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The Magazine of Metalworking and Metalproducing

VOL. 118, NO. 19

MAY 13, 1946

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Tailoring 18-8 Stainless for Aircraft

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Union Finished Steel Roller Chain is manufactured in all standard sizes from  $\frac{1}{2}$ " to  $2\frac{1}{2}$ " pitch, in single and multiple strands.

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# As the EDITOR

# A Community Job

One of the baffling aspects of the reconversion period in the United States is the apathy of the public toward strikes.

During the past five months work stoppages in many lines of business-particularly in steel, electrical equipment and coal-have caused people to endure hardships ranging all the way from simple inconveniences to extremely serious losses.

These hardships have not been borne by any one group or class. They have been inflicted upon rich and poor, skilled and unskilled and city and rural dweller alike. With the curse of strikes distributed so widely, why has there been no great cry of protest from the public?

A logical answer, under the circumstances, would be that the people generally are sympathetic to the idea of higher pay for workers and are willing to be tolerant of strikes. This reasoning would be acceptable if the flurry of strikes had died down quickly and if industrial peace had followed. However, the threat of strikes is increasing and peace is more remote than ever. It is difficult to believe that the public sympathizes with labor to the extent that it is willing to pay the terrific price of continued chaotic labor relations over a prolonged or indefinite period.

Another reason advanced is that the people are war weary and must have a chance to blow off steam. The nation has had ample time to blow off steam and to come to its senses on strikes.

A more plausible reason is that the people have been fed so much misinformation by the federal government and by union propaganda that they do not understand the real economic consequences of many of today's follies—including labor relations and wage policies. Too many people believe that these strikes somehow are part and parcel of a grand planned program of redistributing income that in some devious way will bring about a utopia of economic stability and abundance for all.

Unfortunately industry's efforts to point out the fallacies of this type of reasoning by means of high-powered national campaigns are discounted heavily by large segments of the public. This raises the question as to whether industry's educational work would not be more effective if it were organized at the grass roots level.

Place responsibility for promoting sound economic thinking in a community upon the industries in that community. Achieving sound economic thinking in the community is a sure way of achieving sound economic thinking in the nation.

> tions were being attempted while the workers were idle and before the union presented its demands. Needless to say the majority of Americans are

equally amazed. Who, in his right mind, can understand the tactics of John L. Lewis in the present controversy? His attitude of do as I say, when he demands what amounts to his own private tax on industry through the guise of a miners' health and welfare fund, is so dictatorial and contrary to the American way of doing things it flabbergasts one.

Even more astounding is the apparent inability

# the NEWS

(OVER)

May 13, 1946

**INCOMPREHENSIBLE:** Work stoppages, such as we now are experiencing in the bituminous coal industry, are incomprehensible to visitors from abroad. Foreign delegates to the International Labor Organization meetings in Cleveland and Toledo the past two weeks, expressed amazement at the strike tactics of American unions.

Commenting specifically on the coal strike, they could not understand how such a work stoppage could be tolerated, especially where the demands at issue appeared to be undefined and where negotiaof the government to do anything to end the intolerable conditions which have resulted from the coal stoppage. Shops close throughout the country for want of coal, transportation comes to a halt and our cities are browned out all because it is possible for one man, John L. Lewis, to assume so much power he can tie the nation in knots at his least whim.

Must chaos overwhelm us before we do something to curb such as Lewis, and restore the rule of reason to the people? —p. 59

**UNSURPASSED SERVICE:** Liberal education in the art of casting metals into useful things was offered in Cleveland last week where the golden anniversary convention and equipment exposition of the American Foundrymen's Association were held.

Almost 300 manufacturers and suppliers of foundry equipment and materials maintained displays in the spacious Cleveland Public Auditorium, while convention visitors, numbering in the thousands, were served a technical discussion fare which included nearly 150 papers, addresses, panels and roundtables covering virtually every conceivable technical phase of foundry practice.

The casting of metals is an ancient and honorable art with a record of service to civilization unsurpassed by any other. Despite many handicaps the industry's war performance was par excellence. Today, a new era of service is opening to it, and foundrymen everywhere, conscious of their responsibilities, are striving in every way to modernize their shops and improve their practice to meet the challenge of our times. —p. 62

**ONE METAL'S MISSION:** When beryllium was first known to be lighter than aluminum with a stiffness comparable to steel, it was heralded as a wonder metal which would revolutionize the aircraft industry. But high cost of production and brittleness of some of its alloys prevented realization of this dream. Development work then turned toward use of beryllium as an alloying agent for heavier metals, especially copper. Marked success attended these efforts.

In small parts of many shapes in a variety of electrical applications, beryllium found its true mission in the form of beryllium copper. Its high fatigue life, non-magnetism, corrosion resistance and electrical conductivity are properties now well enough recognized to have given the metal its rightful place in switch parts, small springs and in other intricate shapes still on trial. —p. 88

SIGNS OF THE TIMES: Businessmen and industrialists do not think as a unit with respect to government controls on the economy during the transition to peace. However, there is uniformity of thinking that the controls should be eased considerably and lifted entirely wherever possible. Irving S. Olds, U. S. Steel chairman, says the sooner wartime controls are lifted from manufactured products (p. 61), the better it will be for business and the general public. . . . Selling, which became something of a lost art during the war years, again is to the front. Mill supply men meeting in Atlantic City (p. 64) emphasize the necessity of revitalizing sales staffs to cope with the difficult problems which will be confronted when present pentup demand for goods has been satisfied and the struggle for business will have developed into something of a battle royal. . . . The Maritime Commission is gradually disposing of war-damaged and overage vessels, so far having sold (p. 68) 65 bottoms involving about 225,000 tons of scrap. Indications are future offerings will be made at a rate that will provide something less than 1,000,000 tons of scrap a year. . . . Navy Department is actively pushing an extensive program of scientific research (p. 70) calling for expenditure of many millions of dollars annually. It is banking heavily on the assistance of private industry to achieve its goals. From this multi-million dollar undertaking it is hoped to develop a backlog of fundamental science as a basis for new and improved weapons. . . . Despite work stoppages and supply shortages the automobile builders continue to make progress toward getting into the swing of peacetime production. New models are being introduced right along, Studebaker unveiling its latest creations (p. 76) last week. The new models feature sharp breaks in styling from 1942 and 1946 models. Plans called for a flying production start by the beginning of May but parts shortages have thrown the company's program into reverse. . . . Government, it appears, is faced with a ticklish problem in deciding on acceptance or rejection of bids (p. 80) for the Geneva Steel plant. If it accepts the offer of U. S. Steel, some observers think the old political cry of "monopoly" will be raised again. . . . Millions of tons of iron ore are handled by the Erie Railroad at its docks in Cleveland but some unloading capacity is lost when shorter ships come alongside docks. Modernization now underway (p. 114) will alleviate the situation greatly.

E. C. Aha



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S Down!.. WE'RE COMING IN





Typical of the coal docks on the upper lakes is this nearly empty dock at Superior, Wis. War conditions, plus last fall's coal strike, prevented the accumulation of normal inventories and the current strike has depleted the slender stocks. Industries in the north central states which depend on coal shipped up the lakes are virtually paralyzed. NEA photo

# Power, Shipping Restrictions, Due to Coal Strike, Paralyzing Industry

Recovery after miners go back to work to be long and tedious process. Major automobile plants down or scheduled to close this week. Hundreds of thousands in metalworking plants to be laid off as plants suspend operations

THE six-week-old coal strike is hitting American industry with a paralyzing impact.

Not only are supplies of coal virtually exhausted at many points, but conservation measures instituted by the government, including the embargo of rail freight and the curtailment of power service, are forcing drastic reductions or suspensions of operations through the iron, steel and metalworking industries.

Steel mills, which while reducing operations during the past six weeks have shown a stronger than expected resistance to curtailments, now are closing down rapidly, both on account of depleted coal stocks and because the freight embargo prohibits incoming shipments of vitally needed supplies and outgoing shipments of steel products.

National ingot operations, as calculated by STEEL, last week dropped 9 points to 55½ per cent of capacity and will show a much more abrupt drop this week. Within a matter of days the industry practically will be shut down.

Even should the dispute between John L. Lewis' coal miners and the mine operators be resolved quickly, several weeks will elapse before furnaces receive sufficient coal and coke to resume even a fair rate of operations.

The pinch also is being felt keenly in metalworking plants and related industries. The shortage of finished steel has been increased sharply by the curtailments already effected by the mills and the freight embargo now is blocking practically all shipments of finished items from mills to consuming plants.

Also cutting into the operations of the metalworking plants are the restrictions placed on the use of electric power. In northern Illinois and Indiana where these conservation measures were inaugurated ten days ago, shops were forced to limit operations to 24 hours a week, provided they had the steel supplies and materials necessary for this limited operation.

Great Lakes shipping, which was getting under way to a slow start this season due to the strikes in the steel, iron ore mines and coal mines, has been halted by the Office of Defense Transportation ban on use of bunker coal in transporting materials other than fuel and food. Pittsburgh Steamship Co., subsidiary of the United States Steel Corp. and largest fleet operator on the lakes, started tying up its 63 vessels the middle of last week. Approximately 2000 crewmen ranking from deck hands to captains, have been laid off and scattered to their

## COAL STRIKE

homes in more than 30 states. Similar action was taken by other ore fleet operators, although many of these had not sent out their full fleets yet, due to the scarcity of coal and the strike of iron ore miners at the upper lakes.

Oliver Mining Co., U. S. Steel's ore subsidiary, laid off 2600 men on its Mesabi range owing to the suspension of shipping facilities.

The automobile industry will be virtually paralyzed. Ford operations were suspended indefinitely in practically all plants last week and late in the week General Motors announced that all plants will be forced to close by the end of this week by reason of the freight embargo. First to close will be branch assembly plants, some of which are expected to go down May 13. Chrysler officials said all passenger car lines will shut down this week, as result of the coal strike and freight embargo. Truck assembly lines will continue to work.

The Chicago district has suffered dislocations more serious than any experienced during four years of war, due to the coal strike and the electric power shortage caused by it. Since May 3 all manufacturing and commercial activities have been reduced drastically and the desired power saving of 40 per cent has not yet been attained. Manufacturing operations, with the exception of food, are limited to 24 hours a week, which time can be utilized as individual plants see fit. Most companies are working three 8-hour shifts, then closing down for the remainder of the week. International Harvester Co. plants there worked three 8-hour shifts on Monday, then went down.

### Chicago Steelmaking Drops

Steelmaking operations in the Chicago district last week dropped 131/2 points to 53 per cent of capacity. This was the largest decline since the coal strike started. Wisconsin Steel Co. and Republic Steel Corp. in South Chicago, both dependent on purchased electric power, were forced to suspend steelmaking completely May 4 to conform with the conservation order. Further shutdowns are scheduled soon. Inland Steel cut out another blast furnace May 9 and on May 16 will cut out another, leaving only two out of six in operation. By May 16, hours worked by employees will be reduced to 25 per cent of normal.

In Pittsburgh, Carnegie-Illinois operated last week at only 9 per cent of capacity, below any rate reached during the depression year of 1932. For the district as a whole, ingot operations dropped 10½ points to 45 per cent of capacity. This week's operations are scheduled to drop more sharply, reflecting not only



Usually lost in the glare of theatre marquees and neon signs, downtown Chicago street lights stand out in this photo made on State street as the power shortage forced a dimout. NEA photo

coal scarcity but also the freight embargo.

Republic Steel Corp., Cleveland, reported it will cut its operations to 10 per cent of capacity by May 14, compared with 70 per cent last week. Company's normal employment is about 56,-000 persons, most of whom will be out of work by May 18 if the coal strike persists.

On the eastern seaboard, fuel reserves were reported to have reached virtual exhaustion at many points and iron and steel mill operators predicted the recovery to prestrike levels after the miners go back to work will be a long and tedious process.

In the South, Birmingham ingot operations slumped 20 points last week to 44 per cent of capacity as Tennessee Coal, Iron & Railroad Co. suspended operations at Ensley and took various plate and structural mills off. Republic Steel's plant at Gadsden is scheduled to continue operations at 75 per cent through May. All cast iron pipe plants in the district were reported down.

While some steel mills were planning to make greater use of trucks both for hauling supplies into the mills and finished steel products to consumers, they were uncertain as to how much they could transport in this manner. Trucking facilities available naturally vary from plant to plant. Those mills planning to use trucks indicated they would concentrate on supplying customers located relatively near the producing centers. With the prospect of a widespread suspension of furnaces, mill operators were besieging manufacturers of refractory materials to ship as much of these supplies as possible before the freight embargo became effective, so that repairs could be made during the idle period. Refractory suppliers indicated they were able to supply only a small part of the demand for this material.

While the coal strike and its effects command major interest in the industrial picture, some attention also was being given last week to the possibility of a walkout by operating railroad unions May 18. President Truman has indicated his intention of seizing the carriers if necessary to keep them running.

## Study Shows Steel Prices Steadier than Other Goods

The value of the dollar has shrunk less in steel purchases that in purchases of any of a long list of commodities including corn, beef, wheat, pork, cotton goods, and coffee, according to a recent study made by the American Iron & Steel Institute.

Since the recent advance given by the Office of Price Administration, a dollar spent for finished steel will buy 84.7 per cent as much as it did in August, 1939. During this same period a dollar spent for anthracite coal will buy approximately 31 per cent less; for coffee, 45 per cent less; for butter, 49 per cent less; for wheat, 61 per cent less.

# Lifting of Wartime Controls From Industry Urged by Olds

LIFTING of wartime government controls from all manufactured products was urged by Irving S. Olds, chairman, at the forty-fifth annual meeting of stockholders of the United States Steel Corp. in Hoboken, N. J., May 6.

He charged that the poorer financial showing of the Steel corporation each year since 1941 was "the inevitable result of constantly mounting costs of operation of an enterprise under an economy, largely government controlled, under which maximum prices for steel products were set substantially at prewar level.

"In my personal opinion," he said, "the sooner wartime government controls can be lifted from all manufactured products, the better it will be for the corporation, its stockholders and the general public."

Far from making excessive profits during the war, the chairman declared, the corporation during the five-year war period had an annual profit, before interest, that represented a return on investment of approximately 4.6 per cent. The return on investment has been steadily declining since 1941. It was 4.46 per cent in 1942; 3.94 per cent in 1943; 3.79 per cent in 1944; and 3.64 per cent in 1945.

Arthur M. Anderson, James B. Black, Cason J. Callaway, Thomas W. Lamont and Alexander C. Nagle were re-elected directors for a term of three years.

Asserting that the coal strike was fast "becoming most calamitous," Mr. Olds remarked that "it seems incredible that in an enlightened nation such as the United States a single union, or perhaps more accurately, a single individual, should have the power to cripple the industrial activity of the entire country."

Mr. Olds reviewed briefly the corporation's contribution to the war, pointing out that between Jan. 1, 1940, and Aug. 15, 1945, when Japan capitulated, the company had produced 161,106,000 tons of steel, or an average of 28,641,000 tons per year. Shipments of finished steel aggregated 109,783,000 tons, or an average of 19,517,000 tons a year.

Among the war products originating during this period in the mills of the corporation were 8,200,000 tons of ship plate; 1,200,000 tons of armor plate for ships and tanks; 17,200,000 shell forgings; 16,400,000 finished shells; 2,900,000 bombs; 9,200,000 feet of rocket tubing; and large quantities of armor piercing shot steel, bullet core steel and special steel for helmets-sufficient for the manufacture of 21 million helmets.

During the same period the corporation constructed 911 ships and floating structures, which included 11 large troop transports, 2 light cruisers, 77 destroyers, 52 destroyer escorts, 23 auxiliary combat ships, 4 aviation repair vessels, 33 cargo ships, 7 tankers, 119 LSTs and 78 other types of landing craft.

He told stockholders that \$232 million for various authorized projects remained to be expended at the end of 1945 with the appropriation embracing among other projects modernization of sheet and tin mill facilities in Pittsburgh, Chicago, Birmingham and Pacific Coast areas.

Referring to the corporation's recent bid for the government owned plant at Geneva, Utah, he said that under its proposal, the entire cost to the corporation for acquiring the plant, and installing new facilities, including a \$15 million new cold reduction mill at Pittsburg, Calif., to use the hot-rolled coils from proposed new equipment at Geneva, will be approximately \$91,100,000.

Sharp criticism of the government's labor policy and attitude toward business was voiced by several stockholders.

The apathetic attitude of stockholders in general in the face of present adverse conditions was deplored by one woman stockholder, and another urged a simplification of financial reports so that women stockholders in the corporation, of whom there are many, so she pointed out, could better understand them.

## Present, Past and Pending

### APRIL STEEL OUTPUT DROPS 630,000 TONS

NEW YORK—Production of steel ingots and castings dropped about 630,000 tons to 5,876,998 tons in April due to the shorter month and curtailment of operations caused by the coal strike, American Iron & Steel Institute reported last week. The industry operated at an average rate of 77.7 per cent in April, a drop of 5.6 points from March. Calculated weekly output was 1,369,930 tons.

### WESTINGHOUSE GRANTS 18-CENT RAISE; STRIKE ENDS

PITTSBURGIT—Westinghouse Electric Corp. and CIO-United Electrical Workers have agreed to an 18-cent hourly wage increase with four variations, ending a 16-week strike. Terms of settlement are subject to ratification by the union members who had sought a wage increase of 18½ cents an hour.

### **E SEVEN MARITIME UNIONS THREATEN TO STRIKE**

SAN FRANCISCO—A paralyzing tieup of the nation's coastal and Great Lakes ports June 15 is threatened by joint action of seven maritime unions in convention here.

### COPPER WIRE AND ARMORED CABLE PRICES RISE

WASHINGTON—Manufacturers have been granted price ceiling increases ranging from 2 per cent to 18 per cent on copper wire, copper-alloy wire and copper-clad wire and 14 per cent on armored cable.

### TEMPORARY CURTAILMENT OF TIN PLATE EXPORTS URGED

WASHINGTON—Tin Plate Industry Advisory committee recommended last week that export shipments of tin plate be curtailed to conform to declining production, which will be entirely halted in three weeks. Industry spokesmen also recommended exemption of materials for tin plate production from the treight embargo.

### INDIA SEEN AS PROMISING MARKET FOR DURABLE GOODS

SYRACUSE—India presents one of the greatest markets in the world for durable goods, E. A. Bertsch of Volkhart Bros., distributor in India for Carrier Corp., said here last week.

### BITUMINOUS COAL MINE SAFETY PROGRAM REVIEWED

NEW YORK—More than 100 different safety devices, machines and methods have been introduced into United States coal mines in the last 20 years at a cost exceeding \$100 million, according to the Bituminous Coal Institute.

### **V. B. EDWARDS, HEAD OF DRAVO CORP., DIES**

PITTSBURGH—Vere B. Edwards, 56, president, Dravo Corp., shipbuilding concern, died suddenly last week while addressing the firm's executive committee in the company's Neville Island plant.

## AFA CONVENTION

# Foundrymen Seek Increased Efficiency

Virtually all phases and problems of castings industry discussed at numerous technical sessions of golden anniversary convention of American Foundrymen's Association. Over 150 papers presented. Equipment exposition attracts thousands

### CLEVELAND

THOUSANDS of foundrymen from all sections of the country thronged the exhibition halls and meeting rooms of the Cleveland Public Auditorium all last week at the golden jubilee Foundry Congress and Foundry Show sponsored by the American Foundrymen's Association,

Attendance at the convention sessions and show was expected to break all previous records, estimated attendance at midweek being 15,000.

Included among delegates were numerous visiting foundrymen and engineers from abroad, among them representatives of industry in Great Britain, France, Norway, Sweden, Russia, Belgium, Czechoslovakia, Holland, Australia, China and Canada. One of the features of the convention was the presentation of four exchange papers by representatives of foreign foundry groups.

Some 280 manufacturers and suppliers of foundry equipment and materials maintained displays at the show which occupied all of the space in six separate halls of the Public Auditorium. It was the largest exposition of castings industry equipment in history. About 150 papers, addresses, panels and round-table discussions covering virtually every phase of foundry practice featured the technical session.

### General Addresses Dinner Meeting

In addition there were a number of general sessions, the business session being held on Thursday and the convention closing Friday evening with the annual banquet at which F. J. Walls, president of the association presided, and Brig. Gen. Donald Armstrong, commandant, Army Industrial College, Department of Research, Washington, spoke on "The Foundry in War and Peace."

At the dinner AFA awards and honorary life memberships were conferred. In recognition of meritorious contributions to the progress of the castings industry, three gold medals and two honorary life memberships were awarded. Peter Blackwood, foundry superintendent, Ford Motor Co. of Canada Ltd., Windsor, Ont., received the association's John H. Whiting gold medal "for developmental work on centrifugal

castings and his influence on the free interchange of research data." Hyman Bornstein, director, testing and research laboratories, Deere & Co., Moline, Ill., was cited "for his many and outstanding technological contributions to the foundry industry, particularly in the field of gray cast iron," being the ninth recipient of the William H. McFadden gold medal. Howard F. Taylor, research associate, Massachusetts Institute of Technology, Cambridge, Mass., received the AFA Peter L. Simpson memorial gold medal "for his unfailing interest in and contributions to foundry research and for his influence on the broadening of naval research in the field of cast metals."

William J. Coane, Philadelphia, who recently retired as vice president and a director, Ajax Metal Co. and associated companies, and Harold J. Roast, vice president of Canadian Bronze Co. Ltd., Montreal, received honorary memberships.

Ceremonies officially opening the convention were conducted on the arena floor of the auditorium, Monday morning. AFA Secretary William W. Maloney introduced A. C. Denison, president, the Northeastern Ohio chapter, who welcomed the visitors to Cleveland. Mayor Thomas A. Burke officially greeted the visitors and a message from Ohio's governor, Frank J. Lausche, was read by Mr. Denison.

Mr. Walls, concluding the opening ceremonies, paid tribute to the various foundry organizations contributing to the fiftieth anniversary convention of the AFA. Mr. Walls also read a letter from President Truman extending congratulations on the foundry industry's wartime job.

#### New Equipment Displayed

Technical sessions were well attended throughout the week, reflecting the earnestness of foundry management to improve castings industry practice in the direction of more efficient production and labor-saving methods. At the equipment show air-conditioning equipment and dust control devices were prominent, and new types of machinery aimed at performing automatically jobs that formerly required hand labor received



SHELDON V. WOOD



#### MAX KUNIANSKY

Newly elected officers of the American Foundrymen's Association, who will take office, about midsummer, are: President, Mr. Wood who is president and general manager, Minneapolis Electric Steel Castings Co., Minneapolis; and vice president, Mr. Kuniansky, vice president and general manager, Lynchburg Foundry Co., Lynchburg, Va.

major attention.

Two joint meetings were held by the Safety & Hygiene Committee and the Plant & Plant Equipment Committee. The type of equipment discussed at both sessions was related principally to improving foundry working conditions through correction of dust problems. James Thomson, Continental Foundry & Machine Co., presided at the opening meeting, with C. P. Guion, W. W. Shy Mfg. Co., Chicago, acting as technical chairman.

Management's role lies in establish-

ing a definite safety program, in making specific assignments and delegating sufficient manpower and authority to carry out the policy adopted, it was emphasized.

A comprehensive review of mechanical shakeout systems for the correction of dust problems was presented by James L. Yates, Worthington Pump & Machinery Corp., Buffalo, who told the session he favored a shakeout grate with small openings which trap gaggers and other foreign material, rather than rely upon their separation after they and the sand have dropped through the deck.

Six speakers at the second session of the group discussed equipment available for dust exhaustion. Mr. Thomson also presided at this meeting, with W. O. Vedder, Pangborn Corp., Hagerstown, Md., handling the introduction of speakers.

E. A. Carsey, Kirk & Blum Mfg. Co., Cincinnati, described the different types of commonly-used hoods, emphasizing the importance of correct design and the fact that the exhaust volume determines the size of pipe required to convey exhausted air to the collector. H. C. Dohrmann, Buell Engineering Co., New York, discussed the features of centrifugal collectors; G. A. Boesger, W. W. Sly Mfg. Co., Cleveland, described cloth type collectors, while A. S. Lundy, Claude B. Schneible Co., Detroit, explained the principles of wet collectors.

Fans and exhausters were described by Phillip Cohen, Cleveland district manager, B. F. Sturtevant Division, Westinghouse Electric Corp. How to keep dust control equipment in operation was explained in a concluding paper on "Maintenance," by K. M. Smith, Caterpillar Tractor Co., Peoria, Ill.

### Aluminum, Magnesium Sessions

Two sessions of the Aluminum & Magnesium Division were held, the first a round table luncheon attended by over 150. R. E. Ward, Eclipse Pioneer Division, Bendix Aviation Corp., Bendix, N. J., and A. T. Ruppe, Bendix Produets Corp., South Bend, Ind., presided. The second aluminum and magnesium session, comprising presentation of three papers was presided over by Walter Bonsack, National Smelting Co., Cleveland. "Heat Treatment of Aluminum Alloy Castings," prepared by Walter E. Sieha and H. J. Rowe, Aluminum Co. of America, Pittsburgh, was delivered by the former and consisted of a detailed review of the fundamentals involved in characteristic changes of the metal through heat treatment. Mr. Sicha traced the metal formation through the solidification range, and explained the effect of various types of subsequent heat

treatment.

Results of tests conducted to determine the effect of certain elements on some properties of the 355 type aluminum alloy, were described in a second paper by R. A. Quadt, American Smelting & Refining Co., Barber, N. J., while the concluding paper on "Characteristics of Aluminum Casting Alloy 3 Per Cent Silicon—5 Per Cent Copper," by O. Tichy, National Smelting Co., Cleveland, described the general purpose alloy developed to make use of aircraft scrap.

Approximately 50 attended the opening sand shop course session with F. S. Brewster, Dow Chemical Co., Bay City, Mich., presiding. Discussion leader was Oscar Blohm, Hills-McCanna Co., Chicago, and his topic "Magnesium Molding Sands." He stated that it is worthwhile to use the best possible sand since it makes control easy and provides good castings.

### Hold Gray Iron Shop Course

A gray iron shop course was held under the direction of George A. Timmons, Climax Molybdenum Co., Detroit, and P. T. Bancroft, Republic Coal & Coke Co., Moline, Ill. Subject of the meeting was the metallurgy of cupola mixes and the discussion leader, Kenneth H. Priestley, Eaton Mfg. Co., Vassar, Mich., pointed out that important items in cupola mixes are the type or types of castings to be made, whether the iron is a high strength or plain type, the availability of raw materials, and the labor supply.

At the annual business meeting held in the ballroom of the auditorium on Thursday and presided over by F. J. Walls, president, in addition to the usual reports and addresses of association officials, G. H. Clamer, Ajax Metal Co., Philadelphia, presented the AFA Foundation Lecture—"Test Bars for 85 Copper-5 Tin-5 Lead-5 Zine Alloy — Design and Some Factors Affecting Their Properties."

At this session also the report on the election of new officers and directors was presented. The new officers, who will assume office about midsummer, are: President, Sheldon V. Wood, president and manager of the Minneapolis Electric Steel Castings Co., Minneapolis; vice president, Max Kuniansky, vice president and general manager, Lynchburg Foundry Co., Lynchburg, Va.

Selections for three-year terms as association directors are: Horace A. Deane, vice president, American Brake Shoe Co., New York; J. E. Kolb, pattern shop superintendent, Caterpillar Tractor Co., Feoria, Ill.; H. G. Lamker, superintendent of foundries, Wright Aeronautical Corp., Paterson, N. J.; Bruce L. Simpson, president, National Engineering Co., Chicago; and Stowell C. Wasson, manager, National Malleable & Steel Castings Co., Chicago.



Fifteen thousand visitors crowded into Cleveland Public Auditorium to view exhibits at the Golden Jubilee Foundry exposition and to attend sessions of the AFA Congress. This view shows visitors registering in the reception lobby of the auditorium

## MILL SUPPLY MEETING



WALTER H. GEBHART



THEODORE F. SMITH



J. A. GARDNER



W. E. CALDWELL

# Aggressive Selling Stressed at Triple Mill Supply Convention

Speakers at Atlantic City meeting of 1200 manufacturers and distributors of industrial equipment and supplies say battle royal for business will be in full swing by early 1947, necessitating more efficient salesmanship

### ATLANTIC CITY

BATTLE ROYAL for business will be in full swing by early 1947 and selling, which became a "lost" art during the war, must be resumed on an aggressive and more efficient basis or many companies will fall by the wayside or at least become relatively less important in their fields.

This was the consensus of a dozen speakers who appeared in Atlantic City May 6-8 before some 1200 manufacturers and distributors of industrial equipment and supplies, and representing the membership of the American Supply & Machinery Manufacturers Association, the National Supply & Machinery Distributors Asociation and the Southern Supply & Machinery Distributors Association.

In discussing the need for better selling methods, H. K. Dugdale, executive vice president, Van Sant, Dugdale & Co., Baltimore, pointed out that 16 billion dollars were invested in plant facilities in the short period from June, 1940, to June, 1942, compared with 14 billion in the ten years from 1930 to 1940. At the same time, 50 years of technological improvements were squeezed into the past 5 years which means that the same volume of goods now can be produced in a few months as was made in a full year before the war.

In the future, he said, we must regard the science of distribution as being equally important as the other sciences and consequently more thought should be given to the training of men in schools and colleges. Out of every dollar, 59 cents represents distribution cost and 41 cents production cost. Cost of distribution must be reduced and it will require trained men, he said.

Mr. Dugdale said business in 1947 was expected to be 42 per cent ahead of 1939 which means that each individual company should figure on doing 150 per cent as much business in 1947 as in 1939 to maintain its position in its own industry. Ground will be lost by those doing a poor job of selling and advertising since, he said, sales resourcefulness is just as necessary to success as good plant facilities.

He demonstrated that buying psychology changes quickly by citing gum and cigarets as examples. The public bought mediocre substitutes during the war but these have disappeared with the return of preferred and familiar brands. "The same buying psychology will dominate your business in the near future," he said.

In discussing "Top Management's Responsibility," W. Gibson Carey Jr., president, Yale & Towne Mfg. Co., Philadelphia, said that its first requirement is the selection of key men and welding them into an organization. In addition, top management should participate in the affairs of society as a whole, including the educational, philanthropic and religious fields.

Mr. Carey said he thought the national budget necessarily would be about 25 billion dollars annually by 1947 to maintuin the armed forces, care for veterans, maintain necessary government bureaus and the like. A budget of this size, he said, requires a large national income. Distribution will be one of the big problems of the future and advertising is an essential part of this picture, he said.

W. W. Kemphert, manager, Standard Products Division, Worthington Pump & Machinery Corp., Harrison, N. J., said each company must demonstrate its ability to sell in the highly competitive postwar market and "it may be necessary to rebuild sales organizations from the ground up." The important problem now, he said, is "how to increase sales in 1948 50 per cent over 1940 and cut distribution costs 25 per cent."

R. D. Black, vice president, Black & Decker Mfg. Co., Towson, Md., who retired as president of the American association this year, emphasized the importance of marketing and pointed out that distribution of equipment and supplies is becoming increasingly complicated. In addition to the usual advertising through publications and direct mail, Mr. Black proposed an exhibit so that distributors could become more familiar with the various types of products available.

The American association is actively engaged in studying its markets and methods for more effectively cultivating them. This Marketing Methods Committee is under the chairmanship of J. G. Geddes of H. K. Porter Inc., Everett, Mass., and breaks down into three sub-committees. The Sales Promotion Committee is headed by J. J. DeMario, Raybestos-Manhattan Inc., Passaic, N. J.; the Sales Methods Committee by W. W. Kemphert, Worthington Pump & Machinery Corp., Harrison, N. J.; and the Research & Survey Committee by E. J. Wilcox, J. H. Williams & Co., Buffalo.

Association members have contributed sales figures for a study on where products are distributed. The combined figures are broken down by states and cities so that each manufacturer can check his own individual sales with them and thus determine where sales efforts should be stepped up or cut down. The study is based on 1940 sales and a new study will be made on business done in 1946.

A study also has been made on catalogs. promotional literature, packaging and the like. Out of 180 manufacturers checked, 140 prepare complete catalogs, 107 sectional catalogs and 96 use direct mail in supplementing publication advertising.

The importance of well-trained salesmen was stressed by several speakers. W. E. Caldwell, vice president and sales manager, Cleveland Twist Drill Co., Cleveland, said his own salesmen are trained at the outset for several months and then are required to take refresher courses at intervals. Salesmen of distributors representing his company also come in to the plant for training. This procedure is supplemented by a 26-minute film which serves as a training aid.

New officers of the American Supply & Machinery Manufacturers Association are: President, Theodore F. Smith, president, Oliver Iron & Steel Corp., Pittsburgh; first vice president, W. E. Caldwell, vice president and manager of sales, Cleveland Twist Drill Co., Cleveland; second vice president, W. H. Gebhart, vice president, Henry Disston & Sons Inc., Tacony, Philadelphia; treasurer, J. A. Gardner, vice president, Cincinnati Tool Co., Cincinnati, New members of the executive committee are: J. R. Kelley, vice president, Manning, Maxwell & Moore Inc., New York; and B. E. Hotvedt, Blackhawk Mfg. Co., Milwaukce.

The National Supply & Machinery Distributors' Association elected these new officers: President, William M. Patterson, Frick & Lindsay Co., Pittsburgh; vice president, Areas 1 and 2, F. Marsena Butts, Butts & Ordway Co., Cambridge, Mass.; vice president, Areas 3 and 4, Edward K. Welles, Charles H. Besley & Co., Chicago; and vice president, Areas 5 and 6, Edward H. McLaughlin, Union Hardware & Metal Co., Los Angeles. New executive committee members are: Ray C. Neal, R. C. Neal & Co. Inc., Buffalo; Charles T. Bush, Charles A. Strelinger Co., Detroit; and H. P. Lambrecht, Salt Lake Hardware Co., Salt Lake City, Utah.

New president of the Southern association is Lloyd B. Mize, Industrial Supply Corp., Richmond, Va.; first vice president, T. J. Kenny, S. B. Hubbard Co., Jacksonville, Fla.; and second vice president, Richard Alcott, Riechman-Crosby Co., Memphis, Tenn. Harry P. Leu, Harry P. Leu Inc., Orlando, Fla., was named chairman of the executive committee. J. L. Peoples, Peden Iron & Steel Co., Houston, Tex., also is a new member of the committee.

## STEEL's Editor-in-Chief on Reparations Mission to Far East

with the infantry in France and the

Army of Occupation in Germany. After

the war he returned to the Penton

Publishing Co., serving in various edit-

orial posts. In 1937 he was elected

president and treasurer of the Penton

company, which in addition to STEEL

publishes The Foundry, Machine Design,

New Equipment Digest, Revista Indus-

trial and other industrial and business

publications.

E. L. SHANER, president, the Penton Publishing Co., and editor-in-chief of STEEL, left for the Far East, May 4, as a member of a government Reparations Mission, headed by Edwin W. Pauley, who carries the rank of ambassador and also serves as personal representative of President Truman. Expectations are the Mission will not return to this country until sometime around July 1.

Mr. Shaner is serving as iron and steel consultant on the Mission which consists of 21 persons, all of them experts in some particular field.

The Mission's objective will be to develop information to enable the State Department to work up a program aimed at promoting unity and the economic development of China and Korea, so as to make them economically independent of Japan. It will make studies and investigations with a view to recommending coordinated and rational programs for the healthy industrial development of Manchuria and Korea, as well as utilization of their natural resources in relation to reparations removals from Japan.

Upon Mr. Shaner's recommendations the program for developing an iron and steel industry in China and elsewhere in the Far East will be mapped. He has been prominent in the industrial publishing field for 30 years, and has been active in the affairs of various industrial and business organizations and governmental groups. He was graduated in mechanical engineering from Purdue University in 1914 following which he was employed by the Pennsylvania Railroad. During World War I he served

During World War II he was chairman of the Business Press Industrial Scrap Committee and was identified with other wartime activity committees. He has addressed industrial and business groups throughout the nation on many occasions on subjects pertaining to the iron, steel and metalworking industries, and his weekly editorials in STEEL have won for him outstanding recognition from the business world.

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bound for the Far East are these members of the U.S. Reparations Mission.

Left to right: E. L. Shaner, editor-in-chief of STEEL; A. B. Einig, general man-

ager, Motch & Merryweather Machinery Co., Cleveland; Brig. Gen. G. F.

Schulgen, War Department; Dr. E. L. Klein, special assistant to E. W. Pauley,

chief of the Mission; Col. William Mayer, War Department

## Steel Shortages Cause Hint of Priority Revival

Reinstatement of government distribution controls reported considered by CPA as pressure for metal continues to grow

THE CURRENT voluntary system of handling steel requirements may be scrapped and a schedule of priorities reinstated, it was indicated last week following a meeting of the Iron & Steel Industry Advisory Committee with Civilian Production Administration representatives.

The government agency is reported to be under mounting pressure from housing, farm machinery, railroads and export requirements for steel supplies, to an extent that the present system may not survive.

CPA representatives are said to have advised the meeting that it is increasingly difficult for them to resist this pressure to set up some more formal arrangement.

Steel men maintain the only answer to the supply problem is six months uninterrupted production. They are reported to have taken the position that priorities would merely cut in on orderly production and distribution at this stage.

If priorities are restored, they will give precedence to housing, as required in the Housing Act, next farm machinery, then the railroads and finally exports, CPA indicated to the industry men.

Just how the government would reinstitute priorities is not clear. Personnel to do the job would have to be recruited from industry, the Steel Division staff of CPA having been cut to only a few members in recent months. Within the past month several steel men have returned to the agency to help solve some of the more acute problems of supply for which the agency has been pressed for solution by the Congress.

More than ten million tons of steel have already been lost from potential 1946 production because of strikes and various other work interruptions.

This loss of steel production in the early months of the year coupled with the unusually heavy demand for metal from consumers as they seek to step up their manufacturing operations to meet the huge accumulated requirements for civilian goods, has resulted in what is

described as the tightest steel market situation ever experienced. Producers have put a quota system of distribution into effect in order to spread out available tonnage as far as possible, shipments being based on normal prewar purchases of consumers. While the system has worked out well, it has not entirely solved the supply problem. Steel men, however, are of the view restoration of a government system of priorities would do little more than the present voluntary rationing system in meeting demand since solution of the problem depends solely on the stepping up of production to the maximum of capacity.

## Free Collective Bargaining Urged for Metal Trades

Collective bargaining must be kept free of any atmosphere of coercion and violence and agreements must be equally binding on workers and employers, George A. Romney, general manager, American Automobile Association, told delegates to the first meeting of the Metal Trades Committee of the International Labor Organization in Toledo. Mr. Romney was an American em-

## Calendar of Meetings . . .

- May 16-18, George Westinghouse Centennial Forum, sponsored by Westinghouse Electric Corp., to be held at Pittsburgh.
- May 21-22, American Steel Warchouse Association: Convention, The Plaza, New York. Headquarters are at 442 Terminal Tower, Cleveland 13.
- May 23, American Iron & Steel Institute: Fiftyfourth general meeting, Waldorf Astoria Hotel, Now York. George S. Rose, 350 Fifth Ave., New York, is the institute's secretary.
- May 23-June 2, Mid-America Exposition: Industrial exhibit of postwar home and commercial products, Public Hall, Cleveland. Headquarters are at 226 Public Hall, Cleveland.
- May 27-29, National Association of Purchasing Agents: 31st annual convention and exhibition, Stevens Hotel, Chicago. Association headquarters are at 11 Park Place, New York 7.
- May 29-31, Machinery Dealers' National Assoclation: Annual meeting, Claridge Hotel, Atlantic City, N. J. R. K. Vinson, 20 North Wacker Drive, Chicago 6, executive director.
- June 2-7, Society of Automotive Engineers: Semi-annual meeting, French Lick, Ind. John A. C. Warner, 29 West 39th St., New York 18, secretary and general manager.
- June 3-5, American Gear Manufacturers Association: Annual meeting, The Homestead, Hot Springs, Va. Newbold C. Goin, Empire Bldg., Pittsburgh 22, executive secretary.
- June 3-6, American Society of Mechanical Engineers: Aviation Division meeting, Los Angeles. C. E. Davies, 29 West 39th St., New York 18, secretary.
- June 3-6, National District Heating Association: Annual meeting, The Cavalier, Virginia Beach, Va. John F. Collins Jr., 827 N. Euclid Ave., Pittsburgh 6, secretary-treasurer.
- June 3-7, National Fire Protection Association:

ployer delegate to the conference which is one of a series of industry meetings being held throughout the world under the auspices of the ILO. Late in April a meeting of the Iron & Steel Committee was held in Cleveland. (STEEL, Apr. 29, p. 63, May 6, p. 105)

The Metal Trades Committee meeting drew representatives of employers, workers and government from 14 countries.

Declaring that the "reconstruction, peace and future progress of the world depend upon the establishment of effective and productive co-operative relationships between management and labor," Mr. Romney listed a 5-point program agreed upon by the management delegates. These included:

1. Full employment based on full, efficient production.

2. Belief in the extension of democratic competitive capitalism.

3. Belief in the principles of collective bargaining.

4. Management's right to manage without interference.

5. Intelligent and friendly co-operation between worker, employer and government.

Fiftieth anniversary meeting, Boston. Association headquarters are at 60 Batterymarch St., Boston 10.

- June 7, Electrochemical Society, Pittsburgh Section: Meeting, Mellon Institute of Industrial Research. Richard Rimbach, 1117 Wolfendale St., Pittsburgh 12, secretary.
- June 10-12, American Society of Heating & Ventilating Engineers: Semiannual meeting, to be held at Mt. Royal Hotel, Montreal, Canada, and will continue aboard a cruise ship up the St. Lawrence river. A. V. Hutchinson, 51 Madison Ave., New York 10, secretary.
- June 12-15, American Society of Mechanical Engineers: Oil & Gas Power Division meeting, Milwaukee, C. E. Davies, 29 West 29th St., New York 18, secretary.
- June 13, Metal Powder Association: Spring meeting, Waldorf Astoria Hotel, New York. Association headquarters are at 420 Lexington Ave., New York 17.
- June 17, American Society of Mechanical Engineers: Machine design group meeting, Hotel Statler, Detroit, C. E. Davies, 29 West 39th St., New York 18, secretary.
- June 17-18, American By-Products Coke Institute: First annual meeting, Scaview Country Club, Absecon, N. J. Samuel Weiss, 729 15th St. N. W., Washington 5, executive secretary.
- June 17-20, American Electroplaters Society: Annual convention, Hotel William Pena, Pittsburgh. Society headquarters are at 93 Oak Grove Ave., Springfield, Mass.
- June 17-20, American Society of Mechanical Eagineers: Semiannual meeting, Hotel Statler, Detroit, C. E. Davies, 29 West 39th St., New York 18, secretary.
- June 21-22, American Society of Mechanical Engineers: Applied Mechanics Division meeting, Buffalo. Association headquarters are at 29 West 39th St., New York 18.

