastern Local Ore Cents, units, del. E. Pa. Foundry and basic 56- 63% contract	Brazilian-nominal           44%         2.5:1         lump         \$33           48%         3:1         lump         43	<ul> <li>Sales prices of Office of Metals Reserve, cents per gross ton unit, dry, 48%, at New York, Philadelphia,</li> <li>Baltimore, Norfolk, Mobile and New 50 Orleans, 85c; Fontana, Calif., Provo.</li> </ul>	Molybdenam Sulphide conc., lb., Mo. cont., \$0,75 mines
Foreign Ore Cents per unit, cfi Atlantic ports			
55% Fe., 6-10% Mn., Nom. N. African low phos Nom. Swedish basic, 60 to 68% 13.00 Spanish, No. African ba-	(Extras for alloy content)	GENCT STEELS (Hot Kolled)	Basic open-hearth Electric furnaces
sic, 50 to 60% Nom. Brazil iron ore, 68-69% fob Rio de Janeiro 7.50-8.00	Che	mical Composition Limits, Per Cent	Bars Bars Bars per Billets per Billets 100 lb per GT 100 lb per GT
Tungsten Ore Chinese Wolframite, per short ton unit, duty paid	nation         Carbon         M           NE         9415         ,1318         .80           NE         9425         ,2328         .80           NE         9442         ,4045         1.00           NE         9500         .00         .85         50	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	*0.812         \$16.230         \$1.353         \$27.050          15         .812         16.230         1.353         27.050          15         .812         16.230         1.353         27.050          15         .866         17.312         1.407         28.133           -25         .703         14.066         1.244         24.886
Chrome Ore Gross ton fob cars, New York, Bhiledelphia Baltimore Charles	NE 99122025 .50- NE 99121015 .50- NE 99201828 .50-	.10         .10         .10         .10         .10           .70         .20         .35         .40         .60         1.00         1.30         .20           .70         .20         .35         .40         .60         1.00         1.30         .20           .70         .20         .35         .40         .60         1.00         1.30         .20	30 1.298 25.968 1.677 33.543 30 1.298 25.968 1.677 33.543

Philadelphia, Baltimore, Charles-ton, S. C., Portland, Oreg., or Tacoma, Wash. (S S paying for discharge; dry basis, subject to penalties if guar-antees are not met.)

MB 3320 110-120 100 110 120 100 110 100	E ALE ALL IS COLOR MANAGER	AD THE A THEN OF
Extras are in addition to a base price of 2.9210 per on semifinished steel major basing points and are in cents on vanadium alloy.	pound on finished products and per pound and dollars per gross	\$58.43 per gross ton ton. No prices quoted

Maximum prices per gross ton. Delivered prices do not include 3 per cent federal tax, effective Dec. 1, 1942.

	No. 2 Foundry	Baste	Bessemer	Mal- leable
Bethlehem, Pa., base Newark, N. J., del Brooklyn, N. Y. del	\$29.50 31.20	\$29.00 30.70	\$30.50 32.20	\$30.00 31.70
Bitdsboro, Pa., hoso	21 50	21 00	20 50	22.10
Birmingham hose	51.50	31.00	32.50	32.00
Baltimore del	24.88	23.50	29.50	
Boston, del.	29.62			
Chicago, del.	28.72			
Cincinnati, del.	28.94	28.06		
Cleveland, del.	28.62	27.74		
Newark, N. J.	30.82			
St Louis del	. 30.05	29.55		
Bussel ha	28.62	29.54		
Poston del	28 50	27.50	29.50	29.00
Bosherter del	30.00	29.50	31.00	_ 30.50
Svracuse del	30.03		31.03	30.53
Chicago haso	00.50	00.00	00.00	51.00
Milwankee del	28.00	28.00	29.00	28,50
Muskegon, Mich., del.	\$2.05	23.20	00,20	\$2.05
Cleveland, hase	29 50	79.00	00.00	00.50
Akron, Canton del	28.00	28.00	29.00	28.50
Detroit, base	28 50	28.00	- 29.00	28.50
Saginaw, Mich., del.	30.81	30.31	31.31	30.81
Duluth, base	29.00	28.50	29.50	29.00
St. Paul, del	31.13	30.63	31.63	31.13
Ene, Pa., base	28.50	28.00	29.50	29.00
Boston del	29.50	29.00	30.50	30.00
Granite City Til base	30.00	29.00	31.00	30.50
St. Louis, del	29.00	28.50	29.00	29.00
Hamilton, O., base	28.50	28.00		28.50
Cincinnati, del.	29.68	29.18		29.68
Neville Island, Pa., base	28.50	28.00	29.00	28.50
Pittsburgh, del., N.&S. sides	3 29.27	28.77	29.77	29.27
Provo, Utah, base	26.50	26.00		
Sparround Point, base	28.50	28.00	29.00	28.50
Ballimore del	29.50	29.00		
Steelton, Pa., hase	30.60	20.00		
Swedeland, Pa., base	29.50	29.00	30.50	30 00
Philadelphia, del.	30.43	29.93		30.93
Toledo, O., base	28.50	28,00	29.00	28.50
Youngstown, O., base	. 28.50	28.00	29.00	28.50
Mansileld, O., del	30.66	30.16	31.16	30.66

\* To Neville Island base add: 61c for McKees Rocks, Pa.; 93c Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Allquippa; 97c (water), Monongahela; \$1.24, Oakmont, Verona; \$1.38, Brackenridge.

Exceptions to above prices: Struthers Iron & Steel Co., Struthers, O., charges 50 cents a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malicable pig iron. Republic Steel Corp. quotes \$2 a ton higher for foundry and basic pig iron on the Birmingham basic

High Silicon, Silvery

0.00-0.00 per cent	(Dase)	334.00
6.51-7.00. \$35.00	9.01- 9.50.	40.00
7.01-7.50 36.00	9.51-10.00	41.00
7.51-8.00 37.00	10.01-10.50.	42.00
8.01-8.50 38.00	10.51-11.00.	43.00
8.51-9.00 39.00	11.01-11.50	44.00
Fob Jackson cour	ty, O., per	gross
ton. Buffalo bas	se \$1.25 l	nigher.
Buyer may use	whichever b	ase is
more favorable.		

more lavorable. Electric Furnace Ferrosilleon: SI 14.01-14.50%, \$50, Jackson, O.: \$53.25 Kcokuk, Iowa; \$51.25 Niagara Falls, N. Y. Add \$1 a ton for each additional 0.5% SI to 18%; 50c for each 0.5% Mn over 1%; \$1 a ton for 0.045 % max. phos.

#### Bessemer Ferrosilicon

Prices same as for high silicon sil-very iron, plus \$1 per gross ton.

#### Charcoal Pig Iron

Control blast, low phosphorus. Fob furnace, Lyles, Tenn. \$33.00 (For higher silicon irons a differ-ential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

#### Gray Forge

Neville Island, Pa. .....\$28.00 Valley base ...... 28.00

#### Low Phosphorus

Basing points: Birdsboro, Pa., Steel-ton, Pa., and Buffalo, N. Y., \$34.00 base; \$35.38, del., Philadelphia. In-termediate phosphorus, Central Fur-nace, Cleveland, \$31.00.

#### Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge not to exceed 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents

Manganese: An additional charge not to exceed 50 cents a ton for each 0.50 per cent, or portion there-of, manganese in excess of 1%. of, manganese in Ercess of Nickel: An additional charge for Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, \$2 a ton; for each addi-tional 0.25% nickel, \$1 a ton.

#### **Open Market Prices of Le ading Ferroalloy Products**

Spiegeleisen: 19-21% carlot per gross ton, Palmerton, Pa., \$40; Pittsburgh, \$40.50; Chicago, \$40.60.

Ferromanganese, standard: 78-82% C.L gross ion, duty paid, \$135 fob cars, Baltimore, Philadelphia or New York, whichever is most favor-able to buyer, Rockdale or Rock-wood, Tenn. (where Tennessee Prod-uets Co. is producer), Birmingham, Ala. (where Sloss-Sheffield Steel & Iron Co. is producer); \$140 fob cars, Pittsburgh (where Carnegie-Illinois Steel Corp. is producer); add \$6 for packed c.l., \$10 for ton, \$13.50 for less ton; \$1.70 for each 1%, or frac-tion contained manganese over \$2% or under 78%. Ferromanganese, standard: 78-82% or under 78%.

Ferromanganese, low carbon: East-france, Special, 21c; regular, 20.50c; medium, 14.50c; central 20.80c; medium, 14.50c; vestern zone: Special, 21.30c; regular, 20.80c; medium, 15.75c. Prices are per pound contained Mn, bulk car-jot shipments, fob shipping point, reight allowed. Special low-carbon has content of 90% Mn, 0.10% C, and 0.06% P.

Performanganese Briquets: (Weight approx. 3 ib and containing exactly 2 ib in) per ib of briquets. Con-tract, carlots, bulk 0.0605c, packed 0.063c, tons 0.0655c, less 0.068c, eastern, freight allowed; 0.063c, 0.0655c, 0.0755c and 0.078c, central; 0.066c, 0.0685c, 0.0855c and 0.088c, western; spot up 0.25c. Ferromanganese

Terrotangaten: Spot 10,000 lb or more, per lb contained W, \$1.90; contract, \$1.88; freight allowed as far west as St. Louis,

Perrotitanium; 40-45%, R.R. freight allowed, per lb contained Ti; ton

lots \$1.23; less-ton lots \$1.25; eastern. Spot up 5c per 1b.

Ferroittanium: 20-25%, 0.10 maxi-mum carbon; per lb contained Ti; ton lots \$1.35; less-ton lots \$1.40 castern. Spot up 5c per lb.

Ferrotitanium, High-Carbon: 15-20% contract basis, per net ton, fob Niagara Falls, N. Y., freight al-lowed to destination east of Missis-sippi river and north of Baltimore and St. Louis, 6.8% C \$142.50; 3-5% C \$157.50.

Ferrovanalum: V 35-55%, con-tract basis, per lb contained V, fob producers plant with usual freight allowances; open-hearth grade \$2.70; special grade \$2.80; highly-special grade \$2.90.

Ferromolybdenum: 55-75% per lb. contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

quantity 55.00C. Ferrophosphorus: 17-19%, based on 18% P content with unitage of \$3 for each 1% of P above or below the base; gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price \$58.50, spot \$62.25.

Ferrosilicon: Contract, lump, packed; Ferrosilicon: Contract, lump, packed; eastern zone quotations: 90-95% c.l. 12.65c, ton lots 13.10c, smaller lots 13.50c; 80-90% c.l. 10.35c, ton lots 10.85c, smaller lots 11.35c; 75% c.l. 9.40c, ton lots 9.95c, smaller lots 10.45c; 50% c.l. 7.90c, ton lots 8.50c, smaller lots 9.10c. Prices are fob shipping point, freight allowed, per lb of contained Sl. Spot prices 0.25c higher on 80-90%, 0.30c on 75%, 0.45c on 50%. Deduct 0.85c for bulk carlots.

Ferroboron: (B 17.50% max. and C 1.50% max., Al 0.50% max., and C 0.50% max.) per lb of alloy con-

tract ton lots \$1.20, less ton lots \$1.30, eastern, freight allowed; \$1.2075 and \$1.3075 central; \$1.229 and \$1.329, western; spot add 5c. per lb Ferrocolumbium: 50-60% per lb contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, \$2.25; less-ton lots \$2.30. Spot prices up 10 cents.

Farrochrome: Contract, lump, packed; high carbon, eastern zone, c.l. 15.05c, ton lots 15.55c; central zone, add 0.40c and 0.65c; western zone, add 0.5c and 1.85c; high car-bon, high nitrogen, add 5c to all high carbon ferrochrome prices. De-duct 0.55c for bulk carlots. Spot prices up 0.25c.

prices up 0.25c.
Low carbon, eastern zone, bulk, c.L., max. 0.06% C 23c; 0.1% 22.50c, 0.15% 22c, 0.2% 21.50c, 0.5% 21c, 1% 20.50c, 2% 19.50c, add 1c for 2000 lb to c.L.; central zone, add 0.4c for bulk, c.L., and 0.65c for 2000 lb to c.L.; western zone, add 0.5c for bulk, c.L., and 1.85c for 2000 lb to c.L.; carload packed differen-tial 0.45c. Prices are per pound of contained Cr, fob shipping points. Low carbon, bite nitrogen: Add 2c

Low carbon, high nitrogen: Add 2c to low carbon ferrochrome prices. For higher nitrogen low carbon, add 2c for each 0.25% of nitrogen over 0.75%.

G. 15%. Ferrochrome, Special Foundry: (Cr 62-66%, C about 5-7%.) Contract, lump packed, eastern zone, freight allowed, c.l. 15.60c, ton lots 16.10c, less than ton 16.75c; central zone, add 0.40c for c.l. and 0.65c for smaller lots; western zone, add 0.5c for c.l. and 1.85c for smaller lots. Deduct 0.55c for bulk carlots.

S. M. Ferrochrome, high carbon: (Cr 60-65%, Si, Mn and C 4-6% each.) Contract, lump, packed, eastern

#### Refractories

P

Pa.,

Pa., Ala. N.

Ohio Pa., Ala.

N.

Pa.,

A11

Dry Wire

Pen

Jolie

Birn

Dom to

Ba

Net

er 1000, fob shipping point Net prices
Fire Clay Brick
Super Duty
Mo., Ky
High Heat Duty
TII. Md Mo., Ky 65.00
Ga 65.00
Intermediate Heat Duty
III., Md., Mo., Ky 59.00
Ga
Low Heat Duty
Md., Ohio 51.00
Malleable Bung Brick
bases 75.00
India Brick
(Pa. O., W. Va., Mo.)
Press
Cut 40.00
Sillen Brick
sulvania 65.00
t, E. Chicago 74.00
lingham, Ala 65.00
Magnesite
estic dead-burned grains, net
h, fob Chewelah, Wash.
11k
Basic Brick
ton, fob Baltimore, Plymouth Meeting, Chester, Pa.
me brick 54.00

Chr Chem, bonded chrome ..... 54.00 Magnesite brick ..... Chem, bonded magnesite .... 76.00 65.00

#### Fluorspar

Metallurgical grade, fob shipping point in Ill., Ky., net tons, carloads, effective CaF, content, 70% or more, \$33; 65% to 70%, \$32; 60% to 65%, \$31; less than 60%, \$30.

zone, freight allowed, c.l. 16,15c, ton lots 16,65c, less ton 17.30c; cen-tral zone, add 0.40c for c.l. and 0.65c for smaller lots; western zone, add 0.5c for c.l. and 1.05c for smaller lots. Prices are per lb of contained chromium; spot prices 0.25c higher. Deduct 0.55c for bulk cariots carlots.