## Resale Prices on Steel Products Revised by OPA

Warehouses may add extras for sheets and strip when produced from rimmed stock or aluminum killed steel

WAREHOUSE resellers now are permitted to include in their maximum prices for prime hot-rolled and coldrolled steel sheets and strip appropriate extras for such products when produced from selected rimmed stock or aluminum killed steel.

When making deliveries from their warehouses by truck at the request of purchasers, resellers now may include in their maximum delivered prices the amount by which cost of such truck delivery exceeds freight from shipping point to destination. Conversely, they will be required to determine maximum delivered prices by including appropriate adjustments when the cost of truck delivery is less than freight. Another change in provisions for transportation charges prohibits resellers on the Pacific Coast from including in their prices the amount by which all-rail delivery to their warehouses exceeded cost of rail and water delivery.

Resellers of tin plate are prohibited from including in their maximum prices for that product the increase granted at the mill level by amendment 15 to revised prices schedule No. 6.

## American Iron & Steel Institute Elects Directors

Ten men were elected last week to the board of directors of the American Iron & Steel Institute, New York.

They are: H. G. Batcheller, president, Allegheny Ludlum Steel Corp., Brackenridge, Pa.; B. F. Fairless, president, United States Steel Corp., New York; W. W. Holloway, chairman, Wheeling Steel Corp., Wheeling, W. Va.; Elton Hoyt II, senior partner, Pickands, Mather & Co., Cleveland; Hayward Niedringhaus, president, Granite City Steel Co., Granite City, Ill.; E. L. Parker, president, Columbia Steel & Shafting Co., Pittsburgh; Frank Purnell, president, Youngstown Sheet & Tube Co., Youngstown; C. F. Stone, president, Atlantic Steel Co., Atlanta; Leigh Willard, president, Interlake Iron Corp., Cleveland; and R. W. Wolcott, president, Lukens Steel Co., Coatesville, Pa.

## GOVERNMENT CONTROL DIGEST

Weekly summaries of orders and regulations issued by reconversion agencies. Symbols refer to designations of the orders and official releases. Official texts may be obtained from the respective agencies

### OFFICE OF PRICE ADMINISTRATION

Gray Iron Castings: Effective May 3, following percentage increases may be added by producers: (1) Gray iron castings with maximum prices frozen at levels in effect during the base period, Aug. 1, 1941, to Feb. 1, 1942, 20 per cent (previous 10 per cent increase in base period maximum prices has been revoked so that the 28 per cent increase must be taken on maximum prices prior to the 10 per cent rise); (2) gray iron castings with maximum prices computed by a seller's pricing formula between Oct. 26, 1942, and Dec. 31, 1943, 12 per cent; (3) gray iron castings with maximum prices computed between Jan. 1, 1944, and Dec. 31, 1944, and for castings for which sellers have elected to use their prebase period prices, 6 per cent. (MPR-244; OPA-T-4481)

Bolts, Nuts, Screws and Rivets: Effective May 6, resellers of bolts, nuts, screws and rivets may pass along the 7 per cent increase granted producers Apr. 1. When sold on any basis other than list and discount basis, the reseller may increase his prices the dollar-and-cent amount by which his suppliers' ceilings have been increased. (SR-14G, GMPR; OPA-T-4469)

Reconverting Manufacturers: Any parts for household cooking and heating stoves, vacuum cleaners, washing machines and refrigerators that are still under the general maximum price regulation at the manufacturing level are eligible for reconversion increases, if the manufacturers qualify as reconverters, effective May 11. Metal parts for the consumer goods affected, when sold to the manufacturer of the completed article of consumer goods, are covered by the machinery regulation. (SO-119; OFA-T-4478)

Hand Service Tools: Manufacturers of mechanics' hand service tools received as of May 7 an interim wage-price increase of 5 per cent over March, 1942, prices (or Oct. 1-15, 1941, if no March, 1942, prices existed.) Only tools priced under consumer durable goods regulation are affected by this action. Other types of metalcutting devices and all machine-operated tools are classified as machinery, and are priced under the machinery regulation. (MPR-188; OPA-T-4483)

Warchouse Steel Products: Resellers permitted to include extras for prime hot-rolled and cold-rolled steel sheets and strip when these products are produced from selected rimmed stock or aluminum killed steel, effective May 10. Delivered prices to be adjusted by adding or subtracting the amount by which charges for truck delivery exceed or fall short of railrond freight rate. Pacific Coast resellers not permitted to include in maximum prices the amount by which the cost of all-rail delivery to their warehouses exceeds the cost of rail and water delivery. Resellers of tin plate are prohibited from including in their prices the increase granted at the mill level by amendment 15 to price schedule No. 6. (MPR-49) Wood Working Tools: Effective May 7,

Wood Working Tools: Effective May 7, prices of wood boring and cutting tools increased 17.3 per cent above March, 1942, prices. If a manufacturer stopped selling before March, 1942, he may take his Oct. 1-15, 1941, price as a base. Affected are manually operated auger bits, drills, drill bits and braces, wood borers, saws and saw frames, the ceiling prices of which are covered by the consumer durable goods regulation. (MPR-188; OPA-6459) Business Machines: Maximum prices of busi-

Business Machines: Maximum prices of business machines, including typewriters, increased 12 per cent over October, 1941, prices, effective May 8 at the manufacturers' level. (MPR-188; OPA-6461)

Power Boilers: Manufacturers of steel power

boilers and equipment, which are still under price control, granted a 16 per cent increase over June 1, 1941, maximum prices, effective May 13, (MPR-136; OPA-T-4480) Compressors: Manufacturers' prices for low-

Compressors: Manufacturers' prices for lowcapacity compressors and condensing units having a capacity of 5 horsepower or less, as well as repair and service parts, increased 17 per cent, effective May 9. (MPR-591; OPA-T-4487)

### CIVILIAN PRODUCTION ADMINISTRATION

Bale Ties: CPA has earmarked up to 7500 tons of wire in government surplus property for manufacturing bale ties. This tonnage of carbon steel black annealed or galvanized wire in 12 through 16 gages, inclusive, held by War Administration as surplus property and declared surplus in Iowa, Minnesota, Missouri or states east of the Mississippi must he held for the manufacturers of bale ties. However, 15 per cent of any lot merchandised by WAA may be sold to other buyers. Production of 130,000 tons of bale ties, the estimated 1946 requirements, does not appear probable in view of the recent steel strike and the current production interruption occasioned by the coal strike. (PR-13; CPA-338)

Presses: Producers of mechanical power-driven presses (150 tons or over) may apply to CPA for "CC" ratings for production materials and maintenance, repair and operating supplies entering into their product. Priorities assistance granted does not include aid for procuring capital equipment or construction. Second quarter production of power-drive presses is estimated by CPA at \$12 million compared with an order backlog of more than three times that amount. (PR-28; CPA-348)

Construction Machinery: Priorities assistance to obtain construction machinery has been made available to coal mining companies where procurement of such equipment will materially increase production of certain types of coal in areas cast of the Mississippi. Coal mining companies may apply for "CC" ratings to obtain construction machinery to be used in underground coal mining if such equipment would increase production of high-grade metallurgical and by-product coking coal and double screened domestic bituminous and anthracite coal in the areas defined in schedule 1 to priorities regulation 28. (PR-28; CPA-339)

Lead: May allocations of lead for tetra-ethyl fluid have been set at 4160 tons, which will produce about 25 per cent less tetra-ethyl fluid, on a quarterly basis, than was used in the first quarter. (M-38; CPA-333)

### NATIONAL HOUSING AGENCY

Housing Priorities: Authorizations and priorities assistance may be issued now to veterans of World War II and members of the armed forces who had purchased a home site prior to Apr. 13 and who had made one or more previous commitments for construction of a house which would have a sales price in excess of \$10,000. These applications must be filed within 60 days of the effective date of the regulation, Apr. 29. In the case of a nonveteran who had acquired a home site, made one or more commitments for the purpose of construction, and owned substantially all of the materials required for construction prior to March 26, an authorization without priorities assistance may be issued. Authorizations without priorities assistance may also be issued to persons who had contracted to purchase prefabricated or precut houses which were in process of manufacture on March 26. (NHAR-80-2; NHA-391)

## Maritime Commission Disposing of Damaged and Overage Vessels

Sixty-five ships, involving about 225,000 tons of ferrous scrap, sold to date. Commission to limit offerings so that only about one million tons of iron and steel scrap will reach market annually. Some to be used for special purposes

UNDER a policy of disposing of its damaged and overage vessels gradually, the Maritime Commission so far has sold 65 bottoms involving about 225,000 tons of iron and steel scrap. A few of these ships were sold before Jan. 1 and some in April, but the great majority were sold during the first quarter.

Present indications are that future offerings will be at about this rate—involving a little less than 1,000,000 tons of ferrous scrap a year. The old and damaged vessels could be put on the market at a much faster rate. Right now the commission, according to a statement by Vice Adm. Emory S. Land before he retired as chairman, has in the neighborhood of 1,500,000 tons of shipping that is damaged or overage.

There are two reasons why the commission is disposed to liquidate this inventory over a period rather than as fast as it could be done. One is the expectation that a program of stretching sales out over a period will result in bringing higher prices for the government. The other is that Admiral Land, while with the commission, felt that the liquidation of old and damaged ships by the commission should bring about the creation of a shipbreaking yard in the United States, thus adding to the country's business activities and new jobs.

### Ships Used for Several Purposes

At the present time the commission envisions the sale of old and damaged ships under three conditions. Those so far sold have been disposed of mostly under the first of these conditions; these ships are to be broken up into scrap. A number have been sold for scrapping of the hull and salvage of the equipment. There is a likelihood that some ships may be sold for purposes other than transportation.

For example, the commission has had feelers for the purchase of vessels for highly special uses. In certain instances the plan has been to strip the ship of its equipment and then fill the hull with concrete and use it for a breakwater. In other instances the use of the ships for power-generating purposes has been considered in cases where the ships are equipped with turbo-electric propulsion. Sales of vessels for conversions into scrap so far have been as follows, successful bidders and number of vessels bought: By-Products Iron & Steel Corp., Cleveland, 29; Boston Metal Co., Baltimore, 6; American Iron & Metal Co., Emeryville, Calif., 6; M. D. Friedman Co., Portsmouth, O., 9; Patapeco Scrap Corp., Bethlehem, Pa., 7; New Market Steel Co., Perth Amboy, N. J., 1; Joseph L. Kammer, Cleveland, 2; Liberty Industrial Salvage Co., Pittsburgh, 4; Northern Metal Co., Philadelphia, 1.

The 29 vessels sold to the By-Products Iron & Steel Corp. were all old lake vessels. All the others were occan-going ships, either cargo ships or tankers.

Future sales, the commission feels, will probably be made to companies who have not so far put in high bids. In general, interest is increasing, and the number of bidders also is increasing.



#### MAJ. GEN. E. S. HUGHES

Succeeding Lt. Gen. L. H. Campbell Jr. as Chief of Ordnance, United States Army, is Mai, Gen. Everett S. Hughes. Born in South Dakota in 1885, General Hughes graduated from West Point in 1908 and is a veteran of the two World Wars and of the Mexican punitive expedition. His career has been spent in various Ordnance Department posts and during World War II he had important assignments in the European theater, including that of special assistant to General Eisenhower. He was appointed acting chief of ordnance in February of this year and will take over the duties of chief on June 1. Companies that have filed unsuccessful bids include the United Waste Co., Charlotte, N. C.; J. T. Knight & Son Inc., Columbus, Ga.; C. J. Moore, Greenville, N. C.; J. R. Bundessen, Pittsburg, Calif.; Kaiser Co. Inc., Richmond, Calif.; Constable Hook Shipyard Inc., Bayonne, N. J.; Potomac Ship Wrecking Co., Washington; Dulien Steel Products Co. Inc., Seattle.

## Settlement of Terminated War Contracts Progresses

More than 37,000 terminated war contracts involving canceled commitments cf \$9.7 billion were settled during the first quarter of 1946, according to the Office of Contract Settlement. Of the 312,000 prime contracts terminated since the beginning of war production, only 23,900, or less than 8 per cent, remained to be settled on Mar. 31. This is 13.5 per cent of the 177,000 prime contracts pending unsettled on V-J Day or terminated since then. Of the total of \$64.4 billion of commitments canceled since the beginning of war production, \$42 billion of which was pending on V-J Day or terminated since then, \$24.3 billion remained unsettled on Mar. 31.

By Mar. 31, it was estimated that 81 per cent of the total plant clearance jobs had been completed. The number of requests for the removal of governmentowned plant equipment and termination inventory totaled only 42,500 in the first quarter compared with 74,600 during the fourth quarter of last year. The backlog of pending requests had been reduced to 10,700 on Mar. 31.

New terminations were unexpectedly large in number but not in canceled commitment value during the first quarter when new terminations totaled 8700, involving canceled commitments of \$500 million.

## 1944 Edition of Minerals Yearbook Published

Bureau of Mines, Department of Commerce, has published its 1944 edition of *Minerals Yearbook*, authoritative publication on domestic and foreign mineral commodities.

Prepared annually by the Economics and Statistics Branch of the bureau, the yearbook was withheld from general distribution during the war because of the censorship on publication of much of the data.

Bound copies of the 1944 yearbook may be obtained for \$3 each from the superintendent of documents, United States Government Printing Office, Washington 25.

# ANNOUNCING THE NEW NO.150

**HYDRAULIC INTERNAL GRINDER** 

60" MAX. WORK DIA.

## Another Bryant Postwar Development

The NEW Bryant No. 150 is a giant "internal grinder" with typical Bryant "fingertip" control. It retains the famous Bryant feature of threepoint wheel slide suspension which is the basis of Bryant's reputation for high production of accurate work with fine finish.

The NEW Bryant No. 150 has a preloaded antifriction cross slide, assuring smooth cross feed operation in spite of the size of the machine. Both hand and power cross feed are available and in addition, a hydraulic cylinder slides the wheel spindle to the rear to provide ample access for work loading or checking. The work spindle is bored out to accommodate spindles or other long work which may be chucked conveniently by extension through the work spindle. The work spindle is designed so that chucks or fixtures may be mounted on either or both ends.

The NEW Bryant No. 150 will handle bore or bore & face grinding in a single chucking, and bores may be either straight or tapered. Write for a copy of the new catalog sheet which gives full details, capacities and dimensions.

If your internal grinding work comes within the range of  $\frac{1}{10}$  inch diameter bore up to 60" diameter swing, it will pay you to

### Send for the Man from Bryant!



BRYANT CHUCKING GRINDER CO.

SPRINGFIELD, VERMONT, U.S.A.



REAR ADM. HAROLD G. BOWEN Chief, Office of Research and Inventions

research, calling for the expenditure of many millions of dollars annually and enlisting the co-operation of scores of private research facilities and universities is being undertaken by the Navy. Primarily the Navy's program is being conducted for military purposes, and its breadth is intended, at least in part, to compensate for curtailment of research in past years. This situation was explained by the Navy as follows in a statement accompanying its budget estimates for the fiscal year ending June 30. 1947:

AN EXTENSIVE program of scientific

"The field of fundamental research has been explored to a small degree during the war. Weapons of warfare have been improved and developed, based on fundamental scientific principles known long before the war.

"The storehouse of this knowledge is

rapidly becoming depleted. In order to develop new weapons or new techpiques of warfare which are radically different from those now in use, it is imperative that radically large additions be made to the backlog of fundamental science. The effective prosecution of pure research is the key to our future security."

But the Navy takes a much broader view of its program-and its budget statement explained that its significance to the nation's general economic welfare is fully equal to its significance for purposes of war.

"Experience gained during the war years has established quite clearly the importance of scientific research in the interest of national security," the statement pointed out. "There is ample evidence to show that a nation's welfare, both in peace and in war, is intimately

Broad Research

Multi-million dollar undertaking aimed at adding to backlog of fundamental science as basis for developing new and improved weapons. University and industrial laboratories drawn into program on contract basis. Contracts are free from security restrictions and results of work will be publicized

> associated with its scientific accomplishments. Strength in this respect is reflected not only in the efficient mobilization and conduct of the military effort, but also in better living, more efficient work, and high standards of health and recreation for the nation as a whole.

"Scientific progress and human progress," it declared, "cannot follow separate paths. In consequence of this experience there has developed a general recognition of the necessity for the active pursuit of scientific investigation."

While the actual details of the program have been organized over the past six months or so, the program itself is the outcome of long-range Navy planning. The recognition of the need for comprehensive scientific research was one of the main reasons why the Navy, on May 19, 1945, created the Office of Research & Inventions. That is, the need for the program was envisioned while the war was still in progress.

Guiding the work of the Office of Research & Inventions are three distinguished engineers selected because of their past service to the Navy in engineering and research fields-Rear Adm. Harold G. Bowen, USN, chief of Hesearch and Inventions, Rear Adm. Luis de Florez, USNR, deputy chief, and Capt. M. J. Lawrence, assistant chief. To direct the research program, Admiral Bowen established a Planning Division under the direction of Capt. R. D. Conrad, USN, and also made available for development of the program the Naval Research Laboratory, directed by Com. H. A. Schade, USN, and the Special Devices Division, directed by Capt. Donald L. Hibbard, USNR. To link the Navy men more closely with the civilian scientific fratemity, Dr. Alan Tower Waterman, on leave from the Department of Physics, Yale University, heads the scientific branch of the Planning Division. A notable feature of the program is

the entire absence of security restric-

# Program Enlists Aid of Private Facilities

tions upon contractors. The contracts are unique in that they distinctly authorize the contractors to teach and publish the results of their work for the Navy.

Captain Lawrence further points out: "In the research contracts made by the Office of Research and Inventions, the scientists will decide what project they are best equipped to work on. Mutually, the Navy and the outside laboratory will agree on a broad task, but the Navy will not dictate how to accomplish the task. We want to buy research and get the fruits of it-not dictate it and still expect results. There will be no dogmatic decisions, no dictatorial rulings or regimentation under bosses who do not know what it is all about. The technical military personnel assigned will assist in the administration of the contract and not interfere with the technical direction of the task."

In a general way, the scientific fields to be explored include physics, nuclear physics, chemistry, electronics, the medical sciences, geophysics and meteorology, and mathematics, and such allied technical fields as flight, guided missiles, atomic energy, electronics, subsurface warfare, amphibious wanfare, propulsion and mechanics and materials. But the overall conception is much broader; it contemplates scientific investigation as a co-operative enterprise among the various branches of science; no one branch can be regarded as isolated and independent.

## Staff of Experts To Be Created

One of the objectives, secondary only to the development of new knowledge from fundamental research, is the creation of a staff of technically trained officers and civilians "capable of interpreting the results of fundamental science in the light of the Navy's requirements for them."

A feature which the Office of Research & Inventions constantly has in mind is that no worthwhile research program can be allowed to become frozen. It must be kept flexible-subject to revision, to shifts in emphasis. To maintain such a fluid condition, so that contracts may be written and executed intelligently, the Office of Research & Inventions maintains liaison with all the Navy bureaus to keep abreast of their problems and maintain a proper understanding of the types of solutions sought. It maintains close contact with contractors and, since results of scientific research can-

May 13, 1946

not be plotted in advance, develops the subject matter of contracts largely from contractors' recommendations. One of the plans still to be carried out calls for selection of a panel of prominent civilian scientists to meet from time to time with the chief of research and inventions and with the chief of naval operations for consultation on the naval research program and its implications with respect to military policy.

Part of the research work will be carried out by the Naval Research Laboratory which has a fine establishment at Washington and, in addition, numerous branches in different parts of the country specially equipped and located to conduct special work. The scientific personnel of the Naval Research Laboratory at present is broken down into ten divisions with scientific personnel employed primarily under Civil Service. These divisions are:

Airborne Radio; Aircraft Electrical Research; Chemistry; Fire, Missile, and Pilotless Aircraft Control; Mechanics and Electricity; Physical Metallurgy; Physical Optics; Ship-Shore Radio; Electronics Special Research; and Sound.

The Special Devices Division will function importantly in the program, particularly in the field of synthetic training and equipment, and human engineering. The term "synthetic training" is used to characterize methods and equipment devised for the instructon of students under simulated operational conditions, and it covers, usually, the development of new, complex weapons and instruction in their use.

Following is a list of the universities and industrial laboratories with which



CAPT. M. J. LAWRENCE

NAVAL RESEARCH

research contracts have been negotiated. or with which the negotiations have reached an advanced stage:

Universities - California Institute of Technology, Pasadena, Calif.; Carnegie Institute of Technology, Pittsburgh; University of Chicago; Columbia University, New York; Cornell University, Ithaca, N. Y.; Harvard University, Cambridge, Mass.; University of Illinois, Urbana, Ill.; Johns Hopkins University, Baltimore; Massachusetts Institute of Technology, Cambridge, Mass.; University of Michigan, Ann Arbor, Mich.; University of Minnesota, Minneapolis; New York University; University of North Carolina, Chapel Hill, N. C.; Ohio State University, Columbus, O.; University of Pennsylvania, Philadelphia; University of Pittsburgh; Polytechnic Institute of Brooklyn, N. Y.; Stanford University, Palo Alto, Calif.; State University of Iowa, Iowa City, Iowa; University of Texas, Austin, Tex.; Tufts College, Medford, Mass.; Yale University, New Yaven, Conn,

Industrial laboratories-Aerojet Engineering Corp., Pasadena, Calif.; Austin Co., New York; A. D. Little Inc., Cambridge, Mass.; Battelle Memorial Institute, Columbus, O.; Bone Engineering Corp., Chicago; Burgess Co., Newport, R. I.; E. I. du Pont de Nemours, Wilmington, Del.; Eitel-McCullough Inc., San Bruno, Calif.; General Electric Co., Schenectady, N. Y.; Franklin Institute, Philadelphia; Hollingsworth & Vose Co., East Walpole, Mass.; Institute of Aeronautical Sciences, New York; Radio Corp. of America, Camden, N. J.; Reed Research, Washington; Robert I. Sarbacher & Associates, Atlanta, Ga.; Somerset Lab-



REAR ADM. LUIS de FLOREZ

## NAVAL RESEARCH

oratories, Lyndhurst, N. J.; Stevens Institute of Technology, Hoboken, N. J.

Research contracts under negotiation include: Universities — University of Indiana, Bloomington, Ind.; National Academy of Sciences, Washington; Notre Dame University, South Bend, Ind.; Princeton University, Princeton, N. J.; University of Rochester, Rochester, N. Y.; Syracuse University, Syracuse, N. Y.

Industrial Laboratories — Goodyear Tire & Rubber Co., Akron, O.; Federal Telecommunication Laboratories, Nutley, N. J.; Radium Chemical Co., New York; Standard Oil Development Co., New York; Westinghouse Electric Corp., Pittsburgh.

Research contracts under discussion: Universities - Alfred University, Alfred, N. Y.; Brooklyn Polytechnical Institute, Brooklyn, N. Y.; Brown University, Providence, R. I.; University of California, Berkeley, Calif.; University of Colorado, Boulder, Colo.; Fordham University, New York; Georgia School of Technology, Atlanta, Ga.; Kansas State College, Manhattan, Kans.; Lehigh University, Bethlehem, Pa.; Northwestern University, Evanston, Ill.; Purdue University, Lafayette, Ind.; Rice Institute, Houston, Tex.; Rutgers University, New Brunswick, N. J.; Scripps Institute of Oceanography, La Jolla, Calif.; University of Southern California, Los Angeles; Tulane University, New Orleans; University of Virginia, Charlottesville, Va.; Washington State College, Pullman, Wash.; Washington University, St. Louis; Wesleyan University, Middletown, Conn.; University of Wisconsin, Madison, Wis.

Industrial Laboratories-Bendix Aviation Corp., New York; Collins Radio Corp., Cedar Rapids, Iowa; Eastman Kodak Co., Rochester, N. Y.; Electrodyne, Boston; Emerson Radio & Phonograph Co., New York; Engineering Research Associates, St. Paul; General Communications Co., Boston; B. F. Goodrich Co., Akron; Hastings Instrument Co., Hampton, Va.; Humm Laboratory, Lakehurst, N. J.; Kollsman Square D Co., New York; North American Phillips Corp., Dobbs Ferry, N. Y.; Raytheon Corp., Waltham, Mass.; Remington Rand, Middletown, Conn.; Sperry Gyroscope Co., Brooklyn, N. Y.; Submarine Signal Co., Boston; Edward Stearns & Co., Philadelphia; Sylvania Corp., Boston.

In the field of metals the individual programs call for a large amount of fundamental research on subjects which have been brushed over lightly in the past. Furthermore, as explained to STEEL by Irvin R. Kramer, metallurgist in the ORI's Planning Division, the individual projects represent a breaking



COMM. H. A. SCHADE

down of the overall picture for practical reasons.

"The whole program in metals is so interwoven and integrated," said Mr. Kramer, "that the results obtained in each will be helpful to the progress in all the others."

To illustrate the thoroughness of the approach on the individual projects, a contract now under negotiation by the ORI with the University of Illinois may be cited. The research to be conducted under this contract is to come under such heads as: "Behavior of Materials Under Repeated Stress," "Fundamental Criteria for Selecting Structural Metals," "Analysis of Structural and Machine Elements," etc.

### Better Criteria To Be Developed

"The principal object of the investigation," reads a University of Illinois summary of the university's understanding of the results desired, "is to develop criteria more rational than those now in use for selecting steels for specific and mechanical uses. These criteria are to be based upon the relation between the physical properties of the metals as indicated by small specimen tests and the behavior of structural or machine elements under service conditions. The results, it is believed, will make it possible to predict the service behavior of various types of structural members and machine parts made of different metals and by different fabricating processes."

Mr. Kramer further explains the object of the investigation by pointing out that behavior of a large mass of material under service conditions cannot usually be predicted accurately from investigation of small specimens in the usual laboratory testing machines. One of the primary objects, he says, is the design of test pieces, both large and small, from whose behavior intelligent specifications



CAPT. R. D. CONRAD

for ship plates and other materials may be written.

"The present and future requirements for materials indicate that research must be done on the behavior of material under a wide variety of conditions," said Mr. Kramer. "The strength and ductility are not uniquely defined but are determined by such factors as stress pattern, strain rate, temperature and size of structure. Thus in addition to such static properties as strength, permanent elongation, reduction of area, and hardness, dynamic properties such as creep, plastic deformation, relaxation, and stress gradients must be determined. In order to understand how these factors operate in affecting the behavior of materials a clearer understanding of the mechanism of slip, twinning and cleavage in polycrystalline materials and the limiting conditions of stress and strain to produce failure must be known.

"This is a broad and important field and is of interest to the Navy Department in connection with ship protective systems, armor plate, structural considerations in design, in the fabrication of aircraft and in the proper choice of material in pulse motors. Basic research on materials would include behavior and properties exhibited under such chemical conditions, including the effect of biological factors."

As an illustration of the way in which the individual projects tie in with each other, a contract now under negotiation by the ORI with the Carnegie Institute of Technology may be cited. The research under this contract will fall under such heads as "Kinetics of Reaction in Steelmaking," "Kinetics of Reaction in Solid Alloys," etc. The whole project, in effect, will deal with the physical chemistry of steelmaking. And the information gained under this contract, it is expected, will tie in directly with that gained in the University of Illinois



CAPT. DONALD L. HIBBARD

project described on the preceding page.

"The behavior of steel in service depends not only on its composition and treatment," Mr. Kramer told STEEL, but on how it has been made in the steel plant. "We want to know what happens in the steelmaking process, and what happens to the constituent elements in the charge. We want to know what happens in the different steelmaking processes-what goes on in acid and basic open-hearth furnaces, electric furnaces and bessemer converters that has a bearing on the service behavior of the steel. We want to determine whether, in case of some future national emergency certain steelmaking capacity is destroyed or damaged, the desired product can be produced by other processes and at other locations."

One of the methods to be employed in studying the physical chemistry of steelmaking is the use of radioactive tracers. By this means, it is expected, migrations can be studied, and the locaton of any constituent determined at any desired stage of the steelmaking process.

"The study of Kinetics of Reactions in Solid Alloys, which is the basic science of the heat treatment of alloys, such as in the age hardening of duralumin, the hardening of steel or quenchings, homogenization of mixed powders and in castings, the hardening of duralumin, etc., is also directly connected with the properties of the metals," Mr. Kramer points out. "It is directly related to the plastic behavior of metals, to recovery and recrystallization following cold work and to the behavior of metals in specific applications. These studies will be of wide theoretical and practical importance."

Under a contract already negotiated, Battelle Memorial Institute will conduct a fundamental research program on all heat resistant materials. It will start off



IRVIN R. KRAMER

with alloys of the cobalt-chromium and chromium-molybdenum systems — "the ones most widely used and on which we have the least knowledge." One aim will be to fill present gaps in the knowledge about weldability of heat resistant alloys. This project also will include heat resistant construction by the use of ceramic bodies and ceramic coatings.

Another contract placed, covering "Iso-Elastic Alloys," has been assigned to the Naval Research Laboratory. This study, too, will be of a fundamental nature, with the main object of developing higher strength alloys than now available so that instruments incorporating parts of such alloys will last longer in service. The alloys sought are those which will not undergo changes in their moduli of elasticity over a limited temperature range—usully minus zero to plus 150 degrees centigrade.

To Naval Research Laboratory also has been assigned a project entitled "Contactor Alloys." The Navy now has no short-time means for predicting the behavior of alloys used in making electrical contacts, and it is hoped this gap can be filled. The study also will aim at determining the influence of transient currents on the contactor metal and, vice versa, the influence of the contactor metal on transient currents. Improved alloys also are sought.

### Corrosion Study To Be Fundamental

A project now being negotiated by the ORI jointly with the Naval Research Laboratory and with Ohio State University involves studies under the head of "Corrosion," and this study will be entirely fundamental as contrasted with the usual test work. More information is sought about corrosion in general, stress corrosion, corrosion fatigue, erosion and corrosion in combination, etc.

One of the important objectives of the whole metallurgical campaign, Mr.

## NAVAL RESEARCH

Kramer points out, is to ascertain the full possibilities of all our strategic materials so as to prevent the development of undue shortages in any future national emergency. Many specific phases of the inquiry have this purpose in mind —as, for example, a study of the effects of alloying elements on the ductility of quenched and tempered steels.

ORI's position in regard to research in nuclear physics is: "While the government's position in reference to control of the development of atomic power plants and ordnance is still in doubt, this does not relieve the Navy of its responsibility for the national security in beginning fundamental investigations in the new and very important field of nuclear physics . . . The field is starved for the basic information on which all engineering development must be founded."

Furthermore, ORI points out, the Navy has particular requirements "for both power plants for ships and submarines and underwater ordnance . . . It is therefore proposed to make fundamental research contracts with a number of the leading academic institutions of the country in this field." The contemplated project in the field of nuclear physics is a big one, and ORI expects vast results from it and that these results will have profound effects on development work of the future.

One of the aims is to find "other elements which are capable of yielding practical amounts of energy on either disintegration or synthesis."

#### **Electronics To Be Investigated**

With respect to the field of electronics, ORI's position is that great progress was made during the war years in development of equipment for detection, fire control, communications, navigation and intelligence. But very often these developments were guided by the needs of the moment and the amount of basic investigation and research was quite limited. ORI sees a host of questions in the field of electronics that need to be cleared up through fundamental research.

In the field of chemistry ORI sees a great need for critical evaluation of a vast amount of work already accomplished. The agenda calls for:

A fundamental study and evaluation of synthetic fuels, particularly some new compounds of great promise;

A fundamental study of the combustion process in connection with the use of new fuels and new types of motors, particularly in missiles of great speed and range;

(Please turn to Page 178)



### GRIME AND PUNISHMENT

Out where men are men and the work is tough and dirty, where the air's not conditioned and no refreshing coolant flows . . . that's where portable electric tools show the stuff they're made of. Because that's what these tools are made for . . . to take flying grit that cuts and grinds, clogging dirt and dust, heat and cold, wet and dry and rocketing speed that slices through an hour's job in minutes' time.

Stuff like Fafnir Ball Bearings . . . that's what tough, dependable portable electric tools are made of. Because they need the kind of sealing devices

Fafnir's developed to lock in lubricant and lock out dirt and moisture through long months of abuse and neglect ... positive seals such as the Fafnir PLYA-SEAL with its plastic impregnated fabric washer and spring steel split retainer ring, seals that create no distortion, seals that make the fullest use of newest materials and methods. Be cause these electric tools need the Fafnir kind of precision to keep out brush bounce and keep down excess vibration. And because the Fafnir Balanced Design of deeper races and larger balls gives the extra thrust capacity and rugged dependability you need in tools that lean into the work.

Most of all, what it takes to make ball bearings for portable electric tools is what makes Fafnirs the first

FAFN R BALL BEARINGS

choice of so many machine designers, manufacturers and users ... the mind-to-mind way Fafnir has of working out a bearing problem. The Fafnir Bearing Co., New Britain, Conn.

MOST COMPLETE LINE IN AMERICA

Study of managerial policies and organization of General Motors contained in new book by Peter F. Drucker. Studebaker introduces 1947 models which feature sharp breaks in styling from 1946 and prewar designs.

## DETROIT

HOW to bring "status and function" to the individual in a modern industrial society is one of the most critical problems of our day and the subject of a rather exhaustive socio-political analysis by Peter F. Drucker in his latest book, Concept of the Corporation (John Day Co., New York, \$3). His conclusions are based in part upon a two-year study of the managerial policies and organization of General Motors Corp., undertaken upon invitation of the corporation and concluded last summer. They are not particularly heartening to anyone eagerly awaiting the golden tomorrow of American industry, but at the same time they suggest that perhaps only within the framework of the American social and political system can much sound progress be made,

The author divides his discussion into four parts: Capitalism in one country--more or less of an introductory nature; the corporation as human effort; the corporation as a social institution; and economic policy in an industrial society. Within these four parts are chapters devoted to organization for production, decentralization policies, relations between the corporation and its dealer outlets, foremen--the industrial middle class, workers' problems in an industrial society, possibilities for full employment, etc.

Key to the elimination of unrest and dissatisfaction among working people is seen by Drucker as dependent upon the perfection of means to bring the individual worker dignity, status and function - in his own eyes. Paternalism has failed to provide this because it is held to rest on the basic fallacy that people will take propaganda for reality. Unionism likewise has failed because it has concentrated solely upon economic issues and is in inception and basic nature negative, aiming continually to protect the worker against management, against society and against about everything else. What is needed, says Drucker, is an integration of the worker as a partner

in the industrial system and as a citizen in society.

mirrors of IIIUIORD

In reviewing decentralization of management, which General Motors considers as a basic concept of a successful industrial order, the author describes the corporation as an essay in federalism and an exceedingly successful one, in that it attempts to combine the greatest corporate unit with the greatest divisional autonomy and responsibility. It has

	12 1 1 1 1 1 1			
Automobile Production				
Passenger Cars and Trucks-U. S.				
and Canada				
Tabulated by Ward's Automotive Reports				
	1946	1941		
January	121,861	524,073		
February	83,841	509,332		
March	140,777	533,878		
April	245,000	° 489,856		
Week ended:				
April 20	57,565	° 99,945		
April 27	64,620	° 108,165		
May 4.	67,585	• 130,610		
May 11.	65,000	° 132,380		
°Preliminary.				

resulted in the development of a leadership technique which, as proved in the war, can tackle any manufacturing job and organize it speedily, efficiently and economically. Two exceptions to the policy of decentralization in GM are Chevrolet and Fisher Body.

Keynote to the success of any large corporation, however, is its ability to produce leaders with vision and talent, and GM has been eminently successful in this respect. As the author expresses it: "Without an able, responsible and enterprising leadership, willing and capable of taking the initiative, the most efficient institution cannot maintain its efficiency, let alone increase it. The inability of a socialist enterprise to produce leaders and the failure of socialist competition to replace adequately the yardstick of the competitive market are very severe weaknesses."

On the score of automobile plant workers, much criticism has been directed in the past at the "monotony" of assembly line tasks. Drucker charges this viewpoint as being both superficial and sentimental, claiming it overlooks the fact that monotony in any kind of work is inevitable, as well as necessary, and good for the great majority of men, since the opposite of monotony is insecurity. And he adds: "Complete monotony is certainly unbearable except for a moron; but complete insecurity is just as unbearable except for a madman."

On foremen: "On the unique position of the foreman depends to a very large extent American middle-class mentality and social structure in an industrial age. If we want to maintain this middleclass society, we must maintain the traditional position of the foreman. That means, as far as the foreman is concerned, we must maintain the opportunities to rise into management and the middle-class function and status of foremanship. Certainly during the last 50 years-and especially during the last 15-the foreman has lost rapidly in status, in function and in the chance for individual fulfillment in his job. He has become, or at least tends to become, the 'forgotten man' of American industry."

### Foundation for Free Enterprise

In conclusion, Drucker erects five pillars on which an economic policy for a free-enterprise society rests. They are: (1) A working full employment policy; (2) clear determination of those spheres in which the survival interest of society demands collective political, rather than individual economic, action; (3) recognition of the areas of economic life which in the interest of economic efficiency should be organized on the basis of rationality, that is, on and by market price, but which must also be protected against the market in the interest of social stability (clearest examples in the field of farming); (4) prevention of monopoly, as carefully distinguished from mere bigness which becomes a

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## MIRRORS of MOTORDOM



this five-passenger coupe in which contour-fit windows replace former rear-quarter body panels, giving virtually unobstructed rear vision. Note front windshield has curved glass. Bodies are completely restyled, lower and wider, with improved weight distribution

social asset through decentralization; and (5) centering the economic policy on the conservation of human and man-made assets, inferring the adoption of a fiscal policy and mentality which encourages the accumulation of capital resources for future capital investments.

For those who like to ponder the grave social and political problems of the times, *Concept of the Corporation* is highly recommended.

### New Studebakers Introduced

The automobile industry is weighing the probable ultimate effect of the introduction by Studebaker, officially May 7, of its 1947 models which feature sharp breaks in styling from 1942 and 1946 models. After a sneak preview of the new models in Chicago, Apr. 24, the company hoped to be away to a flying production start by the first of this month and to be rolling new cars at a rate of 25,000 per month by June. However, shortages of frames and other parts threw this planning into reverse and the attainment of peak production now is some distance away.

Most novel of the models currently announced is a two-door five-passenger coupe in which the rear window has been extended around both rear quarter panels to give unobstructed vision. In view of the many complaints of "blind spots" in rear vision directed at automobile builders for years, it is strange this extension of the rear window has been so long in coming, but it is now another Studebaker first.

Other style and design features: Much lower bodies, wider passenger compartments, front fenders blended into body lines, lower center of gravity, floating front spring mounts, self - adjusting brakes, interchangeable-type connecting rod bearings, two-section propeller shaft to eliminate any floor tunnel, "black light" illumination of instrument panel, frame siderails and cross members double flanged at the bottom.

The question now is whether other builders will push their new model development work ahead to meet the Studebaker challenge of an entirely new series of Champion and Commander models. At first glance, the answer would appear in the negative, because of the current sellers' market and because the industry's larger units have never found it necessary to follow the lead of a smaller independent; in fact it has always been quite the reverse.

Two new stamping plants for the Fisher Body Division of CM are well under way, one at Hamilton, O., concentrating on heavy press work, and one at Columbus, O., on lighter stampings. A third project, not yet announced publicly but well along in the planning stage, involves a large heavy-press plant on the west side of Detroit, near the General Motors diesel plant on West Outer Drive. This unit was reported to be virtually a duplicate of the Grand Rapids stamping unit of Fisher Body, although perhaps somewhat larger, and equipment needs had been figured and placed with builders. Latest word around Detroit, however, runs to the effect the project has been suspended for reasons not yet ascertainable.

A gray iron foundry at Chattanooga, Tenn., operated by the Wheland Co., is currently being groomed for a major expansion to supply 15,000 sets of cast brake drums daily for Chevrolet. Large volume of melting, casting and conveying equipment has been placed, with General Motors engineers providing considerable technical assistance on the project and the corporation reportedly supplying financial backing. At least one Chevrolet foundry equipment program has been deferred so that the Wheland Co. job can get in ahead on suppliers' delivery schedules.

First figures on the financial cost of the GM strike were disclosed in the firstquarter report of the corporation, revealing a net loss of over \$36 million. Operating loss was approximately \$89 million but was reduced by income and excess profits tax adjustments. Gross sales during the three months when all plants were strikebound totaled about \$75 million, or only a little over 7 per cent of the figure for the same period a year ago. Net working capital decreased during the quarter by 20 per cent, or to about \$625 million.

Meanwhile, Chrysler Corp. also showed an operating loss in the quarter despite continuing production, of \$8.4 million, reduced by tax adjustments to \$829,928. Sales to dealers in the period totaled 108,176 cars and trucks. Maximum production since V-J Day was attained in the week ending Apr. 27, when 14,029 vehicles were assembled, a figure considerably at variance with the estimate of Ward's Automotive Reports --18,500. This output represents about half-speed for Chrysler, and chronic shortages indicate progressively lower assemblies for the current period.

### Ford's Office Workers Reject CIO

In the first NLRB election involving office personnel of Ford Motor Co., office employees in Chicago recently voted 73 to 30 to reject a proposal that the United Office & Professional Workers of America-CIO serve as their bargaining agent. Time study employees of the same branch also turned down the UOPWA proposal. Organization of office and professional workers is a declared policy of Walter P. Reuther, new UAW-CIO president; how he may fare among larger groups than those just mentioned remains to be seen.

Formation of a new engineering society, the American Society of Body Engineers Inc., has been announced by its president, I. Louis Carron, body engineer of the Detroit Harvester Co. The society is a nonprofit corporation with national headquarters in the Rackham Memorial building in Detroit. A technical convention will be held in October by the society in the Rackham Memorial building with Carl W. Cenzer as general chairman.

Recognition that auto body engineering is now a profession is seen in the fact that the University of Michigan will start a course in the subject leading to an engineering degree.



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May 13, 1946

## ACTIVITIES

# Sees Pittsburgh Benefiting from Diversification

Steel company president says movement of steel producing facilities will spur efforts to obtain new industries

EVENTUAL RELOCATION of some of the steel production facilities now situated in the Pittsburgh area will be for the ultimate advantage of Pittsburgh because such a development would through necessity stimulate diversification of industry there with attendant greater stability of employment, J. L. Perry, president, Carnegie-Illinois Steel Corp., Pittsburgh, has predicted.

Speaking at the Institute on Community Problems of the University of Pittsburgh recently, Mr. Perry pointed out that while Carnegie-Illinois Steel Corp. has and will continue to have some of its largest investments in the Pittsburgh area, Pittsburgh no longer has the advantages it formerly held in relation to markets for steel and availability of raw materials. "We must logically expect," he said, "that when it is necessary for some of the present steel manufacturing facilities in Pittsburgh to be replaced they will be installed at locations nearer to the concentrated consumption of steel, and there will be some reduction in the total ingot capacity in the Pittsburgh area.