6. M. Farrochrome, low carbon: (Cr 62-66%, Sl 4-6%, Mn 4-6% and C 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.15c ton lots 21.00c, less ton lots 22.00c eastern, freight allowed, per pound contained chromium, 20.40c, 20.50c, 20.95c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up 0.25c.

Ferrochrome Briquets: Containing exactly 2 lb Cr, packed eastern zone, cl. 9.50c, ton lots 9.50c less than ton 10.10c, central zone, add 0.3c for cl. and 0.5c for smaller lots; western zone, add 0.70c for cl. and 2c for smaller lots. Deduct 0.30c for bulk carlots. Prices per lb of briquets; spot prices 0.25c higher.

Chromium Metal: 97% min chromi-um, max. 0.50% carbon, eastern zone, per lb contained chromium bulk, c.l., 79.50c, 2000 lb to c.l. 80c, central Sto and 82.60c; west-ern 82.25c and 84.75c fob ship-ping point, freight allowed.

Chromium-Copper: (Cr 8-11%, Cn 88-90%, Fe 1% max.) Si 0.50% max.) contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, ex-cept to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Calcium metal; cast: Contract too lots or more \$1.35, less, \$1.60, pound of metal; \$1.36 and \$1.61

Doit up bc. Consident-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%), per lb. of alloy. Contract, carlots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.00c, 17.35c, and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up 0.25c.

Object up 0.25c. Objectum - Siliconi (Ca 30-35%, Si 30-65% and Fe 3.00% max.), per ib of alloy. Contract, carlot, lump 13.00c, ton lots 14.50c, less 15.50c eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up 0.25c. 0.25c.

0.25c. Silicon Metal: Min. 97% Si and max. 1% Fe, eastern zone, bulk, e.L., 12.90c; 2000 ib to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 96% Si and max. 2% Fe, eastern, bulk; c.l., 12.50c, 2000 lb to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c, fob shipping point, freight allowed. Price per lb contained Si.

Billicomanganese, containing exactly Bilicomanganese, containing exactly 2 lb Mn and about ½ lb SI, eastern zone, bulk, c.l. 5.80c, ton lots 6.35c; central zone, add 0.25c for c.l. and ic for ton lots; western, add 0.55c for c.l. and 0.20c for ton lots. Far-rosilieon, weighing about 5 lb and containing exactly 2 lb SI, or about 2¼ lb and containing exactly 1 lb SI, packed, eastern zone, c.l. 3.90c, ton lots 4.15c, less ton lots 4.45c; central zone, add 0.15c for c.l. and

central, \$1.40 and \$1.65, western: bot up 5c. Calcium-Manganese-Silicon: (Ca 16-30%, Mn 14-18% and Si 53-59%), per 1b. of alloy. Contract, carlots, 16.50c, ton lots 16.50c and less to be the second second

for bulk carlots. Manganese Metal: (Min. 96% Mn, max, 2% Fe), per lb of metal, east-ern zone, bulk, c.l., 30c, 2000 lb to c.l., 32c, central, 30.25c, and 33c; western, 30.55c and 35.05c. Electrolytic Manganese: 99.9% plus, fob Knoxville, Tenn., freight al-lowed east of Mississippi on 250 lb or more: Carlots 32c, ton lots 34c, drum lots 36c, less than drum lot 38c. Add 1½c for hydrogen-removed metal.

Manganese-Boron: (Mn 75% approx., B 15-20%, Fe 5% max., SI 1.50% max. and C 3% max.) per lb of alloy. Contract ton lots, \$1.89, less \$2.01, eastern; freight allowed; \$1.903 and \$2.023, central, \$1.935 and \$2.055 western; spot up 5c.

and 32.055 western; spot up 5c. Nickel-Boron: (B 15-18%, Al 1% max., SI 1.50% max., C 0.50% max., Fe 3% max., Ni, balance), per lb of alloy. Contract, 5 tons or more, 31.90, 1 ton to 8 tons, \$2.00, less than ton \$2.10, eastern, freight all 0 we d; \$1.9125, \$2.0125 and \$2.1125, central; \$1.9445, \$2.0445and \$2.1445, western; spot same as contract. contract.

Borosil: 3 to 4% B. 40 to 45% St, \$6.25 lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: B 1.5-1.9%, ton lots, 45c lb; less-ton lots, 50c lb.

Carbortam: B 0.90 to 1.15% net con to carload, 8c per lb fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium,

as ingliced tool left of the function of the

Silvaz Alloy: (Sl 35-40%, Va 9-11%, Al 5-7%, Zr 5-7%, Tl 9-11% and B 0.55-0.75%), per lb of alloy. Con-tract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern freight allowed; 58.50c, 59.75c and 60.75c, central; 60.50c, 61.90c and 62.90c, western; spot up 0.25c.

spot up 0.25c. SMZ Alloy: (SI 60-55%, Mn 5-7%, Zr 5-7% and Fe approx. 20%) per lb of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c, central zone; 14.05c, 14.60c and 15.10c, western; spot up 0.25c.

CMSZ Alloy 4: (Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75% and C 3.00-4.50%). Contract carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c, 14.75c, 15.25c, western; spot up 0.25c. CMSZ Alloy 8: (Cr 50-56% Mn

CMSZ Alloy 5: (Cr 50-56%, Mn 4-6%, Sl 13.50-16.00%, Zr 0.75-1.25%, C 3.50-5.00%) per lb of alloy. Contract, carlots, bulk, 10.75c.

packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c, 12.50c and 13.00c, central; 13.25c and 13.75c, 14.50c and 15.00c, western; spot up 0.25c. and 15.00c, western; spot up 0.23c. Zirconium Alioy: 12-15%, per la of alloy, eastern contract, carlots, bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads, bulk, per g r o s s ton \$102.50; packed \$107.50; ton lots \$108; less-ton lots \$112.50. Spot up \$5 per ton.

Zirconium Alloy: Zr 35-40%, eastern. contract basis, carloads in bulk or package, per lb of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot up %c.

Alsifer: (Approx. 20% Al, 40% St 40% Fe) contract basis fob Nisgam Falls, N. Y., lump per lb 6.25c; ton lots 6.75c; less 7.25c. Spot up %c. Simanal: (Approx. 20% each Si, Mn, Sinanai: (Approx. 20% each S, Mh, Al) Packed, lump, carload 9c, toa lots 9.25c, less-ton lots 9.75c per lb alloy; freight not exceeding St Louis rate allowed. Tungsten Metal Powder: Spot, not less than 97%, \$2.50-\$2.60; freight allowed as far west as St. Louis. Grainai: Vanadium Grainal No. 1 87.5c; No. 6, 60c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

allowance.

Vanadium Pentoxide, technical grade: Fused, approx. 89-92% V.O. and 5.84% NA.O: or air dried, 83 85% V<sub>8</sub>O<sub>5</sub> and 5.15% NA<sub>2</sub>O, \$1.10 per 1b contained V<sub>2</sub>O<sub>5</sub>, fob plant freight allowed on quantities of 25 lb and over to St. Louis.

#### OPEN MARKET PRICES, STEEL SCRAP IRON AND

Prices are dollars per gross ton, delivered at consumer's plant except where noted.

			OTEN HEA	ATH AND	LASI FUND	ACE GRAD.	CO NO II			
	-Heav	y Melting-	No. 1		Bundles		Shop	Borings	Short Show	el Cast Iron
	No. I	No. 2	Busheling	No. 1	No. 2	No. 3	Turning	Turnings	Turning	Borings
Pittsburgh	25.00	25,00	25.00	25.00	25.00	23.00	20.00	20.00	22.00	21.00
Philadelphia	21.75-22.25	21.75-22.25	21.75-22.25	21.73-22.25	=0100	10.00	18.75-19.25	18.75-19.25	20.75-21.25	18.75-19.25
Buffalo	24.50	24.50	24,50	24.50	24.50	22.50	17.00	17 00	19.00	16.50
Boston	20.20	24.25	24.25	24.25	24.25	22.25	16.75	16.75	18.75	11.75
Valley	25.00	20.35	20,35	20.35	20.35		14.00	14.00	16.00	18.50
Mansfield		1000		20.00	No. Harris		17.50	<u>(11)</u> -	19.50	1
Chicago	23.75	23.75	23.75	23 75	23.75	21.75	16 25	16.25	18 25	18.25
San Francisco	22.00-22.50	22.00-22.50	22.00-22.50	22.00-22.50	22.00-22.50	20.00-20.50	14,50-15.00	14.50-15.00 1	6.50-17.00	15.50-16.00
Cincinnati	24.50	19,50	19.50	19.50	19.50	10.00	8.00			15 20
Detroit	22.32	24,50	24.00	24.50	24.50	00.00	16.20	16.20	18.20	18.32
New York	20.33	20.33	20.33	20,44	20.33	18.33	15.33	15.32	17.33	
St. Louis	22.22	22.22			20.00	10.00	14.72	10.00	16.72	11.11
Jos Angolos	17.00	17.00								****
Los Angeles	16.50	15.50		14.50	14.50		8.00	8.00		
		F	ECTRIC EU	BNACE EO	UNDRY AND	SPECIAL O	PADES		No.1	
		1	Punchinge	Elastria	UNDAT ANL	Alle	GADES	In contraction of the	Chemical	
	Bar Crops		and Plate	Electric	Henny	Free	Curs	Plote Scran	- Cast Iror	Tin Gan
	and Plate	Cast Stee	l Scrap	Bundles	Turnings	Turnings	I ft and unde	r 2 ft and und	er Borings	Dundles
Pittsburgh	27.50	27.50	27.50	26.00	24 50	23.00	27 50	27 00	24,00	21.00
Philadelphia	26.25-26.75	26.25-26.75	26.25-26.75	25.25-25.75	23.25-23.75	20.00	26.25-26.75	26.25-26.75	22.00-22.50	00.50
Cieveland Buffalo	27.00	27.00	27.00	25.50	24.00	22.50	27 (1)	26.50	23.50	24.04
*Boston		27.00	28.50	28.50	22.50	19.75	28.50	28.50	20.75	
Chicago			09.75		117.1				20.01	
San Francisco	18.00	18.00	20110	1		8.00	20.50	20.00		17.00
Detroit			24.82	23.82				1 1 1 1 1 1		1 1 A.A.A.A.
Rew York	21 FO 0F 00		22.83	21.33			22 83	22.33	19.35	
Diffiningham	24.30-25.00	24.30-25.00	24.50-25.00		S		24.50-25.00	24,30-25.00		
			STEEL.	GRADES C	F BAILBOA	D OBIGIN				-
	No. I				A MILLIANDI	Rails		1		Angles
	Heavy Meltin	ng Railroad			Random	Cut 3-ft.	Cut 18-i	n. Railroad	Uncut	Splice
The second second	R.R. Steel	Malleabl	e Axles	Rerollin	g Lengths	and under	and und	er Specialtie	s Tires	ac si
Pittsburgh	26 00	27.00	31_00	28.50	26.50	28.50	29.50	29.50	28.50	28.50
Valley	28.50	01 00	19.4 b		den 1		F		and the second	24.75
Cincunati	22.20	24.50		24.75	22.75	24.75	26.00	25.25		
St. Louis	-0,00	28.00	27.00	25.00	24.00	27.50	Internet and the	1.54	23.50	23.50
Birmingham	23.00-23.50			25.50-26.00	24.00-24.50	26.50-27.00	27.30-28.00			25,50-26,00
San Francisco			26.30		21.00		ALC: NO GOOD		23.00	
Scattle	17.00									
				CAST IR	ON CRADES					
- N	No.1	Charging	Henny	CAST IR	ON GRADES			Class		
	No. 1 Cupola	Charging Box	Heavy Breakable	CAST IR	ON GRADES Unstrippe Motor	d	Broke	Clean	No. 1	Barnt
- 10 - 11 - 11	No. 1 Cupola Cast	Charging Box Cast	Heavy Breakable Cast	CAST IR Stove Plate	ON GRADES Unstrippe Motor Blocks	d Malleable	Brake	Clean Auto Cast	No. 1 Wheels	Barnt Cast
Pittsburgh	No. 1 Cupola Cast 28,00–32.00	Charging Box Cast 24.00-26.00	Heavy Breakable Cast 23.00–25.00	CAST IR Stove Plate	ON GRADES Unstrippe Motor Blocks 23.00–25.00	d Malleable 27.00-29.00	Brake Shoes	Clean Auto Cast 30 00-32 00	No. 1 Wheels	Barnt Cast 20.75-22.75
Pittsburgh Philadelphia	No. 1 Cupola Cast 28.00-32.00 35.00-40.00	Charging Box Cast 24.00–26.00 34.00	Heavy Breakable Cast 23.00–25.00 34.00	CAST IR Stove Plate 26.00-28.00	ON GRADES Unstrippe Motor Blocks 23.00–25.00 32.50	d Malleable 27.00-29.00 35.00	Brake Shoes 20.75–22.75 23.50–24.00	Clean Auto Cast 30.00-32.00 37.00	No. 1 Wheels 15.00–27.00 34.00	Barnt Cast 20.75-22.75 94.00
Pittsburgh Philadelphia Burfalo	No. 1 Cupola Cast 28.00-32.00 35.00-40.00 29.50	Charging Box Cast 24.00–26.00 34.00	Heavy Breakabl Cast 23.00-25.00 34.00 24.00 24.00	CAST IR Stove Plate 26.00-28.00 25.00	ON GRADES Unstrippe Motor Blocks 23.00–25.00 32.50 24.00	d Malleable 27.00-29.00 35.00	Brake Shoes 20.75–22.75 23.50–24.00	Clean Auto Cast 30.00-32.00 37.00	No. 1 Wheels 15.00–27.00 34.00	Burnt Cast 20.75-22.75 24.00
Pittsburgh Philadelphia Buffalo •Boston Chicago	No. 1 Cupola Cast 28.00–32.00 35.00–40.00 29.50 35.00 35.00	Charging Box Cast 24.00–26.00 34.00 31.00	Heavy Breakable Cast 23.00–25.00 34.00 24.00 30.00	CAST IR Stove Plate 26.00-28.00 25.00 33.00	ON GRADES Unstrippe Motor Blocks 23.00–25.00 32.50 24.00 31.50	d Malleable 27.00-29.00 35.00	Brake Shoes 20.75–22.75 23.50–24.00	Clean Auto Cast 30.00-32.00 37.00 37.00	No. 1 Wheels 15.00–27.00 34.00	Barni Cast 20.75-22.75 24.00
Pittsburgh Philadelphia Buffalo Boston Chicago Seattle	No. 1 Cupola Cast 28.00-32.00 35.00-40.00 29.50 35.00 30.00 25.00	Charging Box Cast 24.00–26.00 34.00 31.00	Heavy Breakable Cast 23.00–25.00 34.00 24.00 30.00	CAST IR Stove Plate 26.00-28.00 25.00 33.00	ON GRADES Unstrippe Motor Blocks 23.00–25.00 32.50 24.00 31.50	d Malleable 27.00-29.00 35.00  29.00	Brake Shoes 20.75–22.75 23.50–24.00	Clean Auto Cast 30.00-32.00 37.00 37.00	No. 1 Wheels 15.00–27.00 34.00	Bπrat Cast 20.75-22.75 24.00
Pittsburgh Philadelphia Buffalo Boston •Boston •Chicago •Seattle Cincinnati	No. 1 Cupola Cast 28.00-32.00 35.00-40.00 29.50 35.00 35.00 25.00 33.00	Charging Box Cast 24.00-26.00 34.00 31.00 31.00	Heavy Breakable Cast 23.00-25.00 34.00 30.00 30.00 28.00	CAST IR Stove Plate 26.00–28.00 25.00 33.00 31.00	ON GRADES Unstrippe Motor Blocks 23.00–25.00 32.50 24.00 31.50  33.00	d Malleable 27.00–29.00 35.00  29.00	Brake Shoes 20.75-22.75 23.50-24.00 23.00	Clean Auto Cast 30.00-32.00 37.00 37.00 37.00	No. 1 Wheels 25.00–27.00 34.00	Bπrat Cast 20.75-22.75 24.00
Pittsburgh Philadelphia Buffalo Boston Chicago Seattle Cincinnati Detroit	No. 1 Cupola Cast 25.00-32.00 35.00-40.00 29.50 35.00 35.00 25.00 33.00 35.00-40.00	Charging Box Cast 24.00-26.60 34.00 31.00 31.00	Heavy Breakable Cast 23.00–25.00 34.00 24.00 30.00 28.00 30.00–35.00	CAST IR Stove Plate 26.00-28.00 25.00 33.00 31.00	ON GRADES Unstrippe Motor Blocks 23.00–25.00 24.00 31.50  33.00	d Malleable 27.00–29.00 35.00  29.00	Brake Shoes 20.75–22.75 23.50–24.00 23.00	Clean Auto Cast 30.00-32.00 37.00 37.00 37.00 33.00 37.00-40.00	No. 1 Wheels 5.00–27.00 34.00	Barnt Cast 20.75-22.75 24.00 20.25
Pittsburgh Philadelphia Buffalo Boston Chicago Senttle Cincinnati Detroit St. Louis Vent Vent	No. 1 Cupola Cast 28.00-32.00 35.00-40.00 29.50 35.00 25.00 33.00 25.00-40.00 25.00-80.00	Charging Box Cast 24.00-26.00 34.00 31.00 31.00 25.25	Heavy Breakable Cast 23.00-25.00 24.00 30.00 28.00 30.00-35.00 26.00 27.00	CAST IR Stove Plate 26.00-28.00 25.00 33.00 31.00 27.00	ON GRADES Unstrippe Motor Blocks 23.00–25.00 32.50 24.00 31.50  33.00	d Malleable 27.00–29.00 35.00  29.00	Brake Shoes 20.75–22.75 23.50–24.00 23.00 20.25	Clean Auto Cast 30.00-32.00 37.00 37.00 37.00 33.00 37.00 40.00 32.00	No. 1 Wheels 15.00–27.00 34.00 26.00	Barat Cast 20.75-22.75 24.00 20.25
Pittsburgh Philadelphia Buffalo Boston Chicago Csenttle Cincinnati Detroit St. Louis I New York Birmingham	No. 1 Cupola Cast 28.00-32.00 35.00-40.00 29.50 35.00 35.00 25.00-40.00 25.00-40.00 25.00-80.00 32.00-33.00	Charging Box Cast 24.00–26.00 34.00 31.00 31.00 25.25 26.00–27.00	Heavy Breakable Cast 23.00-25.00 34.00 30.00 30.00 30.00-35.00 28.00 30.00-35.00 27.5 26.00-27.00	CAST IR Plate 26.00-28.00 33.00 31.00 27.00 30.00-31.00	ON GRADES Unstrippe Motor Blocks 23.00–25.00 32.50 24.00 31.50  33.00 28.00–29.00 28.00–29.00 29.00	d Malleable 27.00-29.00 35.00  29.00  30.00	Brake Shoes 20.75–22.75 23.50–24.00 23.00 20.25	Clean Auto Cast 30.00-32.00 37.00 37.00 37.00 37.00 32.00	No. 1 Wheels 15.00–27.00 34.00 26.00	Burnt Cast 20.75-22.75 24.00 20.25
Pittsburgh Philadelphia Buffalo Boston Chicago Scattle Cincinnati 1 Detroit St. Louis 1 New York Birmingham Los Angeles	No. 1 Cupola Cast 25.00-32.00 35.00-40.00 25.00 35.00-30.00 25.00-30.00 32.00-30.00 30.00 30.00 30.00	Charging Box Cast 24.00-26.60 34.00 31.00 31.00 25.25 26.00-27.00	Heavy Breakable Cast 23.00-25.00 34.00 34.00 30.00 30.00 30.00 28.00 30.00-35.00 26.00-27.00 25.00	CAST IR Stove Plate 26.00-28.00 25.00 33.00 31.00 27.00 30.00-31.00 28.00	ON GRADES Unstrippe Motor Blocks 23.00–25.00 32.50 24.00 31.50  33.00 28.00–29.00 25.00	d Malleable 27.00–29.00 35.00  29.00  30.00	Brake Shoes 20.75-22.75 23.50-24.00 23.00 20.25 22.75	Clean Auto Cast 30.00-32.00 37.00 37.00 37.00 33.00 37.00 40.00 32.00	No. 1 Wheels 25.00-27.00 34.00 26.00 27.00	Barnt Cast 20.75-22.75 24.00 20.25

"Fob shipping point; I fob tracks; I dealers buying prices,

# LOGEMANN Presses for Sheet Scrap

In mills, industrial plants and scrap yards, LOGEMANN SCRAP PRESSES are working day and night to prepare sheet

THE NATION NEEDS YOUR SHEET SCRAP!

scrap for the furnaces. Sheet mills particularly recognize the value of the years of experience and the performance records which back up LOGE.

experience and the performance records which back up LOGE-MANN designs and workmanship.

The line includes scrap presses designed for mill Service, presses designed for automobile plant conditions, presses designed for general plant applications. Write for details.

LOGEMANN BROTHERS COMPANY 3126 W. Burleigh St. Milwaukee, Wisconsin



The scrap press illustrated operates in one of the largest industrial plants. Compresses scrap from three directions to produce highdensity mill size bundles. Built in various capacities.

#### NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 17.50-19.50c, del. Conn.; less carlots 17.62 $\frac{1}{2}$ , 19.62 $\frac{1}{2}$ , refinery. Dealers may add  $\frac{3}{2}$ c for 5000 lb to carload; 1c, 1000-4999 lb; 1 $\frac{1}{2}$ , 500-999 lb; 2c, 0-499 lb. Casting, 17.25-19.25c, refinery, 20,000 lb or more; 17.50-19.50c, less than 20 000 lb than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 19.00-19.25c; 88-10-2 (No. 215) 23.25c; 80-10-10 (No. 305) 22.75c; No. 1 yellow (No. 405) 15.00-15.50c; carlot prices, including 25c per 100 lb freight allowance; add <sup>3</sup>/<sub>4</sub>c for less than 20 tons.

Zinc: Price western 10.50c, select 10.60c, brass special 10.75c, intermediate 11.00c, E. St. Louis; high grade 11.50c, del., carlots. For 20.000 lb to carlots add 0.15c; 10.000-20.000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

Lead: Common 11.65c, chemical 11.75c, corrod-ing 11.75c, E. St. Louis for carlots; add 5 points for Chicago, Minneapolis-St. Paul, Mil-waukee-Kenosha districts; add 15 points for Cleveland - Akron - Detroit area, New Jersey, New York state, Texas, Pacific Coast, Rich-mond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston - Worcester, Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., plgs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10.000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 14.87 $\frac{1}{3}$ c; No. 12 foundry alloy (No. 2 grade) 14.87 $\frac{1}{3}$ c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97 $\frac{1}{3}$ %) 15.75c; grade 2 (92-95%) 15.00c; grade 3 (90-92%) 14.62 $\frac{1}{3}$ c; grade 4 (85-90%) 14.12 $\frac{1}{3}$ c. Above prices for 30,000 lb or more; add  $\frac{1}{3}$ c 10.000-30,000 lb;  $\frac{1}{3}$ c 5000-10,000 lb;  $\frac{1}{3}$ c 1000-5000 lb; 1 $\frac{1}{3}$ c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) stand-ard ingots (4-notch, 17 lb) 20.50c per lb, car-lots; 22.50c 100 lb to c.l. Extruded 12-in, sticks 34.00c-38.00c.

Tin: Prices ex-dock, New York in 5-ton lots. Add I cent for 2240-11,199 lb, 14/c 1000-2239, 24/c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straights, 70.00C; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenle, 69.874/c; Grade C. 99.65-99.79% incl. 69.624/c; Grade D, 99.50-99.64% incl., 69.50c; Grade E, 99-99.49% incl. 69.124/c; Grade F, below 99% (for tin content), 69.00c.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 23.50c; 99.8% and over (arsenic, 0.05% max.; other impuri-ties, 0.1% max.) 24.00c. On producers' sales add  $\frac{1}{2}$ c for 999-224 b; and 2c for 223 b and less; on sales by dealers, distributors and jobbers add  $\frac{1}{2}$ c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.5%, fob re-finery 35.00c b: pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c.

Mercury: Open market, spot, New York, \$91-\$94 per 76-lb flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be, \$14.75 per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms \$1.25-\$1.50 lb, del.; anodes, balls, discs and all other special or patented shapes, \$1.30-\$1.55.

**Cobalt:** 97-99%, \$1.50 lb. for 550 lb (bbl.); \$1.52 lb for 100 lb (case); \$1.57 lb under 100 lb.

Gold: U. S. Treasury, \$35 per ounce.

Indium: 99.9%, \$2.25 per troy ounce.

Silver: Open market, N.Y. 90.121/2c per ounce.

Platinum: \$70,50 per ounce.

Palladium: \$24 per troy ounce.

Iridium: \$125 per troy ounce.

#### **Rolled, Drawn, Extruded Products**

(Copper and brass product prices based on 17.50c, Conn., for copper. Freight prepaid on 100 lb or more.)

Sheet: Copper 28.93c; yellow brass 26.17c; com-mercial bronze, 95% 29.17c, 90% 28.75c; red brass, 85% 27.82c, 80% 27.41c; best quality 26.98c.

Rods: Copper, hot rolled 25.28c, cold drawn 26.28c; yellow brass 25.86c; commercial bronze, 95% 28.86c, 90% 28.44c; red brass, 85% 27.51c; 80% 27.10c; best quality 26.67c.

Scamless Tubing: Copper 28.97c; yellow brass 28.93c; commercial bronze 90% 31.16c; red brass 85% 30.48c, 80% 30.07c; best quality brass 29.39c.

Copper Wire: Bare, soft, fob eastern mills, car-lots 23.32c, less carlots 23.82c; weatherproof, fob eastern mills carlot 24.72c, less carlots 25.22c; magnet, dellvered, carlots, 26.73c, 15,000 lb or more 26.98c, less carlots 27.48c.

Aluminum Sheets and Circles: 2s and 3s flat mill finish, base 30,000 lb or more del.; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	S"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 14.90c; cut sheets 15.40c; pipe 14.15c.

Zine Products: Sheet fob mill 15.40c, 36,000 lb and over deduct 7%, Ribbon and strip 14.50c; 3000-lb lots deduct 1%, 6000 lb 2%, 9000 lb 3%, 18.000 lb 4%, carloads and over 7%. Boller plate (not over 12") 3 tons and over 13.25c; 1.3 tons 14.25c; 500-2000 lb 14.75c; 100-500 lb 15.25c; under 100 lb 16.25c. Hull plate (over 12") add lc to boller plate prices.

#### PLATING MATERIALS

Chromic Acid: 99.75%, fiake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lb to 1 ton 17.75c; under 400 lb 18.25c.

Copper Anodes: In 500-lb lots, fob shipping point, freight allowed, cast oval over 15 in., nom.; curved, nom.; round oval straight, nom. electro-deposited, nom.

Copper Carbonate: 52-54% metallic Cu, 250 lb barrels nom.

Copper Cyanide: 70-71% Cu, 1 bbls. nom., fob, Niagara Falls. 100-lb kegs or

Sodium Cyanide: 96%, 200-lb drums 15.00c; 10,000-lb lots 13.00c fob Niagara Falls.

Nickel Anodes: 500-2999 lb lots; cast and rolled carbonized 47.00c; rolled depolarized 48.00c.