### **Must Attract New Industries**

"It must be recognized that everything possible must be done to attract diversified industries," Mr. Perry emphasized. "With the natural advantages abounding here, with the available supply of raw materials and basic products such as steel, aluminum, glass, coal, chemicals and others, there is no reason why this area should not be the seat of many consumer industries.

"With diversification will come stability. There are many industries, which, by their nature, have much more stable employment than has so far been possible in steel. The greater the number and the diversity of those industries which can be induced to settle here, the more favorable will be the industrial fortunes of Pittsburgh. So far as steel is concerned," Mr. Perry asserted, "I look upon this potential diversification with satisfaction because it will provide added markets for our steel capacity here."



SAFETY MANACLES: Punch press operator Peter Baker likes being chained to his machine at SKF Industries Inc., Philadelphia, because in stamping rivet holes in hard steel ball and roller bearing cages it means increased safety and already has helped reduce plant accidents by 22 per cent. The shackling device synchronizes movement of the hands with motion of the press. When the press descends, cords attached to leather wristbands pull the operator's hands away. NEA photo

## BRIEFS...

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

Champion Rivet Co., Cleveland, has appointed the following as distributors for its welding products: F. J. Sweeney, Cleveland and Akron district; Terminal Engineering & Supply Co., Pittsburgh, Pittsburgh district; and Norton Welding Equipment Co., Milwaukee, for Wisconsin.

Columbian Bronze Corp., Freeport, Long Island, N. Y., has purchased Doran Manganese Bronze Co. Inc., Brooklyn, N. Y., from the principals

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controlling Barth Smelting Corp., New York. The acquisition will increase the Columbian marine propeller line to include a range from 2 in. to 22 ft in diameter.

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Stacey-Dresser Engineering, Cleveland, division of Stacey Bros. Gas Construction Co., Cincinnati, has been awarded contracts for installation of two large propane-air plants, one to be located at McMahon compressor station near Perrysburg, O., and the other at the Mt. Sterling, O., compressor station.

Stanley Tools, division of Stanley Works, New Britain, Conn., has acquired the business and plant of North Bros. Mfg. Co., Philadelphia. The latter company will continue operations with the same personnel.

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Joseph T. Ryerson & Son Inc., Chicago, steel warehouser, has begun construction of a warehouse and office building at East 53rd St. and Lakeside Ave., Cleveland. The new facility will have a total floor space of 247,000 sq. ft.

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McNally Pittsburg Mfg. Corp., Pittsburg, Kans., has purchased a majority interest in Morrow Mfg. Co., Wellston, O., which will continue to operate under its own name as a division. Both companies make coal preparation and handling machinery.

## History of Harrisburg Steel Corp. Published

"Since 1853," the title of the history of the Harrisburg Steel Corp., Harrisburg, Pa., which has recently been published, depicts the growth of a small company, the Harrisburg Car Mfg. Co., organized with \$25,000 capital, into an organization which in 1945 had a capitalization in excess of \$31/2 million. Entertainingly written, the book takes the company through the agonizing days of the Civil War (the Battle of Gettysburg was fought 34 miles away), through panics, floods, fires, and two World Wars up to the present time. The history of 93 years and the people who made history in the company's organization is covered in this interesting report.

## Wire Reinforcement Group Elects New Officers

New officers for the coming year were elected at the recent meeting of the Wire Reinforcement Institute held in Hot Springs, Va. They include: J. C. Shepherd, executive vice president. Sheffield Steel Corp., Kansas City, Mo., president; W. H. Stewart, sales manager, Reinforcing Products Division, Truscon Steel Co., Cleveland, vice president. T. J. Kauer, managing director of the institute, was re-elected secretary and treasurer.

New bylaws for the institute were adopted at the meeting, and the decision was made to incorporate.

## Republic Steel Expanding Silicon Strip and Tin Plate Facilities

PRODUCTION of electrolytic tin plate and silicon strip steel will be materially increased at Republic Steel Corp.'s plants when that company's present construction and engineering program is completed. Completion dates on the various phases of the program, according to the present schedule, run from Sept. 1, 1946, to August, 1947.

The program entails contruction of two buildings, one at Warren, O., and one at Niles, O.; installation of new equipment and modification of present equipment to speed up certain processes. One phase of the program is intended to increase annealing capacity of the Warren district.

The first step to increase capacity of the tin mill at Niles will be to use coils larger than the present 5000-pound size. Three customary coils will be buttwelded, forming coils weighing up to 15,000 pounds. Handling equipment will be enlarged and uncoilers and recoilers must be rebuilt to handle the larger and heavier coils.

Frank E. Flynn, manager of the Warren district, estimates capacity will be increased from 20,600 to 23,700 tons a month at the continuous pickler where the butt welding equipment will be installed. Operation of the tandem cold reducing mill, which reduces the strip to the desired thickness, will be speeded up to handle the increased output thus obtained.

### Equipment To Be Added at Niles

Four portable annealing furnaces, two of the standard practice and two ultramodern type furnaces will be installed at the Niles plant. These will increase present annealing capacity to about 9000 tons a month. Installation of three DX gas machines to furnish atmospheric gas in connection with the annealing process is an important part of this improvement. A heavy-type building will be built for the new annealing furnaces.

Extensive modification and redesign of the unitemper mill will be made to speed up its operation to the increased production resulting from the larger coils and to eliminate delays now encountered in the changing of rolls. This unique mill is a 2-stand, 2-high mill, one stand above the other, and was placed in operation in the summer of 1942.

At the Warren plant, improvements will be made in another tin plate production method, the hot-dip process. The project calls for modernizing six hot-dip tin pots. Changes will not affect production capacity, but will enable a better quality tin plate to be produced. Another phase of the program at Warren will be the rebuilding and modernizing of 32 annealing furnaces in the cold strip department, gaining about 7000 tons a month.

Production of silicon strip will be increased by installation of seven radiant tube annealing furnaces and all necessary handling facilities. The annealing capacity of the silicon strip department will be doubled. The silicon annealing furnaces will necessitate the contruction of a new building of a light factory type construction. Six of the furnaces will be contained in this building.

## Follansbee Steel Corp. Adds Warehouse Division

Follansbee Steel Corp., Pittsburgh, has organized a new division, Follansbee Metal Warehouses, in which the present warehousing services of the corporation will be consolidated, according to J. W. Patrick Jr., manager of warehouses.

The change has been made to establish the identity and services of the warehouses separately from the steel production activities of the corporation and as part of a plan to broaden the field of services at present warehouses in Pittsburgh and Rochester, N. Y. The division is planning establishment of other warehouses in localities now under consideration, Mr. Patrick said.

## War Weapons Displayed at Navy Air Firepower Show

A Navy Air Firepower Show at the Naval Air Test Center, Patuxent river, Maryland, was witnessed Apr. 30 by members of the Institute of Aeronautical Sciences. A demonstration of weapons used in the war, as well as those still under development, the show featured numerous types of airplanes, rockets, and small arms.

Displayed for the first time was the 30-ton thrust rocket motor developed as the Navy's answer to the German V-2.

Also displayed were the rocket power unit CML-2N used to drive the "Gorgon" pilotless aircraft; "Tiny Tim," the 12-inch, 1200-pound rocket; and several types of propeller and jet driven aircraft.

# See WAA Facing Ticklish Task in Acting on Geneva Steel Plant Bids

Offers of United States Steel Corp. and Colorado Fuel & Iron Corp. attract most interest on Pacific Coast. Most bids contingent on government financing to add finishing facilities to convert plant to production of marketable civilian products

### SAN FRANCISCO

WESTERN steel interests believe the War Assets Administration faces a ticklish problem in deciding on acceptance or rejection of the six bids received for the Geneva Steel plant in Utah.

Only two of the bids are considered here as carrying much weight. These are the offers of the United States Steel Corp. through its western subsidiary, Columbia Steel Co., to purchase the plant with inventory for \$47.5 million, or without inventory for \$40 million, and the proposal of Colorado Fuel & Iron Corp., Denver, to create a new company to lease the plant at a rental of \$2 a ton for a period of not less than 15 years, with option to buy at a minimum price of \$80 million. The latter offer is contingent upon the government installing facilities costing \$47,-935,000 to integrate the plant for the production of marketable steel products.

Most interest here centers on the offer of the United States Steel Corp.

Advantage to the government in accepting the U. S. Steel bid would be in getting out from under the \$190 million Geneva plant without further fuss or bother, with reasonable assurance that the facilities would be used to provide steel for western consumers.

A drawback, politically, to the U. S. Steel offer is seen in the amount of the bid in relation to the cost of the plant. Observers expect political criticism would be voiced if WAA sold the Geneva plant for a little more than 21 per cent of cost.

Another factor which may militate against a decision to sell to U. S. Steel is the certainty that the old political cries of "monopoly" will be raised again.

In making the U. S. Steel offer, President Benjamin F. Fairless stated the corporation contemplated installing facilities costing \$18.6 million to produce 386,000 tons of hot-rolled coils. These coils would be utilized in the production of cold-reduced sheets and tin plate at a modern cold reduction mill to be erected at Columbia Steel Co.'s plant at Pittsburg, Calif., at an estimated cost of \$25 million. Thus the total estimated cost to U. S. Steel of acquiring and converting the Geneva works would be \$91.1 million, all of which would be financed by U. S. Steel.

U. S. Steel reserved the right to withdraw its bid if not accepted by June 15, 1946.

Colorado Fuel & Iron's offer is based entirely on a leasing proposal with an option to buy. Its plan would keep the government in the steel business perhaps longer than the government may want to continue. Perhaps the greatest opposition to the Colorado Fuel & Iron offer, however, will come from the proposal that the government invest nearly \$48 million additional in the plant. Strong opposition is expected in Congress to spending that much on a facility which already has become a "white elephant" to the government.

The remaining bids come from less well known bidders.

Judson S. Warshaw, New York, offered to buy Geneva "as is" at two-thirds of the "as is" value with a down payment of 50 per cent of the agreed purchase price, or lease the property "as is" on rental-purchase basis, or operate the plant "on a profitable basis, a division of the profits equally, or on a purchase basis with the Reconstruction Finance Corp."

Riley Steel Co., Los Angoles, proposed to buy the property outright for \$135 million with a down payment of \$12,367,102.22, contingent on a government loan for \$28,844,000 with interest at 4 per cent.

Pacific American Steel & Iron Corp., Seattle, offered to purchase the plant for \$40,498,622, payable over a period of 20 years with interest at 2 per cent and would require a loan of \$25 million for plant additions. An alternate proposal would have the government turn the plant over to the company and provide \$25 million loan on the understanding the original cost of the plants and the loan would be repaid from earnings.

Assets Reconstruction Corp. Ltd., Los Angeles, proposed to pay \$38,750,000 for the project and stand the cost of adding the required facilities.

A telegraphic offer from a firm signed by Blue Star Enterprises Inc., Salt Lake City, bidding \$302 million for the plant was withdrawn shortly after it was received. The bid was called an "error" and WAA officials said they did not know the company or the individuals whose names were signed to the wire.

Kaiser Co. Inc. made no bids on the property, but submitted a long letter



SHOVING OFF: Party of Anglo-American atom scientists board the seaplane tender U. S. S. KENNETH WHITING at Terminal Island, Los Angeles, preparatory to leaving for Bikini rendezvous for the atom bomb tests

discussing at length the financial and production relationships between the Kaiser-operated Fontana plant and the Geneva project.

For the South Chicago plant operated by Republic Steel Corp. during the war, only two bids were presented. One was by Republic, which offered to lease the property at a minimum rental of \$2 million annually, or \$3 million annually provided certain facilities were added to the plant.

C. A. Depue of the Central Steel Tube Co., Clinton, Iowa, offered \$17,-500,000 for all assets and property.

## Materials Shortages Cause Layoff of 600 at Boeing

#### SEATTLE

Increased material shortages have resulted in 600 additional Boeing employees being temporarily terminated at Seattle. It is announced they will be reinstated as soon as supplies are again available. The Renton plant is finishing construction of B-29s and it had been planned to place workers from that factory in the Seattle plant. Present employment at the Seattle plant is 7906, at Renton 1864.

Washington state officials report current employment levels are 137.83 per cent higher than the January-February levels of 1939 in manufacturing, service trades and wholesale and retail trades in this state. Highest wartime employment was in June, 1945, with 189.67 per cent of the 1939 figure, declining to 136.10 per cent late last year.

## Los Angeles Group Asks Aid in Obtaining Steel

### LOS ANGELES

Southern California users of sheet steel are facing an industrial crisis because of inability to obtain supplies.

In an effort to remedy this condition, leading industrialists there last week joined in a special plea presented to John Small, Civilian Production Administrator, by members of a special steel committee working through the Los Angeles Chamber of Commerce industry department.

Contained in the statement sent Mr. Small is an excerpt from testimony given by K. T. Norris, president of Norris Stamping & Mfg. Co., before the Senate Small Business Committee.

Moreover, the analysis points out that although western demand for steel has jumped from a prewar 427,000 tons a year to 770,000 tons at present, allocations are being made largely on a basis of prewar distribution. Coal and steel strikes have accentuated scarcity. Basic blame laid to over-optimistic forecasts for postwar steel empire on Coast, which caused some independent eastern producers to withdraw from Pacific markets. No immediate relief in sight

### SAN FRANCISCO

GROWING shortage of finished steel items on the West Coast is attaining proportions that may become serious in the next few months. Although the scarcity is partly the result of the recent steel strike and the current coal strike, real reason goes much deeper and probably will continue long after the strike effects are forgotten.

Jobbers and fabricators of steel products have seen their stocks dwindling for weeks now until nearly every category is in short supply and many items are nonexistent. Thin sheets are especially scarce, but an even greater famine exists for all kinds of wire products. Material like baling wire and strip is unobtainable and farmers will be hard put in the harvesting season to find those items. Pipe is equally scarce.

Many fabricators of equipment like stoves now are facing the prospect of shutting down within a short time unless the supply is increased. Unofficial reports are frequent these days concerning plans of companies to move away from the West Coast unless adequate materials are assured. The construction industry, which has been counted on as a major prop to re-employment in the transition period, is suffering increasingly from the shortage of nails, hardware and other building items.

### Steel Empire Fails To Materialize

Many fabricators and warehousemen place the blame for this situation on over-optimistic predictions of what popular economic columnists have labeled "the West's great new postwar steel empire." Throughout the war, and during the time the Geneva and Fontana plants were being constructed, discussions of the West Coast's steel prospects at times exceeded the most fantastic propaganda campaign.

Those rosy utterances have backfired in this manner: Independent steel producers in the East who accepted the predictions at face value came to the conclusion that their share of the Coast market would dwindle in postwar They calculated that extra expense of shipping steel to the Coast, plus the cost in time, effort and money of building up sales outlets here, was not worth the risk if the Coast were to achieve self-sufficiency in steel production. The result was that a half dozen companies which supplied much of the finished steel material before the war now have withdrawn entirely from the West Coast.

This retreat has put the Coast in the position of not having at this time sufficient home-grounds production of materials, especially of finished items, and the two major producers, U. S. Steel and Bethlehem, are not capable of supplying the additional needs from their eastern mills.

Eventually this situation will be remedied, partly at least, by expansion plans of U. S. Steel and Bethlehem. However, it will be many months before new plants can be constructed. Meantime, unless the eastern independents resume shipments to the Coast, the shortage is likely to become more acute. There is no immediate prospect that shipments will increase. The coal strike has piled up unfilled orders even higher than during the steel strike, and with a continuing heavy demand for steel in the East it is unlikely that eastern mills will divert material to the West.

## Maritime Commission Takes Over Marinship

The U. S. Maritime Commission on May 17, will take over the \$17 million shipbuilding yards of Marinship Corp. on San Francisco bay. The commission plans to use the yard for maintenance and surplus property declarations. The U. S. Engineers also is expected to occupy parts of the plant as a depot for Pacificbound supplies and headquarters for Pacific construction activities.

## Dobeckmun Co. To Build Plant at Berkeley, Calif.

Dobeckmun Co., Cleveland, has announced construction of a new plant in Berkeley, Calif. CPA approval for the project has been received. The new factory will cost \$525,000, including purchase of 50,000 square feet of real estate.



A. C. Wimmer, treasurer, Oil Well Supply Co., Dallas, Tex., a United States Steel Corp. subsidiary, has resigned following 30 years' association with the company. He is succeeded by G. F. Goetzinger, assistant treasurer and general credit manager since April, 1944.

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D. A. Rhoades is vice president and general manager, Aluminum Division, Permanente Metals Corp., Oakland, Calif. Mr. Rhoades has been associated with Kaiser organizations since 1927 when he was graduated from the University of California. Norman L. Krey is works manager of the Mead aluminum reduction plant, and John R. Meek is works manager for the Trentwood rolling mill, both plants being located in Spokane, Wash.

Ferdinand W. Roebling III has been appointed vice president in charge of engineering, John A. Roebling's Sons Co., Trenton, N. J. He succeeds Charles M. Jones who has become vice president in charge of public and industrial relations. Both are members of the company's board of directors. Mr. Roebling became a member of the company's engineering staff following graduation from Princeton University in 1933 and recently returned from five years' service with the Army. Mr. Jones has been associated with the company since 1926.

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Theodore E. Mueller, formerly vice president, general manager of manufacturing, American Radiator & Standard

Sanitary Corp., Pittsburgh, has been elected president succeeding Henry M. Reed who has served since 1938 as both president and chairman of the board. Mr. Reed continues as board chairman. Henry M. Reed Jr. has been elected vice president, general manager of manufacturing, Mr. Mueller's previous position. Mr. Mueller became associated with the company in 1904. He is a director, and member of the executive and finance committees. The younger Mr. Reed, who joined the company in 1926, has served as manager of its Louisville works since 1928.

V. W. Moody Jr. has been named assistant to G. S. Nagle, assistant vice president in charge of manufacturing, Foil Division, Reynolds Metals Co., which division has headquarters in Richmond, Va.

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Charles L. Heater has been elected a member of the board of directors, Genral Steel Castings Corp., Eddystone, Pa., Einar G. Hallquist, for many years head of the corporation's engineering department, has been elected vice president in charge of the Commonwealth plant, Granite City, Ill. Karl S. Howard was elected vice president and will continue in charge of general mechanical and general purchasing.

Frank B. Lounsberry, who has held the position of vice president in charge of manufacturing, an office which has been discontinued, has been named to the newly-created post of vice president

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in charge of methods and processes, Allegheny Ludlum Steel Corp., Brackenridge, Pa. Melvin C. Harris was elected vice president in charge of production. Other new vice presidents are E. J. Hanley, finance, and Clark W. King. Mr. Hanley continues also as secretary and treasurer. Remaining officers of the company were re-elected.

H. W. Poole has been appointed engineer, Steel Mill Division, and C. M. Rhoades Jr., engineer, Machinery Division, General Electric Co., Schenectady, N. Y. Since January, 1946, Mr. Poole has served as engineer-in-charge, Machinery Division.

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R. M. Wilson Jr. has joined the technical service section, Development & Research Division, International Nickel Co. Inc., New York, as a welding engineer. He formerly held a similar position at the Bloomfield, N. J., works of the General Electric Co.

Arthur A. Cambria, chief engineer with the Lapointe Machine Tool Co., Hudson, Mass., for the past eight years, has been appointed New England district manager, U. S. Broach Co., Detroit, and he will have offices at Shrewsbury, Mass.

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Carl de Laval has been appointed sales representative with offices in the Oliver Building, Pittsburgh, for the Chester Electric Steel Co., Chester, Pa.

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Carl A. Ten Hoopen, for 12 years sales manager in the Central District, Cyclone Fence Division, American Steel & Wire Co., has been appointed eastern district sales manager with headquarters in Newark, N. J. He succeeds S. W. Burr, who will handle special sales assignments for the company. Thomas S. Humrickhouse, formerly assistant district manager at



THEODORE E. MUELLER



FRANK B. LOUNSBERRY



MELVIN C. HARRIS

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THE AMERICAN ROLLING MILL COMPANY

## MEN of INDUSTRY



L. M. ALEXANDER

Newark, has been named to succeed Mr. Ten Hoopen as manager at Cleveland. Also announced is the establishment of a sales district for Michigan with headquarters in Detroit. E. B. Wilhelm has been named manager of that office.

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L. M. Alexander recently was promoted to manager of sales, Bolt & Nut Division, Sheffield Steel Corp., Kansas City, Mo. Mr. Alexander has been associated with the company 21 years. During the recent war, he was in charge of alloy and ammunition sales and production for the firm. He returned to bolt and nut sales as supervisor at the end of the war, the position he held prior to his recent promotion.

W. A. Maier has been appointed director of purchases, M. A. Hanna Co., Cleveland. Morris A. Bradley, who is on terminal leave as a major in the Army Air Corps, has been assigned to the post of assistant director of purchases. John Fielding Jr. has been named co-ordinator of purchases for the Hanna Coal Co., Cleveland, subsidiary of the M. A. Hanna Co.

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William A. Scheuch, vice president, Nassau Smelting & Refining Co., Tottenville, Staten Island, N. Y., has been elected president succeeding Frederic W. Willard, retired. George J. Boileau, treasurer, was elected vice president and succeeds Mr. Willard on the board of directors. E. F. Baxter has been elected treasurer and E. F. Stoker, assistant treasurer. Mr. Scheuch joined the Bell System, of which the Nassau company is a part, in 1916, and has been with Nassau Smelting since 1931, serving as vice president and director since 1939.

Rodney Pennoyer, who has been in charge of the equipment department, Hyman-Michaels Co., Chicago, has been



JOSEPH G. PAULE

elected vice president and director, with headquarters in Chicago. Sidney Kelter is appointed manager for the St. Louis region and Frank J. Sheldon has been elected assistant treasurer and comptroller with headquarters in Chicago.

Joseph G. Paule, secretary - treasurer since 1937, Wilson Foundry & Machine Co., Pontiac, Mich., also has been elected to its board of directors.

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Lincoln Electric Co., Cleveland, has added the following representatives to its staff: John F. McFecters, welding engineer assigned to the Kansas City, Mo., office; Hubert G. Hinkle, welding engineer, Columbus, O., area; K. S. Lamb, welding engineer, New York; and Thomas W. Day, welding engineer, St. Louis.

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L. K. Burwell has been named treasurer and general manager, Eastern Machine Screw Corp., New Haven, Conn., succeeding the late Thomas W. Ryley who had been treasurer since 1921. John Rogers'has been appointed assistant treasurer and purchasing agent, Thomas W. Higgins, secretary, and Elizabeth J. Farrell, assistant secretary.

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Walter Schuknecht, associated with the Eastman Mfg. Co., Manitowoc, Wis., since 1930, recently was elected president of the company to succeed the late J. Peter Eastman, founder. Mr. Schuknecht has served for the past several years as vice president. Also elected were: George N. Jagemann, vice president, formerly general manager; M. W. Brose, elected secretary and treasurer.

Burton F. Stauffer, in the rubber industry since 1893, has retired as president and general manager, American Anode Inc., Akron, an affiliate of the B. F. Goodrich Co. He is succeeded by

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Dr. Robert V. Yohe, who since January, 1945, has been vice president of the company.

Dr. Ovid W. Eshbach, dean, Northwestern Technological Institute, has been chosen by the Western Society of Engineers, Chicago, to receive its Octave Chanute medal for 1945.

Vernon L. Beery has joined Consolidated Industries Inc., Lafayette, Ind., and will be in charge of field service and installation in its Stoker Division.

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L. B. Flaws has been appointed sales manager, Systems Products Division, Diebold Inc., Canton, O.

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J. E. Hansen, director of service, Ferro Enamel Corp., Cleveland, recently was elected president, American Ceramic Society.

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Walter E. Thompson has been named sales representative in the state of Alabama for the Standard Transformer Co., Warren, O. He will have offices in the Martin Building, Birmingham.

Charles U. S. Grant has been appointed by Foote Bros. Gear & Machine Corp., Chicago, to serve as sales engineer with the company's Cleveland office.

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R. W. Stueve has been named general supervisor of labor relations, American Car & Foundry Co., New York. The company also announces that J. W. Patton, has been named supervisor of the newly established sleeping car section of the Engineering Division. Mr. Patton is assisted by D. R. Nichols, W. T. Griffin and E. E. Hansen.

Walter J. Dreves has been appointed director of finance and controller, International Plastic Corp., Morristown, N. J., and Thomas Plummer has been named production manager.

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Fred Albrecht, secretary-treasurer, Lodge & Shipley Machine Tool Co., Cincinnati, has retired, and J. Herbert Myers, sales manager, has been named to Mr. Albrecht's place on the board of directors and also has been elected secretary. Harry J. Buettinger, with the company 20 years, has been chosen treasurer. Fred Schoeffler and Louis L. Weber have been re-elected vice presidents.

Norman R. Ekholm has been appointed abrasive engineer for the Pacific Northwest by Norton Co., Worcester, Mass.

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# HIS STATEMENTS ARE RELIABLE

THE Industrial Development Department of Alabama Power Company is staffed with a group of specialists enthusiastic about Alabama as a location for industry. Their enthusiasm stems from the fact that in past years many industries have found in Alabama the combination of climate, raw materials, workmen, transportation, market possibilities and laws not unfavorable to business.

However, they do not permit their enthusiasm to cause them to make statements which could be misleading. Their statements are based on special economic studies of an area as related to the individual industry considering locating there. If the requirements of the industry cannot be met they will state so frankly and endeavor to suggest an alternate.

Currently the interest displayed in Alabama as an industrial location makes it impossible for them to complete, as promptly as they would like to, economic reports for specific organizations. However, if you are contemplating the establishment of a plant in the South they would be pleased to have your inquiry and will begin the compilation of facts from which you can make a decision. They will undertake this independently but can, of course, prepare a more helpful report if they work in collaboration with your representatives.

Industrial Development Department

# ALABAMA POWER COMPANY

### BIRMINGHAM, ALABAMA

## MEN of INDUSTRY

Mr. Ekholm recently returned from more than three years' service in the armed forces, and he replaces J. E. Strachan, who takes over sales engineering work in the company's Worcester office. In addition, Fred H. Paulson and Curtis H. Weissinger have been appointed sales engineers in the company's Refractories Division and will have their headquarters at the Worcester office. C. Lawton Rucker has been appointed resident manager of the company's plant at Bauxite, Ark., replacing J. Felton Gibbons, who is retiring after 33 years' service at the Bauxite plant, first as mine superintendent and later as resident manager. He will continue to serve in an advisory capacity.

Britt M. Smith and Richard E. Smith have opened offices in the Concord Bldg., Portland, Oreg., as engineering consultants specializing in machine designing.

Charles I. Kraus has been appointed sales manager, Alemite Distribution Division, Stewart-Warner Corp., Chicago. Gustave Treffeisen has been named assistant sales manager.

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Daniel Beisinger has been named manager, Saw Division, R. Hoe & Co. Inc., New York, succeeding Edward Foster, who retired recently upon completion of 50 years' service with the company.

Robert S. Sagers has been appointed eastern sales representative, Bunell Machine & Tool Co., Cleveland, and will have Philadelphia as his headquarters.

Kenneth N. Macomber has been promoted to chief engineer from chief service engineer, Lapointe Machine Tool Co., Hudson, Mass. A graduate of Northeastern University, Mr. Macomber had charge of setting up and testing breech ring and breech block broaching operations for various arsenals and companies producing artillery weapons. Also, for the past eight years, Mr. Macomber has lectured on broaching for the Lapointe company.

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Frederick D. Gearhart Jr. has been elected a director, Higgins Inc., New Orleans. He is president, Kobbe, Gearhart & Co., New York, an investment banking house.

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Harold L. Aldrich has been appointed district representative in the New York office for the chemical department, General Electric Co. Mr. Aldrich, recently discharged from the Navy following four years' service, previously had been associated with the United Color & Pigment Co., a division of Interchemical Corp., Newark, N. J.

Walter R. Fidelius has been appointed assistant chief engineer, Optimus Equipment Co., Matawan, N. J. In his new position he will supervise design, construction and service. Mr. Fidelius formerly was with Fitzgibbons Boiler Co. Inc., Oswego, N. Y.

Scott E. Collins has been appointed zone sales manager in charge of the newly opened Cleveland office of the General Detroit Corp., and General Pacific Corp., Detroit, manufacturers of fire extinguishers, motorized fire apparatus and allied equipment. Mr. Collins, with the General Detroit company four years, previously was associated with Fruehauf Trailer Co.

Harvey C. Knowles, a director and vice president, Procter & Gamble Co., Cincinnati, has been elected a director, American Rolling Mill Co., Middletown, O.

A. H. Godfrey, formerly division manager and plant manager, Carboloy Co.,



KENNETH N. MACOMBER



A. H. GODFREY

Detroit, has announced the establishment of the Godfrey Tool & Supply Co., Inc., with offices at 10012 Carnegie Ave., Cleveland. The company, specializing in industrial cutting tools, has been named Cleveland distributor for National Twist Drill & Tool Co., L. S. Starrett Co., Jacobs Mfg. Co., Precision Grinding Wheel Co., and Nicholson File Co. Mr. Godfrey, president of the new organization, at one time was assistant general manager, Carbide Division, Firth-Sterling Steel Corp., and served for two years as production co-ordinator, Cleveland Ordnance district.

Charles H. Colvin, New York, has been elected to the board of directors, Kidde Mfg. Co. Inc., and Bloomfield Tool Corp., both of Bloomfield, N. J. He succeeds Clayton Freeman who has resigned due to ill health. Mr. Colvin is an engineering and administrative consultant to the United States Navy, Bureau of Aeronautics.

Andrew A. Engelhardt, who returned recently from service with the Army, not only has resumed his association with C. H. Martin, Chicago, who represents Holcroft & Co., and Eclipse Fuel Engineering Co., but he also has been elected secretary-treasurer of the Chicago chapter, American Society for Metals, a post he resigned upon entering the service in 1942.

John M. Stadter, formerly general purchasing agent, Glidden Co., Cleveland, has been promoted to assistant general sales manager, Chemical & Pigment Division; Clark Maxson, formerly assistant general purchasing agent, has been named to succeed Mr. Stadter, and C. P. Engelsman has been appointed sales manager of the Chemical & Pigment Division at Oakland, Calif.

F. H. Bigelow has been named manager of the Atlanta office, Ilg Electric Ventilating Co., Chicago. Replacing Mr. Bigelow as manager of the Memphis, Tenn., office is H. H. Wilson, recently released from the Navy. E. Lloyd Widner re-opens the company's office in Knoxville, Tenn. Henry M. Lutes has been appointed manager of the Louisville office.

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B. H. McGill, assistant controller, Bryant Heater Co., Cleveland, recently was named office manager of the company's office in Tyler, Tex.

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Tom J. Peters has been appointed division superintendent of maintenance at the South Chicago, Ill., plant of the Carnegie-Illinois Steel Corp. Mr. Peters

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## MEN of INDUSTRY



MARVIN A. HEIDT

Who is vice president in charge of industrial relations, Bendix Aviation Corp., Detroit, noted in STEEL, May 6, p. 128.

formerly was assistant to the general superintendent, and he succeeds John S. Townsend, resigned.

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Roy A. Egclhoff has been appointed sales representative, Titan Metal Mfg. Co., Bellefonte, Pa. Mr. Egclhoff will represent the company in Iowa, Kansas, Missouri, southern Illinois and southwestern Indiana, with offices in St. Louis.

Hudson T. Morton, for 21 years chief metallurgist and sales engineer, Hoover

## OBITUARIES ....

John J. Prindiville, 75, president and treasurer since 1914, Lapointe Machine Tool Co., Hudson, Mass., and president, International Engineering Works, Framingham, Mass., died in Boston, Apr. 30.

George S. Hayes, 81, purchasing agent, Okonite Co., New York and Passaic, N. J., died May 3 at Upper Montclair, N. J.

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H. Crant Leonard, eastern district manager, A. Leschen & Sons Rope Co., St. Louis, died recently.

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Edson R. Norris, 74, assistant to the vice president, Westinghouse Electric Corp., Pittsburgh, until his retirement in 1936, died recently in that city.

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Maurice Sternlicht, 52, Buffalo, district representative, Federal Enameling & Stamping Co., Pittsburgh, died Apr. 30 in Rochester, N. Y.

William F. Merritt, 48, assistant treasurer, White Motor Co., Cleveland, died



HENRY W. DODGE

Who recently was elected chairman, Air Products Inc., New York, noted in STEEL, April 15 issue, p. 92.

Ball & Bearing Co., Ann Arbor, Mich., and since September, 1945, engineer for Precision Parts Co., Ann Arbor, now is standards engineer, Fafnir Bearing Co., New Britain, Conn., where he will have charge of co-ordinating engineering standards.

Directors elected at the annual meeting of the National Steel Corp., Pittsburgh, are: E. T. Weir, chairman, F. W. Blair, Leon Falk Jr., G. R. Fink, G. M. Humphrey, R. L. Ireland Jr., T. E. Mill-

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at the company's factory hospital Apr. 29. Mr. Merritt, a graduate of Yale University, joined White Motor in 1922 and was made assistant treasurer in 1929.

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Walter Nuttall, 63, general purchasing agent, Blaw-Knox Co., Pittsburgh, died May 3. He had been with the company for 26 years and previously had been associated with other steel companies.

Charles R. Ferguson, 66, chairman of the board, Pittsburgh Screw & Bolt Corp., Pittsburgh, died recently. Joining the company in 1899, Mr. Ferguson became president in 1921, and was made chairman of the board in 1940.

Harry Erickson, 55, production manager for 25 years at the Milwaukee plant, International Harvester Co., died recently in that city. He was with the company for 35 years.

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Thomas W. Ryley, treasurer, Eastern Machine Screw Corp., New Haven, Conn., died recently in West Haven, Conn. He joined the corporation in

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GRAYDON MEGAN

Who has been elected secretary, Inland Steel Co., Chicago, and noted in STEEL, May 6 issue, p. 129.

sop, E. W. Mudge, E. F. Reed, M. W. Sales and J. H. Thompson. Mr. Falk fills the vacancy on the company's board created by the death of his uncle, the late Maurice Falk.

V. C. Knight has been elected vice president in charge of operations, Mc-Cray Refrigerator Co., Kendallville, Ind. He first became associated with the company in 1925. Since January, 1941, Mr. Knight has been serving as chief engineer.

1921, was elected treasurer later that year and also served as secretary from 1936 to 1942. He was a director of the corporation and also acted as purchasing agent.

Robert E. Wenner, 64, tool and die engineer, Jack & Heintz Precision Industries Inc., Bedford, O., died May 1 in Cleveland.

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John J. Howe, 79, who in 1907 directed the building of the first steel mill in the Netherlands, died May 3 in Cumberland, Md. Mr. Howe retired in 1943 as rail designer for the Baltimore & Ohio Railroad in that city.

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George P. Tweed, 75, pioneer in the development of the iron ore resources of Minnesota and Michigan, died recently at his home in Duluth. In partnership with the late Albert Coates, he began development of iron ore resources about 1900. Mr. Tweed was a member of the American Iron & Steel Institute and the American Institute of Mining & Metallurgical Engineers.





WITH engineering study and extensive use the true picture of beryllium copper is now beginning to emerge, and the alloy is finding its rightful place in industry. Although many first claims were exaggerated, the actual properties of beryllium copWide utilization of alloy due to its nonmagnetism, corrosion resistance and high electrical conductivity. These characteristics, coupled with formability in solution-annealed state, high tensile strength, hardness and good wear resistance, insure a wide range of performance

per offer such an unusual combination of characteristics of copper and steel that the term "wonder metal" applied at the time of the discovery of this combination may not have been such a misnomer after all.

Pure beryllium metal is still rather expensive, costing in its pure form about \$45 per lb, and as beryllium copper master alloy \$15 per lb. However, since only 2 per cent of beryllium is needed to give copper valuable age hardening properties, this high cost of the alloying element has not hindered a wide use of the alloy especially in light parts where metal cost is a small element in the cost of the finished component.

The reason for the high cost of beryllium lies mainly in the difficulty of extracting it from the ore, and is not due to its scarcity as many commonly suppose. Beryl is rather widely found about the earth, being between tin and arsenic in its distribution in the earth's crust. It is seldom mined by itself but is produced as a by-product to other mining ventures, mainly mica, lithium, and feldspar. It is found in the United States and Canada, but the main commercial source of supply is Brazil and Argentina. It is not unusual to handle 100 tons of rock to obtain 1/2 ton of beryl which then contains only about 5 per cent beryllium.

Beryl is a beryllium aluminum silicate, and the separation of beryllium from its ore has been called one of the most difficult problems assigned to chemists. One commercial process calls for sintering the ore, crushing the sinter, treating the sinter with sulphuric acid, separating the beryllium and aluminum sulphates, and then roasting the beryllium sulphate to form beryllium oxide. If pure beryllium is needed, the oxide is converted to beryllium chloride or beryllium fluoride and then the metal produced by electrolysis of the fused salts. Commercial use of pure beryllium has been rather limited, some being used as windows for x-ray tubes where its low density

### Fig. 1-Segregated cast structure in beryllium copper ingot caused by slow solidification of melt. This results in low "available" beryllium and reduces hardening response

Fig. 2-Beta stringer remaining in rolled beryllium copper sheet resulting from segregation in ingot. Hard, brittle stringer reduces formability and contributes to low endurance life

Fig. 3-Fine cost structure from controlled conditions will allow full solution of beryllium in copper

Fig. 4-Structure of rolled sheet free of excessive beta phase as produced from fine cast structure shown in Fig. 8

makes for high transparency to x-rays, and its relatively high melting point of 1250° C is an added advantage. Some beryllium was used in the atomic bomb research and production but the extent of its use is yet to be revealed.

More than 90 per cent of all beryllium produced goes into beryllium copper master What are the propetries that have led to such wide utilization of beryllium cop-

alloy which is made by reducing the beryllium oxide with carbon in the presence of copper powder in an electric arc furnace. This master alloy contains about 4 per cent beryllium and is subsequently remelted with additional pure copper to produce the 2 per cent beryllium copper alloy so widely used for springs and precision castings. Production of master alloy for 1945 was estimated to be about 10,000,000 lb. per? Mainly it has been the unusual combination of what we may designate as copper and steel properties. Beryllium copper is nonmagnetic, has the corrosion resistance of pure copper, and high electrical conductivity. It can be readily formed in its soft ductile solution-annealed state and then hardened by heat-treatment to high strength (200,000 psi), high hardness and wear resistance, and to a fatigue resistance which is considerably higher than that obtained with other copper base alloys.

The hardening heat treatment can be carried out at temperatures high enough to thoroughly stress relieve the formed parts. This results in a hardened part free of internal stress and much more stable under load than those materials gaining their hardness from cold working.

This same ability to harden at stress relieving temperatures gives us a new manufacturing process, heat treat forming, wherein the strip or wire is held in a fixture during heat treatment. The stress relief gained is ample to give very close conformity to the shape of the fixture, making possible the production of stampings and coiled parts to closer dimensional tolerances than attainable from mechanical forming alone and without the latter's attendant problem of spring back variation.

It is interesting to note that this development came out of one of the supposed disadvantages of beryllium copper, its tendency to warp during heat treating. This so-called disadvantage first led to the use of retaining fixtures to prevent warping, and then finally to the deliberate use of fixtures to gain greater accuracy of form than previously believed possible in punch press or coil spring, parts. Warping is really

Fig. 8-Excessive grain size caused by batch annealing of beryllium copper sheet resulting in low strength and excessive warping during heat treatment

Fig. 7-Fibrous structure in beryllium copper wire due to inadequate solution anneal in strand furnace. This results in incomplete solution and lowers beryllium available for hardening

Fig. 8-Structure of properly strand annealed beryllium copper wire, with full available beryllium content, and complete control over grain size. Peak spring performance requires raw material meeting these specifications



Fig. 5-Boundary precipitate in beryllium copper sheet which lowers hardenability. This material shows lowered elastic limit, high drift and warps excessively when heat treated



not the correct term to use in considering the change in shape of beryllium copper parts during heat treatment, as warping is usually thought of as an irregular, unpredictable distortion. The change in shape of beryllium copper during heat-treatment is of a regular nature, and its direction and degree can be predicted. It is a function of the phase change which takes place when beryllium copper is hardened and bears a direct relation to the amount of hardening the piece receives.

When conventional materials are wound about a mandrel or bent at an angle, subsequent heating causes a relaxation with the formed part unwinding or moving back toward its position before forming. Beryllium copper formed parts when heat treated wind up, moving in the direction of the forming. Some processors attempt to control this wind-up or movement by reducing the time or temperature of heat treating. Since the wind-up is proportional to the amount of hardening the piece undergoes, this is only successful to the extent that the user is willing to sacrifice full hardening of the beryllium copper. Carried to its logical extreme this could only result in giving no heat treatment at all thereby preventing all wind-up but resulting in properties not worth the added cost of using beryllium copper. Instead the parts should be properly hardened for the physical characteristics desired, and the wind-up controlled through fixtures or other suitable means.

To take full advantage of what beryllium copper has to offer the potential user, requires metallurgical knowledge of the alloy. The compositions most widely used come within the ASTM B-120 specification which calls for 1.90 to 2.20 per cent beryllium, 0.5 per cent (maximum) nickel or cobalt added as a grain refining element, 0.5 per cent (maximum) total impurities, and the balance copper.

Copper will dissolve about 2 per cent beryllium at  $1475^{\circ}$  F and when rapidly quenched from that temperature retains the 2 per cent beryllium in a supersaturated solid solution designated the alpha phase. Any beryllium which does not dissolve in the copper either due to an excess being present or due to faulty mill practice forms a beryllium copper compound containing approximately 6 per cent beryllium, which is dispersed throughout the cross section as beta phase. Beryllium copper is annealed by giving it the solution heat-treatment of  $1475^{\circ}$  F followed by a rapid quench. It cannot simply be heated to anneal it, since that would precipitate the beryllium out of solution, and the material could not be subsequently hardened.

After the solution anneal, it is soft and ductile and

Fig. 9—High abrasion resistance, accuracy of form and non-magnetic properties make beryllium copper an excellent material for solenoid guides

Fig. 10—Precision coil springs of this alloy are produced to close load test to offer great stability

Fig. 11—Typical diaphragms, in addition to high strength and low hysteresis, have advantage of being produceable while dead soft and gaining hardness from heat treatment

Fig. 12—Radar parts of beryllium copper shaped by heat treat forming gives high accuracy at low costs
may be further drawn, rolled, or fabricated into parts. It is hardened by heating it in the temperature ranges of 550 to 700° F. At this temperature only about 0.25 per cent beryllium is soluble in the copper, and the balance precipitating out of solution forming a gamma phase which gives the beryllium copper its desirable properties. Recent work with the electron microscope indicates that the hardness does not arise out of an actual precipitation, but only of an atomic rearrangement preparatory to precipitation. The degree of hardening attained during this precipitation heat treatment depends upon the time and temperature of the heat treatment and upon the amount of beryllium available for hardening.