Nickel Chloride: 100-lb kegs or 275-lb bbls 18.00c lb, del.

Tin Anodes: 1000 lb and over nom. de 500-999 nom.; 200-499 nom.; 100-199 nom. del ;

Tin Crystals: 400 lb bbls nom., fob Grasselli, N. J.; 100-lb kegs nom.

Sodium Stannate: 100 or 300-lb drums nom., del.; tons lots nom.

Zine Cyanide: 100-lb kegs or bbls 33.00c fob Niagara Falls.

#### Scrap Metals

#### BRASS MILL ALLOWANCES

Prices for less than 15,000 lb fob shipping point. Add %c for 15,000-40,000 lb; lc for 40,000 or more.

	Clean	Rod	Clean		
	Heavy	Ends	Turning		
Copper Yellow Brass	15.125 12.375	14.87 12.12	5 14.375 5 11.625		
Commercial Bronze					
95% 90%	14.125 14.000	13.87 13.75	5 13.375 0 13.250		

Red	Brass
-----	-------

85%	13.750	13.500	13.000
80%	13.750	13.500	13.000
Best Quality (71-79%).	13,125	12.875	
Muntz metal	11.625	11.375	10.875
Nickel Silver, 5%	13.000	12.750	6.500
Phos. hr., A. B.	16.250	16.000	15,000
Naval brass	12.000	11.750	11.250
Manganese bronze	12,000	11.750	11.125
manganese stones			

BRASS MAKERS' BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 15.25, No. 2 copper 14.25, light copper 13.25, composition red brass 14.75, auto radiators 11.75, heavy yellow brass 10.50, brass pipe 10.50.

#### DEALERS' BUYING PRICES

(Cents per pound in ton lots or more)

Control per pound in ton lots or more? Copper and Brass: Heavy copper and wire, No. 1 13.00-13.50; No. 2 12.00-12.50; light copper 11.00-11.50, No. 1 composition red brass 12.50-13.00, No. 1 composition turnings 11.50-12.50, mixed brass turnings 7.50-8.00, new brass cilippings 11.50-12.00, No. 1 brass rod turnings 9.75-10.00, light brass 7.00-7.50, heavy yellow brass 9.00-9.50, new brass rod ends 10.25-10.50, auto radiators, unsweated, 11.00-11.50, clean red car boxes 8.75-9.25, cocks and fauceis 10.00-10.50, brass pipe 10.00-10.50.

Lead: Heavy lead 8.50-9.00, battery plates 5.00-5.25, linotype and stereotype 10.50-11.00, linotype and stereotype dross 4.25-4.75, electro-type 9.50-10.00, small foundry type 12.50-13.00, mixed babbitt 9.00-10.00.

Zinc: Old zinc 5.50-6.00, new dle cast scrap 4.50, old dle cast scrap 3.50-3.75.

Tin: No. 1 pewter 44.00-45.00, block tin pipe 60.00-62.00, auto babbitt 35.00-36.00, No. 1 babbitt 35.00-36.00, solder joints 12.50-13.00. siphon tops 38.00-40.00.

Aluminum: Clippings, 2S, 8.50-9.00, old sheets 6.50-7.00, crankcases 7.00-7.50, borings and turnings 3.00-3.25, pistons, free of struts, 5.00-5.25 5.25

Nickel: Anodes 16.50-17.50, turnings 14.50-15.50, rod ends 17.00-18.00.

Monel: Clippings 12.00-12.50, turnings 5.75-6.00, old sheet 9.50-10.00, rods 10.00-10.50, castings 7.00-7.50.

## STEEL CAPACITY?

- 1. How much steelmaking capacity was added during the war?
- 2. How much money was spent? Where are the plants located?
- 3. What is steelmaking capacity today?
  - 4. Is more capacity needed?
  - 5. What has been the long-term trend in capacity and production?
  - 6. What will sheet and strip capacity be in 1947?
  - 7. What new finishing capacity has been added since the war?
  - 8. What companies make the sheets, strip, bars, plates, shapes, pipe, wire and other finished products you need today?

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#### AN OFFICIAL REPORT

STEEL EXPANSION

FOR WAR

W. A. HAUCK

JUNE 16 1945

TEEL

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#### MARKET NEWS

#### New Galvanized Sheet Price Formula Has Zinc Price Factor; Adopted by Some Sellers

GALVANIZED sheet producers are seriously considering a proposed new pricing system for their product. Some producers already have adopted the system and others are expected to follow. Extras for zinc and differentials for gage would be added to a new base price.

At present, No. 24 gage galvanized sheets are quoted to a new base price. Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, and 4.15c, Granite City. Under the new system, the base price would be 3.54c to which would be added the zinc extras and gage differentials, as listed in the following tables, making No. 24 gage 4.65c on the basis of zinc at 10.00 to 11.00c a pound, East St. Louis.

#### NEW GAGE DIFFERENTIALS

8,9 & 10	Base	22	55
11	5	23	60
12	10	24	65
13	15	25	75
14	20	26	85
15 & 16	25	27	95
17	30	28	100
18	35	29	125
19	40	30	150
20	45	31	175
21	50	32	200

#### EXTRAS FOR ZINC

(Cents per 100 pounds)

Zinc Price, cents per

pound,		15 00	04.07	- 00 0
tob E. St.	9-14	15-23	24-27	20-3
Louis	Gage	Gage	Gage	Gag
Under 5c	Base	Base	Base	Bas
5 to 6	3	5	8	10
6 to 7	5	10	15	20
7 to 8	8	15	23	30
8 to 9	10	20	30	40
9 to 10	13	25	38	50
10 to 11	16	30	45	60
11 to 12	19	35	53	70

#### Sheets, Strip . . .

Some small producers revise schedules on culvert and hotrolled annealed

#### Sheet & Strip Prices, Page 132

Pittsburgh—Some of the smaller steel producers have revised price schedules on galvanized and corrugated culvert sheets and hot-rolled annealed sheets. Major steel interests, however, had not taken similar action by late last week and, as in other steel products, are not expected to act until entire price structure can be studied in light of present costs and probable effect of higher prices on the industry's position in connection with pending wage negotiations.

Continental Steel Corp., Kokomo, Ind., Apollo Steel Corp., Pittsburgh, and Newport Rolling Mill Co., Newport, Ky., established a new price structure on galvanized sheets, which had been approved by OPA prior to decontrol, as follows:

No. 10 gage has been substituted for 24 gage as base grade at \$3.55 per 100 pounds, same as old price based on 5cent per pound zinc. To bring the whole schedule more in line with actual production costs the gage differentials have through 27 gage. On 24 gage, for example, the gage differential over 10 gage is up 15 cents per 100 pounds.

Continental Steel Corp., Kokomo, Ind., has established a new base classification on hot-rolled annealed hand mill sheets 19 gage and lighter. The new 19 gage base of \$3.35 per 100 pounds compares with old price structure for 19 gage of \$3.195 under which the hot-rolled base was \$2.425 for 10 gage. Thus, for 19 gage hot-rolled annealed sheets 48-in. and under there is an increase of 15.5 cents per 100 pounds.

A new price setup on culvert sheets also has been made by Continental Steel Corp., raising the former extra for corrugating culvert sheets from 5 to 10 cents per 100 pounds, and applying the regular galvanized sheet extras for short lengths which formerly were not applicable on culvert sheets. Application of galvanizing extras to culvert sheets will in effect raise the price to the equivalent of the higher zinc costs, resulting in an increase of \$7.20 per ton,

Late last week it was reported a small mid-Ohio sheet producer had announced an increase of \$3.50 per ton in hot rolled sheets to 2.60c, base. It also effected an upward revision in pickling and resquaring extras.

Chicago—As was to be expected. <sup>mal-</sup> vanized sheets was among the first products to take higher prices. Larger producers in this district have made no announcement, but one independent serving this territory has revised its price schedule corresponding to action of two eastern mills. No. 10 gage becomes base instead of No. 24 and extras for gage and coating are revised. In brief, No. 24, formerly \$4.05 per hundred pounds, now becomes \$4.65. The new coating extras provide more flexibility in adjusting for fluctuating zine prices. This same mill had also adjusted its price on 19-gage hot rolled sheets.

Boston-Although not always successful. sheet producers are encouraging cancellation of delinquent tonnage, some going back to the second quarter of this year. This is being done in an effort to fit bookings and backlogs nearer potential production for next quarter. Revised orders are being allocated on a quota basis to fill limited openings in that period. These allocations are below re-quirements of numerous consumers and in some cases no allotments of cold-rolled sheets are possible. The same situation exists in hot-rolled and pickled sheets under No. 18 gage. This shortage of lighter gages will be critical into the second quarter at least. In asking for cancellations of old orders, mills frequently find consumer requirements have changed since the original order was entered and experience slight resistance but in other cases users are reluctant to can-cel orders in view of the limited new volume outlook.

Scattered hot-rolled lots in secondary hands are being offered at "fancy" prices, but the tonnage in wanted sizes and grades is not large enough to influence the decontrolled market. Geographical factors, involving freight rate absorption are not as yet affected. For the most part, any interruptions in rolling schedules caused by coal shortages will hit heavier mills first and flatrolled mills last, the latter being better supplied with semifinished steel supplies. been revised starting with 19 gage down

St. Louis-Sheet production continues to improve, permitting a slight gain in deliveries, March schedules are being rolled now and books will not be opened before late in the first quarter. Because of uncertainty of the coal and pig iron situation, Granite City Steel, the areas largest producer, has postponed indef-initely plans to blow in the last of three DPC furnaces. Open hearths have made their annual winter switch from gas to coal and no more than eight days' supply of coal is on hand. A CPA ruling also will force the company to end November with less than 1000 tons of cold pig, against a daily consumption of 300 tons. Price decontrols brought a flood of above ceilings offers here, which were rejected. Otherwise there was no change in de-mand. Mills so far have held off price increases, beyond consideration of a new system for galvanized sheets.

New York—Leading sheet sellers generally have so far made no revisions in prices, although in a few scattered instances, involving smaller mills, some changes are being reported. For instance, three mills are reported to have increased galvanized sheet prices substantially, and still another mill is understood to have made changes affecting certain of the lighter gages of hot rolled sheets.

Meanwhile, demand is pressing and, with the exception possibly of one or two producers, quotas have been set up by the mills for first quarter or, as in one case, for the first month in the new quarter. One interest had expected to establish quotas last week, but because of the disturbed conditions in coal it has decided to hold off a little longer.

#### Steel Bars . . .

#### Bar Prices, Page 132

New York—While some sellers can still accept hot carbon bars in the larger sizes for late first quarter delivery, others are virtually sold out for the entire period. Cold drawn carbon bar sellers are still offering fair range specifications for March, although in the smaller sizes they are sold out until second quarter. All producers of carbon bars will have arrearages at the end of this year, which in some cases will account for at least five to six weeks rolling capacity. Alloy bar schedules remain easy, with one large producer still able to accept business in hot alloys for December on sizes ranging 7/8 inch and larger; and for January on the smaller sizes. Cold drawn alloy deliveries are slightly more extended.

Boston—Cold heading alloy grades of bars have been advanced \$10 a ton, anticipating some advance in carbon grades of heading wire. Only in smaller sizes, mainly cold-finished, are alloys extended in delivery, approximating the situation in carbon stock. In the latter grades, cold-drawn is under pressure from screw manufacturers and producers of small fasteners, including bolts and nuts. Forge shops, usually well supplied with alloys, are frequently seeking to reopen allocations for carbon bars. Forge shops producing for the automotive industry are working some alloy tonnage, but generally the tonnage is far below carbon requirements while the slackening in activity in the aircraft industry has put a dent in alloy demand.

St. Louis—Bar mills have been rela-tively undisturbed by decontrol thus far and generally are holding up price action until the national picture is clarified. A few small increases have been put into effect, under existing contracts' escalator clause, on former loss items. Inquiries from buyers already on the order books are numerous, most wanting to know if the increase is to be more than they can absorb without encountering consumer resistance on the finished product. No cancellations are reported. Black market buyers are now coming into the open with offers of \$20 or more a ton above former ceilings for immediate deliveries. Merchant bar production remains at capacity, with the threat of a scrap curtailment declining. Frices and supplies of pig iron are the principal remaining deterrent. Order books for 1947 are being cracked open a bit for consumers in this district only. They have been filled through the first quarter for some time. Freight car shortages are easing somewhat and it is pre-dicted that difficulty will be cleared in another two weeks. Eastern and foreign buyers continue to plead for places in rolling schedules without result.

#### Steel Plates . . .

Eastern producer advances prices 25 points, making market 2.80c to 3.05c

#### Plate Prices, Page 133

New York — An eastern Pennsylvania producer which had been quoting plates at a premium of 2.80c, basing points, has advanced his prices \$5 a ton, to 3.05c. Thus, the overall spread now ranges from 2.50c to 3.05c, base, with three producers quoting the equivalent of 2.75c, base.

Demand is still pressing, especially for the lighter gages, 3/16 and 1/4-inch, with production handicapped by lack of raw materials. Rolling departments at one eastern Pennsylvania plant recently were down for more than a week, and although operations have since resumed, they will probably be suspended again shortly as a result of the fuel situation. Consequently, as a result of strong demand and plate production difficulties, producers generally report increasing backlogs. Most sellers are not formally accepting tonnage for third quarter; nevertheless, some have enough tonnage already on their books for a carryover into that period. Certain producers have admittedly oversold to some extent, on the assumption that there may later be a certain amount of cancellations and adjustments which would make capacity available for some of the extra tonnage. However, coning schedules back, with a result that they may more than take up the slack offered by any cancellations later.

offered by any cancellations later. Pittsburgh—No price action by major producers on plates was reported last week, but Central Iron & Steel Co., Harrisburg, Pa., has increased plain plates \$5 per ton. The advances did not include floor plates. Worth Steel Co. and Lukens are continuing to sell at \$5 premium granted OPA. Until the nearly depleted inventories of fabricators can be augmented somewhat, relatively little headway is expected to be made against order backlogs. Overall plate demand has held up exceptionally well in recent months and expanding requirements are indicated through most of next year. Producers continue under pressure to meet heavy requirements of freight car builders, and for tank, barge and heavy machinery fabrication.

Chicago—The plate situation is tightening, and producers here are being pressed by consumers unable to have their requirements met by eastern plate mills or strip mills. Production of plates on strip mills, the wartime practice, has now virtually ceased, the facilities having been restored to strip output. Platemakers are becoming more selective in the business they accept and are not interested in going out of their close-by territories.

Birmingham—Plate production, hokling at capacity, still runs short of current requirements with rather guarded apprehension heard from ship-building interests, tank manufacturers and miscellancous users. The allocation system, voluntarily instituted by the mills, remains in effect.

Boston — Plate backlogs are unbalanced in sizes and widths due to the disproportionately heavy demand for lighter gages. Mills which have not been selective in order acceptance now are forced to limit the ratio of light carbon plates in orders. Concentration of production in the lighter gages, of course, results in smaller tonnage for labor involved. Caught in the squeeze are most fabricators of % and ¼-inch stock, notably fabricators of 1000 to 3000-gallon capacity tanks. The same is true of shops producing smaller fuel tanks of No. 12 gage hot-rolled. All fabricators are between plates and heads. Miscellaneous industrial demand is at a high level and also centers in light stock with the exception of weldments. This extends even to carbuilding as reflected in the backlog of Pullman-Standard Works, Worcester, Mass., where bookings are largest in lighter types of transportation units: 883 trolley-buses, 382 street cars and 177 lightweight streamlined railroad passenger cars. The latter includes 153 for the New York, New Haven & Hartford railroad and 12 for Maine Central.

Philadelphia — One eastern Pennsylvania plate producer, who had already been quoting on a premium basis under OPA, has increased tank plate \$5 a ton to 3.05c, basing points. Three other district mills are quoting 2.75c and two others are competing here at 2.50c, base. Demand is active, with some producers booked fully for two months alread. At least two, in fact, are refusing to accept more tonnage for first half of 1947 shipment.

#### Wire . . .

#### Wire Prices, Page 133

Boston — With few exceptions, wire in all shapes is short with consumers, notably in low carbon grades, demand for which is far heavier than before, notably with new products. Production of low carbon wire, starting with rods, has not kept pace with that in high carbon wire because of profit margins and the vertical advances expected in some wire products will involve the former. High carbon supply is therefore relatively better balanced, but few consumers are getting requirements in those grades. More producers are shaking out backlogs with cancellation requests in an effort to start the new year on a more stable monthly basis.

Pittsburgh — Major producers have not yet taken any price action either in respect to base prices or extras. Unconfirmed reports are to effect that a southern producer has increased nail prices for export, while an eastern producer has advanced straightening and cutting extras from \$3 to \$4 a ton on carbon wire, which is in line with that sought by the industry while under price control. The price differential of 53.5 cents per 100 pounds on Pacific Coast nail prices soon is expected to be raised to \$1. Sellers do not anticipate an adjustment in wire rope or strand prices for consumer inventories of these products are in good shape and production is in balance with demand. Better balanced output is expected now that prices have been decontrolled. Output of wire rods, nails, spring wire, for example, undoubtedly will be increased under a more favorable price-cost relationship. Geographical distribution of wire products also should improve.

Chicago — Demand for wire and wire products exceeds capacity to produce by a wide margin. Recent bookings are comparatively light but do not indicate a reduction in requirements—rather it represents difficulties in gearing them to allocations. Customer inventories are unbalanced, particularly in the finer sizes of both high and low-carbon wire. Ability to acquire needed material appears more important to consumers than price. Better availability of lumber is resulting in more pressure for nails. Demand for mesh, strand and telephone wire exceeds production, and one producer is taking little telephone wire business because of congested backlog. Better wire rope orders are coming in, reflecting depleted inventories.

#### Tubular Goods . . .

#### Tubular Goods Prices, Page 133

Pittsburgh — Producers are booked well into first quarter on carbon tubing, while alloys are obtainable early in the period. Sellers have made little headway against order backlogs of standard steel pipe and oil country goods despite uninterrupted production in recent months. In some instances deliveries on oil country goods are extended through first half. Cast iron pipe interests are booked 12 to 15 months ahead and despite heavy demand have not been able to substantially increase output due to acute pig iron shortage. Both black and galvanized, standard and extra-heavy wrought iron nipples are in better supply. Only price revision reported to date is recent adjustment made by Pittsburgh Steel Co. raising seamless oil country tubular goods as follows: H-40 casing up \$14.50 per ton; J-55 up \$9 and N-80 up \$13 a ton. On oil well tubing, H-40 was raised \$3.50 and N-80 advanced \$17 a ton. No increase was made on grade D and E drill pipe and J-55 oil well tubing. Boston—Unable to place large orders

Boston—Unable to place large orders for steel pipe required for gas collecting and other utility lines for delivery





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**MATHEWS CONVEYER COMPANY** ELLWOOD CITY, PENNSYLVANIA SAN FRANCISCO, CAL. • PORT HOPE, ONT. ENGINEERING OFFICES IN PRINCIPAL CITIES at several points, starting third quarter next year in one instance, Stone & Webster Engineering Co., Boston, has issued large inquiries for heavy strip and light plate for the production of welded pipe. Arrangements have been made with mills, reportedly on West Coast, for welding of this material, if available, in sizes and grades required.

Pipe mills are sold well through next year on direct shipments and a considerable utility tonnage remains uncovered. Distributors are supplied by allocation, some by months and some by quarters.

#### Tin Plate . . .

#### Tin Plate Prices, Page 133

Pittsburgh — Sharp curtailment in primary steel operations resulting from cessation of coal mining operations is not expected to promptly force a reduction in tin plate production as in case of plates, structurals and other finished steel items. It now appears improbable that fourth quarter production goal of 850,000 tons will be reached. There is some prospect restrictions on use of tin will be eased early next year; however, there is considerable pressure for continuation of controls throughout 1947 on tin plate used in output of focd containers. CPA recently estimated next year's tin supply will approximate 142,-000 tons, an increase of about 47,000 tons over this year's total. But world tin demand next year is estimated at 190,000 tons against 145,600 for 1946, while United States needs are expected to increase 24,900 tons to 85,000 tons. Boston — Quotas to industrial users

Boston — Quotas to industrial users of tin mill products have been reduced sharply in some instances. Fabricators of small parts, several for the electrical industry, are desperate for terne plate. To meet export quotas, producers frequently are shearing and coating rejects and exporting this tonnage which formerly went to numerous small industrial consumers. High tin plate demand has indirectly cut into light-gage black, coldreduced and electrolytically zinc coated sheets. With supplies of hot-dipped galvanized sheets meager, openings for new applications of electrolytic zinc sheets are numerous, but capacity taken up for tin plate prevents producers from taking full advantage of opportunities.

#### Structural Shapes . . .

#### Structural Shape Prices, Page 133

Birmingham — Shape demand is not quite as insistent as that for some other products in the district. While fabricators are well booked, some of the pressure for shapes has eased off due, in part, to postponed construction plans and development of a "wait and see" attitude on the part of promoters of major projects.

projects. Philadelphia — W. H. Harman Corp., this city, has signed a \$36 million contract with the government for building 10,000 prefabricated all-steel homes in 1947. The homes will be produced at the former Dravo shipyards, Wilmiegton, Del., with operations to get under way by next March. Between 32,000 and 35,000 tons of steel will be required. New York — While structural awards are spotty and include few outstanding

New York — While structural awards are spotty and include few outstanding tonnages, inquiry is somewhat more active. This improvement in specifications is ascribed in part to the decontrol of
#### MARKET NEWS

prices and the withdrawal of certain other controls, as an important step in the eventual restoration of a free market. There has been no relaxation on CPA controls over nonhousing construction nor are there any signs that there will be in the immediate future. However, there is a growing feeling that the building industry within a reasonable time will be back to a normal basis of operation. Some of the projects now out for figures have not as yet been approved by CPA and may not go ahead, but there is nevertheless a greater disposition among builders to get plans completed and estimated, regardless of CPA approval, than there has been recently.

Boston—Few structural contracts have been canceled outright in this area, although at least one has been postponed. New inquiry is down, but district shops usually have backlogs for several months. Some individual tonnages are small, under 200 tons, and fabricators are forced to round out requirements from warehouse stocks which are low with most distributors. Despite this, smaller shops are generally making good on delivery promises.

# Pig Iron . . .

Blast furnaces and foundries operating on dangerously low coke supplies

#### Pig Iron Prices, Page 135

Philadelphia — The Birdsboro, Pa., pig iron producer advanced all grades \$2 a ton last week, bringing prices in balance with costs. Should coal prices advance further, another advance in pig iron likely will develop. Until recently most iron producers were disposed to await developments in the mine dispute pointing to the future price of coal, but with one furnace now having already taken action despite the lack of anything definite on the price of coal, other sellers may advance prices shortly. Increases in the foundry grades would be charged against whatever government premiums they may be receiving under the housing program.

It is likely that certain so-called dislocated basing points on some grades will be dropped in the not too distant future. These number five or so throughout the country. Such action would not run counter to the central policy of the steel industry in establishing an ever increasing number of bases, but would be designed to correct certain unsound marketing practices which have developed over the years.

For instance, Sparrows Point, Md., is now a basing point on foundry iron, as well as certain other grades; yet little or no foundry iron for merchant sale is being produced at that point. Hence, the situation imposes an extra cost burden on other producers in supplying iron to foundries in that district, and also a handicap on the foundries themselves to the extent that they are not receiving as much iron as they would otherwise.

much iron as they would otherwise. Following the walkout at coal mines, the smaller of the two stacks at Swedeland, Pa., was scheduled to be blown out for repairs. Major portion of certified tunnage scheduled for production by that furnace this month has been produced, it is understood.

New York - Curtailment in coal pro-



duction already is having its effect on foundry operations in this' district. Coke has been one of the major bottlenecks for some weeks past, and at present consumer inventories are far below normal. Thirty-day inventories are the rare exception, with many consumers having less than two weeks supply on hand. Shortage of pig iron also will be a factor, inasmuch as inventories are relatively light. Certain foundries declare their opcrations will be reduced 50 per cent within a week unless there is an unexpected break in the soft coal dispute.

During the early part of last week pected break in the soft coal dispute. During the early part of last week specifications for coke and pig iron were heavy in an effort to get in tonnage before the threatened coal strike began; however, there was little appreciable change in the flow as producers were moving materials as fast as their produc-

# tion and supply of freight cars would permit.

Cincinnati — Foundry pig iron is moving steadily from northern and southern furnaces, although there is a modest time lag in most shipments. Attention of melters is being diverted from the long-standing limitations on pig iron tonnage to the increase in scrap price and threat, through a mine strike, against supplies of coke. Few foundries have more than minimum stocks of iron, scrap and coke.

Birmingham—A blast furnace owned by the Sloss-Sheffield Steel & Iron Co. here was scheduled to begin producing foundry and malleable pig iron for the Veterans Emergency Housing program last week in response to incentives set up by the premium payment plan for such iron. The furnace, capable of producing



8000 tons a month has customarily produced ferromanganese. It is now planned to alternate the furnace in two-month periods between ferromanganese and foundry grade pig iron.

Toundry grade pig iron. During the months in which it produces foundry grade pig iron, the furnace will add about 7 per cent of the total monthly supply of such grades in the southern states. Sloss-Sheffield has three other furnaces at Birmingham which produce a total of about 30,000 tons of foundry grade pig iron monthly. The fourth furnace will receive premiums of \$8 a ton on all foundry grade pig iron turned out.

Boston — Any serious interruption in coal supplies would disrupt plans for an early relief in the pig iron shortage blanketing New England. It already has caused delays in the resumption of production and shipments at the Mystic furnace. Given freedom for full production over the next few weeks, shortages might be overcome around the first of the year in foundry grades, but relief will not be apparent as soon in basic and malleable grades. At least two steel works are operating with small reserves of iron. The Mystic and Troy furnaces, which are expected to help ease the shortage, will concentrate on foundry iron during the period just ahead. Both probably will be subjected to more rated tonnage over the next two months, if the housing certification policy is still in effect. An increase in pig iron supply is also looked for to eventually ease the cast iron scrap picture. All this, however, must be predicated on a steady fuel supply.

Pittsburgh - NHA soon is expected to clarify its position on premium payment program for foundry and malleable iron. It is uncertain at this time whether the \$8 and \$12 price differential will be continued should the industry advance prices to offset increased production costs for which they were not permitted to pass on under OPA control and any future advances to compensate for prob-able higher iron ore and coal prices. December directive tonnage under the housing program was little changed. Since the directive tonnage program was extended into first quarter on sheets and bars it is assumed that this procedure of aiding housing equipment suppliers also will be continued on much the same basis as in current quarter. Carnegie-Illinois Steel Corp. blew in two blast furnaces recently that had been down for repairs, making a total of 52 out of 54 units pouring iron. This represents the highest rate of pig iron output to date this year, however operations will be curtailed immediately in event of a coal strike.

Buffalo — Price interest in the pig iron market centers around the possibility of a change in next month's deliveries. New contracts carry the protective clause for producers that shipments will be made at the "seller's price at time of shipments." While producers will have no trouble moving all of next month's output, surprise was expressed over a pronounced lessening of pressure for shipment to consumers. This was attributed by some foundries to a shortage of coke, which has become tighter than pig iron. Sellers reported a sharp decrease in the number of long distance telephone calls from buyers in outlying districts who have been pleading for deliveries. Searching for an explanation for the situation one leading merchant

#### MARKET NEWS

iron producer expressed the thought that inasmuch as the entire iron output is being sold, consumers have reconciled themselves to the fact that they cannot get any more than is being made, therefore it does them no good to press for delivery.

# Electric Furnace Silvery Pig Iron Advances \$2

Effective as of Nov. 1, leading producers of electric furnace silvery pig iron advanced prices \$2 a gross ton on all grades. Electric furn a c e ferrosilicon, 14.01 to 14.50 per cent silicon, is now quoted \$53.25, fob Keokuk, Iowa; \$50, Jackson, O.; and \$51.25 Buffalo or Niagara Falls, N. Y. For each additional 2 per cent silicon, up to 18 per cent, \$1 a ton is added; for each ½ per cent manganese over 1 per cent, 50 cents; and for a maximum of 0.045 per cent maximum phosphorus, \$1 a ton.