A good deal of the early variation in hardness response was due to the lack of understanding of the importance of considering the "available" beryllium, rather than the beryllium content shown by chemical analysis.

Only the beryllium which is in solution in the alpha phase enters into the hardening reaction, and the amount of hardening obtained depends upon this percentage of available beryllium. The rate at which the beryllium copper hardens when heat treated also is affected by the amount of available beryllium, which explains why two lots of metal chemically of the same composition can require different heat treatments. One lot may have all of the beryllium in solution and available while the other may have only 1.5 per cent beryllium available. Any portion present in the form of beta phase does not enter into the hardening reaction and the lot will, therefore, respond much slower to the hardening heat treatment.

The best measure of the amount of available beryllium is the hardenability of the alloy as measured by a heat treat response curve. Such a curve will show directly how much beryllium is available, and will also point out the necessary time at a given temperature to attain the full hardening response.

The cause of low amount of beryllium entering the hardening reaction can be best understood by referring to the process of manufacture with the help of some micrographs of the structure. The first source of possible loss of this beryllium is segregation in casting due to slow solidification of the melt in the mold as illustrated in Fig. 1. The heavy beta formed is not readily broken up and returned to solution during the subsequent hot working of the alloy, and Fig. 2 shows a typical resulting structure.

The beta stringer present in this structure ties up approximately 6 per cent beryllium thus preventing it from entering into the hardening reaction. The fact that it is a hard and brittle phase also contributes to difficulty in forming, and in springs subjected to endurance stresses acts as an internal stress raiser contributing to poor endurance life. Beryllium copper with excess of beta phase has a hardening response which is characteristic of a low beryllium content. With the casting temperature and rate of pouring properly controlled, a suitable cast structure such as shown in Fig. 3 can be obtained which will work down to give a final structure as shown in Fig. 4 which possesses good response to heat treatment.

It is not advisable to attempt to predict the proper performance of the material by micro-structure alone but only in conjunction with hardness response curves. For example, it is possible to obtain a structure such as shown in Fig. 2 and still have a good hardening response



Fig. 13—Effect of heat treatment on properties of halfhard beryllium copper

if excess beryllium is used. Then the alpha phase will have its full 2 per cent available beryllium, and the excess above that will be present as beta phase. A structure entirely free of beta phase is not necessarily desirable, since this can result from insufficient beryllium content.

Another source of low available beryllium is shown in Fig. 5, which illustrates a boundary precipitation variously designated as grain boundary gamma or decomposed beta. Its exact composition is unknown. It is due to faulty mill practice in the casting or hot working stages, and always shows poor hardening response. Tests made with a micro hardness tester show it to be softer than the face of the grain, and springs made with metal having this structure show evidence of low elastic limit and high rate of drift.

After the alloy has been cast and hot worked, the final processing is carried out by cold working, using the solution heat treatment at 1400 to 1475° F followed by rapid quench as a process anneal. Failure to properly control the process anneal is a frequent source of low available beryllium and variation in the rate of hardness response.

Batch annealing often gives variable results due to uneven temperature and uneven quench throughout the batch. Excessive grain growth as shown in Fig. 6 is typical of this method of processing. Such material has poor forming and drawing properties and often shows dis-

(Please turn to Page 142)



TYTY

St. Louis company makes effective use of heavy duty metal spraying gun on pump plungers and tank interiors. Performance in continuous operations distinguished by greater volume of metal deposited and reduced consumption of gases

> By L. E. BROWNE Associate Editor, STEEL

# METALLIZING

METALLIZING on a production basis has been a steady development, much stimulated by war demands, and need for a high-speed heavy duty tool for continuous spraying with a minimum of manual attention has been increasingly apparent.

The spraying of heavier weights of metal, with reduced fuel gas costs per hour, was the general acknowledged aim of many users of the process when Metallizing Engineering Co. Inc., Long Island City, N. Y., developed its type Y gun to make possible use of 3/16-in. diameter wire. Heretofore, with manually operated guns, 1/8-in. wire had been the heaviest size practicable.

One of the first of the Metco guns to embody the new engineering changes and design was delivered to the John Nooter Boiler Works Co. of St. Louis, for testing on practical assignments. This took place a few months before the tool was available for general distribution. Since that time the gun has been almost constantly in operation for several months at the Nooter plant where metallizing is employed for lining various types of vessels and rebuilding worn machine parts.

When balanced against performance of former installations, designed both for hand operation and at times rigged in pairs or groups for production, the gun under test at Nooters cut gas and wire consumption materially.

One outstanding job was the metallizing of 62 cast iron pump plungers, 5%-in. diameter by 40 in. long, used on an oil pump line. These plungers, shown in Fig. 1. are built up approximately 0.080-in. on the radius, with a high-chromium high-carbon steel. After undercutting

Fig. 1-High-speed metallizing at John Nooter Boiler Works as shown involves deposition of 35 lb of high-chromium high-carbon steel on this cast iron pump plunger in less than 2 hours, using 1/8-in. wire and a Metco type Y gun

Fig. 2-Full length cutaway section of the Metco production metallizing gun for which automatic setups and use of fs-in. wire make possible increased deposits of metal with minimum manual operation

Fig. 3-Closeup of gun at work

### PRODUCTION DATA

15# Acetylene Pounds Sprayed	" Dia. Wire Press per Hour	Average Equip. 3% Dia. Wire 15# Acetylene Press. Pounds Sprayed per Hour	% Increas Spraying S
ABRONZE ROOLOY 1	20#/hr 29#/hr. 36#/hr. 21#/hr. 55#/hr.	9#/hr. 14#/hr. 16#/hr. 9#/hr. 27#/hr.	122% 107% 125% 183% 104%
and the second second	,, Д.	······································	128%

/TEEL

May 13, 1946



ment.

and preparation, mean diameter of the plungers was 5% in. Diameters were built up to more than 5%-in. with a total of 35 lb of metal per plunger. Average time for depositing the 35 lb of metal on the 62 plungers was 1.82 hours each. Average volume of oxygen and acetylene consumed per pound of metal sprayed was found to be substantially less than with former equip-

This volume of sprayed metal was attained with <sup>1</sup>/<sub>8</sub>-in. wire, although the gun is designed to take up to 3/16-in. because of a large inventory of this size. Smaller wire naturally reduced somewhat the hourly spraying capacity. but a scarcity of 3/16-in. wire at the time also acted as a deterrent to its use, a difficulty since overcome by larger production of this size and resultant large stocks. Metallizing the interior of a tank car with zinc, likewise (Please turn to Page 148)



Average Orygen Consumption per Pound Sprayed

4.7 cu. ft. 3.0 2.4 4.0 1.4 4.7

Average Acetylene per Pound Sprayed 1.4 cu. ft. 1.2 1.0 1.4 .62 1.9

WHEN impact resistance - not corrosion resistance-is a major consideration, an unstabilized, very lowcarbon, stainless steel will, in most cases, serve adequately. The excellent impact resistance at low temperatures of austenitic steels of the 18-8 type, ideally conditioned, is well established. Since corrosion resistance, high-tensile strengths, relatively good ductility, and impact resistance, all are attributes of an ideally conditioned austenitic structure, any further treatment which would tend to alter that structure must be done at some sacrifice of these desirable properties.

Before the chemistry and mechanism of carbide precipitation were sufficiently understood, and countermeasures such as reduction of carbon content, stabilization, or heat treatment were effected, this determent proved a major obstacle to the advancement of these now extremely important commercial alloys. Use of 18-8 chromium nickel austenitic steel as a structural material for certain service conditions, including process operating temperatures to minus 150° C, is indicated and accepted. The welding of this material, with its attendant heat effects, gives rise to special considerations regarding the exact grade, the welding procedure and the treatment required to give optimum results.

### **Carbide Precipitation Not Serious**

If unstabilized, and of carbon content in excess of 0.08 per cent (Type 302), normal welding operations (without subsequent heat treatment) on sections having thicknesses up to about 0.75-in. will not induce serious carbide precipitation. It is conceivable that if the extreme upper limit of carbon content (0.20), low chromium (17.00), low nickel (8.00), the upper limit of heat x time incidental to "normal" welding operations, and heavy sections where mass would considerably slow the cooling rate, all were in combination, some serious carbide precipitation probably would be in evidence.

If a negligible amount of carbide precipitation is induced under conditions as stated above and if the

Impact resistance of welded stainless

Considerations are discussed regarding e x a c t grade, welding procedure and the heat treatment required to give optimum results at low temperatures with austenitic 18-8

### By J. G. HENDERSON Consulting Engineer Charleston, W. Va.

weldment is subjected to no especially active corrosive media s u c h as would cause intergranular corrosion, the impact resistance at low service temperatures need not be seriously reduced.

Here again, however, some qualification is in order, especially with respect to (a) any carbide precipitation in austenitic stainless steels increases its tensile strength while reducing its plasticity and impact strength and (b) even mildly corrosive media, under ideal conditions, can attack selectively at the grain boundaries and cause intergranularcorrosion notches so as to further reduce the impact strength.

While the mere existence of chromium carbide at the grain boundaries does embrittle the metal, the degree of such embrittlement alone appears to be insufficient to seriously reduce the impact strength, even at extremely low temperatures. The susceptibility of the metal to further reduction of impact strength as a result of any intergranular corrosion which may occur is, however, a matter of concern.

However, should the impact resistance be seriously reduced under the conditions stated, and if a stabilizing heat treatment is not practicable an alloy grade having an upper limit of 0.08 per cent of carbon (Type 304) would maintain a safe impactresistance level. The welding of an extremely low-carbon grade of austenitic stainless steel (Type 304) does not seriously impair its impact resistance, even at service temperatures as low as minus 150° F. The carbon content of 0.08 per cent maximum is below the solubility limit in the precipitation range (800-1500° F). Slightly higher cost of this special alloy may be justified in cases where it is not always possible to completely and positively evaluate the conditions involved.

### Stabilized Grade Indicated

If all conditions were combined to create the greatest amount of carbide precipitation, in the low-carbon alloy—heavy sections (mass) with high total heat input, slow cooling, lower limit of nickel, etc.—a stabilized grade (Type 347) is indicated, and this whether or not corrosion is anticipated.

Metallic arc welding recommends itself on the basis of: (a) Lower total heat input; (b) considerably shorter time in the precipitation range; (c) lack of carbon pick-up.

Type 304 (0.08 C maximum) stainless steel will fulfill the requirements because: (a) Low carbon content with other stated conditions, will permit welding without undue carbide precipitation; and because (b) cost comparison is favorable—roughly, 40c/ lb for 302; 42c/lb for 304; 52c/lb for 347.

It is strongly recommended that reliable and comprehensive test data should be obtained. It should include tensile and impact tests at various temperatures from atmos-

(Please turn to Page 112)

AIR-OPERATED FIXTURES

Safer, faster production and labor economy are among advantages of automatic and semiautomatic fixtures and controls

> By S. JOHNSON, JR. Bendix-Westinghouse Automotive Air Brake Co. Elyria, O.

AIR operated fixtures offer several advantages, but the chief advantage is labor economy as compared to manual or mechanical operation. Air controls are positive and have proven their worth from a standpoint of increasing production per manhour and have indirectly contributed a great deal to safety in the shop.

In four years of using air operated fixtures developed for our own use we have never had an accident that can be laid to air failure. Chances are no greater with an air clamp than they are with a hand operated mechanical clamp. An operator can become fatigued and may fail to tighten the work holding clamp tight enough to hold the part, which is hazardous, and the same thing may be true if he tightens it excessively and breaks the part or distorts the part so that it may break when the cutting tool strikes it.

Air controls shown in accompanying illustrations are standard parts which we manufacture for the air brake system of automotive transport vehicles, and are high production items which are relatively inexpensive.

The first question that may come to mind is the amount of compressed air required for their use. The entire air supply for our plant is from a two stage steam driven air compressor having a displacement of 992 cfm and a volumetric efficiency of about 85 per cent at 125 psi. Our air supply originally was intended for testing facilities only. Most of our products require testing by air. In setting up our plant some air operated fixtures were

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originally contemplated, but not the quantity we are now using, which is about 375. We have not increased the air supply capacity originally set up for the plant and the 375 air fixtures do not place an excessive load on our total air supply. As closely as we can estimate or check, we believe the 375 air operated fixtures take up about 15 per cent of the total amount of compressed air used in the plant.

Main item used for clamping in the fixtures is what is known as a brake chamber. These are preferable to cylinders for three reasons: As a diaphragm is employed instead of a packing cup, no leakage problem is involved; As a diaphragm is employed there is no friction problem involved; because of these two reasons there is no maintenance problem as these diaphragms have an average life of about 1,000,000 cycles.

A control valve is used to operate the brake chamber. This can be one of many types but in a majority of cases a simple rotary disc type valve is used. A regular key type cock is not desirable because the frequency of operation causes too much wear and excessive leakage develops. Fig. 1 shows a cross-section of the brake chamber which you will note consists of two metal plates, a molded composition rubber and fabric diaphragm and a push plate with a push rod attached. Fig. 2 shows the various sizes of brake chambers manufactured by Bendix-Westinghouse, respective effective areas and overall sizes. Fig. 3 shows a simple rotary disk type control valve used for the most part in admitting or releasing air to and from the brake chambers used to clamp work in the fixtures.

Crankcase Milling Fixture: Fig. 6 shows a milling fixture used for straddle milling of small compressor crankcases in loaded position. This fixture, used on a Cincinnati Duplex Hydro-matic milling machine, replaces an old style bar type fixture that required two nuts and a large end wrench to operate. Present fixture involves only a quarter turn of the handle on a Bendix-Westinghouse two-way valve to operate the brake chamber fixture. Another advantage of this type fixture is that parts to be milled are secured with enough pressure (Please turn to Page 154)

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### **Use of Future Steels To Depend on Costs**

Induction Hardening Causing Major Shift to Carbon Steels

By MAURICE N. LANDIS Manager, Metallurgical & Research Divisions La Salle Steel Co. Chicago

ALL appearances indicate that AISI system of naming steels will be followed in the future. The SAE has now adopted the AISI system except for the prefix letter. We believe this prefix letter fulfills a need in that it symbolizes the method of steel manufacture or general class of the steel such as "B" for bessemer manufacture and "A" for alloy, "C" means carbon steels and "E" electric furnace.

Of what is undoubtedly major interest to you is our opinion as to the most popular and most available of the generally used steels.

In the carbon steels, we anticipate that the various grades will pretty well go along as they are now, except that C-1042 is fast replacing C-1040 and C-1045 as the medium carbon shafting steel. C-1042 is identical to C-1040 and C-1045 except for carbon which is 0.40 per cent to 0.47 per cent. 1020-90 (C-1019), I think, will continue to be the generally used lower carbon shafting and carburizing steel. Also, C-1050 is being employed where good hardenability is a must more and more.

In screw steels, we look for B-1112 to continue to be the basic free machining steel with B-1113 being used more and more, when screw machines are able to take advantage of its superior machinability.

We look for little change in the open hearth free-machining steels. C-1117, the former X-1314, should continue to lead for those applications where ready machining and open hearth quality are required. C-1137, formerly X-1335, is still a popular quenching, free machining steel, although our tritex No. 2,

### Diamond Wheels Offered For Sharpening Carbide

A line of resinoid-bonded diamond abrasive wheels now offered by Wickman Corp., 15533 Woodrow Wilson avenue, Detroit, is stated to be of same design as diamond wheels originated and made in England and Canada.

Designed particularly for sharpening carbide tools, the wheels are said to provide a faster cutting action without Opinions below are those of the author expressed to a customer recently, in reply to a letter asking for advice on steel specifications of the future. Mr. Landis frankly states the situation is difficult to predict, and his opinions were gained from talking to both steel producers and users. These opinions, he said, are only those of today one thing being certain new steels will be developed while old favorites will disappear

modified C-1144, is rapidly becoming more popular where excellent machinability, superior to that of C-1137, and hardenability are requirements.

In regard to the alloy steels, the picture is not so clear. The 8600 series seems definitely to be in, especially A-8640 and A-8617, for quenching and carburizing respectively. Also, some A-4140 is being specified and produced as well as a little A-3140. There is not much 3115, 3120 or 4120 being used now for carburizing, though the grades are sometimes available.

Actually, the 8600 series worked very well during the war, performing fully as well as the older alloys. Further, the scrap situation is certain to make these ternary alloys attractive to the producers.

Other higher alloyed steels are certain to be used for those applications which actually require them. Thus A-4615, A-4640 and either A-4340 or E-4340 are almost indispensable at times. In

usual tendency to become hot. Diamond hand hones also available, for touching up tool set-ups.

### Purdue Offers Hardness Value Chart for Alloys

To aid manufacturers in choosing the most suitable alloy for the service required, a two-table chart is offered by Engineering Experiment Station of Purdue University, Lafayette, Ind. First this connection the 4300 series has met a lot of critical situations in the aircraft industry with success. We do not believe, however, that these high alloys will be indiscriminately specified as they sometimes were in the past. Many designers have learned that the less expensive leaner alloys are fully adequate for most jobs.

Another factor which is going to influence the future steels is the constant pressure to reduce costs. Thus if a refinement of heat treating techniques makes it possible for a shop to use carbon steel instead of alloy, a change is made to carbon. But the same refinements might make it possible to mass quench alloy steels where individual quenching of carbon is required, with the change then to alloy. Along this line the widespread adoption of induction hardening is causing a major shift from the carburizing steels, both carbon and alloy, to steels of approximately 0.50 per cent carbon.

The use of sulphur to enhance machinability of alloy is rapidly gaining ground and we are sure it will continue. Previously when raw sulphur was added, there was serious doubt among many metallurgists as to the quality of the steel produced. With introduction of the sodium bi-sulphite process, our La-Sulphite, the doubts largely have been eliminated, so that we now can say the La-Sulphite alloys are quality steels with markedly enhanced machinability. This is especially pertinent in the heat treated bar steels where considerable machinability has heretofore necessarily been sacrificed to produce a strong tough steel.

table lists all the usual hardness scales of some 300 different alloys and materials. One hundred of the more common alloys and materials are listed in the second abbreviated table.

Table I lists materials under five rockwell scales, according to type of penetrator and major load, one Vickers, and two brinell scales. Table II gives hardness ratings in two rockwell scales, using brale penetrators, two brinell scales, using 500, 3000 kg loads, one Vickers scale.

# IRON AND STEEL ENGINEERS HOLD Symposium on Rolling Practice

WELL-ROUNDED program of papers on rolling mill practice and equipment featured the annual spring conference of the Association of Iron and Steel Engineers, Congress hotel, Chicago, May 6-7. Over 500 were in attendance. Tuesday morning a large party was conducted on a tour through the South Chicago plant of Republic Steel Corp.

C. P. Hammond, superintendent rolling mills, Atlas Steels Ltd., Welland, Ont., in speaking on "The Art of Rolling Rounds," pointed out that the desire on the part of barmakers to obtain uniformity from bar to bar has been accomplished through improvements in design and equipment such as extreme care in design of grooves to give equal distribution of stock, installation of mills sufficiently rigid to eliminate spring, incorporation of bearings to give a minimum of journal and thrust wear and improved rolls and guide equipment.

To make a clean well-filled round, he explained, it is necessary to fill the groove ahead of the final finishing pass. In making a 2-in. round enough stock must be started with to fill the 2<sup>1</sup>/<sub>9</sub>-in. groove.

A good round can be made in four



passes providing the man guiding itthrough is expert in entering each pass with the bar turned up to exactly 90 degrees and keeping it there. If any one of the four passes has not been kept in the 90-degree position, a fifth pass is necessary.

Opening of a hand round groove is most important, Mr. Hammond stated. Too little will cause the bar to have flat spots or be an octagon shape while too much opening will produce an oval shape and more difficulty will be encountered when guiding the bar through the pass. The amount of opening depends mainly on the amount of draft from one pass to the next.

The final pass can be controlled by the lead pass in the first set by moving the top roll slightly in the direction the section is laying or pulling. This eliminates several passes and requires less expert tongsmen to produce a good round. It also increases production and gives a cleaner bar due particularly to the flat and edging passes.

A typical design for a regular single arc oval is one in which width is 1.33 times the diameter of the finished round, and the thickness 0.90 increasing the width on small rod sizes and decreasing on sizes above 1-in. diameter. Double arc oval leader passes are widely used and have proved satisfactory for rounds 1-in, diameter. This design rides well going through the finishing groove and allows greater reduction in area with less overall draft on the height of the oval.

Mills are now using a double radius former edging with a reasonable amount of opening of around 15 degrees, the larger radius being equal to about 14 times the diameter of the finished round. This design provides clearances for scale to peel off and still leaves the corners covered, which gives the roller control of the section. He knows when he has a rectangle with equal diagonals entering the former, and this section leaning on the oval. He can correct it by moving the top roll of the former edg-



FOR LOWER COSTS ALL ALONG THE LINE ...

## Specify an Alloy Steel That Is "Tailor Made" To Meet Your Needs



**T**HESE alloy steels aren't like others. True, they are often made to SAE analyses, but there the similarity stops.

You can expect new things from Carpenter Special Purpose Alloy Steels. They will do things that other alloy steels won't do. These steels are "tailor made" to fit your job requirements. Because they arrive at your plant in a condition that is close to your finished product requirements, they often save you time and money in fabrication. And because they are consistently uniform lot after lot, these steels help you reduce rejects, improve product performance and eliminate many servicing calls.

For a moment consider not the price of the material coming into your plant, but the cost of the product that leaves it. Actually, Carpenter Special Purpose Alloy Steels are "operation reducers"... furnished with a heat treatment, finish or close tolerance that cuts your fabricating costs and reduces rejects.

If you are interested in finding ways to cut costs with Carpenter Special Purpose Alloy Steels, ask for a copy of "Fitting the Steel to the Job". It is a new booklet that points the way to lower costs on jobs where you use alloy steels.





Carpenter

**ALLOY STEELS** 

... made in a tool steel mill ... inspected by tool steel standards ing in the same direction as the section is laying. If the section is being repeated, the top former roll would be thrown in the opposite direction. This is an important point on the mill as the right amount of stock to make the round is obtained at this point.

T. N. Sloan, roll engineer, Republic Steel Corp., Buffalo, in discussing "Roll Design for Die Rolling," explained that die rolling differs from ordinary rolling mainly in the finishing or die rolling stand. This stand must be rigidly constructed with extra long windows to permit the use of rolls of varying diameters; it must have special fixtures such bly, co-ordination with other units, and so far as possible, standardization of parts with other tables so that the number and variety of spares may be held to a minimum.

Because of the severity of service of front and back tables, solid forged steel rollers are generally used.

The line shaft is made of hot rolled, turned or forged steel and the composition may vary from mild carbon through the higher carbons to chrome, nickel, molybdenum alloys, depending on the loads.

A low chromium, nickel, molybdenum forging (SAE 4340) quenched and heat



MODERN BUILDING: One story construction eliminating elevators and increasing ease of layout because of few floor obstructions features new building designed and erected by Walter Kidde Constructors Inc., New York, for the new plant of Reynolds Spring Co., in Trenton, N. J. It has a large expanse of windows and has no parapet above window sash except in the office section. Construction is steel frame, insulated steel roof deck, steel sash, brick walls and concrete floor

as chucks, liners and mandrels to accommodate various sized rolls. The process also requires a separate motor of variable speed; a gear reducer, pinions and universal couplings, connecting pinions and rolls, and a timing device on the mill end of the top pinion to permit the setting of the top roll in the proper registration with the bottom roll.

In laying out a rear axle, the rolls are designed so that the largest end of the long taper enters the pass first and rolls down the long taper. The thinner the flash the more the extrusion. The thicker the flash the less friction and therefore the less forward slippage.

In flash rolling it is common practice to roll as high as a 78 per cent reduction from the leader bar, but in flashless rolling 48 per cent is the largest attained and then only under ideal conditions.

In describing the design of blooming and slabbing mill tables, J. G. Meenan, design engineer, United Engineering & Foundry Co., Pittsburgh, emphasized that the designer must consider the initial and operating costs, ease of assemtreated before machining to about 240 to 300 brinell, will give to shock-resistant gear with a uniform core strength and a high percentage of contact area. A low-carbon alloy which can be carburized to 450 brinell or over has excellent wearing qualities but being rather brittle through the area of case hardening, is more susceptible to tooth breakage.

Safe working capacity of a bearing as applied to roll necks in general is dependent upon a number of factors. This was brought out by Paul Haager, assistant chief engineer, industrial division, Timken Roller Bearing Co., Canton, O., in his paper on "Roller Bearings." Sudden overloads within the static capacity of the bearing do not usually injure any of the rolls or working surface. Sudden overloads up to five or six times the normal working capacity of a bearing will not injure any of the roller or race surfaces, he stated. In cases where sudden shock loading can be anticipated with reasonable accuracy, an actual figure of 8 to 10 times the normal imposed load has been known to exist without the actual failure of the bearing.

The speaker described the balancedproportion bearings which establish the ideal, bore-outside-diameter, that is, width proportions for a mill main roll bearing by determining the average mill separating force that would be imposed on a mill roll having a certain diameter and having a roll bearing length in line with present design trends. These particular bearings show ratings up to 40 per cent higher than bearings previously supplied and will show from 50 to 60 per cent increasee in neck strength. This insures greater mill and neck rigidity which results in greater precision in rolling.

H. L. Smith, Federal Metals Division, American Smelting & Refining Co., Pittsburgh, in speaking on "Metallic Bearings," stated that in a majority of older type or nonprecision bearings, a good bearing operation is obtained by reducing the length of the bearing to 1 or  $1\frac{1}{2}$ times the diameter. In modern equipment where precision bearings are used, the ratio of length is still further reduced to about  $\frac{3}{4}$  or less of the diameter.

### Older Bearings Give Longer Service

Older bearings can be made to give longer trouble-free service, by using a bearing alloy which possesses the desired characteristics for the service intended, and then making the bearing properly by applying certain fundamental principles of good foundry practice and lubrication.

In discussing running clearance the speaker stated experience indicates that 0.001-in. per inch of shaft up to 6 in. is usually sufficient, and for bearings over 6-in., 0.0005-in. is added for every additional inch of shaft though the expansion of babbitt and the shaft must be considered.

New developments in synthetic rubber have made possible the straight use of this material as a sealing element. This fact was brought out by L. C. Krug. Chicago Rawhide Mfg. Co., Chicago, in his paper on "Bearing Seals." The material is not attacked by grease, oil and water and when in operation the presence of lubrication causes little friction or wear.

With properly designed seals, he said, there is no problem to achieve sealing providing the shaft runs true. Another problem is shaft deflection. Various factors stressed by the speaker follow:

1. Have the shaft on which the seal operates polished as smooth as possible. Shaft finish has everything to do with effective life of a seal.

2. Lubricate the tip of the seal with grease just before assembling. This is (Please turn to Page 152) NOW THAT GAGES MADE OF TIMKEN GRAPHITIC STEEL ARE AVAILABLE ....

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### mass production has a new ally!

YEARS AHEAD - THROUGH

Holding specified tolerances in mechanical parts now has been made more practical. The way is open to greater precision in mass production and a host of new product improvements.

Because Timken Graph-Mo Steel has a highly stable structure, gages made of it remain more accurate. They last considerably longer. They can be machined 25% to 30% faster. And they have excellent heat treating qualities.

Equally important is the evolution other Timken Graphitic Steels are bringing about in tools and dies — and in moving parts of precision machines subject to constant friction.

Already customers' savings are endless—incalculable. They are typical of what happens when specific problems of alloy steel users receive the direct attention of metallurgists skilled in producing hundreds of analyses.

It could pay you well to find out what improved properties our flexible specialty mill might process into the alloy steel you use. Write Steel and Tube Division, The Timken Roller Bearing Company, Canton 6, Ohio. Timken Bearings, Timken Alloy Steels and Seamless Tubes, Timken Removable Rock Bits. TIMKEN Fine Alloy, STEEL AND SEAMLESS TUBES

ENIGMA IN STABILITY! Since the beginning of steel making, production of a tool steel which could be machined freely and afterward heat-treated to extreme hardness and stability had baffled the industry.

To metallurgists of The Timken Roller Bearing Company it seemed that the answer might lie in a method of precipitating *free graphite* from the excess carbides in a special alloy steel which had been saturated with carbon. Five analyses with wondrous properties were produced and patented; christened Graphitic Steels.

On more than 50 test applications in our own bearing plant, the new thoroughbred Graphitics repeatedly outperformed every other tool steel. Today, for many of our tool steel customers, they are delivering performances, once thought "impossible."

AND

EXPERIENCE

\*

RESEARCH

# ENGINEERING NEWS at a glance

EXPERIMENTAL work is being actively conducted on stainless W, the steel developed by U. S. Steel Corp., and until recently on the secret list of developments, according to John S. Ewing of the Stainless Steel Division, Carnegie-Illinois Steel Corp. Stainless W, unlike 18-8, is magnetic. Its composition range is approximately 0.07 per cent carbon, 17.0 chromium, 7.0 nickel, 0.07 titanium and 0.02 aluminum. Other elements present are in amounts normally found in other steels, Mr. Ewing declared.

IN THE East, it was learned, Torrington Co., Bantam Bearings Division, has added self-aligning spherical roller bearings to its line. The Torrington, Conn. manufacturer reports results of recent tests of the bearing have been so gratifying that an extensive program was set in motion for their production. The bearing operates under conditions of reasonable misalignment of housings or shafts, but is self-aligning because the bore of the outer race is a section of a true sphere.

ECONOMIES running as high as 60 per cent may be realized by manufacturers, it is said, by taking advantage of new service offered by Air Products Inc., Chattaaooga, Tenn. The concern is providing oxygen generators on a lease basis, installing them in the lessee's plant, where all oxygen produced and consumed is metered, and paid for on a volume basis.

Each of the generators is equipped with an exclusive oxygen compressing system. Extensive use is made of Mechanite castings to meet special lowtemperature operating requirements of the equipment.

Among the first to install one of these



generator units was the Ross-Meehan Foundries of Chattanooga.

INDUSTRIAL truck operators can recharge the batteries of their respective trucks as easily as turning on an electric light when using the automatic battery charger being produced by Electric Products Co., Cleveland. All the operator has to do, the company states, is connect up the charging plug with lead batteries. No further manual attention is required. The charger shuts down completely when the last cell has been charged.

ABRASIVE Engineering Corp., Spring Lake, Mich., enlarges all types and sizes of reamers from ½ to 3 in. by forging, the company revealed recently. According to the company, success of its process depends solely on the thickness of the tool's teeth. Resizing is done by forging the teeth to displace sufficient metal from the back to the top of each tooth increasing the total diameter to the required dimension. Work is said to extend life of each tool 3 to 6 years.

MANUFACTURERS of electronic equipment are provided with a reliable means of delaying the control of heavy current circuits for a predetermined time interval, and of eliminating chatter on delicate instrument contacts by using a new thermal delay developed by the Instrument Division, Thomas A. Edison Inc., West Orange, N. J. The unit is designed for continuous operation with its heater energized. It combines both time delay and control functions in one unit, providing preset delay periods of 2 sec to 8 min, it is said.

DEVELOPMENT of a compass that points only east and west is reported by General Electric Co., Schenectady, N. Y. A new alloy called silmanal which is magnetized across its width rather than along its length is responsible for the development. A compass needle of this alloy, to align its magnetic field with that of the earth, must point east and west, GE said.

A QUARTER'S worth of glue is the principal raw material required to make more than a cubic foot of a new insulating material called Foamboard, developed by Foster D. Snell Inc., Brocklyn, N. Y. The product, suggested for use for insulating vehicles—railroad cars, trucks or planes—against heat, cold or noise, weighs I to 3 lb per cubic foot. In thin layers it somewhat resemblas flannel but, as usually made, it is more

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CMP has consistently supplied the needs of more and more fabricators who profit from the precision qualities inherent in all CMP Spring Steel. Because precision strip rolling techniques were pioneered by CMP, we know that you can benefit by drawing on the experience pool in our

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STRIP STEEL

like dried natural sponge which has been cut into slabs 1 in. thick. Use of different fillers enables characteristics of the product to be varied, and a curing process renders the glue resistant to water, fungi and other destructive agents, it is said. Furthermore, the development may have synthetic rubber, asphalt, glass or wood fibers compounded with it to obtain special properties desired.

IN THE central Ohio town of Mt. Vernon, Cooper-Bessemer Corp. revealed development of a diesel engine of 40 per cent thermal efficiency that operates on manufactured and coke-oven gas. Gas is admitted to cylinders along with the intake air. Ignition is provided and controlled with the injection of a small quantity of pilot oil, it is said.

ENTIRELY new rules governing airflow behavior at trans-sonic speeds must be found, articulated and incorporated into new aerodynamic shapes which will either resist destructive effects of this region or enable the aircraft to penetrate it at such velocity that the effects have no time to build up, W. E. Beall, vice president, Boeing Aircraft Co., Seattle, said recently in an article on "Super-Sonic Explorers." The Boeing executive stated many aircraft designers are often asked "How will the ultra-highspeed airplane look?" According to the aerodynamicist, who insists it is too soon to say, the shape of the plane of tomorrow which looks best to him, so far, is not a far cry from the paper airplane one used to make and toss across the school room.

ACCORDING to a report received from the Department of Commerce, a German chemist developed a silicon detector cell that seems to require no adjustment, is not sensitive to shock and detects 3 and 9 centimeter waves. Cell consists of a series of cylindrical rods of carbon standing on end in a quartz

BELOW is the new 2A Duomatic lathe built by Lodge & Shipley Machine Tool Co., Cincinnati, and now being exhibited at the Paris fair by R. S. Stokvis et Fils, French machine tool importers. Emile Dubut, Stovkis demonstrator shown at the machine, studied features of the small size lathe in the American plant before it was boxed for shipment. According to the maker's president and general manager, William L. Dolle, the Renault Works is supplying work pieces during the demonstration of the automatic lathe. The fair, which ends June 10, is the first exhibition to include machine tools since the war. Both Mr. Dolle and J. Herbert Myers, secretary and sales manager of Lodge & Shipley, plan to visit the fair late in May



tube. Powdered aluminum is introduced into the end of the tube which is then placed in a tubular electric furnace. Air is evacuated from tube, and silicon tetrachloride is introduced under pressure. Temperature of furnace is raised to  $800^{\circ}$  C, and silicon crystals are de posited on the surface of the carbon. Carbon cylinder is then mounted on a ceramic base, and a metal electrode is brought into contact with crystals on the end of the carbon rod.

VALUABLE aid for slow-motion study of rotating, reciprocating or vibratory mechanisms in industry is provided by the use of a stroboscope recently developed by Communications Measurements Laboratory. The New York company states the development, which also can be used to study mechanical stresses and strains under dynamic conditions, "stops" rotary or vibratory motion at speeds of 600 to 48,000 rpm in four ranges.

ACCORDING to Safety Research Institute Inc., New York, those responsible for fire protection would do well to examine old and emergency approved extinguishers for possible replacement, now that standard units again are available. Standard extinguishers bear the Factory Mutual insignia "FM" in addition to the Underwriters' Laboratories label, distinguishing them from models of substitute materials bearing the letters "EAS." Latter label indicates the extinguisher requires more careful maintenance, and may not stand up as long as standard types, the safety institute reported.

IN BROCKPORT, N. Y., it was learned, Karge & Son Machine Co. has patented a process which enables the concern to turn parts of metal or plastic in shapes, lengths, slenderness and smoothness, in either short or long runs, to very close tolerances which often makes final grinding unnecessary. One long slender length demonstrated by the company measured 72 in. with diameters of  $\frac{1}{15}$  to  $\frac{1}{16}$  in.

IN MIDLAND, Mich. recently, Dow Corning Corp. revealed that heat-stable silicone rubber, called Silastic, developed to meet war uses, now has been improved to the point where it yields products twice as strong, tough and elastic than those produced before the development was refined. The improved product can be molded or extruded into any shape, and it can be applied as a c ating for metal, wire or glass cloth. It also makes a good insulating material. Dow stated.



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- Bundyweld Tubing is made by a process entirely different from that used in making other tubing. A single strip of copper-coated S.A.E. 1010 steel is continuously rolled twice laterally . . .
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- 3 copper coating fuses and alloys with the double steel walls. After brazing and cooling, it becomes a solid double wall steel tube, copper brazed throughout 360° of wall contact . . .
- copper coated inside and 4 out, free from scale, closely held to dimensions. Hard or annealed in standard sizes up to 5/8" O.D. Special sizes cold drawn, Also in Monel, nickel and nickel alloys.

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May we work with you on your tubing problems? Prove that Bundyweld can, most likely, serve you better and cut costs? Write Bundy Tubing Co., Detroit 13, Mich.



AND REPRESENTATIVES: Rutan & Co. 112 S. 16th St. Phila. 2, Pa.

Eagle Metals Co. 3628 E. Marginal Way Seattle 4, Wash.

Alloy Metal Sales Ltd. 861 Bay St. Toronto 5, Canada

# Self-Aligning Dearing

A new spherical roller bearing of Torrington Co., South Bend, Ind., not only is self-aligning but also offers two-directional thrust, high radial capacity and unit construction for easy installation. Sizes start at 1.5748-in. bore, and bearing is said to be especially suited for heavy-duty applications



ceptacle for foreign particles

A new form tool setting gage made by F. H. Smith Mfg. Co., Chicago, is designed primarily for resetting form tools of certain automatic screw machines in precisely the same position from which they were removed to be sharpened. Because of simplified resetting, operator has more incentive to sharpen tools. Both front and back slides can be set with equal speed and accuracy regardless of spindle rotation direction. Made in three sizes, gage also can be used to advantages on lathes





Automatic

Ratchet-Action Wrench

One of two separate styles of a new automatic, adjustable, ratchet-action wrenches made by Oscar W. Hedstrom Corp., 4834 West Division, Chicago, is shown here. Jaws have a Vee groove for gripping corners and faces of nuts alternately for close-quarter work. Other style has pipe-wrench teeth for use on rounded nuts. Called the Larc-o-matic wrench, it provides instant thumb-trigger adjustment, and an automatic "eye" adjustment control that keeps jaws in constant grip on square, hexagonal and odd-size nuts. It automatically ratchets and secures a 1/4, 1/6, 1/8 and 1/12 turn grip. Three sizes available include: A 6-in. tool opening to 13/16-in., and 8-in. mode opening to 1 in., and 10-in. wrench opening to 1 3-8 in. FOR STRONG, LIGHTWEIGHT PARTS IN AUTOMOBILES AND MACHINERY USE J&L ELECTRICWELD TUBING

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By GUSTAF SODERBERG **Consulting Engineer** Graham, Crowley & Associates Inc. Jenkintown, Pa.

Process for cadmium, copper and its alloys, magnesium, and zinc can be used to enhance surface appearance, condition the surface for plating, or passivate it to prevent corrosion

PURPOSE of bright dipping (which may be defined as a corrosion process whereby the percentage of specular reflectance from a metallic surface is increased without the application of an outside electromotive force) may be to improve the surface appearance of an article, to prepare the surface for a subsequent treatment such as plating, or to passivate the surface to prevent subsequent corrosion and discoloration and improve paint adherence. Bright dipping is also used to remove a peculiar crystal growth which appears on surfaces which are cadmium plated at very low current densities. It is used primarily on solid copper and brass and on electroplated coatings of zinc, cadmium, copper and brass. No commercial bright dipping of magnesium and lead are known. In a paper presented at the Electrochemical Society symposium on "Before and After Plating," these applications were listed and the following processes were reviewed.

### Bright Dips for Copper and Its Alloys

Copper bronze and brass are frequently bright dipped in a nitric sulphuric-muriatic acid bath. Graham' recommends for bulk dipping as the final bright dip a composition of 800 g/L H2SO, (Sp. gr. 1.84); 100 g/L HNO, (Sp. gr. 1.38; 2.5 g/L HC1 (Sp. gr. 1.17); and 491 g/L HO at a maximum of 35° C (91° F). In this dip the function of the hydrochloric acid is to decrease slightly the attack on the copper and to increase sharply the attack on zinc; nitric acid functions in the opposite manner. The attack on both alloy constituents increases with increasing sulphuric acid content up to about 550 grams per liter, then decreases as the sulphuric acid content is increased further. Increasing temperature causes the attack on copper to increase sharply and that on zinc to decrease slightly up to about 50° C (122° F), above which the trends are reversed. The color and the brightness can most readily be controlled at a temperature not exceeding  $35^{\circ}$  C ( $95^{\circ}$  F) above which a smoky color develops.

Since much heat is evolved in the bright-dip reaction and since relatively minor changes in composition of the bath effect the color produced, it is common practice to do the necessary surfacing in a preliminary dip. This so called "scaling dip" contains less sulphuric acid and is therefore more active than the regular bright dip. Typical analysis is 700 g/L concentrated H\_SO, 100 g/L concentrated HNOs, 5 g/L concentrated. HCl and 544 g/L H.O. Time of immersion in this dip is long enough to produce desired smoothing of the surface at whatever temperature is reached. The optimum color is then brought out in the regular bright dip in a few seconds.

It is stated by Larsen<sup>8</sup> that brightdipped parts must be surrounded by nitrous gases on transfer to subsequent rinsing operation and that access of air, common in automatic handling, causes discoloration. To overcome this effect he proposes the use of phosphoric acid in the bath, his preferred bath composition being 50 per cent  $H_{a}SO_{4}$ , 36 per cent HNO. and 14 per cent  $H_{a}PO_{4}$ .

Adding chromic acid (Meyer and Dunleavey<sup>4</sup>) to inhibit the evolution of nitrous gases (thus decreasing health hazards) to reduce the reaction rate, makes it possible to transfer the dipped parts more slowly and with less drag-out loss, and to passivate the metal. Their preferred solution contains 80 cc H<sub>2</sub>SO<sub>4</sub>, 20 cc HNO<sub>4</sub>, 1 cc HCl, 55-60 g CrO<sub>3</sub> and 200 cc of water. This type of bath has been used widely during the war, especially in automatic operations. It is also particularly suitable for use on thin, plated coatings.

Following bright dips for zinc plate and cadmium plate are generally adjusted<sup>4</sup> for operation at room temperature to produce the desired brightness on a smooth electroplate in a few seconds, or up to less than one-half minute, without the removal of more than a very small percentage of the electroplates. Magnesium, which also belongs to the IIb group of the periodic table, may be bright dipped in some of these same solutions.

Ganser<sup>s</sup> proposed an aqueous solution of 0.5-1 per cent by volume concentrated nitric acid for cadmium. Unfortunately the discoloration of cadmium-plated parts packed closely together is accelererated when this dip has been used, probably due to the formation of ammonium salts<sup>6</sup>. A weaker dip containing 0.25-5 per cent by volume concentrated nitric acid has been used very successfully on zine plate<sup>1</sup>, being less sensitive than several other dips to the presence of such impurities as copper in the plate.

### Chromic Acid Dips

The chromic acid dips developed by Dubpernell and Soderberg<sup>6</sup>, <sup>a</sup> overcame the tarnishing of cadmium-plated parts packed closely together and provided considerable passivity ("passivity" is used throughout this paper to designate the presence on a metal surface of a visible or invisible film which reduces the reactivity of the surface in any corrosive medium) which even has some value in outdoor exposure." These dips contain, besides chromic acid, a relatively small amount of sulphuric, hydrochloric or nitric acids. With large amounts of the mineral acids a yellow to brown protective film is formed which is known as "cronak" and has large commercial use.10 When applied under proper conditions it can, if desired, be removed by either acid solutions of pH/2.68 or alkali hydroxide solutions 4.25 N, leaving a brightened but active surface on the zinc or the cadmium plate.

Preferred solutions, the use of which does not require after-treatment, are: for cadmium "rack work," 100 g/L CrO<sub>4</sub> and 1.67 g/L H<sub>s</sub>SO<sub>4</sub>; for cadmium "barrel work" 100 g/L CrO<sub>3</sub> and 1 g/L H<sub>2</sub>SO<sub>4</sub>. A suitable solution for brightening zinc plate contains 300 g/L CrO<sub>3</sub> and 5 g/L H<sub>2</sub>SO<sub>4</sub>. Meyer and Dunleavey" recommend for zinc 200 g/L CrO<sub>2</sub> 15 g/L Na<sub>2</sub>SO<sub>4</sub> and 52.5 g/L HNO<sub>8</sub>. Ostermann<sup>12</sup> uses a solution containing, by weight, 25 per cent CrOs, 10 per cent HCl and 55 per cent H.O for zinc alloys containing copper. He rinses in water and then immerses in a 10 per cent chromium trioxide solution until the slight coloring that is produced in the first solution has disappeared.

The reactions during bright dipping in chromic acid solutions include the formation of the salts of the metal and chromic salts, the accumulation of both of which can be tolerated as long as the chromium trioxide content of the dip is maintained at the relatively high initial value.

Acidified hydrogen peroxide solutions are being used for bright dipping of both cadmium12 and zinc14 plates. A number of acids may be used for acidification, including sulphuric, hydrochloric. perchloric, fluosilicic, formic acetic dichloroacetic acids, as long as certain proportions are used. Preferred formulas are: For cadmium, 7 per cent by volume of 30 per cent H2O2 with 0.3 per cent by volume H<sub>2</sub>SO<sub>4</sub> (Sp. gr. 1.84)<sup>15</sup>; for zinc<sup>8</sup> 4 per cent by weight H<sub>2</sub>O<sub>2</sub> and 0.25 per cent by weight H<sub>2</sub>SO<sub>4</sub>.

The hydrogen peroxide bright dips have the advantage that the reaction products are water and the metal salts, which latter can be tolerated in large amounts. However, the passivation afforded is less pronounced than that produced in chromic acid solutions. Also, impurities



SEMIAUTOMATIC TIRE BUILDER: Bead setters have just moved out of the way, and the automatic stitchers have come into position to make the "turn up" of first and second plies of an auto tire on this tirebuilding machine shown in operation at Goodyear Tire & Rubber Co., Akron. Machine is said to enable tires to be built up to a point of vulcanization at a 50 per cent faster rate with a reduction in operator physical energy. Photoelectric and electronic devices activate machine's automatic operations

in the electroplate are more likely to cause discoloration of the final finish than in the case of the nitric acid bright dip on zinc and the chromic acid bright dip on either cadmium or zinc.

Stockton<sup>16</sup> found that the oxy-acids of the pentavalent halogens, especially 0.1 to 0.76 N bromic acid, brighten cadmium.

### Bright Dip For Lead

It has been observed that the aqueous solution containing 3.5 per cent by volume of 30 per cent hydrogen peroxide and 3.5 per cent by volume of glacial acetic acid, when used as a dropping-test reagent for lead plate17, causes periodic brightening and darkening of the lead. It is possible that a slight decrease of the acid content would give a satisfactory bright dip.

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### New Fluorescent Fixture Directs Light Up and Down

A new fluorescent fixture which directs 40 per cent of the light from its two 40watt lamps upward to the ceiling and 60 per cent downward is said to give efficient illumination with low fixture brightness, according to its maker, Curtis Lighting, Inc., 6135 West 65th street, Chicago 38. Reflectors, louver fins and canopy are of aluminum and wiring channel, end plates and hanger stems are of steel.

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### Welded Stainless

### (Concluded from Page 94)

pheric down to that of liquid air, photomicroscopy, etc., covering the several grades of materials in question, both in the unwelded and the welded conditions.

Referring to the chromium-nickel austenitic stoels, W. B. Miller<sup>1</sup> states that under severe conditions this alloy will corrode at the junction of base metal and weld regardless of the method used for making the joint. This condition is attributed to the effect of carbide precipitation, which occurs in the heatmany of these applications, 18-8 steels with carbon below 0.07 per cent have been recommended when the service was such that a higher carbon steel with a slower dissociation rate could have been used to better advantage. Also, the low carbon steels are more expensive to make and their general use must eventually place them in a higher price class.

It has been shown by E. C. Bain, R. H. Aborn, and J. J. B. Rutherford<sup>3</sup>, that the austenitic stainless steel suffers definite loss of mechanical properties with the formation of a new phase; the precipitation of the carbides in-

	HARDNESS	AND IM	PACT OF 18-8 AFTE	ER LONG H	EATING	
			Time at 1000° F			
Carbon	1 Hr		980 H	r	1971 Hr	
Per cent 0.07 0.09 0.11 0.17	Brinell 131 119 131 143	Izod 112 111 112 113	Brinell 185 135 149 143	Izod 112 110 108 103	Brinell 121 131 143 163	Izod 107 108 108 107
			Time at 1200° F			
	1 Hr		2059 Hr		3068 Hr	
0.07 0.09 0.11 0.17	119 139 135 136	113 112 109 114	135 137 168 190	104 100 43 35	131 131 163 197	107 98 30 35
			Time at 1450° F			
	I Hr		1390 Hr		2387 Hr	
0.07 0.09 0.11 0.17	126 143 162	113 113 113	133 131 164 177	96 90 57 66	126 131 170 179	93 108 56 63

affected zone. However, effect of welding heat is considerably reduced in alloys of carbon content below 0.06 per cent, and subsequent annealing may be omitted for service in moderately severe corrosive solutions. It is also stated that alloys containing 0.12 per cent carbon without stabilizing additions (columbium, titanium, etc.) m a y be satisfactorily welded and will withstand many mildly corrosive conditions without heat treatment. If the welds are subjected to severe corrosion conditions, they should be heat-treated at approximately 1850-1900° F.

Austenite of both the low and high carbon 18-8 steels, states C. A. Scharschu, will undergo dissociation when held for sufficient time at 800-1500° F, although it appears that a much shorter time is required for the higher carbon steels. But when the time for heating and cooling through the range takes only a few minutes, as in a welding operation, very little dissociation takes place. These compositions may therefore be used without subsequent anneal for many welding components. For creases the strength of the steel but reduces its plasticity and impact strength. Impact tests reported by Union Carbide and Carbon Research Laboratories' on a steel of 0.088 per cent carbon, 18.51 per cent chromium, and 9.65 per cent nickel, water quenched from 2000° F, revealed that standard Izod test pieces bent but did not break when subjected to the test at temperatures ranging from room temperature to minus 300° F. Impact values given for these specimens are 113-119 ft-lb; it was also noted that no further change occurred in the samples even after remaining at minus 300° F for 65 hr, whether tested at that temperature or after warming to room temperature. Note, however, that these specimens were water quenched from 2000° F.

A steel which analyzed 0.13 carbon, 17.80 chromium, and 7.97 nickel was also tested. The Izod impact strength reported by Scharschu for this stainless steel is 118 ft-lb as a bend at room temperature whereas it broke at minus 300° F at 82 ft-lb. Scharschu offers as a possible explanation of this loss in impact value the fact that the alloy has a higher carbon and lower chromium and nickel composition.

Problem of the susceptibility of 18-8 chromium-nickel steels to intergranular corrosion as a result of carbide precipitation is said by Brick and Phillips<sup>5</sup> to have been either solved for most commercial applications by additions of elements more powerful than chromium in carbide-forming properties, or minimized by maintaining the carbon below the solubility limit in the precipitation range (below 0.08 per cent in Type 304).

The impact strength of 18-8 chromium-nickel steels is not affected by holding the steels for a short time at 1000°, 1200° and 1450° F, but after several hundred hours a decrease in impact is obtained with a corresponding increase in hardness, states Scharschu<sup>\*</sup>. His results show that a maximum change takes place as indicated in the accompanying table; impact values obtained after 17,000 hr at 1200° F on the same steels were practically the same as those given in the table for 3068 hr.

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### Lubrication Problems in Cartoon Presentation

Alemite Answers, cloth, 223 pages, 5½ x 8½ inches; published by Alemite Division, Stewart-Warner Corp., 1826 Diversey Parkway, Chicago 14, for \$3.

Man's age-long struggle with friction is the subject of a book by the Alemite Division of Stewart-Warner Corp. It is a graphic presentation, with illustrations of hydrocarbons cavorting in animated movie style and cutaway views of bearings and other friction points to demoastrate in laymen's pictures and terms the how, when, what, where and why of lubrication.

The authors believe the era has passed when rule of thumb procedures governed lubrication practice and that today lubrication is a science founded on logical analysis, guided by research and tempered by experience.

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### ERIE RAILROAD MODERNIZES



being installed at Cleveland docks. Brown machines long in service will be dismantled. Early methods employed in transferring iron ore from the hold of wooden sailing vessels to the docks and thence to storage is related in detail. Many complex problems are involved in piling various grades of ore

Fig. 1-Girder of the new Hulett upon which the bucket trolley operates being lowered in place

Fig. 2-New 17-ton Hulett unloading machine in the process of assembly

Fig. 3-Erie Railroad dock, Cleveland, as it appeared in 1887. Four Brown unloading machines handled the ore from the sailing vessels to stockpile



/TEEL



MILLIONS of tons of iron ore have been handled by the Erie Railroad at its docks in Cleveland and large storage yard at North Randall, O., located about 11 miles south of Cleveland. Ore docks of the Erie are located in the old river bed of the Cuyahoga river connecting with the main channel near the New York Central railroad about 1/2-mile away. Tugs are employed to get the ore boats from Lake Erie to the docks.

Present facilities consist of four Brown Hoist and two Hulett type unloading machines with a maximum capacity of 1500 tons of iron ore an hour. Buckets on the Brown machines handle 7 tons and on the Huletts 17 tons each. The average time required to move a bucket of ore with a Brown machine from the hold of a vessel to the hopper of the machine is about 40 sec with a Hulett l min.

For continuous full capacity operation, the four Brown machines' will handle the same amount of ore as the two Huletts but on short boats it is not practical to use all six machines. About two-thirds of the boats are now handled with two iluleits and two Browns. This is on the basis of 61 per cent for the Huletts and 39 per cent for the four Brown units. At present, however, a program of

modernization is underway at the docks including the installation of a new 17ton Hulett built by the Wellman Engineering Co., Cleveland. When the program is completed the three Huletts will handle all the ore unloaded at the docks. Boat owners prefer this type unloading machine inasmuch as the control of buckct movement causes little or no damage to the hatch sides of the boats. At these docks it has been found that one Hulett will handle the same amount of ore as two Brown machines. When the new Hulett is ready for operation the four Brown machines, which have been in service for 40 years, will be retired.

At the Erle's North Randall storage yard a car dumper handles 200 cars of iron ore per 24 hours, or a total of 10.-000 tons. When unloaded the different grades are piled separately by an ore bridge which has capacity for handling 9000 tons per 24 hours.

Many consignees receive iron ore shipped over the Erie docks. Each consignee has different grades of ore, and these must be kept on separate piles to avoid mixing. The problem is to organize so that there will be no loss to the furnace operator and the railroad company. In the early stages of ore handling there was considerable confusion.

but under the direction and supervision of the dock company few, if any, complants have arisen.

Prior to the middle 80's the present dock was operated by the Eric Railroad through the medium of a labor contactor, the company doing all of the business and the contractor furnishing the necessary labor for doing the work, which at that time was mostly done by hand. The dock was originally equipped with a horse operated hoist whereby a horse on one end of a rope raised a bucket of ore from the hold of the boat. The ore was transferred to a wheelbarrow, wheeled across a temporary staging and dumped on the ore pile on the dock. Later a donkey engine displaced the horse hoist, and still later a cable tramway arrangement was used, both to hoist the ore and transport it to the pile.

In 1888 the NYP & O Dock Co. was incorporated, and a lease made of this dock by the Erie Railroad and its associate railroad companies to the NYP & O Dock Co.

Prior to 1902 there was no automatic machinery whatever. The ore was shoveled from the hold of the boat into steel buckets of 1 ton capacity each, and these were hoisted in rotation by the Brown bridges, carried back and dumped into cars or onto the piles as the case might be. In addition to the men in the hold. the common laborers on the dock, known as pinchers and dumpers, were paid at an hourly rate for the time they worked in moving cars up and down the track, cleaning up the dock, dumping the buckets, and such other functions as were necessary. The superintendent of the dock at that time was a man who had grown up from foreman and gang boss. His ability was confined almost entirely to handling that particular type of labor, among whom the use of liquor was not restricted.

About 1900 the first attempt at laborsaving machinery came about when two steam shovels were purchased for reloading ore on the dock, both at Cleve-



land and North Randall. This proved to be a distinct improvement, especially at North Randall where the loading had all been done by shoveling the ore direct into cars.

During the period of 1897 to 1901 no distinct advances were made in the art as far as the NYP & O dock was concerned, except that some of the old Brown machines were repaired and renewed, and the front legs were raised to get them over larger boats. During these years the old ships, such as the "Mary McGregor", "Hackett", "Geo. T. Hope", "Pease" and "Planet" and other old crafts of the early type were still largely engaged in the ore trade. Cargoes of less than 1000 tons were not infrequent, and those from 1000 to 2000 tons were of almost daily occurrence.

In 1901 the first real advancement toward automatic unloading was made when the NYP & O Dock Co. contracted with Hoover & Mason, Chicago, for the construction of three automatic bucket unloaders of 5 tons each. These machines were erected and put into operation in the fall of 1902.

In 1906 a new chapter in the history of the NYP & O Dock Co. commenced. Locomotive cranes or crib buckets were put in service at North Randall, which showed considerable improvement over steam shovels, and an additional trestle was built to increase the storage there. The liquor question which had caused so much disturbance was well under control. Night work had been organized. Strikes were still frequent and disturbing, but were often prevented and usually better handled.

### Additional Unloaders Built

In 1906 it was decided to build additional automatic unloaders. A contract was made with the Brown Hoisting Machinery Co., Cleveland, for four 5ton man trolley plants electrically operated. These were the most modern units of their kind which had been built. A contract also was made with Hoover & Mason for one additional unloader. One of the innovations was the incorporating in each machine a bin of 200 -tons capacity to permit a continuous operation of the unloaders during temporary periods of car shortage. These bins were hung on scales whereby the weight of the car was accurately determined as loaded. These scales were among the carly types devised for this purpose. By this arrangement the weighing of the ore was much simplified and more correct weights were secured. The scales also



SHINES 'EM: This automatic rotary buffing setup is supplemented by cam-operated sprayer which at intervals renews the buffing mixture applied to the wheels. After a full revolution of table, deep-drawn cups shown are polished mirror-bright from top to flange by a glue and grain mixture prepared by J. J. Siefen Co., Detroit, and known as Nu-Spra-Glu. Cam, right foreground, is tripped by lug on table to open air valve containing mixture; automatic gun is at center, rear. There is little waste as practically all material is sprayed directly on the wheel and stays put were the means of avoiding overloading which frequently occurred when the ore was dumped direct from the machine into the car and the weight estimated. At the time these machines were installed a power house also was constructed, modern in every particular, and up until the season of 1923 the current for the operation of the dock machines was generated by this power house. Since 1923, however, power has been furnished by the City of Cleveland Light & Power.

In 1908 the storage capacity of the Randall docks was about 750,000 tons, the ore being dumped through trestles and reloaded into cars by steam shovels and locomotive cranes.

In 1910 plans were devised for an ore storage plant embodying all of the best experiences of the blast furnace companies and other ore docks. Contract was let to the Wellman-Seaver-Morgan Co., Cleveland, for a new car dumper, and with Heyl & Patterson, Pittsburgh, for a 10 ton man-trolley ore bridge, and before the close of navigation in that year they were put in operation.

### Ore Bridge Destroyed

On March 25, 1911, the bridge was destroyed by dynamite by the Structural Iron Workers, who were at that time on a strike throughout the country. Contract for the rebuilding of the bridge was let to Heyl & Patterson and the work was completed four months later. With the advent of the bridge and car dumper, the old trestles, steam shovels and locomotive crane were dispensed with, and all ore for storage was handled by the car dumper and the bridge. Capacity of the new yard at Randall is 1,000,000 tons, having been extended two or three times since its original construction.

Operation of the docks by an outside company is generally a universal custom, inasmuch as dock companies handle the ore more advantageously than the railroad organization. Many complex problems are connected with the handling of ore and unless there is an experienced organization in charge throughout the year many difficulties may be created by the failure on the part of the organization to properly distribute the ore in storing it on the different piles. Mixture of one ore with another would create disaster at the furnaces, resulting in large claims against the railroad company. The ore mining business owing to the demand of consumers has been developed to such an extent that there is now mined and sold from the mines in Michigan, Minnesota and Wisconsin over 300 different grades of iron ore, all of which are carefully graded as to the chemical and physical composition, and bought accordingly by the consumers who must know the exact chemical analysis. Shippers, therefore, are vitally

# toone RAPID TOP CHARGING





Size OT Lectromett for melting 12 ton heats, Roaf has been extend and swung asids, yeady for charging.

MORE production per mon hour is an effective ments of lowering production costs and that is exactly what Lechamelt's experience proven top charging design can do for you.

The top-charge fundee readily cuts down that interval between heats. The furnace root is trydrau ically raised and swung aside by the operator moving one valve the drop bottom bucket places a full charge ... hydraulic power returns root to operating position and the furnace is ready to begin melting again. One user reports a three to five minute power off to power on interval averaged, with 30% more pounds produced per man hour with the top-charge furnace than with a door-charge type.

Lectromelt Top-charge Furnaces are available in capacities ranging from 100 tons down to 250 pounds.

### PITTSBURGH LECTROMELT FURNACE CORPORATION

PITTSBURGH...30...PENNA.



### Small Parts Produced Automatically by

### LATHE ATTACHMENTS

A LATHE attachment for producing small parts that require only form or cutoff operations is completely automatic and can be installed without drilling holes. Made by Dunn Engineering Co., 6341 Lyndon avenue, Detroit, it is designed for attachment to either the Atlas or Logan lathe. It may be removed at will and lathe restored to normal service.

Attachment employs face cams to control operation of rocker arms, which in turn controls operation of form or cut-off tools. Either circular or flat form tools or a combination of both may be used, type depending upon volume of production. Rocker arms operate on hardened and precision ground pivots instead of slides, eliminating need for frequent adjustment. Stock is automatically fed through a tube into a collet by feed fingers. Moving stock stop determines length of part to be cut off. Closing of collet, also an automatic operation, is timed to coincide with start of operation of work tools.

Power for Dunmatic attachment, shown in accompanying illustration, is taken from standard lathe lead screw. It is transmitted by a roller chain through a steel worm and bronze worm gear, providing efficient and quiet operation.

interested in seeing that their customers receive the orcs which they purchase ever keeping in mind that it only takes a small amount of ore foreign to those on which the burden is calculated to disarrange proper working of furnace.

Vessels carrying the ore from the upper lakes, and railroads carrying it to its destination come into direct contact with the unloading docks, so that it can be readily seen that the unloading docks constitute a community of interest to all connected with the production and transportation of the ore and its conversion into the finished product. Dock companies by reason of their organization are trusted by blast furnace interests to show proper regard to the careful handling of the ore as it passes over the dock. It is at this point in its journey from the mines to the furnaces that the greatest loss can be incurred by reason of improper management. While some similar conditions apply to the upper lake docks as they do to the unloading docks in regard to the danger of the ore becoming mixed, a final analysis of the ore is not made until the boat is unloaded, and any mixture made prior to that time becomes known before it works harm to the consumer.

A large percentage of the individual

cargoes contain more than one grade of ore. These are separated from each other sometimes by a bulkhead or often merely by leaving one hatch empty, and it is from this condition that the danger arises of the ores becoming mixed while being unloaded. There is no way of telling from observation the chemical constituents of the ores, and it is only by constant watchfulness and a thorough understanding of the consequences that the consumer receives the right ore. A mixture of other ores or foreign material makes his product undesirable and may entail a large loss to him.

When railroads attempted to operate these docks it was found they lacked training along the proper lines, having no knowledge of conditions surrounding the handling of ore, nor could they acquire this knowledge without going through a course of training similar to that of the dock companies. This training takes years. Benefits accruing to the railroads due to the contracting of the docks to the dock companies are many. All of the docks have been operated on the open-shop plan since 1908, with absolute authority resting with the management of the dock companies to hire or discharge men as it sees fit, pay whatever wages in its estimation are justified, and to insist on the proper observation of such rules as it deems advisable to employ. If, under the present conditions, a strike is called on the railroads, the dock companies are involved in no way, but would continue to operate, and owing to their vital position in the chain of the iron and steel industry, have an immense effect on the other links in this chain.

This article was prepared from information secured from early files of the Eric Railroad Co. and made available by its operating department.

### Low Grade Ore Processing Described in Report

A war-developed process for beneficiation of chromite concentrates from low-grade chrome-ore deposits in Montana is described in detail in a newly released Bureau of Mines publication. The "roasting and leaching" process consists of heating chromite with carbon in a kiln to reduce ore's iron content to a semimetallic state. The iron thus becomes soluble in dilute sulphuric acid, and much of it can be removed leaving an insoluble residue enriched in chromium.

The report covers preliminary investigations and results of pilot plant operations in detail. A free copy of report of investigations 3834, "Beneficiation of Montana Chromite Concentrates by Roasting and Leaching," may be obvained from Bureau of Mines, Department of Interior, Washington.

"SS" Class Steel "So" Clease Steel Reller Chain. A strong, durable chain for conveyors and elevators, with a wide variety of attach-ments for practically any conveying or elevating needs.

"55" Class Long-Pitch Engineering Chain. For Spron and Right conveyors, bucket elevators, carriers, and similar applications, elevators, carriers, and similar applications, wherever heavy loads are carried at slow speeds.

С

Clotk Type and Draw Lench. Slow speed chains of high tensile strength, for metal drawing, steel transfer, and car haul service. Usually furnished riveted.

### **Chain by LINK-BELT** tested for service

You can be sure that Chain by Link-Belt will meet every requirement of performance. Design, material, workmanship must meet rigorous operating tests before the chain is permitted to become a part of your installation. Built to the highest standard of quality ... and tested to meet these standards ... Chain by Link-Belt will give you trouble-free service throughout the years.

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**CHAINS AND SPROCKETS** for conveyors • for drives • for power transmission

"SS" Class Short Pitch. For medium and heavy duty drives; made with offset or straight side bars; with or without bush-ings or rollers.

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**300 AXLE SHAFT BEARING RACES** PER HOUR. Hardens axle bearing to 62 Rockwell "C". Eliminates inner race formerly pressed on. Gives 50% more strength.



100 ROCKER SHAFTS PER HOUR. TOCCO-hardened at six areas per shaft, TOCCO flxture accommodates shafts 14" to 36" in length, having 6 to 12 hardened areas. No scale or distortion.

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**500 DISTRIBUTOR CAMS PER HOUR.** 

Cam surfaces TOCCO-hardened to 62 Rockwell "C" after assembly

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2000 PISTON PINS PER HOUR. Continuous hardening of carburized piston pins to 62 Rockwell "C". Pins TOCCO-hardened free of distortion

> Speedy, accurate TOCCO Induction Hardening enables you to produce better products, faster, at a fraction of the cost of conventional heat-treating. One manufacturer gets such results for 142 different parts . . . with one standard TOCCO machine! Fixtures are readily changed, permitting quick tool-up to suit the job.

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> THE OHIO CRANKSHAFT COMPANY . Cleveland 1, Ohio

INDUCTION HARDENING, BRAZING ANNEALING, HEATING



# HEAT TREATING

SEMIAUTOMATIC pusher-tray furnace for uniform heating and cooling has been developed by W. S. Rockwell Co., Fairfield, Conn., for heat treating large cast steel truck rear axle housings. Furnace is designed to heat castings to 1650° F, holding them at that temperature for 1 hour, then discharging them on an individual tray to enable them to cool uniformly in still air. Thus every 12 min one tray containing its load enters the heating zone of the furnace and one casting is discharged. Total normalizing time is 48 min in heating zone, and 60 min in holding zone.

Heating chamber of furnace is approximately 15 ft long and 6 ft 5 in. wide. It has heating and holding zones, the higher zone being at charging end. A series of proportioning mixer burners, utilizing natural gas, fires from both sides of furnace above and below work line. This provides fine heat distribution, eliminating areas of high heat density. Heat input for each zone is controlled automatically by separate recording potentiometer pyrometers.

Feature of the operation is manner in which work cycle progresses automatically. This is accomplished by a system which co-ordinates a time clock with the complete actuating mechanism to raise furnace doors, discharge heated work, push in new charge, photo at left above, and lower doors in accordance with a predetermined operating program.

Time clock turns on a hydraulic pump

. . . features automatic work cycle that charges parts, exposes them to heat for predetermined period, removes treated parts

wrnace

which simultaneously causes both doors to be raised, cutting in pusher at charging end and pullers at the discharge end. As pusher moves tray of work forward, it trips a limit switch which causes pullers to pull out the load, as shown in photo at right above; as forward edge of pulled-out tray reaches a certain point, it trips an electric eye which cuts in a time-delay relay to close discharge door. On return stroke pusher trips a limit switch to close charging doors. Hydraulic pump then is shut off to complete mechanical cycle.

Cooling rack is long enough to hold several trays of castings, allowing sufficient time for cooling before being taken away. Work progresses through furnace on cast grid type trays moving on three roller rails. Trays, roller rails, dog puller heads and other metal parts which have to resist the high temperature are of Misco alloys.

Furnace is designed to handle castings 64 to 66 in. long, weighing approximately 350 lb. Exposure of castings individually to heat treatment is said to produce a more uniform grain size, marked reduction of scale and appreciable savings in subsequent machining time. Hard spots, often due to uneven heating and cooling of large masses of work, are eliminated. After receiving a drawing heat treatment, the axle castings will withstand a load of 70,000 psi before breaking.

Attention of an experienced heat treater is not necessary. Castings are loaded individually on tray at charging end by means of a monorail and holst, and likewise removed after cooling—a job easily done by the ordinary worker.

Furnace also is used for normalizing on trays miscellaneous steel and alloy steel castings such as pump bodies, valve bodies, cylinders and agricultural machinery parts of all sizes and shapes in progressive movement through the furnace with the same controlled heating quality.

# INDUSTRIAL EQUIPMENT

### **Crank Pin Grinder**

With development of 40 x 216 in. Fype B hydraulic crank pin grinder by Landis Tool Co., Waynesboro, Pa., it is possible to grind pins and main bearings of large marine and locomotive diesel engine crankshafts accurately on a high production basis. A dual work drive arrangement eliminates or minimizes objectionable torsion deflection in crankshaft.

Power is transmitted from each work drive motor through a combination multiple V-belt and silent chain reduction unit to a drive shaft extending along enspeed of speed work drive and traverse motors. Two ammeters enable the operator to accurately determine whether crankshaft is correctly balanced before grinding,

Steel 5/13/46; Item No. 9053

### Hydraulic Cylinders

Maximum power without leakage and lasting accuracy of bore dimensions result from the centrifugal-cast barrels of the improved "Rotocast" hydraulic cylinders, announced by Logansport Machine Co. Inc., Logansport, Ind.



tire front of machine. Speed of the work drive motors is synchronized electrically.

Jogging handwheel on drive shaft in front of each head enables operator to readily rotate work in order to engage fixture aligning latches. Work heads may be moved longitudinally on work table. Work spindle bearings are automatically flood lubricated with a bull's-eye gage at front of each head.

Interchangeable throw blocks, top halt of which is floating type for final clamping purposes of crankshafts have varying end main bearing diameters. Conventional work rest supports shaft at each end and a special rest supports center main bearing.

Shoulder grinding attachment is supplied for grinding crankshaft checks. Control is by means of a handwheel which allows grinding to be done from either left to right or right to left, amount of movement being ¼-in.

A desk, for centralized electrical control has pushbuttons for various electric motors and field rheostats used to adjust These cylinders are adapted for a wide range of operations involving pushing, clamping, lifting, forcing, holding, pulling, pressing and other power movements in any direction, permitting improved product efficiency with lower operating cost, on new or old equipment.

Built for operating pressures to 1500 psi, Rotocast cylinders are offered in



7 mounting types, 3 piston rod models and 9 standard bores and may be used for water-treated service but if untreated water must be used cylinders of special material can be supplied.

Barrels are cast from close-grained

gray iron which permits smooth, true bores which can be honed to a mirror finish, assuring uniform flow of power with minimum friction. Four automotive type piston rings contribute to positive operation.

Alley cast iron end covers may be rotated on barrel to place vent ports at the top, bottom or either side. Alternate pipe tap locations, tapped and plugged, are also provided. Cover attachment holes are standard on all models, making covers completely interchangeable, and permitting a wide range of combination mountings.

Synthetic "O" ring gaskets are used to provide a permanently leak-proof seal between the cylinder barrel and end covers.

Steel 5/13/36; Item No. 9205

### Precision Gage Kit

Designed for production checking in the small shop, a new gage kit, Producto-Chek, is developed by DoAll Co., Minneapolis. It consists of a number of instruments used in conjunction with gage blocks for quickly setting up practically any type inspection gage.

Dial indicating snap gages, plain bench, dual bench, angle and square comparators, precision height and depth gages,



and a series of go-no-go snap gages of any size up to 18 in. besides plug and internal gages of any size in graduations of 0.0001-in. can be quickly made up from the set.

Feature of the kit is a set of wires of various diameters lapped to the accuracy of gage blocks and used as plug gages. The Producto-Chek gage kit weighs 40 lb and is housed in a hardwood 20 x 10 x 4 in. box.

Steel 5/13/46; Item No. 9126

### **Electronic Switch**

A new electronic switch unit has been designed by United Cinephone Corp., Torrington, Conn., to meet the demand for a switch which can be used in the presence of explosive gases. The new model, designated as No. 8336, uses

(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 128.)

### How to Boost Production and Reduce 86 Worries to 1

### A TRUE STORY ABOUT MODERN CENTRALIZED LUBRICATION

IN A WELL-KNOWN PLANT a battery of 7 stamping presses totaling 86 bearings is positively, safely lubricated from one central point while the presses are producing. It's a typical example of how Alemite Centralized Lubrication steps up machine efficiency and productiveness.

### How Alemite Centralized Systems Can Benefit You

- You assure "barrel-to-bearing" application of uncontaminated lubricants.
- You end bearing failures and shut-down due to faulty lubrication.
- You abolish human error and reduce accidents.
- You gain More Productive Time per machine.
- You save lubricant, repair costs, and make machines last longer.
- You can safely, positively lubricate hundreds of bearings from one central point without stopping machines.

Alemite Systems are adaptable to almost every type of light and heavy machine used in the steel industry. Cranes, straighteners, tables, shears, blast furnaces, blooming mills, structural mills, rolling mills, levelers, etc. They can be installed for manual or automatic operation on present equipment, or built into new machines as original equipment. The over-all savings can enable you to amortize an Alemite System in as little as 3 months.

Have an Alemite Lubrication Specialist demonstrate Centralized Lubrication right at your desk with transparent working models. Call the Alemite Distributor nearest you, or write Alemite, 1879 Diversey Parkway, Chicago 14, Illinois. Alemite Dual Manifold Feeder Valve · Fully hydraulic · Only 2 moving units in valve · No springs,

no check valves • Indicator at each valve • Lubricant delivery easily adjustable • Heavy duty construction: hardened steel piston • Available with 2, 6, 8 and 10 bearing outlets.



### INDUSTRIAL EQUIPMENT

relay with hermetically sealed contacts.

These switches are used primarily for pressureless limit switching floatless control of liquid levels and to elimination of contact arcs and welds. No maintenance beyond replacing the type 2050 Thyraton tube at infrequent intervals is required.

Steel 5/13/46; Item No. 9195

### **Tapping Machine**

Cleveland Tapping Machine Co., 3610 Superior avenue, Cleveland, offers a horizonal, combination drilling and tapping machine for high production drilling and tapping of extra long pieces, up to 96 in. long, with only one handling. Work piece is loaded against a stop, automatic-



ally clamped in position and not moved until drilled and tapped.

Outstanding feature is possibility of drilling, indexing to tapping position, and tapping work piece to proper depth, eliminating possibility of misalignment. Each of the two spindles can be independently adjusted for depth of travel and held to within 0.010 in. horizontal travel.

Spindles are equipped with oversize ball bearings. The machine has five speeds, can drill and tap from ½-in. to ½in. American National course threads in steel. Tapping spindle revolves at 60 per cent of drilling spindle.

Steel 5/13/46; Item No. 9151

### Speed Control

A precise, wire-range, quick-responding speed control for boiler draft fars, centrifugal pumps, blowers and compressors is provided by the new magnetic adjustable-speed drive announced by Electric Machinery Mfg. Co., Minneapolis. Two operating parts, a rotating ring and magnet, make the drive a selfcontained, electro-magnetic torque transmitter. It is used in combination with a constant speed ac motor and an electronic controller to provide split-revolution speed control.

With built-in ratings of approximately 25 hp and larger at 600 to 1800 rpm, drive is available in several forms to meet requirements of new or existing installations. It also can be used in combination with synchronous motors to provide power factor correction. *Steel* 5/13/46; *Item No.* 9182

### **Five-Position Switch**

General Control Co., 1200 Soldiers Field road, Boston, announces a new model MCF 5-position cam-lever switch featuring single hole mounting of switch



frame to panel and single bolt assembly of contact block to switch frame for ease in assembly and wiring.

Switch is locking or nonlocking in all positions except center position, which is always locking. Motion of switch from center to all positions is straight line.

Fine silver contacts are permanently riveted to nickel-plated, phosphor-bronze contact springs, and all parts are noncorrosive. Contacts are rated at 10 amp, 125 v, ac (noninductive load). Steel 5/13/46; Item No. 9340

### Milling and Boring Machines

Identified as No. 3 Model T., Kearney & Trecker Products Corp., Milwaukce, announces precision machine for milling, boring, and threading operations in one setup on special machine members, gear boxes, box jigs and fixtures.

Table is fully supported throughout its entire travel. Ram type construction of spindle slide maintains perfect alignment locked in position for milling operations or released while boring feeds are in use. Rear bearing extensions eliminate overhang at back end of spindle ram and fully supports attached gear box during the entire ram travel.

Spindle rotation is electrically controlled through a swiveling pendant which contains switches for starting and stopping, forward or reverse, inching, and spindle brake. All controls for spindle and boring feeds from 35 to 1400 rpm are placed in the self-contained spindle head. Boring and threading feed changes are effected through pick-off gears located under a cover in the spindle head.

All operating movements of the machine can be controlled to 0.0001 in. through built-in dial indicators. A fourposition stop on the spindle ram facilitates step boring operations. Steel 5/13/46; Item No. 9076

### **Fixture Clamp**

Fixture clamp, a self-contained clamp, applicable to most clamping operations, is now offered along with the Cone-Lok unit by N. A. Woodworth Co., Ferndale, Mich.

The long-wearing fixture clamp, manufactured with plunger travel of 3/4, 1 1/32, and 13/4 in., consists of male cones which are formed on pinion shaft,



and which fit closely with female cones integral with housing. Work is clamped at any location desired in the stroke of the plunger, and severe chatter due to heavy milling cuts, fails to loosen the clamp on the work.

Cone-Lok unit consists of rack, pinion, bushing and lever. It is intended for adaption to fixtures and machines of special design.

Steel 5/13/46; Item No. 9148

### **Microfilming Machine**

A new microfilming machine, demonstrated by Recordak Corp., Eastman Kodak subsidiary, Rochester, N. Y., photographs both sides of small documents simultaneously at a 35 to 1 reduction or papers up to 9½ in. wide and of un-

(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 128.)

### **COPPER ALLOY BULLETIN**

REPORTING NEWS AND TECHNICAL DEVELOPMENTS OF COPPER AND COPPER-BASE ALLOYS

Prepared Each Month by Bridgeport Brass Co. "Bridgeport" He

### Headquarters for BRASS, BRONZE and COPPER

### **Copper-Base Alloys**

Effect of Additional Elements on Fhysical Properties and Corrosion Resistance

When copper is alloyed with zinc in various proportions, the resulting material is known as "brass" which is stronger than either of the materials from which it is made. In general, the physical properties of brass depend largely upon manipulation, that is, whether it has been cast, rolled, extruded, drawn, or annealed. Properties such as ductility, springiness, toughness, strength, and stiffness are controlled either by annealing or by the amount of reduction by cold rolling or drawing following the last anneal. Machinability, corrosion resistance, hot and cold workability, etc., are controlled largely by modifying the proportions of copper and zinc, and by the addition of small quantities of elements such as lead, tin, silicon, aluminum, nickel, phosphorus, arsenic, etc.

#### **Electric Furnace Melting**

Bridgeport quality begins in the casting shop where melting and alloying are performed in the types of electric furnaces suitable for the particular alloys involved. At a turn of the wheel the furnace is tilted and its contents are poured into the immense water-cooled copper-lined mold to make a cast bar. Although the oldtime hand-fed pit fires were spectacular, melting in electric furnaces has been among the most important advances to improve materially the uniformity and quality of present-day brass mill products.

A casting in the form of a flat bar is the starting point for sheet and in the form of round billets for rod, wire and tubing. Samples taken at the furnace during pouring are speeded to the laboratory for analysis to make sure that all alloys are controlled within specifications. Impurities which may affect the uniformity of the product are checked by frequent spectrographic and chemical analyses. The laboratory takes a most important role in brass making—analyzing incoming raw materials, specifying the mill treatment to meet customers' requirements, checking the finished material, developing better processes, creating new alloys, and improving existing ones.

### The Copper-Zinc Alloy System

When copper and zinc are melted together they alloy to form a new material, brass, which is quite different from the parent metals. As the copper content decreases, the brasses vary in color from rich bronze (90-10), to golden (85-15), to yellow (70-30) and finally yellow-red (60% copper, 40% zinc).

Roughly, alloys containing from 63% to 100% copper are of the alpha type and

are suitable for cold working such as cupping, drawing, stamping, cold forging. Strip metal for drawing and stamping and wire for cold heading come under this range of composition. Alloys in the low copper range  $(60 \pm 2\%$  copper, remainder zinc) are best suited for hot extrusion and hot forging and have the characteristic alpha plus beta type structure. Brasses below 58% copper have a limited application.

#### **Effect of Additional Elements**

There are many important brass and copper alloys which have been modified or whose properties have been changed by the addition of a third or fourth element. In every case the added element has been selected because of some specific improvements desired. With the growth of modern science and the development of metallurgical laboratories, the effect of various additions has received very careful study. One of the major research problems in the brass industry today is the thorough and

systematic study of the effect of additions and the search for those additions that will provide specific improvements.

Lead added to brass in amounts ranging from 0.15% to 4% greatly improves its machinability. There are limitations on the amount of lead to be added because of its harmful effect on ductility and cold and hot forgeability.

Tin is added to brass in amounts up to 2%. The addition of 0.75% to 1% improves its resistance to corrosion from sea water. For example, Admiralty condenser tubes contain copper 70%, tin about 1%, zinc remainder. Tin added to 60-40 brass is designated as naval brass (copper 60%, tin .75%, zinc remainder). Tin added to the high copper-zinc alloys increases strength and modifies the color. Such alloys are popular with the jewelry trade.

Aluminum is added to brass to improve its resistance to impingement corrosion from turbulent water, containing entrapped air, flowing at high velocity. Aluminum brass condenser tubes contain approximately copper 76%, aluminum 2%, and remainder zinc. Aluminum also increases the strength of brass and is often one of the minor elements in manganese bronze, a 60-40 brass which contains small amounts of manganese, iron, tin and aluminum.

Silicon—A small percentage in brass lowers its thermal and electric conductivity and makes it suitable for spot welding. A very small quantity of silicon in bronze welding rod has the effect of reducing the fuming during welding. Silicon in amounts up to 3% added to copper increases its strength and toughness. Copper-silicon alloys are sold under the trade names Duronze I, II and V. Silicon added to aluminum bronze increases its strength, corrosion resistance and machinability. Just as in brass, silicon affects the alpha-beta phase boundary relationship. Hence, a normal alpha structure may be thrown into the alpha plus beta structure with correspondingly better hot working properties.

Iron increases the strength and hardness of brass and is sometimes added in the Muntz metal type of alloy. It retards grain growth during annealing. Standard specifications for brass strip for cupping or drawing limit the permissible iron content which is not considered desirable when maximum ductility is required.

(Continued on back page)



### **COPPER ALLOY BULLETIN**

### **Copper-Base Alloys (Cont.)**

Nickel additions to copper-zinc alloys have been made for many years, the resulting alloys having been known as nickel silver. The addition of nickel whitens brass until it becomes silver in color. As the nickel content increases, the alloy becomes stronger. The alloy containing 18% nickel is commonly used as a base for silver plated hollow ware. Nickel greatly lowers the electrical conductivity of the alloys and makes them desirable for high resistance purposes.

Arsenic, phosphorus and antimony, acting as corrosion inhibitors, are added in small amounts to brass condenser tube alloys to increase their resistance to dezincification from sea water.

### **Research and Development**

Intensive research and development of copper-base alloys in the last decade have completely changed the picture for brasses and bronzes. Many new alloys and improved old ones are resulting from the work done by Bridgeport metallurgists. This work has been stepped up considerably during the past few years. Also a consistent program of corrosion research has brought forth much new information regarding the behavior of metals in corrosive media. As a result our Technical Service Department is better equipped to help fabricators of metal goods with their problems. We are also in a better position to collaborate with engineers of power plants, oil refineries, and chemical industries to increase the service life of condenser, heat exchanger and evaporator tubes.

Continued improvement in the quality of basic materials makes possible lower costs through the reduction of scrap losses and extra mechanical and finishing operations. Nevertheless, the limitations of each alloy must be taken into consideration. Laboratory supervision, however, has made possible uniform control of such properties as hardness, softness, machinability and grain structure. Once the fabricator determines which properties fit his methods of manufacture, the mill is then in a position to furnish uniform material and reduce unnecessary labor and spoilage.

For more complete details on copperbase alloys write for your copy of Bridgeport Brass Technical Handbook. 128 pages of practical data.