## Scrap . . .

#### Scrap Prices, Page 136

New York — Although most melting steel grades are holding at around \$5 a ton above former OPA ceilings, the market on these grades hasn't as yet shown any definite signs of leveling off and in the case of cast grades increases to date have been higher than in the steel grades and with the situation even more unsettled. Local dealers are paying around \$32 to \$33 fob cars as compared with the OPA ceiling of \$25, and in some isolated cases still higher prices have been paid.

This greater unsettlement in cast is ascribed in part to the fact that there are so many more buyers of cast in this district, as compared with steel, and that in general the cast buyers are relatively much smaller consumers of the scrap. However, some trade interests look for clarification of the market on cast within another fortnight.

St. Louis — Scrap shipments have picked up 20 to 25 per cent since decontrol, and reserves. formerly down to two weeks, are now estimated at 30 days or better. One large steel foundry has accumulated the 45-day limit and is out of the market, allowing ground stocks elsewhere to rise more rapidly. No. 1 and No. 2 steel scrap is up \$5 here, and foundry grades \$2.50. The trade feels another \$2.50 boost in the latter may come this week, making what amounts to a \$5 across-the-board rise. That, of course, will depend largely on foundry bidding. The initial increases were regarded as a test to soe if those amounts would keep scrap flowing. If they do, hey may well prove to be the top for a lime. Improved shipments are believed wholly an effect of prices rather than better weather. It is also indicated that boarding at remote points for a price merease may have been ample to offset a scasonal drop.

Cincinnati — Some semblance of price stability has developed in the iron and steel scrap market after an unsettled weck fellowing the removal of OPA controls. Mill policies helped as a steadying influence. Bids on railroad lists are awaited as a barometer. Some tonnage was freed by the higher prices, but not enough material is coming out to meet demands, one district interest recently cooling two



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widely used for producing satin finish on nearly all types of metals. NU-SPRA-GLU replaces greaseless compound, and represents a new step in buffing development. It works most efficiently, produces excellent results, does not go down the blower or on the floor, and *lasts longer on the wheel*. NU-SPRA-GLU can be supplied in all sizes from 120 to 600.

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open hearths because of a short supply. Competition for cast is keen, at a nominal quotation of \$33 for No. 1 cupola.

Boston — Stabilization in scrap prices is needed to bring about heavier shipments and this is developing in heavy melting steel grades at \$20.35 a ton at shipping points. Differentials between ports, operative under controls, have been eliminated. Advances have been higher and confusion greater in cast grades, although some foundries stopped buying after the first flury. For the present, there is no differential between No. 1 and No. 2 heavy melting steel, but a return to this differential is expected as soon as supply improves.

ed as soon as supply improves. Buffalo — Prices on open hearth and blast furnace grades of scrap are begin-

#### MARKET NEWS

ning to show some degree of stability, but cast items remain unsettled. Heavy melting and No. 1 and No. 2 bundles have leveled off at prices \$5 above former OPA ceilings while turnings and borings have increased \$2.50. Although a flurry of offerings followed the immediate announcement of price decontrol, dealers reported a considerable falling off in receipts this week.

Prices on cast scrap continue to gyrate wildly because of limited supplies and brisk demand. One report had a midstate sale of cast at more than \$40 a ton. Other sales were reported in the thirties. Dealers, however, placed No. 1 cupola at \$28 to \$30 a ton. While negotiations have centered around the extent of price upturns, some hesitancy



Above, is pictured a 6,000 pound Brosius Auto Floor Manipulator serving a 1,000-ton forging press in the Timken Roller Bearing Company plant at Canton, Ohio.

This machine manipulates the hot blank while it is being forged under the press, and also charges and draws the heating furnaces— a multiple service with one machine.

The power for these machines is received, either from the plant supply through a flexible cable and a rotating collector mounted on the mast of the machine, or from a machine mounted gasoline engine driven generator, where the floor area may be too great for cable operation. Being self-contained, no tracks or expensive runways are needed just a smooth reinforced concrete floor is sufficient. Write for descriptive folder on this equipment.



was apparent among consumers over the prospects for a coal strike. Dealers, too, were concerned over the possibility of an easier market. One railroad has sent out notices that its list will be at least \$5 higher.

Seattle—Foundries are as active as short supplies of cast iron scrap and pig iron will permit. Until recently scrap was ample for current needs but a shortage has developed and plants find difficulty in filling requirements. The price for No. I cupola cast scrap remains \$25 gross. New work is being taken and the situation indicates a busy winter, provided shortages are relieved.

Steel scrap was raised \$2.50 following decontrol, as announced by the principal consumer whose plant had to lower production 25 per cent by closing one furnace because of lack of scrap. The new price for No. 1 heavy melting is \$17, gross, fob plant. This is expected to stimulate shipments and permit capacity operations. The new level likely will be adopted by other plants. Due largely to lack of railroad and automobile scrap, there is no surplus in this area.

Philadelphia — Melting steel prices have leveled off, at least temporarily, at about \$5 a ton over the OPA ceiling prices. Cast prices, however, continue unsettled and strongly buoyant. Billet and forge crops are being re-established as a classification here at \$28.75 to \$29.25, delivered. The coal strike, with its restrictive influence on pig iron production, is imparting a strong undertone to scrap, especially cast scrap. Pittsburgh — Some improvement in

Pittsburgh — Some improvement in movement of scrap developed last week at higher price levels of \$5 a ton above former OPA ceilings on steelmaking and electric furnace grades. Cast scrap moved at \$5 above former ceilings for short hauls and \$3 in those instances involving substantial freight absorption. Turnings and cast iron borings were increased another \$2.50 a ton last week, thus restoring the normal relationship with heavy melting steel prices. Of the 195 blast furnaces depending

Of the 195 blast furnaces depending principally on Lake Superior ore, 170 were in blast on Nov. 1 compared with 166 on Oct. 1 and only 132 on Nov. 1, 1945. Of the 25 idle stacks on Nov. 1, 21 were in the United States and 4 in Canada.

Despite higher scrap prices, the supply outlook remains very critical for winter months. Due to this shortage, 31 open hearths were idle last week with at least one interest reporting further curtailment will be necessary soon unless incoming scrap is substantially increased. Curtailment of steel operations due to the coal strike will ease the scrap situation somewhat, but this, of course, is not a sound solution to the present problem.

D:troit — In conformity with agreements reached at a conference in New York last Monday, prices of all grades of turnings are advanced another \$2.50, making the increase in scrap prices \$5 across the board, except for cast material. However, mills declare they will permit no upgrading as in the days of control, and will reject cars of open-hearth scrap which have been upgraded to plate scrap, the latter carrying a \$5 per ton premium over open-hearth.

A Chevrolet list comprising 141 carr was released for free bidding last week. This is about an average list from this producer, but is the first time in months it has not been channeled to a specific mill, presumably because of the return of a free market.

Cast scrap has soared to an indeterminate point, largely as the result of fantastic bids by foundries scrambling for what little material is available. Meanwhile the price quoted on No. 1 cupola cast is nominal at \$35-\$40.

# **Reinforcing Bars** . . .

#### Reinforcing Bar Prices, Page 133

Boston — Elimination of jobber allowances to fabricating distributors has been proposed as one method of increasing profit margins on concrete reinforcing bars. Some mills are reported considering this action. Bulk of reinforcing bars are distributed through integrated fabricating units. Nearby stocks are low and commitments against larger tonnage inquiry are difficult to meet.

# Nonferrous Metals . . .

#### Nonferrous Prices, Page 138

New York—Advances in primary copper and lead and in zinc oxide prices featured the nonferrous metal markets last week.

Copper—Phelps Dodge Corp. and Miami Copper Co. advanced prices 2 cents a pound to the basis of 19.50c, Connecticut valley, while other leading producers held unchanged at 17.50c. Due to the fact that the government has ended purchases of copper abroad, domestic users now will have to pay 21.50c a pound for imported copper. The industry does not want to see the price of copper rise too sharply, due to the probable effect on consumption. Temporary removal of the 4-cent tax on copper imports and reduction of the 4-cent tax by 50 per cent through presidential decree have been proposed by various trade interests.

American Brass Co. last week advanced ist prices for copper products two cents a pound and proportionate increases for brass and other alloy products. The company also has changed its discount for cash payment to ½ from 1 per cent previously.

Anaconda Wire & Cable Co. increased its prices for less than carload lots of wire as follows: Bare wire 26.02c, up 2.2 cents; weatherproof wire, 26.92c, up 1.7 cents a pound; and magnet wire, 29.68c, up 2.2 cents. It is understood that these prices are based on domestic copper at 19.50c a pound.

A leading smelter in the mid-west has announced it will make no change in brass ingot prices for the present, despite the advance to the 19.50-cent level in some quarters. This company will continue to ship and book scrap metal business on the basis of the market on date of shipment.

Lead-Leading producers of lead advanced prices 1.30 cents a pound last week to the basis of 11.65c, East St. Louis. The 11.80-cent level for lead at New York is equal to the foreign price plus import duty and transportation charges from Mexican port of origin. The latest advance in lead was attributed to the government's decision to terminate its program of purchasing all imported lead. Under this program, the government had been absorbing the import duty and a portion of transportation costs.

Zinc-While prime western zinc process held unchanged at 10.50c, East St. Louis, zinc oxide prices advanced 1 MARKET NEWS

cent a pound, reflecting the increase in zinc prices during the week ended Nov. 16. American process "lead-free" zinc oxide is now quoted 9.00c a pound.

#### Warehouse . . .

#### Warehouse Prices, Page 134

Boston—On slower moving products, warehouses are deferring or halting shipments. Larger sizes generally are involved since distributors press for small and lighter stock in the same products. Inventories are becoming more unbalanced as aggregate tonnage taken in by jobbers this quarter is below that in the preceding like period. Firm orders placed for next quarter are below estimated requirements for numerous sizes and grades, Obviously, some mills are channelling more steel to the manufacturing trade directly, reversing the preference which distributors had in the third quarter under the warehouse directive. Chicago—Warehouses continue to ad-

here to price lists in effect prior to OPA decontrol and from all indications will adhere to this policy until mill prices undergo revision. Distributors received heavy shipments during third quarter but their inventories do not reflect this because of the heavy inroads customers have made by heavy buying. These inventories will undergo heavy drain as manufacturing companies seek to maintain operations as long as possible during the coal dispute.

St. Louis—Warehouse steel inventories continue to decline, with increasing spottiness in assortments and sizes. The drop last month was probably the heaviest of the year. Aside from alloy bars, all items are in extremely short supply. Currently, warehouses are receiving deliveries scheduled four to six months ago, and there is





little hope for improvement before the first or second quarter of 1947. Sheets continue in greatest demand and some mcrease in pressure from the farm and housing industries is noted.

housing industries is noted. Philadelphia — Some leading jobbers report business so far this month as being ahead of the corresponding period of October, both in point of tonnage and dollar value. Principal demand is for sheets, small carbon bars and small shapes, as has been the case for several months.

## Bolts, Nuts . . .

#### Bolt, Nut, Rivet Prices, Page 133

New York—Except for one small New England maker, bolt and nut manufacturers have so far held their price schedules unchanged. One steel producer has announced a new extra of 50 cents per hundred pounds on hot rolled and cold drawn alloy steel, cold heading quality.

ing quality. Demand for bolts and nuts, especially the smaller items for general manufacturing assemblies, has given manufacturers an average backlog of around 16 to 20 weeks. Manufacturers of cap screws have little to offer before the end of the second quarter of next year. Structural rivets demand reflects CPA restrictions on non-housing construction, with delivery promises relatively easy.

Pittsburgh--No general upward adjustment in bolt, nut and rivet prices is indicated on basis of present production costs. Price advances granted by OPA earlier this year were in most instances sufficient for manufacturers to make small profit and everything possible is expected to be done to prevent further rise in selling prices. Output of fasteners has improved moderately in recent months although manufacturers still are unable to keep pace with incoming orders. Order backlogs on track bolts extend into third quarter next year.

# Rails, Cars . . .

#### Track Material Prices, Page 133

New York — All consideration of a new program of allocations of car steel has apparently been abandoned, following a meeting of car builders with government officials in Washington on Nov. 18. Car builders generally are satisfied with the decision not to go ahead with new allocations in view of the fact that it would have meant the disarrangement of their existing programs in at least most cases. Also the outcome of the meeting was generally satisfactory to steel producers, all of whom are heavily booked and who would only have to set back tonnage already on order to handle the allocations.

One reason suggested for the decision not to go ahead with further allocations of car steel is the reported intention of CPA to withdraw from the picture as rapidly as possible. CPA has already dropped various regulations and others are expected to follow in fairly short order. Just how long it will be before CPA will cease functioning entirely remains to be seen. However, some believe that to all practical intents and purposes the agency will have wound up most of its affairs by the end of this year, although under the present law it has until March 31 to go.

Cleveland - All passenger cars on the

Chesapeake & Ohio railroad lines will be replaced under a modernization program which will cost about \$26 million. A contract for 284 passenger cars has been awarded to Pullman-Standard Car Mfg. Co., Chicago, for delivery beginning late in 1947 and continuing through the first half of 1948. The car order consists of 93 sleeping cars, 38 dining cars, 99 coaches, 22 coach-baggage cars and 32 special-purpose cars. These units will be distributed among the Chesapeake & Ohio and its affiliates, the Pere Marquette and the Nickel Plate.

# Canada . . .

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Toronto, Ont.—While Canadian steel producers are out of the market insofar as most items of iron and steel are concerned for the remainder of the year, deliveries against old orders are gaining in volume and there has been noticeable improvement in industrial activities and building trades in the past week or two. Steel Co. of Canada Ltd., Hamilton, and Algoma Steel Corp., Sault St. Marie, are almost back to normal production schedules following the strike and Dominion Steel & Coal Co., Sydney, N. S., is rapidly nearing this stage. However, operations as a whole are still well below capacity and most companies continue with delayed repair work.