### **Bridgeport's Phosphor Bronze for Starter Clutch Discs**

Bridgeport's Phosphor Bronze, improved through advanced processing and quality control methods, has found wide use in aircraft starter clutch discs because of its excellent resistance to fatigue and wear, as well as the accuracy of its manufacture. The clutch is built up of alternate discs of bronze and steel, and any surface imperfections or temper differences would mean excessive wear and slippery, unreliable clutch action.



Aircraft motor starter clutch discs made from Bridgeport's Phosphor Bronze

The Phosphor Bronze for these motor starter clutch discs is produced to very close limits of surface variation and allows perfect contact between the steel and bronze discs over the entire area of all surfaces. Since the ratio with respect to variation in temper between the two materials determines the amount of wear, the hardness of Bridgeport Phosphor Bronze is carefully controlled. Its dependability in such engineering applications is the result of precision manufacture, which maintains its exceptional physical properties at a consistent level of quality.

### NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

New Height Gage for the precision inspec-tion, layout, scribing and checking of large size jigs, fixtures, dies and castings employs an extra large vernier permitting finely gradu-ated scales to be read quickly, easily and more accurately. It is furnished in various sizes provided with both English and metric scales No. 681 scales.

**Portable Spot Welding** machine has been announced which has a capacity for parts under 1/s" round. Weighing approximately 25 pounds, the unit employs a pair of insu-lated copper tweezers which eliminate oxidation and enable the electrodes to be applied directly to the elements to be joined. It plugs into 115 V, 60 cycle power supply and may easily be adapted to 220 V. No. 692

Automatic Cut-off for the completely automatic manufacture of return bends or elbows is capable of handling tubing up to 5" O.D. and pipe up to 4" O.D. No. 683

New Surface Preparation has been developed for use on copper, brass and zinc prod-ucts where shot or sand blasting are impractical prior to application of protective coatings. No. 684

Filing, Sawing, Lapping and trimming operations are achieved with a new, all-purpose die filer machine. It has few moving parts and filing and sawing overarms may be inter-changed in a short time. No. 685

New Automatic Flow regulator for use with hydraulic machine tools offers unlimited flow in one direction and predetermined rate of No. 686 flow in opposite direction.

High-speed Lathe for bench work is used for finishing and polishing small metallic and non-metallic parts. Permits a range of work-ing speeds from zero to 40,000 RPM and can be detached and used separately as a hand teal No. 687 hand tool.

In a Quenching Machine for gears, liners, bearing races and discs, work is held by air pressure between upper and lower dies while quenching oil is pumped from below at timed rates to pass upward through the lower die, surround the work and leave through the upper die. Machine is said to prevent dis-tortion in the work, controlling application No. 688 of the oil.

Roller and Ball Bearings in guide pins of new die sets are reported to eliminate the possibility of their "freezing" even at high speeds. Die sets can be opened and closed by hand. Round pin die sets use ball bearings and square pin models use roller bearings. No. 689

their metal problems.

TECHNICAL SERVICE-Staff of

experienced, laboratory-trained men available to help customers with

WAREHOUSE SERVICE-Ware

### BRASS, BRONZE, COPPER, DURONZE, NICKEL SILVER, CUPRO NICKEL

Warehouse Service in Principal Cities

STRIP AND SHEET-For draw-STRIP AND SHEET—For draw-ing, stamping, forming, spinning, Leaded alloys for machining, drilling, tapping. Silicon bronze, phosphor bronze for corrosion resistance. Al-loys suitable for springs, Engravers' copper and brass. WIRE—Cold Heading alloys for screws, bolts, nuts, nails, fastenings, electrical connectors, Phono-Electric trolley and contact wires.

ROD—Alloys for screw machine operation. Duronze III high strength, corrosion-resistant, good for machin-ing and hot forging. Hot forging and cold heading alloys. Welding Rods. Copper-covered ground rod.

TUBING-For miscellaneous fabrication. For condensers and heat ex-changers. For water, air, oil and hy-draulic lines.

too severe for a single metal or alloy. PIPE-Brass and copper for plumb-

ing. FABRICATED GOODS-Plumb-ing brass goods. Radiator air valves.

DUPLEX TUBING-for conditions

house and jobbers stocks available for prompt delivery in principal cities. Aer-a-sol insecticide dispensers. Automobile tire valves.

KAN man Ю "Bridgeport BRIDGEPORT BRASS COMPANY, BRIDGEPORT 2, CONN. + ESTABLISHED 1865 limited length at 18 to 1 reduction.

The Duplex Recordak is expected to have wide application in business and industry where file cards, record sheets, and other papers contain information on both sides.

Recording is on 100-ft rolls of unperforated 16-mm film. Basic advantage of microfilming is a reduction of filing space, with safety and economy. Steel 5/13/36; Item No. 9201

### **Gaging Heads**

Hardened steel class B gaging heads, ranging from 0.240 to 2.510 in. diameter designed especially for shops having short production runs on frequent changeovers, are announced by Federal Products



Corp., 1144 Eddy street, Providence, R. I. Principal difference between these and regular class A heads is that they are not chromium-plated and lapped, but are fine-ground, having the same degree of measuring accuracy. Steel 5/13/36; Item No. 9193

### Motor-Driven Shop Truck

Chore Boy, offered by Buda Co., Harvey, Ill., is a dual wheel, heavy duty, platform type shop truck of one ton capacity. It has a large non-skid deck with a loading space of over 20 sq ft



and is provided with dual wheels in order to carry extra heavy loads.

Its construction features are electrically weided reinforced steel frame; comfortable spring cushioned seats with form-fit back rest; simplified controls with hand lever for forward, reverse and

neutral; one-hand steering with convenient foot brake and accelerator, and seat cushion hinged so that when operator leaves seat, brakes are automatically applied. Due to one wheel front steering, and narrow overall width of 40 in., it can be easily maneuvered through narrow aisles, up and down ramps, on platforms and loading decks and into box cars and trucks,

Weighing 1100 lb, it is equipped with an air-cooled 7.7 hp engine capable of speeds up to 15 mph and with an economy of operation of 35 to 40 miles per gallon of gas. The transmission is of the simple friction type and is connected with heavy duty chain drive to rear axle on which are mounted dual wheels. Steel 5/13/36; Item No. 9196

### **Metal Cutting Shears**

Heavy Machinery Division, Cleveland Crane & Engineering Co., Wickliffe, O., is announcing a line of power-driven metal-cutting shears employing a revolutionary pivoted-blade principle. The upper blade of each shear operates on two heavy pivot pins secured to end housing and travels in a circular path.

By turning a hand crank knife clearance may be varied to thickness of plate being cut, a dial indicator showing clearance in thousandths of an inch. The machine may be arranged for squaring, slitting, or set at any intermediate position for notching.

Frame and blade are all-welded steel, one-piece construction. Because knife adjustment is made by movement of upper blade, bed is welded integral with frame.

A heavy spring-operated mechanical

hold-down holds plates firmly during shearing and automatically clamps thick plates with higher pressure than thin plates. Shear angle or rake is low, minimizing end thrust, camber and bow in cut pieces.

Shears are offered in sizes for cutting plate of thicknesses from 12 gage to 11/4 in. and lengths from 6 ft to 16 ft. Speeds range from 60 strokes per min on smaller shears to 25 strokes per min on largest size.

Steel 5/13/46; Item No. 9157

### **Buffer and Grinder**

A low pedestal type buffer and grinder, designed especially for the grinding and buffing of long, odd-shaped pieces is announced by Hobart Brothers, Troy, O. It is adaptable for the processes in a wide variety of shops.

Grinder provides over 40 in. of working space between the wheels, and low



design of pedestal enables worker to sit at work and brace the work piece between his protected knee and the buffing wheel. The 3 hp motor incorporated is repulsion-



(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 128.)

### INDUSTRIAL EQUIPMENT

induction if single phase or squirrel-cage induction of 8-phase type. It uses current only in proportion to the load, and is nonstalling type that will not slow down under rated load. It operates at 1750 rpm. *Steel* 5/13/46; *Item. No.* 9133

### Air Valve

An air valve which can be mounted on drill presses or other machines for automatic control of air cylinders is announced by Mead Specialties Co., Chicago. Poppet seals, lined with synthetic rubber, assure air-tight valve action and freedom from oil and moisture deteriora-



tion. The two cam followers require only 1/16-in. movement to operate the valve from full open to full closed.

A foot-control model, illustrated at left, offers a choice of either 3 or 4-way operation, and an adjustable stop provides a quick change from one to the other. The model at right, for cam operation, is for controlling air cylinders. A bench valve for hand operation also is available.

Steel 5/13/46; Item No. 9207

### Oxygen Mask

Mine Safety Appliances Co., Pittsburgh, announces a new oxygen mask for respiratory protection. It is a cylindertype oxygen breathing apparatus which features simplicity and ease of operation.

Mask is offered in two types. One type

is equipped with an oxygen cylinder which is carried on the wearer's back and supported by an adjustable harness. It supplies oxygen for about 1 hour. The other, for short-time use, is a front sling model using a small cylinder.

Both models provide oxygen exactly as needed by the wearer. Oxygen control is



by means of a "demand" regulator with which mask is equipped. A pressure gage indicates amount of oxygen in cylinder at all times.

Steel 5/13/46; Item No. 9130

### **Expansion** Reamer

Lempco Products Inc., Bedford, O., announces a new design dual-spiral expansion reamer. The principal change in the new design is a solid one-piece body all the way from the driving end to the lower lock nut. This one-piece construction considerably reduces the number of component parts. In addition, because of its increased rigidity, cutting blades spiral even more concentrically than previously, and runout is held to an absolute minimum, insuring accuracy to extremely close tolerances. Steel 5/13/46; Item No. 9110

### Flame Failure Safeguard

Designed to provide explosion protection for industrial and commercial oil and pulverized coal burners, Fireye photoelectric flame failure safegnard introduced by Combustion Control Corp. 77 Broadway, Cambridge, Mass., instantly cuts off fuel and sounds an alarm when the flame in burners fail.

Consisting of phototube and amplifying system housed in dust-tight container, en-



tire unit is mounted directly on the furnace wall in a manner which permits photoelectric cell to observe flame. A pyrex filter keeps equipment dust-light and a heat-absorbing filter protects it from radiated heat.

A pilot light, visible through an angle of 180°, and a time delay element which prevents relay from dropping out during momentary flame disturbances are other features. Designed for power supply of

FOR MORE INFORMATION on the new products and equipment mentioned in this section, fill in this form and return to us. It will receive prompt attention.

Circle nun ing to the	nhers below control of thems in	rrespond- in which	NAME
you are in	iterested;		
9053	9201	9337	COMPANY
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(All claims are those of respective manufacturers; for additional information fill in and return the coupon on this page.)
# Look at this radiograph as a cost analyst would...

# ...and you'll see something more than an internally unsound casting

You'll see in this radiograph an end to costly production lag . . . to customer rejections . . . wasted machining time.

You'll see a way to get more sound castings from each heat by correcting foundry technic . . . to salvage rejected castings through repair welding . . . to improve inspection, assembly, and other processes.

You'll see how this radiograph might be useful to your designer in suggesting changes to reduce weight safely . . . achieve greater simplicity . . . bring about manufacturing economies.

And there are other benefits . . . lower unit costresulting from better, lighter, more economically produced products . . . increased customer good will—due to faster deliveries and satisfactory performance of products proved sound by radiography.

When you balance the relatively small cost of x-rays against the large dollars and cents savings in production costs, you'll find that radiography can put you well ahead on the black side of the ledger.

If you have x-ray equipment, why not get together with your radiographer and your engineers . . . to see if you have overlooked opportunities to use radiography even more profitably? Or write to

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Eastman Kodak Company, X-ray Division Rochester 4, New York

# Radiography Another important function of photography





### J&L WIRE ROPE SPEEDS BUILDING OF GREAT AIRPORTS AND HIGHWAYS THAT WILL SERVE YOU WELL

With the help of strong, sinewy, flexible steel wire rope, long-dreamed-of projects for great airports and highways to serve you are fast becoming realities. Gigantic earthmoving machines are working on these big construction jobs . . . mightily, irresistibly, yet speedily . . . with wire rope applying and guiding their tremendous power.

Using big power shovels, bulldozers, tractors, pushers, graders, motor scrapers, dump trailers—all manipulated by wire rope—contractors are cutting off mountain tops, filling in valleys, moving and leveling millions of cubic yards of rock and earth to provide mile-long landing strips for your flights across the nation or overseas. They are slashing through foothills, bridging streams, leveling depressions in the plains so that you can make time from city to city on express highways with easy grades, wide curves and no traffic lights.

To rig equipment for these big jobs, many contractors specify Jones & Laughlin wire rope—made of J&L Controlled Quality steel. They have found this Precisionbilt, Permaset, preformed wire rope will outlast regular wire rope, stand up under extra heavy service, keep their equipment operating with a minimum of down time, help them speed to completion the new airports and highways you are eagerly waiting to use.

### JONES & LAUGHLIN STEEL CORPORATION



LIGHTER, STRONGER, CONTROLLED QUALITY STEELS

### WINGS & WHEELS

Imagine building today's airports and express highways with the horse-drawn scoops (see small sketch), stone-bed wagons, twowheeled dump carts, mattocks, sledges, picks, shovels and other hand tools of 50 years ago! In that era roads were local and unpaved, airports undreamed of, the internal combustion engine, gasoline and steel in abundance just dawning upon the industrial scene and steel wire rope still in its infancy.

3,050 new dirports and improvement of 1,625 of the 3,000 existing fields are proposed by the CAA at cost of \$1,250,000,000.

Leveling off 4 mountains and filling valleys is record-making earthmoving job at site for Kanawha Airport in rugged terrain near Charleston, W. Va. The grading totals more than 9,700,000 cubic yards, involves extraordinary depths and quantities of both cuts and fills. Nearly every type of earthmoving and grading equipment is being used, most of it depending upon wire rope for control or transmission of power. Job will be completed this year.

Wortime necessities more than doubled the capacity of J&L's modern wire rope plant at Muncy, Pa.

National roads, planned for new Federal 40,000-mile system of interstate highways connecting practically every city of 100,000or more will carry 20% of all motor traffic (expected to reach 40,000,000 vehicles by 1950), have entrances and exits only at selected points, with 300-ft. fenced right-ofway, grade separations, no stop lights, four-lane pavement, moderate grades.

Arterial highways through cities are being planned by Pittsburgh, Washington, Houston, Dallas, San Antonio, Fort Worth, Detroit, Denver, Chicago, Atlanta, Hartford, Los Angeles, San Francisco.

Plane landing every 24 seconds and one taking off every 24 seconds is capacity planned for new world airport under construction at Idlewild, L. I., close to midtown Manhattan. Gradual development is planned for pin-wheel design of runways around central loading hub and three-mile-long arcade building with space for loading 104 planes at one time. Idlewild will be eight times area of LaGuardia Field, require personnel of 30,000 to 50,000, provide parking space for 30,000 autos, have 4-story administration building with observation decks, restaurants, hotel rooms, offices.

4,000 miles of wire are wound in a 24hour day (taking .041-inch wire as the average) in the wire re-winding department of the J&L Wire Rope Plant.

Illustrated J&L wire rope book, with information for users of wire lines, may be obtained by writing on business letterhead to: Publicity Manager, Jones & Laughlin Steel Corporation, Pittsburgh 30, Pa.

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### WORDS FROM PROMINENT STEELWELD PRESS USERS





## SIMPLICITY OF DESIGN AND RUGGED CON-STRUCTION that produce Long Life

★ Horsburgh & Scott Helical Speed Reducers are engineered for simplicity of design with every part ruggedly built from the finest materials. These features plus precision manufacture and assembly are your guarantee of better speed reducers that last longer . . . it will pay you to investigate these single, double and triple Helical Speed Reducers.

Send note on Company Letterhead for Speed Reducer Catalog 39 **THE HORSBURGH & SCOTT CO.** GEARS AND SPEED REDUCERS 5112 HAMILTON AVENUE • CLEVELAND, OHIO, U.S. A.

#### -INDUSTRIAL EQUIPMENT-

for adjustments, and control lever is placed to insure a minimum of operator strain. Normal adjustments of clutch and brake mechanisms can be made quickly and easily from outside of unit.

Cable control is compact, permitting close mounting to tractor, for balance and protection against damage. Cast steel structural members and case provide strength for working parts. Anti-friction bearings are used throughout. Cable drum is set into recess in case to assure freedom from cable fouling. *Steel* 5/13/46; *Item No.* 9300

#### **Reversible Gage Set**

A complete line of standard reversible gage sets in cabinets is announced by Size Control Division of American Machine & Gage Go., 4636 West Fulton street, Chicago. Thread and plug gages are available in this type of design which is said



to give two or more gage members for the price of one. They are made up in partial or complete thread series.

Gages are available in old or new ASME drill sizes, also in fractional sizes in any combination of increments of 0.001-in. Standard thread or gear wire sets in any series are also available. Steel 5/13/46; Item No. 9323

#### Spot Welder

The No. 310-AA Universal spot welder developed by Eisler Engineering Co., 750 South Thirteenth street, Newark, N. J., is adaptable for spot welding all types of sheet metal work. It also can be used with a hand-operated push and tong type gun welder, and for alternating current arc welding, at 100-400 amp.

Machine has deep throat provided by both horns which can be lengthened or shortened by sliding them in bearings to fit size and type of sheet metal work to be welded. Horns also are mounted on top of fabricated case, making the machine suitable for spot welding of large sheet metal parts.

Although welder is intended for work

#### **SERVICEABILITY OF GILBERT & BARKER GAS PUMPS INCREASED**





#### Graphitar's resistance to wear helps eliminate maintenance on Gilbert & Barker pumping units

B.c

To a service station operator, the installation of a Gilbert & Barker gasoline pump means years of dependable, trouble-free service. This dependability is the result of sound engineering and efficient working parts which include a Graphitar meter valve seat. In Gilbert & Barker pumps the Graphitar seat affords a leak-tight seal that effectively resists constant friction and the corrosive action of gasoline. The seat cannot freeze, because Graphitar is unaffected by temperature and because it is lubricated by the gasoline being pumped. Thus in Gilbert & Barker gas pumps, Graphitar valve parts are adding to their reputation for efficient, dependable performance already established in steam, chemical, and gas service.

#### Graphitar parts prove effective in scores of installations

In virtually every type of industrial mechanism, Graphitar bearings, seals, rings, and other functional parts perform with long-life dependability. Graphitar will not melt or fuse at any temperature. It is mechanically strong, chemically inert, and light weight. It can be finished to a wide variety of close-tolerance.shapes and sizes with the modern production facilities at The United States Graphite Company. See listing in Sweet's File for Product Designers, and write for new 44-page cotalog.



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# Recognize Flaking?



#### SPERRY'S NON-DESTRUCTIVE SUPERSONIC METHOD

When the searching unit of the Sperry Supersonic Reflectoscope is applied to the surface of steel containing flakes a pattern much like that above instantaneously appears on the cathode-ray screen. The operator, trained in less than two weeks, at once recognizes defective material, and *accurately locates* the internal flaws.

The Supersonic Reflectoscope is now being used in the metal industry for all of these testing operations:

- To inspect raw stock for defects.
- To maintain a constant quality check during production.
- **3.** To make final inspections of the finished products.



Cracks, voids, inclusions, and other internal defects are located just as readily as flakes. Depth of penetration is in the order of ten feet.

Write for Bulletin I-3000

SPERRY PRODUCTS, Inc. Hoboken 1, N. J.

#### -INDUSTRIAL EQUIPMENT-

of light gage, it also will weld heavier work in short throat position. Rating of welders is from 20 to 50 kva at shortest throat depth. Horns as well as tip holder and tips are water cooled.

Machine can be adapted for air as well as foot operation. Wiring permits independent operation of spot and arc welding. It can be equipped either with mechanical or all electronic type timer and contactor.

Steel 5/13/46; Item No. 9209

#### Side-Dump Trailer

A fifth wheel construction, which aids in making short turns, is incorporated into a side dump trailer now being manufactured by Palmer-Shile Co., 796 South Harrington, Detroit. Gear type dumping rockers provide smooth action dumping which can be controlled from



either right or left sides, as desired. An automatic coupler at rear permits use of trailer in train hauling.

The all-welded trailer has a heavygage reinforced steel body mounted on a structural steel framework with a 30 in. pull bar. It is equipped with four  $3\frac{1}{2} \times 18$  in. roller bearing metal wheels with molded rubber tires. Steel 5/13/46; Item No. 9215

#### Attachment Arbor

A combination attachment arbor for half-inch electric motor shafts, announced by A. D. McBurney, 939 West Sixth street, Los Angeles, is designed to take grinding wheels with 3/4-in. holes on



main shaft, or 1/2-in. holes on the small ends. This extension can be used for rag or wire wheels, circular saw blades or for holding 1/2-in. 24-thread drill chucks which in turn grip drills from No. 60 to those 1/2-in. in diameter.

This arbor has a distinct advantage over the ordinary arbor in that it fits well over and onto the main motor shaft, so that a 1-in grinding wheel is mounted



# Pays Its Own Way In A Hurry

Certain types of machining operations are "slotter jobs." Cumbersome or difficult for other machine tools, such work can be handled most easily and quickly on a Rockford Hy-Draulic Slotter. Extensive experience in a variety of shops has proved that Rockford Hy-Draulic Slotters are practical machine tools that pay for themselves in a hurry. Illustrated is a typical use; there are many, many others. Check your own machining operations for time-saving production-increasing slotter jobs. Meanwhile write today, for Hy-Draulic Slotter Bulletin 2913.



New machines with capacities and performance to meet present-day standards are essential to operating profits. Let us show you the advantages of modern Rockford Hy-Draulic Machine Tools.



ROCKFORD Hy-Draulic SLOTTERS Are Made in Three Sizes.





# **INSURANCE POLICY**

for

\* Il you haven't a copy of the Thred-Kut Chart, write uswe will gladly send you one, without obligation.

STUART'S ThredKut Heavy Duty Cutting Oil has played an important part in solving many of industry's toughest metal working problems. Reference to the time-tested ThredKut Chart\* has insured the proper application of this versatile product in many production emergencies. Alert production executives will find these aids of great help in answering troublesome metalworking problems. D. A. Stuart Oil Co., Ltd., 2735½ S Troy Street, Chicago 23, Illinois.



#### -INDUSTRIAL EQUIPMENT-

directly on the main shaft and not out on the arbor extension, eliminating the possibility of "whipping" and dangerous disintegration of the grinding wheel.

An adapter for grinding wheels only also has been developed, enabling users to mount grinding wheels directly over motor shafts.

Steel 5/13/46; Item No. 9206

#### **Combustion Analyzer**

All readings are recorded on the one meter of the Stack-O-Meter announced by Davis Emergency Equipment Co. Inc., 45 Halleck street, Newark, N. J., for use by maintenance men needing a portable instrument for combustion analysis.

Carbon dioxide percentage readings are obtained from gas samples collected through a hand aspirator bulb of the unit.



Stack temperatures are obtained electrically from a thermocouple and draft measurement is obtained through a separate tube.

Accuracy of the instrument, which weighs only 11 lb and measures  $13 \times 12 \times 5$  in., is based on thermal conductivity principle of analyzing gases by means of an electrical Wheatstone bridge circuit. Steel 5/13/46; Item No. 9124

#### Nonswivel Type Boom

Speedy and economical lifting and transporting of many types of loads in manufacturing operations is afforded by power trucks equipped with a horizontal, nonswivel type boom which moves vertically with its shoulder riding in the upright columns of the truck. This mechanism has proved particularly useful for single, heavy and bulky objects to which a hook, chain, rope or cable may be attached. No muscle-power is required beyond securing a chain or cable to object and to hook on the boom. Boom functions somewhat as a boom on a crane, but the complete unit is more compact and can be maneuvered within more limited areas.

Suspended by a short length of chain, an object can be swung around easily for passage through narrow aisles or doors, or for positioning for finishing operations,



### **BEFORE**-20 PER HOUR

The job required the joining of a steel adapter to a steel tube used in Bazooka Grenades. At first welding was tried. But, pressure in back of the welds often caused them to crack. Reinforcing screws were added as shown at the left. But the whole method was slow—one man could do only 20 welds per hour.



## 480 PER HOUR

At the left you see how the job was finally done. A ring of EASY-FLO wire was preplaced in a groove in the adapter. Joint surfaces were fluxed and adapter, with brazing alloy ring in place, inserted in the tube. Fast induction heating completed the joint in a few seconds-practically no finishing was needed-production jumped to 480 per hour from one induction heating unit. The cut-away view below shows how fast-flowing EASY-FLO penetrates throughout the joint area the instant the brazing temperature 1175° F. is reached. Originally mild steel tubes were tested at a pressure of 300 p.s.i. Demands for greater power brought a change to high tensile steel. Now these EASY-FLO joints are capably meeting test pressure of 22,000 p.s.i. Production in one plant alone reached a million a month.

#### FIND OUT WHAT EASY-FLO CAN DO FOR YOU

On hundreds of jobs little EASY-FLO Rings (in this case they cost but 2c per joint) are revolutionizing results—providing superior joints, fast production and surprisingly low costs. Today's competition demands speed and economy. Find out how EASY-FLO can help you. As a starter, get full details in Bulletin 12-A—write for a copy today.

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# ROUSTABOUT CRANE

. . . Does 10 times more time-saving, cost-cutting work than you expect when you buy it . . .



### The fast-action load-handler all around your place

Hundreds of users who have bought the Roustabout with a few jobs in mind, soon had it speeding 101 jobs of loading, unloading, moving, shifting and stacking, indoors but especially out. Mobile, it's *where* you want it *when* you want, over rough ground or smooth, up hill and down, handling anything to 7½ tons. Modernly engineered for years of overwork, ball-bearing boom turntable and gears all running in oil. It saves costly delays and manpower, quickly pays for itself. Write for the whole efficiency story now — no obligation, of course.

#### THE HUGHES-KEENAN COMPANY 585 NEWMAN STREET • MANSFIELD, OHIO

• With grab-bucket, Roustabout hustles sand, cinders, etc.

 Equipped with magnet, Roustabout handles scrap,

ingots, etc.



#### -INDUSTRIAL EQUIPMENT-

or shipping. Truck, developed by Elwell-Parker Electric Co., Cleveland, can carry loads up to 3000 lb. Boom is available in lengths of 72, 66 and 60 in. from face of uprights. At lowest point hook is 22 in. above floor level; at highest, 8 ft. Boom may be made interchangeable with a platform with which a still greater variety of loads may be transported. in the shop.

Steel 5/13/46; Item No. 9319

#### Hydraulic Press Welder

Featuring an inverted type hydraulic cylinder through which welding pressure is applied, a new automatic welder in 30, 50 and 75 kva capacities suitable for either spot or projection welding is announced by Federal Machine & Welder Co., Warren, O. Cylinder is a part of slide or ram, while piston is the fixed member,



its upper end being secured to top of welder by a heavy transverse, adjustable spring.

The adjustable spring serves a dual purpose, actuating a switch initiating the timing controls and providing a quick reaction for a fast follow-up on welding stroke. Welding pressure is adjusted by the pressure regulator and gage.

A foot switch attached to a flexible cable is only control to consider after welder has been set for a specific job. Water cooled transformers and electrodes are standard equipment. Water-cooled horns are available on special order. The welders are available in three sizes handling 26 to 6 gage sheets or comparable material.

Steel 5/13/46; Item No. 9166

AIRLESS

The size of your plant "waste" line directly affects not only the size of your profits but also your ability to compete on a favorable basis.

A frequent contributing factor in swelling expense bulges is inefficient cleaning . . . a condition that nearly 3000 plants have solved with Airless Wheelabrators.

This modern cleaning method is extremely fast, economical and efficient. The Wheelabrator unit throws a storm of more than 280,000 shot or grit per second that no sand or scale can resist.

Result: Unusual savings in time, money, manpower, horsepower, and floor space . . . a minimum of breakage . . . products are scoured lustrously clean . . . faster machinability with less tool grinding . . . simplified work-inspection. If these are the advantages you want in your own business let us show you in black and white how a Wheelabrator will quickly pay for itself out of savings.

#### HOW IT WAS DONE AT GUELPH STOVE COMPANY

Guelph Stove Company, one of the leading Canadian manufacturers of stoves and furnaces, eliminated costly waste in the cleaning room by installing a No. 3 Wheelabrator Table and a 27" x 36" Wheelabrator Tumblast to handle their entire production.

In addition to removing sand from castings in the green stage, both machines are used for cleaning preparatory to enameling. (See illustrations at right.)

Twelve tumbling mills were eliminated . . . breakage of fragile stove parts become a thing of the past . . . production capacity was increased using only a fraction of the former floor space . . . and cleaner working conditions were maintained.



Wheelabrator CAN REDUCE

Notice the bright, clean, silvery appearance of the Wheelabrated costings in the conveyor of the 27" x 36" Wheelabrator Tumblast. This load of gray iron costings was cleaned in just four minutes.

OF



LARGEST BUILDERS



A one-minute cycle through the No. 3 Wheelabrator Table is sufficient to remove foundry sand from stove plate and furnace castings. Many tons of castings of the type shown in the picture above are cleaned daily in the rough stage and prior to enameling.

This 27" x 36" Wheelabrator Tumblast, operating *n* in e hcurs daily, cleans all of the small stove and furnace parts. Loads weighing several hundreds of pounds each are cleaned in from two to six minutes.

EQUIPMENT

507 S. BYRKIT ST.

BLAST.

AIRLESS

# GRIND BETTER

### Reduce Costs! Avoid Injuries! Increase Production!

WELDISKS grind better because they lie flat... do not soften up ... do not curl or warp.

WELDISKS last longer, thereby reducing costs, because, unlike ordinary disks, their amazing cold-setting cement (a scientific formula – not glue or resin) actually improves with age!

**WELDISKS** avoid breakage and injuries to operators because of their laminated backing of fibre for stiffness plus cloth for strength.

**WELDISKS** are better disks. Prove it to yourself! Write for a free sample. State size of disk, grade of grit, and brief description of work to be done. A WELDISK will be sent promptly without obligation to you.



#### Beryllium Copper

(Continued from Page 91) tortion and erratic warping when heattreated.

The use of the continuous process of annealing is necessary for uniform hardening response, but has its limitations if not properly handled. In the continuous process inadequate time at temperature results in a structure such as shown in Fig. 7 wherein the fibrous structure developed by drawing is still present. Poor hardening response due to insufficient solution of the beryllium in the copper is the result.

An adequate anneal requires the use of special equipment designed for beryllium copper which will put the beryllium into solution without excessive grain growth and quenches at a rate to ensure retention of the beryllium in solution. This preferred practice results in the structure illustrated in Fig. 8. The beryllium is fully available, yet the grain size is controlled to give uniform forming characteristics.

#### **Control of Mill Processes**

Adequate control of these mill processes is necessary to ensure material of quality so that the fabricator of parts can obtain the results expected. After proper incoming material inspection has ensured material with adequate available beryllium, the processor can exert the greatest control over final quality by his selection of heat treating time and temperature.

Some of the desirable characteristics of beryllium copper such as corrosion and non-magnetic properties are inherent with the alloy. The physical properties, however, are largely dependent on the hardening heat treatment and are under control of the processor.

Tensile strength, hardness, yield point, elastic modulus, conductivity, drift, and stress relief all undergo changes during heat treatment as shown in Fig. 13. The relative rate at which these changes take place depends upon the initial temper of the stock, the amount of available beryllium, and the temperature selected for heat treating. Each final product requires a particular combination of properties that can be best met by selecting the proper heat treatment. Just as in using steel, the heat treatment needs to be tailored to the requirements of the finished part.

One of the most striking applications wherein advantage is taken of the ability to harden beryllium copper at stress relieving temperatures is shown in Fig. 12. Parts requiring accurate shape are difficult to form in thin metal by conventional means. The group illustrated was pushed out of flat stock and given final





NGINEERING

KEEP LOGAN LATHES READY TO RUN, ADD TO SERVICE LIFE,

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The use of self-lubricating bronze bearings in place of plain bearings is typical of Logan Lathe design. The self-lubricating bearings are of a special bronze that is absorbent in texture and impregnated with lubricant. As a shaft revolves in one of these bearings, the lubricant is gradually released in a self-controlled flow which keeps an even film of oil over contacting surfaces. In this way, even though the lubricant is only infrequently renewed, the bearing surfaces are protected. In addition, the spindle on every Logan Lathe revolves on precision preloaded ball bearings that never need lubrication. This sustained lubrication is another factor in the sustained accuracy and long life of Logan Lathes. Get the full story of the advantages offered by the complete line of Logan Lathes from your nearby Logan Lathe dealer, or write direct for a catalog.

**SPECIFICATIONS COMMON TO ALL LOGAN LATHES** ... swing over bed,  $10\frac{1}{2}^{"}$ ... bed length,  $43\frac{1}{6}^{"}$ ... size of hole through spindle,  $25/32^{"}$ ... spindle nose diameter and threads per inch,  $1\frac{1}{2}^{"}$ -8... 12 spindle speeds, 30 to 1450 rpm ... motor,  $\frac{1}{2}$  hp, 1750 rpm ... ball bearing spindle mounting ... drum type reversing motor switch and cord ... precision-ground ways, 2 V-ways and 2 flat-ways.

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BON OUTSINE ROOMS ALL WITH PRIVATE BATH . . . SINGLE FROM \$2.50 . . . DOUBLE FROM \$4.80 Charles H. Lott, General Manager form by holding the parts in fixtures during heat treatment. This ability to produce very accurate shapes with spring temper is one of the outstanding possibilities derived from beryllium copper.

In another large group of applications, illustrated in Fig. 10, advantage is taken of electrical conductivity, high endurance stress, and accurate fixture forming to produce springs used in electrical switches and relays. The heat treatment for this group varies with the emphasis on final properties. Some of the springs are used in electrical snap switches requiring a combination of high electrical conductivity and good endurance life. Others are used in relays where endurance is less of a factor, but electrical conductivity and accurate control of shape are important.

#### Adjustment Cost Reduced

Usual practice in making relay switches calls for manual adjustment of spring leaves to give each one the desired pressure. Although this is one of the largest items of assembly cost it can be considerably reduced and often eliminated by using the accuracy of form available in beryllium copper springs.

The same technique is used to produce the coil springs in Fig. 10 to closer load test than previously available, although here again a still different heattreatment is desired because one of the requirements of precision coil springs is stability or freedom from loss in pressure under load. Beryllium copper with its high spring temper attained by heat treatment offers greater stability than spring alloys which gain their temper from cold work. In the past, designers wishing to apply accurate pressures could not rely on springs, as they could not be obtained to accurate load and lacked stability. That is no longer the case. Compression coil springs can now be produced in commercial quantities to meet close load test tolerances.

Beryllium copper is finding many applications as pressure diaphragms, Fig. 11. Conventional spring materials that gain their spring properties from cold working cannot be formed when rolled to sufficiently high temper to give good spring properties. They must be stress relieved to gain the stability needed and this results in further loss of spring temper. With beryllium copper the desired convolutions can be readily formed in the soft ductile state; then the diaphragm is heat treated to high spring temper at the same time it receives full stress relief giving it superior stability.

Solenoid guides illustrate another use for beryllium copper. Here the requirements are for a nonmagnetic material accurately formed to properly guide the solenoid core, and a material that is





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**PINK** is outstanding for resurfacing worn carbon steel and steel parts subjected to wear and abrasion. Easy to apply and economical to use. Will operate with either A.C. or D.C welding machines.



wear resistant to the abrasive action of the core laminations. These parts are heat treated for maximum hardness, and give a useful life of 3,000,000 operations compared with 200,000 for the best material previously used.

The electrical instrument frame is typical of a group of applications where beryllium copper is not used because of its spring properties, but because it can be formed and heat treated to accurate dimensional tolerances. In this part the elimination of finished machining brought the manufacturing cost below that of a die casting, and the strength was considerably above the values obtained in die casting alloys. For this part, the heat-treatment was selected to give maximum stress relief for close conformity to the holding fixture.

It can be seen from these examples that beryllium copper offers the designer of parts a spring alloy that can be fabricated into complex shapes while soft and hardened to full temper by subsequent heat treatment, that it offers the corrosion resistance, conductivity, and non-magnetic properties of the copper alloys combined with the high strength, wear, and fatigue resistance of the steels, plus greater stability and accuracy of form than available in either. By thus taking full advantage of the possibilities of beryllium copper, the designer of postwar components has a metal which can open to view new horizons of performance.

#### Powdered Metal Contacts Offered

A new series of Gibsiloy silver tungsten and silver tungsten carbide electrical contacts is offered by Gibson Electric Co., 8360 Frankstown avenue, Pittsburgh.

Contacts are claimed to have higher current carrying capacity, greater nonwelding characteristics and longer life.

Made of powdered metal, the manufacturer states that these contacts comprise a range of combinations in silver tungsten series, from 10 to 80 per cent tungsten, and in silver tungsten carbide series, from 20 to 80 per cent tungsten carbide, with hardnesses from 80 to 100 rockwell B.

Tradename Gardwell for its line of safety clothing and equipment was recently adopted by Safety Clothing & Equipment Co., 7016 Euclid avenue, Cleveland. Company includes in its products aprons, leggings, pants, coats, sleeves, welding jackets, hats, gloves, etc., in such materials as asbestos, chrome leather, fireproofed duck.





At no extra engineering cost, you can have a Reading Electric Hoist that's CUSTOM-BUILT to solve your special materials handling problems.

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See your distributor for more information on Reading's Unit Construction Plan or write us today for your copy of "144 Answers To Your Hoisting Problems."

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#### **Production Metallizing**

(Continued from Page 93)

with 1/8-in. wire, the Nooter shop deposited 40 lb of metal per hour. In this unit bard metal gears were used. It is the opinion of Nooter engineers that use on this job of 3/16-in. wire and soft metal gears, since incorporated, could increase weight of metal sprayed from 70 to 100 per cent.

In a later operation the company utilized 3/16-in. wire and special high-speed gears to deposit 500 lb of zinc and 250 lb of tin on interiors of several storage tanks 12 ft in diameter and 251/2 ft long, the shell of each tank presenting 1000 sq ft of space to be covered. With two Y-type units working, spraying time for depositing zinc was 8 hr and 15 min, and for the 250 lb of tin, 5 hr and 50 min. There was an automatic setup for the two units.

Design of Gun: The production gun is designed, engineered and built entirely for automatic operation, thus minimizing size and weight limitations ordinarily dominant. Larger and heavier parts required for constant rather than intermittent operation are provided by the improved design, although total weight of the gun does not exceed 11 lb. Incorporated are several features which increase operating efficiency and eliminate difficulties experienced with smaller and lighter hand equipment.

For improved gas head efficiency, the gas siphon plug, which is also the nozzle seat, is a separate unit of aluminum bronze, easily removed for cleaning or replacement, see cutaway view upper right in Fig. 2. A series of individual gas siphon jets are drilled into the plug. To build up acetylene pressure by means of a siphoning action, these jets take high oxygen pressure and pressure balance of gases is no longer necessary; variations of from 2 to 10 lb in either oxygen or acetylene during operation or lighting has little or no effect. Backfire from fluctuating pressures is eliminated

Hose connections are at the rear. Three brass tubes take air, gas and oxygen flow directly to the gas head and are permanently attached, doing away with joints, nipples and bends, also leaks through faulty connections. A taper valve lighting stop permits operation without valve tension.

It is believed this unit is the first piece of metallizing equipment to use fluid lubrication, pumping oil to all critical points. A screw-type pump, continuation of the countershaft worm (not shown) and operating in a close fitting sleeve, forces lubricant under pressure to the rear of the gun for operation in any position.

Operation: A mechanically improved

Facts and Figures on New and Expanded Facilities of the Steel Industry are now revealed in

# STEEL EXPANSION FOR WAR

#### By W. A. HAUCK An official report by Mr. Hauck for the War Production Board

THIS 192-page handbook is an official report prepared for the War Production, the Reconstruction Finance Corporation and other government agencies.

Much heretofore unpublished information is presented on new and revamped facilities of hundreds of plants, including

those in the ore, ore transportation, coal and coke, refractory, ferro alloy, scrap, foundry and forging industries.

The report provides details on types of products, capacity increases, plant locations, costs, etc. Included are 148 photographs, plus charts and tables.

**NEW SUPPLEMENT**—An 18-page supplement prepared by Mr. Hauck for the Reconstruction Finance Corporation and included at no extra charge—brings the report completely up-to-date. It will serve as a valuable reference for many years.



#### STEEL-Book Department Penton Building, Cleveland 13, Ohio

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STEEL EXPANSION

W A HAUCK

JUNE 14 1915

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No. 8 IN A SERIES... Some helpful answers to industrial lubrication problems...





#### THE PROBLEM ....

At a large coal-handling dock, the journal bearings of heavy-duty moving equipment gave trouble in hot weather because the lubricating grease softened and ran out of the bearings. Furthermore, during rainy weather, the lubricant was washed out of the bearings. To combat this condition, excessive amounts of grease were used...keeping the bearings in operation, but only at extremely high costs.

THE DIAGNOSIS... A Penola Engineer quickly realized the need of a grease that would adhere well to the moving surfaces... and would withstand the washing action of water and summer's heat.

#### THE PRESCRIPTION.



## Peetal 1

Widely employed in steel mills, this grease solved the problem presented by the coal-handling equipment. Bearings now last considerably longer and require less frequent lubrication. The elimination of the use of excessive amounts of grease represents a big saving in time and money for the company!

PENOLA LUBRICANTS



PENOLA PRODUCTS HAVE MEANT EXTRA PROTECTION SINCE 1885

controlled power unit features double braking surface and elimination of thrust on bearings. It consists of the highspeed, reaction type, curved blade air turbine shown in forefront of Fig. 2, directly coupled to a power-absorption type governor. An excess of power is fed to the turbine for normal loads. If the load increases suddenly, power being absorbed by the governor is automatically reduced by the same amount as the increase, all without change of speed. With a sudden decrease in load, the governor operates to absorb the additional power without permitting the turbine to speed up. Exact speed of the drive, the point at which the governor operates, is selected by means of a control ring integrally mounted with the unit.

Wire speeds cannot vary once the control ring is set, the latter being locked in any desired position by a spring detent ring operating in a series of grooves. The locked and indexed control ring must be forced out by hand pressure. Dual power control means less load per square inch of braking surface and the twindisk brake design balances out thrust on the bearings. Air exhausts to a group of holes in the special control ring, rather than through a wire mesh screen, and finds exit in the space between ring and turbine cover.

Not only are bearings, worms and gears of heavier construction, but gear efficiency is increased by steeper helix angles on the worms, with less heat and power loss. With a tall post mounting, the gun can be set up in any position, swiveled or pivoted, and the unit also may be fixed on a counterbalance. Housing is a single-piece aluminum casting, designed to make the interior completely accessible.