Although mill operations are near normal, supply of iron and steel remains tight with little prospect of easing until well into 1947. During the strike, most stocks were cleaned out of consumers plants and the majority are meeting with only minor success in rebuilding inventories, since producers are spreading supplies over as many users as possible to keep all plants in operation.

# Ferroalloys . . .

#### Ferroalloy Prices, Page 135

Pittsburgh — While one producer of ferromanganese is accepting contracts for the entire first quarter at current levels, certain others are taking contracts at present prices for only one month at a time, rather than commit themselves for all three months, as they normally do. This latter policy is designed to permit increases should conditions warrant. Incidentally, manganese alloys were the only important ones in the ferroalloys field still under control at the time OPA ceilings were generally lifted a short while ago.

# Steel Operating Rate Drops as Miners Strike

#### (Continued from Page 36) page continue through this week much more drastic reduction in production schedules is indicated.

Steel interests report a relatively wide range of coal inventories, from 8 days supply at capacity output to 30 days in a few instances. The industry's average stock position in this district is estimated at about 12 days' supply.

Independent by-product coke operators are believed to have around 15 days' coal supply and it is estimated industrial plant stocks are about the same. Coal stocks of public utilities approximate 35 days' supply and railroads 20 days.

Philadelphia—Prolongation of the soft coal strike will bring drastic reduction of steelmaking operations in this area. Moving quickly to conserve coal supplies, producers started curtailing cperations immediately upon the calling of the strike. Blast furnace production was affected almost at once with one eastern Pennsylvania stack taking occasion to blow out for repairs.

First effects of the coal strike on production were difficult  $t_0$  evaluate. However, expectations are that sharp curtailment of operations will be forced throughout the area within a week or so at latest.

#### Some Curtailment at Chicago

Chicago—Operations at blast furnaces and steel plants in this district were not immediately seriously affected by the coal mine strike but producers took quick steps to curtail production in event the miners' walkout is prolonged. Ingot operations in the area last week were estimated at 90 per cent of capacity, but a drop from that level is indicated for this week.

Inland Steel Co. immediately started to cut operations, banking two blast furnaces and dropping five open hearths from production. Finishing operations are scheduled to be curtailed this week. The company's coal stocks are reported sufficient for no more than two weeks at 86 per cent of capacity operation.

#### Southern Steel Rate Seen Falling

Birmingham—The exodus of Alabama coal miners was under way here the first of the week, well in advance of John L. Lewis' deadline for expiration of the current mine contract. Checks Monday showed three mines of TCI and several small commercial operations down.

# Expect Cut at Cleveland

Cleveland — Ingot operations in this area averaged 93 per cent of capacity hast week, rise of four points from the preceding week. This rise came in the lace of the coal mine strike at midweek, the increase being effected prior to the miners' walkout.

Expectations at last weekend were that some curtailment of production would be effected this week, though steel mill executives indicated operations would be tapered off gradually if the coal strikes were prolonged. Mill coal supplies were described as fair.

# STRUCTURAL SHAPES ...

STRUCTURAL STEEL PLACED 4500 tans, copper fabricating plant, Wolverine Tube Division, Calumet & Hecla Copper Co.,

- Decatur, Ala., to Virginia Bridge Co., Birmingham, through Foster & Creighton, Nashville, Tenn., general contractor.
- 1200 tons, theater building, Mexico, to Virginia Bridge Co., Roanoke, Va.
- 835 tons, state bridge, Hamden, Conn., to Electric Boat Co., Groton, Conn.
- 600 tons, building, General Electric Realty Corp., Pittsfield, Mass., to Lehigh Structural Steel Co., Allentown, Pa.
- 590 tons, Nescafe plant, Nestles Milk Products Inc., Freehold, N. J., to Bethlehem Steel Co., Bethlehem, Pa.
- 565 tons, plant, General Foods Corp., New York, for erection in the cast, to Bethlehem Steel Co., Bethlehem, Pa.
- 450 tons, plastic building, Carbide & Carbon Chemical Corp., Texas City, Tex., to Bethlehem Steel Co., Bethlehem, Pa.
- 328 tons, sheet piling, dock, Chicago, for Cuneo Press Inc., to Carnegie-Illinois Steel Corp.; Harry A. Thompson, Chicago, contractor.
- 250 tons, municipal garage, Third Ave., New York city, to American Bridge Co., Pittsburgh.
- 100 tons, shapes and bars, incinerator, Pittsfield, Mass., to Topper & Griggs, West Hartford, Conn.; N. Benenuti & Sons, New Londan, Conn., general contractors.

#### STRUCTURAL STEEL PENDING

- 3500 tons, sports arena and a 10-story hotel, Broad and Lehigh streets, Philadelphia; general contract to McCloskey Contracting Co.
- 3000 tons, hangars, Gravelly Point, Va., for government.
- 2730 tons, oil barges, for Mississippi Valley Barge Line Co., St. Louis.

500 tons, steam station, Tampa, Fla., for Tampa Power & Light Co.; Stone & Webster Engineering Co., Boston, engineer.

- 400 tons. copper fabricating plant, Wolverine Tube Division, Calumet & Hecla Copper Co., Decatur, Ala., to Virginia Steel Co., Birmingham, through Foster & Creighton, Nashville, Tenn., general contractor.
- 300 tons, bridge, Philadelphia Electric Co. at Norristown, Pa.; bids Nov. 29.
- 100 tons, extension to Public School 102, New York city, bids asked.
- Unstated, plants in Roza project, Washington, and Hungry Horse project, Mont.; bids to Bureau of Reclamation, Denver, Dec. 4 and 11, respectively.
- Unstated, two steel towers, river crossing at Salem, Oreg., bids to Bonneville Administration, Portland, Oreg., Nov. 22; spec. 3874.
- Unstated, 16 trash racks, Cascade Dam, Idaho; bids to Bureau of Reclamation, Dec. 13.
- Unstated, \$1 million new gypsum board plant for National Gypsum Co., Clarence, N. Y.; Siegfried Construction Co., Buffalo, general contructor.

#### **REINFORCING BARS** ....

#### REINFORCING BARS PLACED

400 tons, miscellaneous building projects, to Bethlehem Pacific Steel Co., Bethlehem, Pa.

- 320 tons, East 34th St. bridge, Tacoma, Wash., to Bethlehem Pacific Steel Co., Seattle; Guy F. Atkinson, Scattle, general contractor.
- 300 tons, viaduct and approaches, state highway project, Hamden, Conn., to Truscon Steel Co., Boston, through Mariani Construction Co., New Haven, Conn., general contractor.
- 300 tons, bridge, Hamden, Conn., to Truscon Steel Co., Boston, through Mariani Construction Co., New Haven, Conn.
- 200 tons, Belmont telephone exchange building,



Chicago, for Illinois Bell Telephone Co., to Joseph T. Ryerson & Son Inc., Chicago; Dahl-Stedman Co., Chicago, contractor.

100 tons, addition, St. Margaret's hospital. Spring Valley, Ill., to Joseph T. Ryerson & Son Inc., Chicago; T. S. Willis, Janesville, Wis., contractor; bids Oct. 4.

#### REINFORCING BARS PENDING

- 2000 tons, superstructure building KK, diesel engine plant, Peoria, Ill., for Caterpillar Tractor Co.; bids Nov. 21.
- 1700 tons, several housing projects, Providence, R. I.
- 300 tons, paving, Calhoun county, Iowa, for state; Koss Construction Co., Des Moines, contractor; bids Nov. 12.
- 280 tons, paving, Floyd county, Iowa, for state; Koss Construction Co., Des Moines, contractor; bids Nov. 12.
- 180 tons, paving, Pottawattamie county, Iowa. for state; Koss Construction Co., Des Moines. contractor; bids Nov. 12.
- 105 tons, substructure, fixed highway bridge over Calumet river at 130th St., Chicago, for Department of Public Works; bids Dec. 5.
- 100 tons, paving, Woodbury county, Iowa, for state; Booth & Olson Inc., Sioux City, Iowa, low on general contract; bids Nov. 12.

#### PLATES . . .

#### PLATES PLACED

- 1000 tons or more, 12 steel pipes, 12-feet diameter, Columbia Basin project, to Western Fipe & Steel Co., San Francisco, \$1,272,850.
- 370 tons, 36-inch, welded ½-inch plate pipe, Metropolitan district, Boston, to Walsh-Holyoke Co., Holyoke, Mass.
- 200 tons or more, ½-million gallon water tank, Selwood Park district, Portland, Oreg., to Pittsburgh-Des Moines Co., Scattle, Wash, low \$59,870.
- Unstated, 33 bulk tank units, 55 and 38-foot diameter, Fort Lewis, Wash.; Sam Bergesen, Tacoma, Wash., general contractor.
- Unstated, oil storage tank for the Texas Co., Portland, Oreg., to Chicago Bridge & Iron Co., Chicago.

#### PLATES PENDING

- 200 tons or more, ½ million gallon water tank, Wapato, Wash.; Chicago Bridge & Iron Co., Chicago, low.
- Unstated, 53,000 feet 18-inch water pipe, Hills boro, Oreg.; bids Nov. 18.

# PIPE . . .

#### CAST IRON PIPE PLACED

- 215 tons, 38-inch cast iron pipe, Metropolitan District Commission, Boston, to Warren Pipe Co. of Massachusetts Inc., Boston.
- Unstated, Oak Grove water district, Portland, Oreg., to Rushlight Sprinkler Co., Portland, \$113,339.

# CAST IRON PIPE PENDING

135 tons, 6 to 10-inch, Quincy, Mass.; bids in.

#### RAILS, CARS ...

#### RAILROAD CARS PLACED

- Chesapeake & Ohio, 284 passenger cars, to Pullman-Standard Car Mfg. Co., Chicago; include 99 coaches, 93 sleeping cars, 38 dining cars, 22 coach-baggage cars, and 32 special purpose units.
- Maine Central, 250 fifty-ton box cars, to Pullman Standard Car Mfg. Co., Chicago, these are in addition to 500 fifty-ton box cars placed for the Boston & Maine, an award that was referred to in last week's issue as involving 550 box cars.
- New York City Board of Transportation, one 10-car subway train, bids Dec. 16; alternate specifications are being asked on aluminum, stainless steel and on low carbon high tensile steel.

# CONSTRUCTION AND ENTERPRISE

#### ALABAMA

- BIRMINGHAM—Southern Natural Gas Co., Watts Bldg., is planning construction of a gas compressor plant to cost \$500,000.
- BIRMINGHAM—M-H Hardware Co. has been organized by E. T. Brown Jr., as president, with \$3,100,000 capital stock to engage in wholesale and retail hardware and manufacturing business.
- PRATT CITY, ALA.—Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, has awarded \$97,000 contract to its own forces to repair shop for Pratt Shop rail transportation works.

#### ARKANSAS

PINE BLUFF, ARK.—Chamber of Commerce, c/o board of directors, is contemplating construction of a manufacturing plant to cost over \$100,000.

#### CALIFORNIA

- EAST LOS ANGELES, CALIF.—M. P. Kirk & Sons Inc. has received a building permit for construction of a corrugated iron machine shop at 2714 S. Indiana Ave., to contain 4000 square fect of floor space and to cost \$8000.
- LOS ANGELES Modern Faucet Mfg. Co., 1700 E. 58th Place, has received CPA approval for factory addition at 1751 E. Randolph St., to cost \$7500.
- LOS ANGELES—California Metal Enameling Co., Vernon, Calif., has obtained a building permit for construction of a loading shed at 6650 E. Slauson Ave., containing 2751 square feet of floor space and costing \$6000.
- LOS ANGELES—Ziegler Steel Service Co., 1560 N. Ditman Ave., has obtained CPA approval for construction of a warehouse at 6000 Anaheim-Telegraph Rd. The structural steel and corrugated metal structure will be 60 x 300 feet and will cost \$85,000.
- TORRANCE, CALIF.—Bates Expanded Steel Co., 160 N. LaSalle St., Chicago, is planning construction of several industrial buildings on a recently purchased 16-acre site at Arlington Ave. and Doniquex St., to cost over \$500,000.

#### COLORADO

GRAND JUNCTION, COLO. — Co-Operative Refinery Co., c/o Don B. Hibbs, 350 E. Armour St., Kansas City, Mo., is planning construction of a 3500 barrel daily capacity refinery to cost \$2,750,000.

#### ILLINOIS

- CHICAGO—Chicago, Milwaukee, St. Paul & Pacific Railroad, K. F. Mystrom, 516 W. Jackson Blvd., chief engineer, has awarded contract for one-story. brick, steel, and concrete diesel engine building to Ragnar Benson Inc., 4744 W. Rice St., for an estimated \$117,975. A. O. Lagerstrom, c/o owner, is the architect.
- HILLSIDE, ILL.—Aluminum Co. of America, 520 N. Michigan Ave., has awarded contract for one- and two-story die cast plant consisting of eight buildings to J. Griffiths & Son, 228 N. LaSalle St.
- NILES, ILL.—Lighthouse Trailer Co., 631 W. Shubert, is asking for bids for foundation for one-story, 700 x 250-foot, brick, steel factory to cost \$350,000. Lundstrum & Skubie, 53 W Jackson Blvd., Chicago, are architects.
- ROBINSON, ILL.—Ohio Oil Co., H. E. Handy, superintendent at Robinson, is planning plant additions at a cost of \$1 million to increase storage capacity of refinery to 51,500,000 gal.