Fig. 3 is a close-up of the gun in operation on a production metallizing job. Accompanying table gives convincing evidence of vast improvement in performance over former records.

#### New Electrode Prevents Underbead Cracking

A new, all-position mild steel electrode, designed primarily to prevent underbead cracking in welding of hardenable steels, is now available from Air Reduction Sales Co., 60 East 42nd street, New York. Tests are said to indicate this electrode is satisfactory for welding low alloy, high tensile steels, free-machining and cold-rolled steels and material to be vitreous-enameled after welding.

The electrode, known as Airco No. 312, is also suitable on low alloy or mild steel applications where stress relieving is desirable but cannot be accomplished due to lack of facilities or magnitude of application, the company states.



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For the *ultimate* in time-and-laborsaving efficiency, KINNEAR Motor Operators add push-button control, plus any number of remote control stations if desired. KINNEAR Rolling Doors are built in any size, for old or new construction. Write.

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#### **Rolling Practice**

(Concluded from Page 100)

important. If the seal runs dry for the first few minutes of operation great damage will be done in sliding the seal onto the roll neck or shaft. 3. Press fit the seal into the housing

3. Press fit the seal into the housing bore carefully to prevent the possibility of cocking which will distort the seal and make it eccentric.

4. Try to secure at least 1-in. square cross section for seal room in the bore. Provide outside lubrication between the seals used back to back or in double reversed assembly.

5. When the shaft enters the seal be sure not to damage the sealing lip. Some mills are using hydraulic assembly table or rack to place the chocks on and off the roll necks. This device allows for perfect alignment. The end of the roll enters the chock and seal in a concentric position.

centric position. 6. Tests for seal leakage may be made after the seal is in place in the chock. This is done by introducing dummy roll neck, plugging all pipe lines and applying about 10 psi air pressure to the entire assembly. If the air pressure holds, the seal should prove satisfactory.

A new one-way fired soaking pit that has neither regenerators or recuperators was described by N. J. Urquhart, Fort Pitt Bridge Co., Canonsburg, Pa. The pit design is a standard oblong box with its width, length and depth in the proper ratio to the type and sizes of ingots which will be heated in it. The burner inlets and the flue outlets are located in the same wall of one of narrow sides.

In his paper on "Modern Steel Providing Methods," R. W. Graham, assistant division superintendent, slab and plate mills, Carnegie-Illinois Steel Corp., Munhall, Pa., mentioned that most mills use the term "providing" to mean the process of converting product sizes into semifinished sizes and weights, and in converting these into ingot requirements.

Methods should be positively specified and completely outlined so as to eliminate guess work, and as conditions change or as new products are developed, field studies must be made in order to keep the providing procedure upto-date. No degree of care and accuracy on the part of the provider will consistently give satisfactory results unless frequent and thorough checks are made to verify correctness of procedure.

A modern method of ingot providing is built around the assumption that the sum of top and bottom crops plus heating losses is a constant, regardless of the ingot height. This thought, the speaker stated, implies variable yield, the smaller ingots having the lower yield, and the maximum length ingots yielding the largest percentages of useable products. Metallurgically this per cent is sound, and in actual practice it has had the **2-fold** beneficial effect of increasing the **average mill** yields, and of reducing the number of short cuts produced.



COLD SPRAY-GRANODINE produces a dense smooth zinc phosphate coating that protects steel and paint for a durable, lustrous paint finish.

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#### Air-Operated Fixtures

#### (Continued from Page 96)

to prevent chatter and slipping while they are being milled, thus reducing cutter breakage by eliminating possibility of operator not drawing the holding bar tight enough with a wrench. Former standard allowed 0.623 min handling time per piece, as compared with new allowed time of 0.176 min per piece with the brake chamber fixture.

Cylinder Block Milling Fixture: Fig. 5 shows a fixture used for milling small compressor cylinder blocks in loaded position. This fixture replaced a hand operated bar fixture used on Cincinnati milling machine. Fixture is equipped with two Bendix-Westinghouse brake chambers as the heavier cut taken on cylinder blocks requires more holding pressure than on crankcases. Time saved on this operation amounts to 0.447 min. Figured in dollars based on our present production, savings on this one operation alone amount to \$644 per year.

Test Fixture For Treadle Type Brake Valve: Fig. 4 shows a fixture used to make pneumatic inspection tests on a treadle type air brake valve assembly. Fixture, in the loaded position, was designed to eliminate manual screwing of fittings to the part during test. The No. 1 valve operates the top brake chamber to secure the valve in the fixture. The No. 2 valve advances three plungers at once to close the ports on the valve. Steady pressure exerted by brake chamber gives an air tight seal insuring an accurate test. Two-way valve mounted on bench turns on air for leakage test and hand. Valve at right supplies air to an air cylinder that actuates pedal of valve as in actual operation. Fatigue operations eliminated by using air controls to seal and actuate the valve pedal make it possible for a girl to test this valve-previously, all tests of this type were made by men. Savings realized on this operation amount to \$.026 per valve or monthly savings of \$128.50.

Natco Drilling Fixture: Fig. 7 shows a fixture used on a Natco 3B-L machine for drilling and boring operations on cylinder heads for compressors in loaded position. This fixture is constructed with four air cylinders which will later be changed to brake chambers. Clamping the heads by air eliminates tightening each piece in various positions by hand. One operated foot-valve operates all five positions at one time. This was originally set up this way and it is estimated that it gives about 50 per cent more production than if it were hand mechanically operated.

Cylinder Block End Milling Fixture: Fig. 8 shows a fixture used on a Sund-

strand milling machine for milling the ends of our compressor cylinder block in loaded position. Fixture formerly used on this operation involved use of locating mandrels, split washers and nuts. Operator was responsible for tightening nuts on fixture so piece was held firmly and this was a slow operation. By installing a brake chamber and two-way valve on the fixture and eliminating the large locating mandrels this operation was speeded up enough to pay for the controls, in less than 2 weeks. With pressure maintained by brake chamber there is no danger of the piece shifting during operation. A saving of about \$750 per year in direct labor was effected from this operation.

Fixture For Pressing Oil Seal Into End Cover: Fig. 9 shows a fixture used to press conventional oil seals, such as Chicago rawhide leather seals, into the small end covers used on our compressors in loaded position. This operation was formerly done on a hydraulic arbor press. The press took up considerable floor space, had to be located at end of line and was a safety hazard because pieces involved in operation were small and irregular and had to be held by hand during pressing operation. A very efficient press has been made using a brake chamber operated by two-way valves. Pieces are positioned below ram. Ram is lowered by hand to position, then both hands are removed from fixture to operate the valves applying air to brake chamber-which in turn presses oil scal in place. Chance of injury has been eliminated as press will not function unless both valves are operated at same time. Some savings in assembly labor are involved here but main consideration was safety.

Crankshaft Milling Fixture: Fig. 10 shows a fixture used to position and hold a compressor crankshaft during the keyway milling operation in the loaded position. This fixture is used on a Kent-Owens hand feed miller, milling the keyway on crankshafts. Need for accurate locating and substantial grip on this operation prompted the changeover from a hand operated cam fixture to the brake chamber fixture. Operator positions piece against stops with one hand, and turns on air with other. Air operation of this fixture affords direct labor savings of approximately \$600 per year.

Cylinder Block Rough Boring Fixture: Fig. 12 shows a fixture used to hold a compressor cylinder block during rough cylinder boring operation in the loaded position. This fixture was designed for accurate locating and rigidly holding the part for a critical operation. Two brake chambers are used, one on each side, and pressure exerted insures holding of the piece without slipping or vibration during boring operation and two-way valve enables operator to secure piece with finger tip control. By replacing the old manual operated fixture with the present brake chamber fixture, a 20 per cent increase in production was realized on this operation.

Rifle Drill Fixture For Crankshafts: Fig. 13 shows a fixture used to hold compressor crankshafts during rifle drilling operations in the loaded position. This crankshaft holding fixture used on a Leland Gifford hydraulic feed retracting type drill press is another example of the advantages realized by using brake chambers to supply sufficient power to securely hold parts for machining. Drilling long oil holes in crankshafts requires rigidity of work as a slight shift or vibration of the crankshaft will cause drill breakage and creates scrap. By replacing the old bar and nut type fixtures with the present type brake chamber fixtures it has been made possible for one operator to run four spindles at once. We estimate a 100 per cent increase in production per manhour as against hand mechanical clamping.

Drill Fixture For Name Plate Holes: Fig. 14 shows a fixture used to hold a small compressor crankcase during the name plate drilling operation in the loaded position. This fixture is used on a Leland Gifford drill press for drilling four rivet holes to attach the name plate to the crankcase. One brake chamber and a two-way valve are used on this fixture. Formerly done by loading the piece into a fixture and fastening with a split washer and thumbscrew, the operation has shown a 15 per cent increase in production with installation of air controls.

Connecting Rod Babbitting Fixture: Fig. 11 shows a fixture used to babbitt compressor connecting rods in loaded position. This four station air operated fixture replaced the old hand method for babbitting fixtures. Parts to be babbitted are positioned in fixture and top half of fixture is lowered to position. Power applied by air chamber insures a tight seal over piece and keeps babbitt from running out of fixture. Savings in time of this method over the old enabled us to pay for the fixture installation and also show a savings of \$5800 the first year. In addition to this there also was a substantial saving in the amount of rework due to the tight seal provided by the air chambers. It also is possible to babbitt oil seals in the same fixtures by merely changing the locator in the fixture. A big saving has been made by eliminating the hand operation of removal of plug after babbitting has taken place (in illustration, done by an air operated pin ejector.)



Some persons argue that, since a horse pushes his collar, he is, in effect, pushing the load. The debate then centers about the efficiency of the transmission.

There is no argument about the efficiency of OTTUMWA-Sykes generated herringbone gears. The continuous teeth, true involute, utilize every fraction of face width, giving full bearing surface, creating the most economical and most efficient system yet devised for the transmission of power between shafts whose axes are parallel. OTTUMWA GEAR REDUCTION UNITS are furnished in single, double and triple reductions; respective ratio capacities are 2-1 to 10-1--10-1 to 60-1--50-1 to 200-1. Single reduction unit here has the cover removed. OTTUMWA will help you select the proper reducer, or cut gears from your own blanks up to 10'2" dia., 24" face. Our catalog, filled with valuable technical data, will be mailed on request.



# the BUSINESS TREND

CONTINUED SHRINKING of the nation's bituminous coal supplies as miners remained away from work lowered industrial production one index point in the week ended May 4.

However, through that date (after five weeks of the coal strike) industry had displayed considerable resistance to the miners' strike by drawing on reserve coal stocks, and as a result STEEL's industrial production index at 120 per cent (preliminary) for the week ended May 4 still was well above the 74 per cent low mark reached in the fourth and final week of the steel strike early this year.

Principal factors in lowering STEEL's industrial production index are reduced steel ingot output and railroad car loadings. Electric power output had held up well through May 4 but unless coal stocks are replenished soon a sharp decline will occur because of fuel shortages and resultant "brown-outs" that have been instituted in several areas. Automobile production through the week ended May 4 had increased for nine consecutive weeks, although it was nearing the point where fuel shortages would reverse that trend.

COAL—At the end of the fourth week of the bituminous coal miners' strike, production of soft coal this year through Apr. 27 had fallen 15.9 per cent, or 31,084,000 tons, behind output for the corresponding period of 1945.

RAILROADS-An estimated deficit of \$42,400,000, after interest and rentals, was incurred by Class 1 railroads in March, compared with a net profit of \$62,931,000 in March, 1945. In the first quarter of 1946 they had an estimated net income, after interest and rentals, of \$17,-100,000, compared with \$146,698,000 in the corresponding period of last year. Total operating revenues in the first quarter of 1946 totaled \$1,866,113,380, compared with \$2,276,234,529 in the same period of 1945 or an 18 per cent decrease. Operating expenses in the first quarter of 1946 amounted to \$1,568,170,303, compared with \$1,574,092,307 in the corresponding period of 1945. or a decrease of 0.4 per cent. Expenses for the first quarter, 1946, include approximately \$147 million of back pay resulting from the recent wage increase of 16 cents an hour. These charges were made in the March accounts. Fifty-nine Class 1 railroads failed to earn interest and rentals in the first quarter of 1946. Volume of ton-miles of revenue freight traffic handled by Class 1 railroads in March has been estimated at 52 billion, highest this year, but 19 per cent under March, 1945.

CONSTRUCTION—Demand for construction is reflected in the F. W. Dodge Corp.'s report that construction contracts awarded in the 37 states east of the Rocky mountains in March totaled \$697,593,000, compared with \$387,399,000 in February and \$357,501,000 in January



#### THE BUSINESS TREND



FINANCE Bank Clearings (Dun & Bradstreet-millions) Federal Cross Debt (billions) Bond Volume, NYSE (millions) Stocks Sales, NYSE (thousands) Loans and Investments (billions)† United Stotes Gov't, Obligations Held (millions)† United Stotes Gov't, Obligations Held (millions)†	Latest Period° \$12,426 \$272.9 \$34.4 5,446 \$65.3 \$46,935	Prior Week \$11,371 \$274.3 \$20.8 7.292 \$65.5 \$47,050	Month Ago \$13.004 \$274.5 \$27.0 8.127 \$66.0 \$40,818	Year Ago \$11,039 \$235.1 \$83.8 7.552 \$57.1 \$42,854
PRICES				
STEEL's composite finished steel price average All Commodities Industrial Raw Materials Manufactured Products Bureau of Labor Statistics Index, 1926 = 100.	\$63.54 109.5 122.7 105.1	\$63.54 100.6 123.0 105.1	\$63.54 108.7 121.1 104.5	\$57.55 105.7 118.2 101.9

# DAGE Welding ELECTRODES CUT PRODUCTION TIME



Economy in production welding is a matter of "know-how." In addition to our selected distributors, capable Page Service Engineers are constantly in the field, helping out on specific welding problems. Specializing in stainless steel, Page offers a complete range of electrodes and gas welding rods---PLUS the benefit of engineering knowledge based on years of experience. Get in touch with your PAGE distributor.

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PAGE STEEL AND WIRE DIVISION AMERICAN CHAIN & CABLE

# HELPFUL LITERATURE

#### 1. Carbon & Alloy Steel Data

Bliss & Laughlin, Inc.—Steel Datalator slide chart provides data on carbon and alloy steels. AISI designations and grades are covered. Hardness conversion table and information on chemical compositions, furnace treatment, carburizing treatments, and end-quench hardenability hands are shown.

#### 2. Lens For Welding

American Agile Corp.—Illustrated sheet, bulletin No. 124, describes Metalklad lens for eye protection in welding. Comparison of ordinary lens and this lens are shown. Greater visibility, minimum glare, full eye protection and improved welding efficiency are claimed for lens.

#### 3. Surface Grinding

Blanchard Machine Co.—78-page illustrated booklet entitled "Work Done on the Blanchard— Third Edition" contains data on machining and finishing of flat surfaces. Materials ground include ferrous and nonferrous metals as well as glass, carbon, plastics and minerals such as quartz, agate and sapphire.

#### 4. Dust Control Equipment

American Air Filter Co.—34-page illustrated bulletin No. 270-A presents tables, charts and discussions on Roto-Clone dust control equipment. Also explained are pressure relationships in exhaust system and methods of measurement. Included are applications of unit in metal grinding, sawing, sand conditioning, electric fumaces, die sinking and others.

#### 5. Stainless Fabrication

Alloy Mfg. Co.—4-page illustrated folder "Stainless Fabrication & Engineering by Alloy" introduces many intricate fabricating problems and their solution as engineered by company. Standard stainless steel type numbers and analyses are presented for easy reference. Pictured applications include pressure tanks, piping, heat exchanger and cabinet.

#### 6. Alloy Castings

Alloy Casting Co.—20-page illustrated catalog covers company's line of precision, light section alloy castings. Engineering services rendered and castings of nickel chromium, chrome nickel, straight chrome, chrome nickel manganese and tainless steel alloys are discussed.

#### 7. Transformers

Allis-Chalmers Mfg. Co.—4-page illustrated folder entitled "There Are 2 Ways" describes improved method of spotting small dry-type transformers at load centers next to machines they serve. Results are said to be reduction of length of heavy secondary line required for low voltages, minimizing of line drop, constant voltage and stepped-up motor and lamp performance. Mechanical data and list prices are included.

#### 8. Name Plates

American Name Plate & Mfg. Co.--8-page Illustrasted folder describes company's line of name plates, precision scales and rules, dials for elocks, radios and scientific instruments, deconated and formed parts, instruction plates with etched diagrams and copy, instrument panels and nose plates for diesel locomotives. Name plates are made of metals including steel, tinc, aluminum, brass, bronze, nickel silver and stainless steel.

### 9. Arc Welding Accessories

Air Reduction Sales Co.-12-page illustrated booklet describes complete line of accessories for all types of arc welding machines and operations. Types of equipment covered include electrode bolders, graphite electrodes, welding cable, colle connectors, and cable lugs. Also listed are welding helmets, goggles, face shields, headgear, aprons, gloves and sleeves. Additional section is devoted to Airco Heliwelding.

#### **10. Electroplating**

Acme Plating Co.—16-page illustrated booklet entitled "Behind The Scenes in a Modern Plating Shop" describes company's facilities in zinc, cadmium and hard chromium electroplating operations. Advantages of various types of coatings are discussed.

#### 11: Steel Castings

Vulcan Iron Works—8-page illustrated bulletin No. A-423 describes company's facilities for producing carbon and alloy steel castings for sugar mill machinery, locomotives, rotary kilns and electric hoists. Castings up to approximately 40,000 pounds can be produced in large volume.

#### 12. Machine Tool Accessories

Zagar Tool, Inc.—26-page illustrated catalog presents information on company's line of collet tools, broaching machines and multiple drill heads for milling, drilling, tapping, grinding, slotting, turning and broaching operations. Dimensions and list prices are included.

#### 13. Metal Forming Machinery

Yoder Co.—12-page illustrated bulletin G451 covers roll forming equipment, rotary gang slitters, side trimmers, tube and pipe mills, cutoff equipment, recoilers, uncoilers, coil boxes and special metal forming machinery. Bending and edging machines and plate levelers are shown also.

#### 14. Heat Treating Equipment

3 13 23 33 43

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40 50

15 25 35

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American Gas Furnace Co.—24-page illustrated catalog No. C-1302 describes line of gas carburizers, forges, blowpipes and burners, melters, automatic quenching tanks, pyrometers, blowers and pots, oven, tube and high speed furnaces for various heat treating operations.

#### 15. Strain Gages

Baldwin Locomotive Works, Baldwin Southwark Div.—24-page illustrated bulletin No. 179 contains complete data on SR-4 bonded resistance wire strain gages and alternating current operated low-level voltage amplifiers. Typical applications and uses of various gages are shown.

#### 16. Tubing

Agaloy Tubing Co.—12-page illustrated booklet entitled "Plan with Agaloy Tubing" discusses seamless, welded, spiral-brazed, cold drawn, composite, stainless steel, monel, inconel and nickel tubing and tubular forms. Metals, tolerances, temper, finish sizes, shapes and weight of tubing are covered.

#### 17. Cutting Tools

Acromatic Tool Co.-56-page illustrated catalog No. 46 covers complete range of standard carbide tipped reamers, shell reamers, twist drills, core drills, stub screw machine reamers, counterbores, milling cutters, saws and turning tools. Special carbide and high speed steel tools are described also.

#### **18. Time Controls**

Automatic Temperature Control Co.—Illustrated catalog contains reprints covering electrically operated time controls for installation in various machines and processes which use operating devices such as motors, valves, solenoids, relays, signals or heaters.

#### 19. Stainless Steels

Allegheny Ludlum Steel Corp.—100-page handbook contains data on 26 types of stainless and heat resisting steels, their corrosion resistance to 230 materials, properties, products, available forms and sizes, and fabrication methods.



PRODUCTS	- 200 23	
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#### 20. Stripped Thread Repair

Aircraft Screw Products Co.—4-page illustrated folder No. 300 contains instructions for installing Heli-Coils in tapped thread repair work. Included are specifications and parts numbers of accessory tools recommended for use with inserts for American National and spark plug tapped threads.

#### 21. Hobbing Machine

Barber-Colman Co.—4-page illustrated booklet describes type S automatic hobbing machine for high speed, continuous hobbing of spur gears and pinions for small precision instruments such as meters, clocks, watches, cameras, motion picture apparatus, etc. Features, advantages, design details, dimensions and specifications are covered.

#### 22. Clamshell Buckets

Blaw-Knox Co.--40-page illustrated catalog No. 2059 contains application, design details and installation data of four-rope clamshell buckets for handling coal, iron ore, open hearth slag, lake boat cargoes of many kinds, and most granular, free-flowing materials. Line drawings show various types of buckets and manner in which they are geared and reeved.

#### 23. Diamond Wheels

Bay State Abrasive Products Co.—24-page illustrated booklet gives data on standard diamond vitrified bonded wheels. Cups, dishes, internal wheels, mounted points and hand hones are described also. Supplementary discount schedule covers percentage of discounts for vitrified, resinoid and metal bonded abrasive products.

#### 24. Recorders & Controllers

Bristol Co.—28-page illustrated bulletin No. pH 1302 contains data on continuous pH recording and controlling instruments for use in water, food and by-products, metals, paper, chemical, textile, rubber and plastics industries. Immersion and flow type electrode assemblies and various electrodes are discussed.

#### **25. Lubricants**

Brooks Oil Co.—12-page illustrated booklet discusses advantages of L P. Leadolene lubricant for mill tables; mill pinions; circulating oil and hydraulic systems; open and enclosed gears; flexible couplings; wire rope; worm drives; rolling mill screwdowns; and open, enclosed, horizontal, vertical, inclined, high or low speed screws.

#### 26. Plant Sites

San Francisco Chamber of Commerce-30page illustrated brochure entitled "The San Francisco Bay Region As a Factory Location" covers such subjects as environment, geography, transporation, materials, markets, labor, sites and buildings, power, fuel and water, capital and credit, taxes and waste disposal and drainage.

#### 27. Casting Process

Austenal Laboratories, Inc.—8-page illustrated catalog "Microcast Process" explains origin and development of Microcast process, its industrial advantages, range and type of castings and their applications in industry. Completely new range of alloys and cast parts with unusual physical properties is discussed.

#### 28. Safety Tools

Ampco Metal Inc.—28-page illustrated catalog No. 117 covers safety tools made of Ampco metal and beryllium copper. More than 500 items are listed and include tools subjected to especially severe service. They are recommended for use in presence of explosive liquids, fumes, gases and dust. Applications of tools in industrial plants are pointed out.

#### 29. Carbide Tool Grinder

Willey's Carbide Tool Co.—4-page illustrated folder is descriptive of model 50-A carbide tool grinder equipped for wet and dry grinding. Unit handles rough, semifinish and finish grinding of tool bits ranging up to maximum of 2 inches square or equal cross section area. Specifications and accessories are listed.



#### 30. Abrasives

Brightboy Industrial Div., Weldon Roberts Rubber Co.—12-page illustrated catalog No. 57 describes Brightboy abrasive wheels, tablets, sticks, rods and blocks which are available in Tuff-Tex, Fine-Tex and standard types for burring, finishing and polishing metals and metal parts.

#### **31. Compression Molding Presses**

Watson-Stillman Co.—8-page illustrated bulletin No. 640-A describes semiautomatic compression molding presses available in capacities from 50 to 1200 tons. Unit is suitable for molding either by compression or transfer method and can be obtained with self-contained or separate power unit.

#### 32. Relays

Ward Leonard Electric Co.—8-page illustrated bulletin No. 130 contains data on heavy duty relays; single pole, single break relays; single pole, double break relays; double pole relays with common feed; double pole, single break relays; three and four pole relays; double throw relays; latching relays and double throw transfer relays. Complete specifications and prices are listed.

#### **33. Punch Presses**

Walsh Fress & Die Co.—4-page illustrated bulletin No. 945 is descriptive of open back inclinable punch presses with 6, 10, 15, 20, 30, 50 and 80-ton capacitics. Presses are built in flywheel, geared or combination geared models and all wheels are furnished with solid webs.

#### 34. Flexible Couplings

John Waldron Corp.—20-page illustrated catalog No. 57 describes standard and special types of series A flexible gear type couplings. Typical installations are shown and cutaway drawings illustrate construction features. Data on Walflex seal which hermetically seals coupling against breathing to eliminate oxidation of oil is included.

#### 35. Hand Screw Machine

Wade Tool Co.-12-page illustrated booklet presents data on models No. 5 and No. 7 hand screw machines. Former has 3/4-inch collet capacity and latter has 1-inch collet capacity. Spindle speeds of both models, in ratio of 4 to 1, nre 315, 515, 825, 1270, 2065 and 3300 revolutions per minute.

#### **36. Chains and Attachments**

Woodhouse Chain Works—88-page illustrated catalog No. 45 contains information on history, specifications, care and use of chains and attachments. Prepared specifically for buyers, engineers, users and architects, catalog contains tables on metric conversion, weights of round steel and wire gages.

#### **37. Motor Frames**

American Welding & Mfg. Co.-4-page illutrated folder "Welded Motor Frames" lists assemblies manufactured and features presented by welding process. Fabrication of parts to close tolerances is also discussed. Frames and assemblies for alternating and direct current motors are diagrammed.

#### 38. Pumps

Worthington Pump & Machinery Corp.-8page illustrated bulletin No. W-413-B50 describes type VST variable stroke triplex power pumps for stationary or marine boiler feeding. direct operation of hydraulic presses, product pipe line pumping and process charging in chemical plants and refinerics. Diagrammatic arrangement showing pumping and control mechanism is included.

#### **39. Steel Floor Plate**

Alan Wood Steel Co.-16-page illustrated pocket folder entitled "A. W. Rolled Steel Floor Plate" furnishes engineers and purchasing agents with complete data pertaining to four rolled steel floor plate patterns which are designed to meet every possible flooring problem in industry and transportation. Included are engineering blue prints and application illustrations. Tables of weights and sizes are given.

# MARKET SUMMARY

## Rough, Rugged Road Faces Steel Industry's Recovery

Much time necessary to refill raw material reserves ...Freight embargo hastens closing of plants ... Downward movement accelerated

REGARDLESS of the further extent of the soft coal strike the steel and iron industry faces a long and difficult road in getting back to anything like normal. Fuel reserves have reached virtual exhaustion and even if mining were resumed at once more than a month would be required to assure blast furnaces sufficient coke to operate effectively in supplying steelmakers and foundries.

Paralysis of the industry is proceeding at an accelerating rate that promises almost complete shutdown within a short time. Not only are blast furnaces and steel plants being closed but consumers of steel are also being forced to cut production deeply and in many cases to cease altogether. Ingot production is falling each week and with the rail embargo cutting off movement of raw materials, as well as finished products, little margin remains for hope of making steel or for obtaining it for fabrication.

One effect of the freight embargo has been to cause some producers who still have some raw material on hand to indicate they would close this week. Even mills in the electrified areas in the East claimed it would not be worth the effort to ship only to destinations where steam haulage would not be required. They are also faced by difficulty of obtaining supplies under embargo conditions and believe that what might be en route to arrive in the early days of the stoppage could be used to better advantage after the coal strike than to attempt to carry on under present conditions.

Steelworks operations last week dropped 9 points further, bringing the estimated national rate to 55½ per cent of capacity. This week is expected to show a sharper decline as fuel stocks shrink and the rail embargo causes further curtailment. Last week Pittsburgh dropped 10½ points to 45



#### May 13, 1946

(Percentag	ge of Ingol in Leading	t Capacity Districts)	Engag	red
	Week Ended May 11	Change	Same 1945	Week 1944
Pittsburgh	45		92	93.5
Chicago	53		98	101.5
Eastern Pa	57	-14	93	94
Youngstown	45	- 7	92	96
Wheeling	74.5	-11.5	91.5	102.5
Cleveland	78	- 8	, 93.5	91.5
Buffalo	49	-25.5	90.5	90.5
Birmingham	44	-20	95	95
New England	d 80	5	90	90
Cincinnati	89	+ 6	87	89
St. Louis	54.5	+ 5	80	79.5
Detroit	84	- 3	88	89
Estimated nati	ional			
roto		- 9	95	99

per cent, Wheeling 11½ points to 74½, Buffalo 25½ points to 49, Chicago 13½ points to 53, eastern Pennsylvania 14 points to 57, Youngstown 7 points to 45, Birmingham 20 points to 44, Cleveland 8 points to 78, Detroit 3 points to 84, and New England 5 points to 80. Cincinnati gained 6 points to 89 per cent and St. Louis 5 points to 54½. West Coast steelmakers showed no change, at 84 per cent.

When steel production is resumed consumers will find little opportunity for placing further orders. Mills generally have not opened books for next year and the fact remains that most have obligations running well into 1947. Because of setbacks in production constantly being received as result of labor disturbances the carryover at the end of the year is expected to be heavy, being definitely assured in a number of products. This condition will be accentuated in direct proportion to the length of the coal strike.

Pig iron supply is decreasing steadily, with a greater decline expected this week, as fuel supply deteriorates. Many foundries are closing, others operating part time. Both coke and pig iron are short and scrap is almost unobtainable in grades used in the foundry.

Scrap in general is scarce but demand has suffered no diminution, melters seeking to obtain tonnage for use when conditions return to normal, as inventories in almost all cases are low and the certain shortage of pig iron makes scrap a necessity. With shortened steel supply to consumers the output of industrial scrap is cut to almost nothing. The situation is further complicated by inability to ship scrap under the rail embargo. The best that can be done is to move as much as possible by truck or to option material for later shipment.

Movement of Lake Superior iron ore in April was far below that of the same month last year, totaling 729,902 gross tons, compared with 7,282,074 tons. Canadian ore totaled 76,140 tons, compared with 46,932 tons in the same month last year. Movement this year promises to be much smaller than in 1945, the season opening later and lack of fuel preventing ships operating full time. Reserves of ore at furnaces and Lake Erie ports are much larger than a year ago.

### COMPOSITE MARKET AVERAGES

				One	Inree	One	TIVE
				Month Ago	Months Ago	Year Ago	Years Ago
	May 11	May 4	Apr. 27	Apr., 1946	Feb., 1946	May, 1945	May, 1941
Finished Steel	\$63.54 -	\$63.54	\$63.54	\$63.54	\$60.91	\$57.73	\$56.73
Semifinished Steel	40.60	40.60	40.60	40.60	37.80	36.00	36.00
Steelmaking Pig Iron	25.50	25.50	25.50	25.50	24.75	24.00	23.00
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.13	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 Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap 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 and Wire Rods, cents per lb; coke, dollars per net ton; others dollars per gross ton.

**Pig** Iron

Bessemer, del. Pittsburgh .....

#### **Finished Material**

	May 11.	Apr.,	reo.,	May,
	1946	1946	1946	1945
Steel bars, Pittsburgh	2.50c	2.50c	2.375c	2.170
Steel bars. Philadelphia	2.82	2.82	2,695	2.49
Steel hars Chicago	2.50	2.50	2.375	2.17
Shanes Pittshurgh	2.35	2.35	2.225	2.10
Shapes Philadelphia	2.465	2.465	2.340	2.21
Shanes Chicago	2.35	2 35	2.225	2.10
Diatos Pittehurgh	2.50	2 50	2.375	2 21
Plates Philodelphia	2.55	2 55	2.425	2.26
Distor Chicago	2.50	2 50	2 375	2 22
Shoots bot rolled Dittshurgh	2 425	2 425	2 3125	2 20
Sheets, not-rolled, Fittsburgh.	3 975	3 275	3 165	3 05
Shoets No 94 galy Dittsburgh	4.05	4.05	3.875	3.65
Chests hat solled Com-	9 495	2 425	2 3125	2 20
Sheets, not-rolled, Gary	2.920	3 975	3 1625	3.05
Sheets, cold-roned, Gary	1.05	4.05	2 875	2 66
Sneets, No. 24 gaiv., Gary	4.00	9.00	0.010	2 10
Hot-rolled strip, over 6 to 12-in., Fitts.	4.00	2.00	2.225	2.20
Cold-rolled strip, Pittsourga	3.05	3.05	2.920	2.00
Bright basic, bess. wire, Pittsourgh	3.05	3.03	2.90	2.02
wire nails, Pittsburgh	3.25	3.20	3,073	4.04
Tin plate, per base box, Pittsburgh	\$5.25	30.20	\$3.123	\$5.00

#### **Semifinished Material**

Sheet bars, Pittsburgh, Chicago\$38.00	\$38.00	\$37.00	\$34.50
Slabs, Pittsburgh, Chicago 39.00	39.00	37.50	34.50
Rerolling billets, Pittsburgh 39.00	39.00	37.50	34.50
Wire rods, No. 5 to g-inch, Pitts 2.30c	2.30c	2.2250	2.05

Basic, Valley Basic, eastern del. Philadelphia No. 2 fdry., del. Pgh. N. & S. sides No. 2 foundry, Chicago Southern No. 2, Birmingham Southern No. 2 del. Cincinnati No. 2 fdry., del. Philadelphia Malleable, Valley Malleable, Chicago Charcoal, low phos., fob Lyles, Tenn. Gray forge, del. Pittsburgh	26,00 27,84 27,19 26,50 22,88 26,94 28,34 26,50 26,50 33,00 26,69	26.00 27.84 27.19 26.50 22.88 26.94 26.50 26.50 33.00 26.69	25.25 277.09 26.44 25.75 22.13 26.19 27.59 25.75 25.75 33.00 25.94	24.50 26.34 25.69 21.35 25.44 26.34 25.00 25.00 33.00 25.19 140.33
renomanganese, dei. rittsburgi	140.00	140.00	140.00	
Scrap Heavy melting steel, No. 1, Pittsburgh Heavy melt. steel, No. 2, E. Pa. Heavy melting steel, Chicago Rails for rolling, Chicago No. 1 cast, Chicago	\$20.00 18.75 18.75 22.25 20.00	\$20.00 18.75 18.75 22.25 20.00	\$20.00 18.75 18.75 22.25 20.00	\$20.00 18.56 18.75 22.25 20.00
Coke Connellsville, furnace ovens Connellsville, foundry ovens Chlegen by product fdry del	\$7.50 8.25 13.75	\$7.50 8.25 13.75	\$7.50 8.25 13.75	\$7.00 7.75 13.35

#### STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA schedules, except those for stainless steels which are now exempt from price control. Price schedule No. 6 covers semifinished and finished iron and steel products; by-product foundry coke, No. 29; relaying ralls, No. 46; beehive oven coke, No. 77; bolts, nuts and rivets, No. 147; coke by-products, GMPR, except sulphate of ammonia, No. 205. Finished steel quoted in cents per pound and semifinished steel in dollars per gross ton, except as otherwise noted. Pricing on ralls was changed to net ton basis as of Feb. 15, 1946.

#### Semifinished Steel

Carbon Steel Ingots: Fob mill base, rerolling quality, standard analysis, \$33.

Alloy Steel Ingots: Pittsburgh, Chicago, Buf-falo, Bethlehem, Canton, Massillon; uncrop, \$46.80.

Rerolling Billets, Bloonis, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, \$39; Detroit, del., \$41; Duluth (billets), \$41; Pac. ports (bil-lets), \$51. (Andrews Steel Co., carbon slabs, \$41; Northwestern Steel & Wire Co., \$41, Ster-ling, III.; Granite City Steel Co. \$47.50 gross ton slabs from D.P.C. mill. Geneva Steel Co. \$58 64 Pac. ports. \$58.64, Pac. ports.)

Forging Quality Blooms, Slabs, Billets: Pitts-burgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, \$47; Detroit, del., \$49; Duluth, billets, \$49; forging billets fob Pac mort \$50 Pac. ports, \$59.

(Andrews Steel Co. may quote carbon forging billets \$50 gross ton at established basing points; Follansbee Steel Corp., \$49.50 fob To-ronto, O.; Geneva Steel Co. \$64.64, Pacific ports.)

Alloy Billets, Slabs, Blooms: Pittsburgh, Chi-cago, Buffalo, Bethlehem, Canton, Massillon, \$56,16; del. Detroit \$58,16; eastern Mich. \$59.16.

Sheet Bars: Pittsburgh, Chicago, Cleveland Buffalo, Canton, Sparrows Point, Youngstown, \$38. (Empire Sheet & Tin Plate Co., Mans-field, O., carbon sheet bars, \$39, fob mill.)

Skelp: Pittsburgh, Chicago, Sparrows Polnt, Youngstown, Coatesville, 1b, 2.05c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—3, in. inclusive, per 100 10, \$2.50. Do., over 3,—41-in., incl., \$2.45; Galveston, base, \$2.40 and \$2.55, respectively. Worcester add \$0.10; Pacific ports \$0.50.

Bars

Hot-Rolled Carbon 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., 2.60c; eastern Mich., 2.65c; New York, del., 2.84c; Phila., del., 2.82c; Guif ports, dock, 2.85c; Pac. ports, dock, 3.15c. (Sheffield Steel Curp., 2.75c, fob St. Louis; Joslyn Mfg. & Supply Co., may quote 2.55c, fob Chicago.) Bail Steel Bars: Same prices as for hot-rolled Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.

Hot-Rolled Alloy Bars: Pittsburgh, Youngs-town, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.81c; De-troit, del., 2.91c. (Texas Steel Co. may use Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahome ). Oklahoma.)

AISI	(•Basic	AISI	(*Basic
Series	0-H)	Series	O-H)
1300	.\$0.104	4300	\$1.768
2300	. 1.768	4600	1.248
2500	. 2.652	4800	2.236
3000	. 0.52	5100,	0.364
3100	. 0.884	5130 or 5	5152. 0.468
3200	. 1.404	6120 or 6	5152 <b>0.988</b>
3400	. 3.328	6145 or 6	5150. 1.248
4000	. 0.468	8612	0.676
4100 (.1525 M	10) 0.728	8720	0.728
(.2030 N	10) 0.78	9830	1.352

•Add 0.25 for acld open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh. Chicago, Gary, Cleveland, Buffalo, base, 20,000-39,999 lb, 3.10c; Detroit, 3.15c; Toledo, 3.25c. Cold-Finished Alloy Bars: Pittsburgh, Chicago,

Conternished Alloy hars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 3.48c; Detroit, del., 3.58c; castern Mich., 3.63c. Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Spar-rows Point, Buffalo, Youngstown, base, 2.35c; Detroit, del., 2.45c; eastern Mich. and Toledo,

2.50c; Gulf ports, dock, 2.70c; Pacific ports, dock, 2.75c.

May 11, Apr., 1946 1946

\$27.69 \$27.69

Feb., 1946 \$26,94

Мау, 1945 \$26.19

Reinforcing Bars (Rail Steel) : Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Young-town, Buffalo, base, 2.35c; Detroit, del., 2.45c; eastern Mich. and Toledo, del., 2.50c; Gulf ports, dock, 2.70c. Gulf

Iron Bars: Single refined, Pitts., 4.76c; dou refined, 5.84c; Pittsburgh, staybolt, 6.22c; re Haute, single ref., 5.42c; double ref., 6.7cc. 4.76c; double t. 6.22c; Terre

#### Sheets, Strip

SHEETS, STIPP Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base, 2.425c; Gran-ite City, base, 2.525c; Detroit, del., 2.555c; eastern Mich., del., 2.575c; Phila., del., 2.555c; New York, del., 2.665c; Pacific ports, 2.975c; (Andrews Steel Co. may quote hot-rolled netic for shipment to the Detroit area on the Middle-town, O., base; Alan Wood Steel Co., Consho-hocken, Pa., may quote 2.60c on hot carbon sheats, nearest eastern basing point.) Cold-Bolled Sheets: Pittsburgh, Chicago, Cleve-

Cold-Rolled Sheets: Pittsburgh, Chlcago, Cleve-land, Gary, Buffalo, Youngstown, Middietown, base, 3.275c; Granite City, base, 3.375c; De-trolt, del., 3.375c; eastern Mich., del., 3.425c; New York, del., 3.615c; Phila., del., 3.425c; Pacific ports, 3.925c.

Galvanized Sheets, No. 24: Pittsburgh, Chi-cago, Gary, Birmingham, Buffalo, Younstown, Sparrows Point, Middletown, base, 4.05c; Granite City, base, 4.15c; New York, del. 4.29c; Phila., del., 4.22c; Pacific ports, 4.60c, Corrugated Galv, Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square, 3.73c. Gary, Birmingham, 29-gage, per square, 3.73c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16-gage not corrusted, copper alloy, 4.15c; Granite City, 4.25c; Pacific ports, 4.60c; coopper iron, 4.50c; pure iron, 4.50c; zinc-coated, hot-dipped, heat-treated, No. 26, Pitts-burgh, 4.60c.

Aluminized Sheets, 20 gage: Pittsburgh, hot-dipped, coils or cut to lengths, 9.00c.

162

Enameling Sheets: 10-gage; Pittsburgh, Chl-cago, Gary, Cleveland, Youngstown, Middle-town, base 3.20c; Granite City, base 3.30c; Detroit, del., 3.30c; eastern Mich., 3.35c; Pa-cific ports, 3.85c. 20-gage: Pittsburgh, Chlcago, Gary, Cleve-land, Youngstown, Middletown, base, 3.80c; Detroit, del., 3.90c; eastern Mich., 3.95c; Pa-cific ports, 4.45c. Chl-

#### Electrical Sheets No. 24:

	Pittsburgh	Pacific	Granite
	Base	Ports	City
Field grade	3.90c	4.65c	4.00c
Armature	4.25c	5.00c	4.35c
Electrical	4,75c	5.50c	4.85c
Motor	5.425c	6.175c	5,525c
Dynamo	6.125c	6.875c	6.225c
Transformer	100 C		22
72	6.625c	7.375c	
65	7.6250	8 3750	

8.875c 9.675c .....

#### Tin, Terne Plate

(III, IEINE Flate (OPA celling prices announced March 1, 1946.) Tin Plate: Pittsburgh, Chicago, Gary, 100-lb base box, 55.25: Granite City, Birmingham, Sparrows Point, 55.35. 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, Birm-ingham, Sparrows Point, \$4.70, \$4.85, \$5.00, respectively. respectively.

Gary, base 29-gage and lighter, 3.30c; Granite Uity, Birmingham, Sparrows Point, 3.40c; Pa-cific ports, boxed, 4.30c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted, 4.05c; Pacific ports, 4.80c, Manufacturing Ternes (Special Coated): Pitts-burgh, Chicago, Gary, 100-base box, \$4.55;

Granite City, Birmingham, Sparrows Point,

Roofing Ternes: Pittsburgh base per pack-as 112 sheets: 20 x 28 in., coating I. C. 8-lb \$12.50; 20-lb \$15.50 (nom.); 40-lb \$20.00 (nom.)