#### MICHIGAN

DETROIT—CPA approval has been granted for construction of a \$193,000 project involving erection of 80 prefabricated hangers at De-

#### troit City airport.

- DETROIT—Central Induction Heat Treating & Brazing Inc., 5100 Tillman Avc., has been organized with \$25,000 capital by Rev O. Baubic, Detroit Yacht Club, Belle Isle, Mich., to process, heat treat and braze metals.
- DETROIT—McCollom Metals Inc., 702 Pallister Ave., has been incorporated with \$10,000 capital by Cecil G. McCollom, same address, to conduct a general manufacturing and foundry business.
- DETROIT—Mortasteele Vault Co., 5155 Loraine Ave., has been organized with 7500 shares of no par value stock to manufacture vaults, safes, etc., by Curtis M. Steele, 1726 Seward Ave.
- DETROIT Custom Metal Products Corp., 14595 Stansbury Ave., has been formed by Charles P. Wineman, 13111 Monte Vista, to manufacture metal products. It is capitalized at \$50,000.
- DETROIT Detroit Bearing & Bushing Co., 3379 Gratiot Ave., has been organized with \$200,000 capital to manufacture bearings, bushings and metal products by George V. Wilson, 2424 Mcrriweather Rd., Grosse Pointe Farms, Mich.
- DETROIT—Linwood Pump Corp., 4222 Second Ave., has been incorporated with \$50,000 capital by Francis W. McCauley, 3963 Bishop Rd., to manufacture pumps and other mechanical devices.
- DETROIT Petroleum Accessories Inc., 500 Griswold St., has been incorporated with \$50,000 capital by Roland H. Burks, 2366 Franklin St., Berkley, Mich., to conduct = general manufacturing business.
- DETROIT-Tru-Bore Boring Co., 18201 Garfield Ave., has been organized with \$45,000 capital to engage in precision boring, machining and milling of castings by Harry Hissons, same address.
- DETROIT-Link Welder Corp., 13840 Elmira Ave., has been formed by Herbert W. Link, 8330 Sorrento Ave., to manufacture and install machinery. It is capitalized at \$100,-000.
- DETROIT—Odel Tool & Die Casting Co. Inc., 8820 Grinnell Ave., has been organized with \$200,000 capital to conduct a general manufacturing business by Fred Wiswedel, 701 Lincoln Rd., Grosse Pointe, Mich.
- DETROIT—Great Lakes Products Inc., 1705 Washington Blvd. Bldg., has been organized with \$50,000 capital to conduct a general manufacturing business by Vincent J. Gilleo, 488 Lenox Ave.
- DETROIT—Fabricated Metal Stampings Inc., 2542 Bull Bldg., has been organized with \$50,000 capital to deal in steel and steel products by Michael R. Bagdade, same address.
- DETROIT—Mercury Steel Corp., 6402 Grandy St., has been incorporated by Edward A. Gorney, 357 Lakewood Ave., to manufacture coin-operated machines. The company has \$200,000 capital.
- GRAND RAPIDS, MICH.—Manufacturers Supply Co., 38 Commerce Ave. S. W., has been organized by Edward H. Idema, 1750 Robinson Rd., to deal in machinery, tools and engines. It is capitalized at \$100,000.
- GRAND RAPIDS, MICH.—Michigan Wheel Co. is having plans prepared by Wilfred P. Mc-Laughlin, architect, for construction of \$100,000 factory addition.
- HAZEL PARK, MICH.—Hettche Mfg. Co., 2328 East Nine Mile Rd., has been organized with \$75,000 capital to conduct a general manufacturing business by Jacob Brodsky, 4053 Elmhurst Ave., Detroit.
- LANSING, MICH.—Oldsmobile Division, Geaeral Motors Corp., has awarded contract for truckwells and alteration to Clark Construction Co., Grand Ledge, Mich., and Darin & Armstrong Inc., Detroit. Smith, Hindman

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WRITE FOR CATALOG



& Grylls Inc., Detroit, is the architect.

- MONROE, MICH.—Monroe Scrap Material Co., 1216 East Third St., has been organized by Morris D. May, 649 Borgess Ave., to deal in scrap and salvage. It is capitalized at \$100,-000.
- PLEASANT RIDGE, MICH.—United Reel & Mfg. Co., 420 East Ten-Mile Rd., has been incorporated with \$50,000 capital to engage in a general manufacturing business by Duane Vincent, same address.
- SAGINAW, MICH.—Mid-West Foundry Inc., 1315 Monroe St., has been formed with \$50,-000 capital to conduct a general foundry and machine shop business by John C. Helveston Jr., same address.
- STURGIS, MICH.—Sturgis Machine Co., 206 Jacob St., has been organized by Sturgis Products Co., 203 Jacob St., to manufacture machinery equipment and accessories. It has \$50,000 capital.
- TRENTON, MICH.—National Burner & Mfg. Co., 1260 W. Jefferson Ave., has been formed with \$50,000 capital to manufacture gas burners by Frank B. Francis, 13763 Castleton Ave., Detroit.

#### MISSOURI

ST. LOUIS—J. F. and C. E. Higgins, 5165 Easton Ave., have awarded contract for onestory 74 x 100-foot, sheetmetal fabricating plant, 1515 Academy Ave., to J. F. Higgins & Co., 5165 Easton. C. N. Jacobs, 4540 Morganford Rd., is the architect.

#### **NEW JERSEY**

BRIDGETON, N. J.—Owens-Illinois Co. has plans under way for construction of one-story warehouse to cost \$600,000. I. W. Reiser, c/o owner, is the engineer.

#### NEW YORK

- BUFFALO—National Aniline Division, Allied Chemical & Dye Corp., 1501 S. Park Ave., is planning construction of a plant addition to cost over \$100,000. United Engineers & Constructors Inc., 1401 Arch St., Philadelphia, is the consulting engineer.
- NIAGARA FALLS, N. Y.—E. I. duPont de Nemours & Co., duPont Bldg., Wilmington, Del., is planning construction of laboratory and office, power plant, water pumping station, electric substation, etc. near Gill creek for manufacture of adiponitrile. Facility will cost \$3 million.
- SCHENFCTADY, N. Y.—General Electric Co., River Rd., is contemplating construction of factory to manufacture steam turbines and electric generators. Cost will be \$20 million.

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- ASHTABULA, O.—Electro Metallurgical Co., Lake Rd. E., is planning to place in operation a manganese alloy furnace, marking the firm's resumption of alloy production. It also expects to increase its number of ferroalloy furnaces in the near future.
- BELLEVUE, O.—National Farm Machinery Co. has awarded separate contracts of \$70,000 for one-story, 65 x 380-foot, forge addition. Klein Structural Iron Works, Bellevue, is the engineer.
- CANTON, O. Carnegie-Illinois Steel Corp., 1301 15th St. S. W., plans to start construction soon of a \$25,000 one-story, 50 x 40foot, factory building at 1464 Henry Ave., S. W.
- CLEVELAND—Cleveland Flux Co., 1026 Main Ave., plans construction of \$15,000 plant addition to provide increased space for manufacture of foundry flux.
- CLEVELAND—Accurate Die Casting Co., 3089 East 80th St., contemplates plant addition for increased capacity of die castings. Cost is estimated at \$25,000.
- CLEVELAND—Chase Brass & Copper Co. Inc., 1155 Babbitt Rd., is planning construction of a \$125,000 plant to manufacture copper and brass mill products.

- CLEVELAND—Carpenter Heating & Stoker Co., 1929 East 55th St., plans building a one-story 70 x 100-foot factory at 2135 St. Clair Ave. to cost \$26,400.
- CLEVELAND—Aluminum Co. of America, 2210 Harvard Ave., plans \$182,000 expansion of facilities for manufacture of aluminum permanent mold castings.
- DAYTON, O.—Dayton Power & Light Co., Gas & Electric Bldg., is planning construction of power plant on Miami river, 11 miles south of city, and substation and dam across the river. Cost of the project will be \$12 million.
- FAIRPORT HARBOR, O.—Diamond Alkali Co. plans erection of a \$73,000 chemical plant here with an undisclosed amount to be spent for new equipment. One of the products to be manufactured will be hydrochloric acid in gas form which will be sold to Glenn L. Martin Co., which is building an adjacent plant.
- LORAIN, O.—Thew Shovel Co., E. 28th St., plans construction of a 91 x 151-foot building to cost \$62,000.
- LORAIN, O.—Thew Shovel Co., Fulton Rd. and W. 28th St., has awarded contract for design and construction of factory to Austin Co., 16112 Euclid Ave., Cleveland. Factory will cost an estimated \$175,000.
- MANSFIELD, O.—Maginniss Power Tool Co., with a plant at 200 Ashland Rd., has been incorporated by H. G. Maginniss, 418 Marion Ave., Nicholas S. White and Mabel Huston and is authorized to issue \$6000 common and \$30,000 preferred stock.
- MASSILLON. O.—Eaton Mfg. Co., Rose Ave. S. E., is planning to spend \$68,000 for construction of a new building for manufacture of spring lock washers.
- MEDINA, O.—Standard Welding Service, Medina St., Jack Post, owner, has purchased a site on Smith Rd. where a \$25,000 welding shop will be creeted.
- SALEM, O.—National Sanitary Co., 921 S. Ellsworth, contemplates construction of a \$50,000 plant to be used for increased production of plumbing fixtures.
- TOLEDO, O.—Sohio Petroleum Co., c/o G. W. Hanneken, vice president, has completed plans for a lubricating oil plant to cost \$8 million and an oil separation unit to be built at a cost of \$1 million.
- WARREN, O.—Warren Metal Decorating Co. has been organized with \$100,000 capital with Albert E. Chanson, 265 Laird Ave., acting as statutory agent. The company is in the process of purchasing a plant and expects to spend \$30,000 for rehabilitating it and an additional \$100,000 for equipment.
- YOUNGSTOWN—Steel City Mfg. Co., 1683 Mahoning Ave., M. Murray Fibus, president, has been incorporated with \$63,500 capitalization to fabricate metal products in a new building being erected on Meridian road.
- YOUNGSTOWN—Dupage Mfg. Co., Youngstown-Poland Rd., formerly a partnership known as the Dupage Trailer Mfg. Co., has been incorporated by Alfred J. and William F. Diebold and Joseph J. Ward.

#### OREGON

- PORTLAND, OREG. Commission of Public Docks is having plans prepared for tower, belt conveyor, car unloading hopper and spur railroad tracks. Bid date is unstated.
- PORTLAND, OREG.—Pioneer Division, Flintkote Co., 55 Alameda St., Los Angeles, has asked for bids on a one-story, 115 x 480foot, steel frame building to cost \$278,000 for manufacturing roofing. G. P. Swarte, c/o owner, is the engineer.

#### PENNSYLVANIA

- BEAVER FALLS, PA.—Armstrong Cork Co., Lancaster, Pa., has awarded contract for one-story steel wool factory to cost an estimated \$60,000, to D. F. Nellis & Sons Co., 525 St. Clair Ave., East Liverpool, O.
- CHESTER, PA .- South Chester Tube Co.,

- Front & Thurlow Sts., has awarded contract for 148 x 600-foot factory to Frederick Massiah, 1342 Cypress St., for \$78,500.
- HARMONY TOWNSHIP, PA.—A. M. Byers Co. is planning construction of a one-story, 100 x 315-foot, steel frame corrugated steel siding mill to cost \$103,500.
- NEW KENSINGTON, PA.—General Electric Co., New Kensington, has awarded contract for 88 x 100-foot factory addition, to cost an estimated \$60,000, to Minotte Bros., Hays St., Pittsburgh.
- PHILADELPHIA—Judson Kerr & Bros. Inc., 5738 Westminster Ave., has postponed indefinitely construction of a factory to cost \$100,000.
- PHILADELPHIA—Ordnance Gauge Co., 4030 Frankford Ave., has let contract for two-story, 47 x 110-foot, factory addition to G. A. Stevenson, 4701 Pine St., for \$75,000. Lewis J. Cowan, 1237 Market St., is the architect.
- PHILADELPHIA—Ballinger Co., 105 S. 12th St., will soon let contract for three-story and basement, 100 x 101-foot, manufacturing building and one-story, 33 x 53-foot, garage for John E. Syostrom Co. Inc., 1715 N. Tenth St., to cost \$500,000.
- PITTSBURGH—Rockwell Mfg. Co. has awarded contract for test building on Lexington Ave. to O. H. Martin, 18 First St. Franklin, Douden & Associates, 552 Century Bldg., is the architect.
- SOUDERTON, PA.—Paulsboro Mfg. Co., 1700 Walnut St., Philadelphia, has extended date for bids on warehouse and office building to cost \$400,000. Ballinger Co., 105 S. 12th St., Philadelphia, is the architect.
- WASHINGTON, PA.—National Annealing Box Co. has awarded separate contracts for \$60,000 for onc-story, 44 x 280-foot, plant. Hunting Davis & Dunnels, 1150 Century Bldg., 132-7th Ave., Pittsburgh, are architects.

#### TEXAS

- CORSICANA, TEX. Magnolin Pipeline Co., Dallas, Tex., is planning construction of a 650-mile, 20 inch, crude oil pipeline from Corsicana to southern Illinois.
- DALLAS, TEX.—Lone Star Gas Co., 1915. Wood St., has awarded contract to its own forces for construction of gas plant units to cost \$300,000 and for replacing gas lines to cost \$275,000.
- GARLAND, TEX. International Engine Rebuild Corp., Beltline Rd., has awarded contract for a plant building to cost an estimated \$65,000 to W. H. Wallace, Garland.
- GARLAND, TEX.—J. Y. Taylor Mfg. Co. is having plans prepared by Consolidated Architects & Engineers, 1009 Ft. Worth National Bank Bldg., Ft. Worth, Tex., for one-story factory building at 100 Bankhead St., to cost \$20,000.
- HOUSTON, TEX.—Diamond Alkali Co., Oliver Bldg., Pittsburgh, has awarded contract for design and construction of chemical plant units to Brown & Root Inc., Box 3, for approximately \$240,000.
- ORANGE, TEX.—E. I. duPont de Nemours & Co. has awarded contract for design and construction of methanol plant at Sabine river works to Lummis Co., 420 Lexington Ave., New York, for \$639,000.

#### WASHINGTON

PROSSER, WASH.—Bids will be called in December for treatment plant, including two 20foot diameter digesters, clarifier, filter, etc Plans are being prepared by G. D. Hall, Yakima, Wash., engineer.

#### WISCONSIN

MILWAUKEE——Delta Mfg. Division, Rockwell Mfg. Co., 620 E. Vienna St., has awarded contract for one- and two-story, 144 x 216foot, factory addition to Selzer-Orms Co., 6222 W. State St., Wauwatosa, Wis., for an estimated \$143,500. A. H. Kloppenburg, 708 E. Green Tree Rd., is the architect.



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November 25, 1946

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