#### Plates

Plates Carbon Steel Plates: Pittsburgh, Chicago, Cary, Cleveland, Birmingham, Youngstown, Pparrows Point, Coatesville, Claymont, 2.50c; New York, del., 2.69c; Phila., del., 2.55c; St, Louis, 2.74c; Boston, del., 2.82-3.07c; Pa-effe parts, 3.05c; Gulf ports, 2.85c. (Grantic City Steel Co. may quote carbon plates 2.65c fob D.P.C. mill; Geneva Steel Co., Provo, Utah, 3.20c fob Pac. ports; Central Imn & Steel Co., Harrisburg, Pa., 2.80c, bas-ing points; Lukens Steel Co., Coatesville, Pa., 2.75c, base; Worth Steel Co., Claymont, Del., 2.60c, base.) Phor Plates; Pittsburgh, Chicago, 3.75c; Pa-

2.00c, base.) Phor Plates: Pittsburgh, Chicago, 3.75c; Pa-cifle ports, 4.40c; Gulf ports, 4.10c. Oren-Harth Alloy Plates: Pittsburgh, Chi-cago, Coatesville, 3.75c; Gulf ports, 4.20c; Pacific ports, 4.40c. Chad Steel Plates: Coatesville, 10% cladding: nlckel-chad, 18.72c; inconel-clad, 26.00c; monel-clad, 24.96c.

#### Shapes

Sinapes Situational Shapes: Pittsburgh, Chicago, Gary, Situational Shapes: Pittsburgh, Chicago, Gary, Situation State State

Wire and Wire Products

asham, per 100 pounds)	Birm-
Bright hanufacturers in carloads	
Spring (Except Dissemer	•\$3.05
Wire Products to Trade	•\$4.00
Cine and staples	
Galanti and cement-coated	193 25

cial and staples	
Galvanized and cement-coated	1\$3.25
Wire, Merchant Quality	11\$2.90
Annealed Galacty	100 00
Galvanized	\$\$3.50
	200.00

(Fob Pittsburgh, Chicago, Cleveland,	Blrming-
nam, per base column)	
Woven fence, 151% gage and heavier	72
Barbed wire, 80-rod spool	79
Barbless wire, twisted	79
Fence posts	14
Balo fles, single loop	(21/2

•Add \$0.10 for Worcester, \$0.05 for Duluth and \$0.50 for Pacific ports. Add \$0.30 for Worcester, \$0.50 for Pacific

t Add \$0.50 for Pacific ports. \$Add \$0.10 for Worcester, \$0.70 for Pacific

#### **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, 1 point less on butt weld. Pittsburgh base only on vrought iron pipe. Butt Weld

	200 100	Dutt	weiu		
	Ste	eel	See.	II	on
In.	Blk.	Galv,	In.	Blk.	Galv.
1/2	, 53	30	14	21	014
14 &	. 56	371/2	5	27	7
1/2	. 601/2	48	1-114	31	13
3/4	. 631/2	52	1%	35	151/
1-3	. 651/2	541%	2	341%	15
	1000	Lap	Weld		
	St	eel		L	ron
In.	Elk,	Galv.	In.	Blk.	Galv.
2	. 58	461/2	114	2011	014
21/2-3	. 61	491%	11/2	251%	7'-
31/2-6	. 63	511%	2	271/	9
7-8	.1.62	4914	21/2-31/2	2816	111%
9-10	. 611/2	49	1	3014	15
11-12	. 601/2	48	41/2-8 .	. 2916	14
2.17	# COO.	100	9-12	2516	9

		- Sea	mess-	LICC,	weig-
0.D.		Hot	Cold	Hot	Cold
sizes	B.W.G	Rolled	Drawn	Rolled	Rolled
1"	. 13		\$9.90	\$9.36	\$9.65
1%%.	. 13	Mapres .	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
21/4	. 13	15.50	18.42	15.06	18.03
21/1 "	. 12	17.07	20.28	16.57	19.83
21/2"	. 12	18.70	22.21	18.11	21.68
23%"	. 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	T	

Pipe, Cast Iron: Class B, 6-in. and over, \$54 Per net ton, Birmingham; \$59, Burlington, N. J.; \$62.80, del., Chicago; 4-in, plpe, \$5 higher, Class A plpe, \$3 a ton over class B.

Rails, Supplies Standard rails, over 60-lb, fob mill, net ton, \$43.40. Light rails (billet). Pittsburgh, Chicago, Birmingham, net ton, \$49.18. •Relaying rails, 35 lb and over, fob railroad and basing points, \$31-\$53. Supplies: Track bolts, 4.75c; heat treated, 5.00c. Tie plates \$51 net ton, base, Standard spikes. 3.65c. spikes, 3.65c.

• Fixed by OPA Schedule 46, Dec. 15, 1941. **Tool Steels** 

Tool Steels: Piltsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; Reg. carbon 15.15c; extra carbon 19.48c; special carbon 23.80c; oil-hardening 25.97c; high carbon-chromium 46.53c.

				Base.
W.	Cr.	V.	Mo.	per lb
18.00	4	1	- 141-	72.49
1.5	4	1	8.5	58.43
	4	2	3	58.43
6.40	4.15	1.90	5	62.22
5.50	4.50	4	4.50	75.74

Rivets

Fob Pittsburgh, Cleveland, Chicago, Birmingham

Structural 3.75c .65-5 off

#### Washers, Wrought

#### Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chi-cago. Additional discounts: 5 for carloads; 10 for full containers, except tire, step and plow bolts.

	Tire bo.	lts			• • • • • •	50 011
	Plow bo	lts	•••••			65 off
	1 1010 00	11.3	64	The late		00 011
-	In nach	ragos hi	stove	urate 7	1-10 0	f nute
	nttoch	ied 71 c	off hulk	- 80 of	f on 15	000 of
	3-in.	and shot	ter. or	5000 0	er 3 in	nuts
	separa	nte.	,	0000 0		
			Nu	fe		
	Semifini	shed hex	***	11	SS	S.A.E.
	-7-in. a)	nd smalle	er			64
	1/in. at	nd smalle	r		62	
	1/2-In1-	In				60
	12-in1-	in			59	
	1%-in]	1/2-in			57	58
	1%-in. /	and large	er		56	
	Addition	nal discou	int of 10	) for 1u.	li kegs.	
		He	xagon C	ap Screv	¥8	61.115
	Upset 1	-in., sma	ller			. 64 off
	Milled 1	-in., sma	uller	Q_4		. 60 011
	Ilmant 1	in and	re Head	Set Ser	ews	71
	Upset 1	-in, and	and lar			- 60 off
	No 10	and smal	ler	gei		70 off
	Stain	less S	teels			
	(0)	en marke	t prices.	OPA I	orice con	ntrol
		suspe	nded Oct	t. <b>11, 1</b> 9	45.)	
		B	ase, Cen	ts per It	)	
	CHROM	HUM NIS	CKEL S	TEELS	15-1	1 1 2 2 2 2
					H. R.	C. R.
15	0.000	Rong	Plates	Sheets	Strip	Strip
83	302	. 25.96c	29.21c	36.79c	23.930	30.30c
	303	. 28.13	31.38	38.95	29,21	35.71
	209	21.05	31.38	38,90	20.40	32.40
	309	38 05	12 28	50 85	40.03	50,85
	310	53 02	56.26	57.35	52 74	60.59
	312	. 38.95	43.28	53.02		
	•316	. 43.28	47.61	51.94	43.28	51.94
	1321	. 31.38	36.79	44.36	31.65	41.12
	1347	. 35.71	41.12	48.69	35.71	45.44
-2	431	. 20.56	23.80	31.38	18.94	24.35
100	STRAI	GHT CHI	ROMIUM	STEE	Ľ	
	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	20.00	24.25	21.00	20.04	24.00
	4404	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	39.49	37.87	56,26
	501	. 8.66	12.98	17.04	12.98	18.39
	502	. 9.74	14.07	18.12	14.07	19.48
-	STAIN	LESS CL	AD STE	EL (20	%)	177-100
-	(Fob F	Ittsburgh	and V	Vashing	on, Pa	, plate
	prices i	nclude an	nnealing	and plo	kling.)	
	304		19.48	20.56		
	410		17.31	18.39		
	430		17.85	18.94		A
	446		19.48	20,56		A

11/k/ and larger, all lengths ...... 59 off All diameters, over 6-in. long ...... 59 off

• With 2-3% molybdenum. \$ With fitanium. † With columbium. •• Plus machining agent. †† High carbon. || Free machining.

#### **Metallurgical Coke**

Price Per Net Ton	
Beehive Ovens	10.1
Connellsville, furnace	*7.50
Connellsville, foundry	.8.00- 8.50
New River, foundry	9.00- 9.25
Wise county, foundry	7.75- 8.25
Wise county, furnace	7.25- 7.75
By-Product Foundry	
Kearney, N. J., ovens	13.05
Chicago, outside delivered	13.00
Chicago, delivered	13.75
Terre Haute, delivered	13,50
Milwaukee, ovens	13.75
New England, delivered	14.65
St. Louis, delivered :	†13.75
Birmingham, delivered	10.90
Indianapolis, delivered	13.50
Cincinnati, delivered	13,25
Cleveland, delivered	13.20
Buffalo, delivered	13.40
Detroit, delivered	13.75
Philadelphia, delivered	13.28

\*Operators of hand-drawn ovens using trucked coal may charge \$8.00; effective May 26, 1945. †14.25 from other than Ala., Mo., Tenn.

#### **Coke By-Products**

Spot, gal, freight allowed east of	Omaha
Pure and 90% benzol	15.00c
Toluol, two degree	27.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c
Per pound fob works	
Phenol (car lots, returnable drums)	10.50c
Do., less than carlots	11.25c
Do., tank cars	9.50c
Eastern plants, per pound	
Naphthalene flakes, balls, bbl, to job-	
bers	8.00c

Per ton, bulk, fob port Sulphate of ammonia ... ..... \$29.20

### WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras. Quotations based on OPA mill prices announced March 1, 1946. Open market prices designated by dagger.

Hot-rolled bars	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 heavier wider than 6-inch)	Galvanized flat sheets (24-gage bare)	Cold-rolled sheet (17-gage base)	Cold finished bars	Cold-rolled strip
Boston	4.162 <sup>1</sup> 4.008 <sup>1</sup> 3.997 <sup>1</sup>	4.162 <sup>1</sup> 4.018 <sup>1</sup> 4.018 <sup>1</sup>	5.977 <sup>3</sup> 5.824 <sup>3</sup> 5.824 <sup>3</sup>	3.999 <sup>1</sup> 3.815 <sup>1</sup> 3.815 <sup>2</sup>	5.450 <sup>4</sup> 4.524 <sup>3</sup> 4.524 <sup>3</sup>	4.356 <sup>1</sup> 4.224 <sup>1</sup> 4.224 <sup>1</sup>	5.674 <sup>14</sup> 5.460 <sup>10</sup> 5.460 <sup>10</sup>	4.969 <sup>14</sup> 4.838 <sup>14</sup> 4.838 <sup>14</sup> 5.00725	4.594 <sup>11</sup> 4.553 <sup>11</sup> 4.553 <sup>11</sup> 4.099 <sup>12</sup>	4.985 5.024 5.024 5.029
Philadelphia 4.072 <sup>1</sup> Baltimore	3.916 <sup>1</sup> 4.009 <sup>1</sup>	3 855 <sup>1</sup> 3 844 <sup>1</sup>	3.768 <sup>1</sup> 5.502 <sup>1</sup>	3.743 <sup>1</sup> 3.619 <sup>1</sup>	4.6021	4.172	5.3441	5.077*	4.502**	
Washington 4.1911	4.180	4.0461	5.5911	3.8211	4.7411	4.2911 4.4151	5.646 <sup>17</sup> 5.821 <sup>11</sup>	5.066 <sup>14</sup> 4.490 <sup>14</sup>	4.491 <sup>m</sup> 4.615 <sup>m</sup>	
Bethlehem, Pa.	3.701	4.121.	5.715-	0.550						
Coatesville, Pa.		3.70 <sup>4</sup> 3.70 <sup>4</sup>								4 010
Buffalo (city) 3.60 <sup>1</sup> Buffalo (country) . 3.50 <sup>1</sup> Pittsburgh (city) 3.60 <sup>1</sup>	8.65 <sup>1</sup> 3.55 <sup>1</sup> 8.65 <sup>1</sup>	3.88 <sup>1</sup> 3.55 <sup>3</sup> 3.65 <sup>3</sup>	5.51 <sup>1</sup> 5.15 <sup>1</sup> 5.25 <sup>1</sup>	8.575 <sup>1</sup> 3.475 <sup>1</sup> 3.575 <sup>1</sup>	4.169 <sup>1</sup> 3.85 <sup>1</sup> 3.95 <sup>1</sup>	4.069 <sup>1</sup> 4.060 <sup>1</sup> 3.850 <sup>1</sup> 9.750 <sup>1</sup>	5.20 <sup>36</sup> 5.10 <sup>36</sup> 5.20 <sup>36</sup> 5.10 <sup>36</sup>	4.625 <sup>10</sup> 4.625 <sup>10</sup> 4.625 <sup>10</sup> 4.525 <sup>10</sup>	4.20 <sup>m</sup> 4.20 <sup>m</sup> 4.20 <sup>m</sup> 4.10 <sup>m</sup>	4.60 4.70 4.60
Cleveland (city) 3.60 <sup>1</sup>	8.55 <sup>1</sup> 8.838 <sup>1</sup>	3.55 <sup>4</sup> 3.65 <sup>1</sup>	5.438	8.5751 8.5751	3.951 9.951	3.850 <sup>1</sup>	5.827*	4.625 <sup>34</sup> 4.525 <sup>34</sup>	4.20 <sup>m</sup> 4.10 <sup>m</sup>	4.70 4.60
Detroit 3.70 <sup>1</sup>	3.911 <sup>1</sup>	3.8594	5.5311	3.475 <sup>-</sup> 3.675 <sup>1</sup>	4.0501	3.950 <sup>1</sup>	5.4504	4.725*	4.251	4.909
Omaha (city, del.). 4.293 <sup>3</sup> Omaha (country)4.193 <sup>3</sup> Cincinnati 3.861 <sup>1</sup>	4.343 <sup>1</sup> 4.243 <sup>1</sup> 3.941 <sup>3</sup>	4.343 <sup>1</sup> 4.243 <sup>1</sup> 3.911 <sup>1</sup>	5.943 <sup>1</sup> 5.843 <sup>1</sup> 5.541 <sup>1</sup>	4.018 <sup>1</sup> 3.918 <sup>1</sup> 3.650 <sup>1</sup>	4.498 <sup>1</sup> 4.398 <sup>1</sup> 4.025 <sup>1</sup>	4.393 <sup>1</sup> 4.293 <sup>1</sup> 3.925 <sup>1</sup>	5.865 <sup>11</sup> 5.275 <sup>11</sup>	4.700*	4.461*	4.961
Youngstown					9 951	8 7504	4.85 <sup>18</sup> 5.10 <sup>16</sup>			
Middletown. O. <sup>*</sup> Chicago (city) 8.75 <sup>1</sup> Milwaukee 3.887 <sup>1</sup> Indianapolia 3.83 <sup>1</sup>	3.80 <sup>1</sup> 3.937 <sup>1</sup> 3.88 <sup>1</sup>	3.80 <sup>1</sup> 3.937 <sup>1</sup> 3.88 <sup>1</sup>	5.40 <sup>4</sup> 5.537 <sup>1</sup> 5.48 <sup>1</sup>	3.475 <sup>1</sup> 3.612 <sup>1</sup> 3.743 <sup>1</sup>	3.95 <sup>1</sup> 4.087 <sup>1</sup> 4.118 <sup>1</sup>	3.850 <sup>1</sup> 3.987 <sup>1</sup> 4.018 <sup>1</sup>	15.40 <sup>16</sup> 5.722 <sup>10</sup> 5.368 <sup>10</sup>	4.425 <sup>14</sup> 4.562 <sup>14</sup> 4.793 <sup>14</sup>	4.20 <sup>m</sup> 4.337 <sup>m</sup> 4.43 <sup>m</sup> 4.811 <sup>m</sup>	4.90 5.087 5.030 5.352
St. Paul4.018	4.06	4.06*	5.664	8.785	4.272*	4,172*	5.622*	4.572*	4.481	5.181
Memphis, Tenn 4.265 <sup>1</sup> Birmingham 3.65 <sup>1</sup>	3.947* 4.315 <sup>1</sup> 3.80 <sup>1</sup>	4.315 <sup>1</sup> 3.80 <sup>4</sup>	6.031 6 1591 6 3201	4.190 <sup>1</sup> 3.675 <sup>1</sup> 4.283 <sup>1</sup>	4.565 <sup>1</sup> 4.05 <sup>1</sup> 4.658 <sup>1</sup>	4.465 <sup>8</sup> 3.950 <sup>1</sup>	5.715 <sup>14</sup> 5.20 <sup>14</sup> 5.808 <sup>15</sup>	5.005 <sup>34</sup> 5.077 <sup>34</sup> 5.304 <sup>24</sup>	4.78 <sup>n</sup> 4.99 <sup>21</sup> 5.079 <sup>21</sup>	5.465
Houston, Tex 4.00 <sup>a</sup>	4.50	4.50	5.75*	8.965	4.603*	4.563*	5.763**	7 4950	6.0332	5.863
Los Angeles 4.65 <sup>4</sup> San Francisco 4.40 <sup>4</sup> Portland, Oreg 4.70 <sup>34</sup>	4.90 <sup>4</sup> 4.60 <sup>r</sup> 4.70 <sup>st</sup>	5.204 4.90 <sup>1</sup> 5.00 <sup>31</sup>	7.454 6.601 6.7521	5.2254 4.775 4 875 4 975	5.30* 6.10* 6.65* 5.80*	4.750 <sup>°</sup> 5.000 <sup>sr</sup> 4.60 <sup>s</sup>	6.80 <sup>11</sup> 6.20 <sup>11</sup> 6.40 <sup>15</sup>	7.525 <sup>11</sup> 6.825 <sup>11</sup> 6.55 <sup>15</sup>	5.783 <sup>11</sup> 5.983 <sup>10</sup> 6.23 <sup>11</sup>	7.583
Tacoma, Wash 4.60 <sup>e</sup>	4.70	5.00*	6.75	4.87	5.80	4.604	6.4015	6.5515	6.23 <sup>n</sup>	

\*Basing point cities with quotations representing mill prices, plus ware house spread. NOTE—Ceiling prices fixed by Office of Price Administration in revised price schedule No. 49, as amended. Deliveries outside above cities computed in accordance with regulations.

BASE QUANTITIES 400 to 1999 pounds; 400 to 14,999 pounds; any quantity; 500 to 1999 pounds; 400 to 8999 pounds; 400 to 89 399 pounds; 400 pounds; 500 to 9999 pounds; 400 to 39 399 pounds; 400 pounds; 500 to 1499 pounds; 50

to 1499 pounds; <sup>14</sup>—one bundle to 1499 pounds; <sup>14</sup>—one to nine bundles; <sup>14</sup>—one to six bundles; <sup>16</sup>—100 to 749 pounds; <sup>16</sup>—300 to 1999 pounds; <sup>16</sup>—1500 to 39,999 pounds; <sup>16</sup>—1500 to 1999 pounds; <sup>16</sup>—1000 to 39,999 pounds; <sup>16</sup>—400 to 1499 pounds; <sup>16</sup>—1000 to 1999 pounds; <sup>16</sup>—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base; <sup>17</sup>—300 to 4999 pounds.

Dres Lake Superior Iron Ore Gross ton, 511/5% (Natural) Lower Lake Ports Did range bessemer	Indian and African         48% 2.8:1         48% 3:1         48% no ratio         South African (Transvaal)         44% ne ratio         45% no ratio         50% no ratio         50% no ratio         Brazilian-nominal         44% 2.5:1 lump         48% 3:1 lump	Rhodesian         39.75       45% no ratio       \$28.30         41.06       48% or ratio       \$1.00         31.00       48% 3:1 lump       \$4.00         Domestic (seller's nearest rail)       48% 3:1       \$43.50         28.30       31.00       Manganese Ore         32.80       Sales prices of Office of Metals Reserve, cents per gross ton unit, dry, 48%, at New York, Philadelphia, Bal-         185, 45%, at New York, Mobile and New       Valean, 85c; Fontana, Calif., Prove,	Utah, and Pueblo, Colo., 91c; price include duty on imported ore and are subject to premiums, penaities and other provisions of amended M.P.R. No. 248, effective May 13, 1944. Price at basing points which are also points of discharge of im- ported manganese ore is fob cara, shipside, at dock most favorable us the buyer. Outside shipments direct than Metal Reserve prices. Melybdenam Sulphide conc., lb, Mo cont., mines
Foreign Ore Cents per unit, cli Atlantic ports		and the second second second	
Manganiferous ore, 45- 55% Fe, 6-10% Mn. Nom. N. African low phos. Nom.	4	NATIONAL EMERGENCY STEELS (Hot	Rolled)

N. African low phos.	Nom.
Swedish basic, 60 to 68%	Nom.
Spanish, N. African ba-	
sic. 50 to 60%	Nom.
Brazil fron ore, 68-69%	
fob Rio de Janeiro	7.50-8.00

	Tun	gsten	Ore	
Chinese short paid	Wolfn ton u	amite, mit,	per duty	\$24.00
	Chu	ome	Ore	
(Equ	ivalent	OPA	schedu	les):
Gross t Philad	on fol lelphia,	b car Balt	imore,	o York, Charles-

.08-.15 .08-.15 .08-.15 .15-.25 .20-.30 .20-.30 .13-.18 .23-.28 .80-1.10 .80-1.20 15.60 16.64 13.52 24.96 24.96 .780 .30-.60 .20-.35 .30-.50 NE 9425 ..... .676 1.248 1.248 0 .30 .30

Cr.

30-.50

NL

30-.60

Chemical Composition Limits, Per Cent-

SŁ

.20-.35

Billet

per GT

\$26.00

28.00 27.04 23.91 32.24

32.24

Basic open-hearth Electric furnace

Billets per GT \$15.60

Bars

Mo.

per 100 lb.

\$0.780

Bars

100 lb.

\$1.300 1.300 1.352 1.196 1.612 1.612

 NE NE NE	9442 9722 9912 9920	 .4045 .2025 .1015 .1823	1.00-1.30 .5080 .5070 .5070	.2035 .2035 .2035 .2035	.8050 .1025 .4060 .4060	.4070 1.00-1.1 1.00-1.1
	-	 - Jalalon	he a here	p la selar	808a mer	pound a

Mn.

(Extras for alloy content)

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Carbon

Desig-nation

NE 9415

#### Pig Iron

Prices (in gross tons) are maximum fixed by OPA Price Schedule No. 10, effective June 10, 1941, amended Feb. 14, Oct. 23, 1945, and March 15, 1946. Exceptions indicated in footnotes. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included.

	No. 2			Mal-
	Foundry	Basic	Bessemer	leable
Bethlehem, Pa., base	\$27.50	\$27.00	\$28.50	\$28.00
Newark, N. J., del.	29.03	28.53	30.03	29.53
Brooklyn, N. Y., del	30.00			30.50
Birdsborn, Pa., base	27.50	27.00	28.50	28.00
Birmingham, hase	22.88	21.50	27.50	
Baitimore del	28 11	maree		
Buston del	27.64			
Chicago del	26 72			
Cincinnati del	26 94	26.06	1	
Cleveland del	26.62	25 74		
Newark N .T	28 64			
Philadelphia del	27.96	27.48		
St Louis del	26.62	27 54		
Buffain, hase	26.50	25.50	27.50	27 00
Boston del	28.00	27.00	29.00	28.50
Rochester del	28.03		29.03	28 53
Syracuse del	28 58		29.58	29.08
Chicago hoso	26.50	28.00	27.00	29.00
Milwankaa dat	27 60	27 10	28 10	27 60
Muskegon Mich del	27 69	#1.10	20,20	27 69
Clereland have	26.50	28.00	27 00	96 50
Akron Conton dol	27 89	27 90	29 90	27.90
Detroit base	28.50	26.00	27.00	20 50
Saginaw Mich del	28 91	28.91	20.31	20.00
Duinth base	27.00	26.50	27 80	27.00
St Paul del	20 13	28.63	20.63	20.13
Rrie. Pa hace	26 50	26.00	27 50	27 00
Everett. Mass have	27.50	27 00	28.50	28.00
Roston del	28.00	27 50	29.00	28.50
Granita City III base	26.50	26.00	27.00	26.50
St Louis del	27.00	26 50		27.00
Ramilton O bere	28 50	28.00		26.50
Cincinnati del	27 61	27 11		27 61
Neville Island Pa hore	26 50	26.00	27.00	26.50
Plitshursh del N & C sides	27 10	26.60	27 80	27 19
Provo. Utab have	24 50	24.00	21.00	
Sharnsville Pa base	29.50	24.00	27 00	98 50
EDETTUTE Point hase	27 50	27,00	21.00	20.00
Baltimore del	29.40	21.00		
Stellon Pa hasa	40.30	97.00	*****	
Swideland Pe base	27 50	27.00	28 50	28.00
Philadelphia dol	29.34	27 84	40.00	28.04
Toledo, Q. hase	26 50	26.00	27.00	28.50
Youngstown O have	20.50	26.00	27.00	28.50
Mansfield O dal	20.00	27 04	29.04	28 44

\*To Neville Island base add: 55 cents for McKees Rocks, Pa.; 84 cents, Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Allquippa; 87 cents (water), Monongahela; \$1.11, Oakmont, Verona; \$1.24. Brackenridge.

Exception to Celling Prices: Struthers Iron & Steel Co., Struthers, O., may charge 50 cents a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable pig iron. Celling Prices are aggregate of (1) governing basing point, (2) differ-

entials, and (3) transportation charges from governing basing point. (2) differ-point of delivery as customarily computed. Governing basing point to the one resulting in lowest delivered price for the consumer.

Perromanganese, standard: 78-82% C.I. gross ton, duty paid, \$135 fob cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer, Rockale or Rockwood, Tenn. (where Tennessee Products 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 less ton; \$170 for each 1%, or frac-tion contained manganese over \$2% tion contained manganese over 82%

or under 18%. Ferromansanese, low carbon: East-ferromansanese, low carbon: East-ferromansanese, low carbon: East-20.50c; medium, 14.50c; central 20.80c; medium, 14.50c; vestern medium, 14.80c; western men: Special, 21.55c; regular, 21.05c; medium, 15.75c. Prices are per pound contained Mn. bulk car-lot alignments, fob aligning point, freight allowed. Special low-carbon has content of 90% Mn. 0.10% C. and 0.06% p. Spiegeleigen: 19-21% carlot per

and 0.06% P. Spiezele en: 19-21% carlot per gross ton, Palmeton, Pa., \$36; Pittsburgh, \$40,50; Chicago, \$40,60. Electrolvite Manganese: 99.9% plus, fob Knowville, 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.

metal. Chromium Metal: 97% min. chromi-um, max. 0.50% carbon, eastern zone, per lb contained chromium bulk, cl., 79.50c, 2000 lb to cl. BC; central Sic and S2.50c; west-ern 82.25c and 94.75c; fob ship-ping point, freight allowed. Purrocolumbium: 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 10 cents

ton lots \$2.30. Spot prices 10 cents ber lh higher. Ferroehrume: High carbon, eastern zone, bulk, c.l., 13c, 2000 lb. to c.l. 13.90c; central, add .40c and .65c; western, add 1c and 1.85c--high nitrogen, high carbon ferro-chrume: Add 5c to all high carbon ferrochrome prices; all zones; low carbon eastern bulk c.l. may ferrochrome prices; all zones; low carbon eastern, bulk, c.l. max. 0.06% carbon, 23c, 0.10% 22:50c, 0.15% 22c, 0.20% 21:50c, 0.50% 21c, 1.00% 20:50c, 2.00% 19:50c; 2000 lb to c.l., 0.06% 24c, 0.10% 23:50c, 0.15% 23c, 2.00% 22:50c, 0.50% 22c, 1.00% 21:50c, 2.00% 20:50c; central, add 0.4c for bulk, c.l. and 0.65 for 2000 lb to c.l.; western, add 1c for bulk, c.l. and 1.85c for 2000 lb c.l.; carload packed differential 0.45c; fob ship-ping point, freight allowed. Prices per lb contained Cr, high nitrogen, low carbon ferrochrome rolces; all zones. For higher nitrogen carbon add 2c\_for each 0.25% of nitrogen add 2c for each 0.25% of nitrogen over 0.75%.

over 0.75%. Special Foundry Ferrochrome: (Cr 62-66%; C approx. 5-7%.) Con-tract, carload bulk 13.50c, packed 13.95c, ton lots 14.40c, less 14.90c, eastern, freight allowed, per pound contained chromium; 13.90c, 14.35c, 15.05c and 15.55c central; 14.50c, 14.95c, 16.25c and 16.75c, western; spet un 25c spot up .25c.

spot up .25c. S.M. Ferrochrome, h i r h carbon: (Cr 60-65%. Sl 4-6%, Mn 4-6% and C 4-6%.) Contract, carlot, bulk, 14.00c, packed 14.45c, ton lots 14.90c, less 15.40c, eastern, freight allowed; 14.40c, 14.85c, 15.55c and 16.05c, central; 15.00c, 15.45c, 16.75c

High Silicon	, Silver
--------------	----------

3.00-6.50	per cent	(base)	\$32.00
6.51-7.00	\$33.00	9.01- 9.50.	38.00
7.01-7.50.	34.00	9.51-10.00.	39.00
7.51-8.00 .	35 00	10.01-10.50.	40.00
3.01-8.50.	36.00	10.51-11.00.	41.00
3.51-9.00.	37.00	11.01-11.50.	42.00

Fob Jackson county, O., per gross ton; Buffalo base \$1.25 higher. Buyer may use whichever base is more favorable.

Electric Furnace Ferroailloon: SI 14.01 to 14.50%, \$45.50 Jackson co.; each additional 0.50% silicon up to and including 18% add \$1; low im-purities not exceeding 0.005 P, 0.40 SI, 1.0% C, add \$1.

#### Bessemer Ferrosilicon

Prices same as for high silicon sil-very iron, plus \$1 per gross ton.

#### Charcoal Pig Iroa

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Teon. \$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

#### Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Buffalo, N. Y., \$32.00 base; \$33.24, del. Philadel-phia. Intermediate phosphorus, Central Furnace, Cleveland, \$29.00.

#### 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 a ton for phosphorus content of 0.70 per cent and over.

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%.

Nickel: An additional charge for

#### **Ferroalloy Prices**

and 17.25c, western; spot up .25c;

and 17.25c, western; spot up .25c; per pound contained chromlum. S M Ferrochrome, I o w carbon: (Cr 62-66%, Si 4-6%, Mn 4-6% and C 1 25% max.) Contract, carlot, bulk, 20.00c, packed 20.45c, ton lots 21.00c, less ton lots 22.00c, eastern, freight allowed, per pound contained chromium; 20.40c, 20.85c, 21.65c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up .25c, .25c.

22.85c and 23.85c, western; spot up .25c. SMZ Alloy: (SI 60-65%, 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 .25c. Silicaz Alloy: (SI 35-40%, Ca 9-11%, Al 5-7%, Zr 5-7%, Tl 9-11% and B 0.55-0.75%), per lb of alloy con-tract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed, 25 50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up .25c. Silicaz Alloy: (SI 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 4c. CMSZ Alloy 4: (Cr 45-49%, Mn 4-6%, SI 18-21%, Zr 1.25-1.75% and

Spot up '4c. CMSZ Alloy 4: (Cr 45-49%, M 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 .25c. CMSZ Alloy 5: (Cr 50-56%, Mn 4-6%, Si 13.50-16.00%, Zr 0.75-

nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, \$2 a ton; for each additional 0.25% nickel, \$1 a ton.

#### Refractories

Per 1000 pieces, fob shipping point. Net prices

Fire Clay Brick Super Duty

#### Intermediate Heat Duty

Ohlo			50.60
Pa., Ill.,	Md.,	Mo., Ky	54.80
Ala., Ga			49.15
N. J			54.80

#### Low Heat Duty

Pa., Md., Ohlo ..... 42.35

Malleable Bung Brick

All bases	70.45
Ladie Brick (Pa., O., W. Va., Mo.)	
Dry Press Wire Cut	36.45 34.15
Silles Brick	
Pennsylvania Joliet, E. Chicago Birmingham, Ala	60.40 69.30 60.40
Magnesite	
Domestic dead-burned grains, net ton fob Chewelah, Wash., net ton, bulk net ton, bags	22.00 26.00
Basic Brick	
Net ton toh Baltimore Ply	nouth

Meeting, Chester, Pa. Magnesite brick 

#### Fluorspar

Metallurgical grade, fob III., Ky., net tons, carloads, CaF<sup>\*</sup> content, 70% or more, \$33; 65 but less than 70%, \$32; 60 but less than 65% \$31; less than 60%, \$30. After Aug. 29, 1944, base price any grade \$30,000 \$30.00.

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, 13.00c central;
13.25c, 13.75c, 14.50c and 15.00c, western; spot up 0.25c.
Ferro-Boron: (B 17.50% max, and C 0.50% max.) per lb of alloy contract 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 up 0.25c.
Marganese-Boron: (Mn 75% approx., B 15-20%, Fe 5% max.) per lb of alloy contract ton lots, \$1.89, less \$2.01, eastern; freight allowed;
\$2.075, eastern; freight allowed;
\$2.075, eastern; freight allowed;
\$2.076, Fe 5% max.) per lb of alloy. Contract ton lots, \$1.89, less \$2.01, eastern; freight allowed;
\$3.903 and \$2.023, central; \$1.935 and \$2.055 western; spot up 5c.
Nickel-Boron: (B 15-16%, Al 1% max, SI 1.50% max, C 0.50% max, SI 1.50% max, C 0.50% max, SI 1.90, 1 ton to 8 tons, \$2.00, less than ton \$2.10, eastern, freight allowed;
\$1.90, 1 ton to 8 tons, \$2.00, less than ton \$2.10, eastern; freight allowed;
\$1.90, 1 ton to 8 tons, \$2.00, less than ton \$2.10, eastern, freight allowed;
\$2.145, western; spot same as contract.
Chronium-Copper: (Cr 8-11%, Cu contract. Chromium-Copper: (Cr 8-11%, Cu

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: of St. Louis rate will be allowed;

of St. Louis rate will be allowed; spot up 2c. Vanadium Oxide: (Fused: Vana-dium oxide 85-88%, sodium oxide approx. 10% and calcium oxide approx. 2%, or Red Cake; Vana-dium oxide 85% approx, sodium ox-ide, approx. 9% and water approx
2.5%) Contract, any quantity, \$1.10 castern, freight allowed per pound vanadium oxide contained; contract carlots, \$1.105, less carlots, \$1.108, central; \$1.118 and \$1.133, western; central; \$1.135 and \$1.155, Western; spot add 5c to contracts in all cases. Calcium metal; cast: Contract ton lots or more \$1.35, less, \$1.60, pound of metal; \$1.36 and \$1.61 central, \$1.40 and \$1.65, western; spot up 5c.

spot up 5c. Calcium-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. Calcium-Silicon: (Ca 20.25%, Si

spot up 0.25c. Calcium-Silicon: (Ca 30-35%, Si 60-65% and Fe 3.00% max.), per 1b 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.

15.25c and 16.25c ecntral; 1.3.35c, 17.40c and 18.40c, western; spot up 0.25c. Briquets, Ferromanganese: (Weight approx. 3 lb and containing exactly 2 lb Mn) per lb of briquets. Con-tract, earlots, bulk 0.0605c, packed 0.063c, tons 0.0655c, less 0.068c eastern freight allowed; 0.063c, 0.055c, 0.0755c and 0.078c, central; 0.066c, 0.0765c and 0.078c, central; 0.066c, 0.0685c, 0.0855c and 0.088c, western; spot up 0.25c. Briquets, Ferrochrome: Containing exactly 2 lb Cr, eastern zone, bulk, c.l., 8.25c per lb of briquets, 2000 lb to c.l., 8.75c; central, add 0.3c for c.l. and 0.5c for 2000 lb to c.l.; western add 0.70c for c.l., and 0.2c for 2000 lb to c.l.; silleomanganese,

for 2000 lb to c.l.; silicomanganese,

eastern, containing exactly 2 lb Mn and approx. ½ lb Si, bulk, c.l., 5.80c, 2000 lb to c.l., 6.35c; central add 0.25c for c.l. and 1c for 2000 lb to c.l.; western, add 0.55c for c.l., and 0.2c for 2000 lb to c.l.; ferro-silicon, eastern, approx. 5 lb, con-taining exactly 2 lb Si, or weighing approx. 2½ lb and containing exactly 1 lb of Si, bulk, c.l. 3.35c, 2000 lb 'o c.l., 3.80c; central, add 0.15c for c.l., and 0.40c for 2000 lb to c.l.; western, add 0.30c for c.l. and 0.45c for 2000 to c.l.; fob shipping point, freight allowed. freight allowed.

Ferromolybdenum: 55-75% per lb contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

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.

SS8.50, spot \$62.25,
Ferrosilicon; Eastern zone, 90-95%, blk, c.l., 11.05c, 2000 lb to c.l., 12.30c; 80-90%, bulk c.l., 8.90c, 2000 lb to c.l., 9.95c; 75%, bulk, c.l., 8.05c, 2000 lb to c.l., 9.05c; 50%, bulk c.l., 6.65c and 2000 lb to c.l., 7.85c; central 90-95%, bulk, c.l., 11.20c, 2000 lb to c.l., 12.80c; 80-90%, bulk, c.l., 9.05c, 2000 to c.l., 7.10c, 2000 lb to c.l., 12.80c; western, 90-95%, bulk, c.l., 11.65c, 2000 lb to c.l., 15.60c; 80-90%, bulk, c.l., 9.55c, 2000 lb to c.l., 13.50c; 75%, bulk, c.l., 8.75c, 2000

lb lb to c.l., 13.10c; 50%, bulk, c.l., l., 7.25c, 2000 lb to c.l., 8.75c; fob ship-ral ping point, freight allowed. Prices 00 per lb contained Si.

Grainal: Vanadium Grainal No. 1 87.5c; No. 6, 60c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

Silicon Metal: Min. 97% Si and Silicon Metal: Min. 97% Si and max. 1% Fe, eastern zone, bulk, c.l., 12.90c; 2000 lb 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 con-tained Si.

Manganese Metal: (96% min. 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;

ern zone, bulk, c.l. 30c, 2000 lb to c.l., 32c, central, 30.25c, and 33c; western, 30.55c and 35.05c. Ferrotmagaten: Spot, 10,000 lb or more, per lb contained W, \$1.90; contract, \$1.88; freight allowed as far west as St. Louis. Tungsten Metal Powder: Spot, not less than 97%, \$2.50-\$2.60; freight allowed as far west as St. Louis. Ferrotitanium: 40-45%, R.R. freight allowed, per lb contained T1; ton lots \$1.23; less-ton lots \$1.25; east-ern. Spot up 5c per lb. Ferrotitanium: 20-25%, 0.10 maxi-mum carbon; per lb contained T1; reproduktion: 27-23%, 0.10 inter-num carbon; per lb contained Ti; ton lots \$1.35; less-ton lots \$1.40 eastern. Spot up 5c per lb. High-Carbon Ferrofitanium: 15-20% contract basis, per net ton, fob Niagara Falls, N. Y., freight al-

lowed to destination east of Missia-sippi river and north of Baltimore and St. Louis, 6.8% C \$142.50; 3-5% C \$157.50.

Carbortam: B 0.90 to 1.15% net ton to carload, &c per lb fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Bortam: B 1.5-1.9%, ton lots, 45c lb; less-ton lots, 50c lb.

Ferrovanadum: Va 35-55%, con-tract basis, per lb contained Va, fob producers plant with usual freight allowances; open-hearth grade \$2.70; special grade \$2.80; highly-special grade \$2.90.

Zirconium Alloys: Zr 12-15%, per lb Alreonium Alloys 2r 12-15%, per le of alloy, eastern contract, carlots, bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads, bulk, per gross ton \$102.50; packed \$107.50; ton lots \$103; less-ton lots \$112.50. Spot up <sup>1</sup>4c 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 ¼c. Alsifer: (Approx. 20% Al, 40% Sl, 40% Fe) contract basis fob Niagara Falls, N. Y., lump, per lb 5.50c; ton lots 6.00c. Spot up ¼c. Siminal: (Approx. 20% each Sl, Mn, Al) Contract, freight not ex-ceeding St. Louis rate allowed, per lb alloy; carlots 8c; ton lots 8.75c; less-ton lots 9.25c. Borosil: 3 to 4% B, 40 to 45% Sl, Sc.25 lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed. Zirconium Alloy: Zr 35-40%, eastern.

# OPEN MARKET PRICES, IRON AND STEEL SCRAP

- MARKET PRICES -

Following prices are quotations developed by editors of STEEL in the various centers. For complete OPA ceiling price schedule refer to maximum price regulation No. 4 Quotations are on gross tons. 24 50 No 1 Comp Bundlag 19.50 Street Car Ayles

(Dellardente)		Machine Turnings	14.20	No. 2 Comp. Bundles 10.50	Steel Palls 3 ft	21.50
(Delivered consumer's plan	it)	Short Shovel Turnings.	16.25	No. 2 Comp. Bundles 19.50	Steel Angle Bars	21.00
No. 1 Heavy Melt. Steel	\$18,75	Mixed Borings, Turn	14.25	Charaline Turnings 10.50-11.00	Cost Iron Whools	20,00
No. 2 Heavy Melt. Steel	18.75	Cast Iron Borings	15.25	Shoveling Turnings 12.50-13.00	No. 7 Machinamy Cast	20.00
No. 2 Bundles	18.75	Low Phos	21.75	Cast fron Borings 11.50-12.00	No. 1 Machinery Cast.	22.00
No. 3 Bundles	16.75			Mixed Borings, Turnings 10.50-11.00	Railrond Malleable	16.50
Mixed Borings, Turnings	13.75	PITTSBURGH:		No. 1 Cupola Cast 20.00	Breakable Cast	10.00
Machine Shop Turnings	13 75	(Delivered consumer's	s plant)	Breakable Cast 16.50	Stove Plate	15.00
Billet, Forge Crons	23 75	Railroad Heavy Melting	\$21.00	Low Phosphorus 21.00-22.00	Grate Bars	15.20
Bar Crons Plate Scran	21.25	No. 1 Heavy Melt. Steel	20.00	Scrap Rails 20.50-21.00	Brake Shoes	15.20
Cast Steel	21.20	No. 2 Heavy Melt. Steel	20.00	Stove Plate 18.50-19.00	The second s	
Punchinge	21.20	No. 1 Comp. Bundles	20.00	Store whate fifthere who solo solo	BIRMINGHAM:	1 1/ 1
Flog Dumpag Dundles	21.23	No. 2 Comp. Bundles	20.00	NETROIT.	(Delivered consumer's p	lant)
Liec, Furnace Bundles.	19.75	Short Shovel Turnings	17.00	DEIROIL.	Billet Forge Crons	\$22.50
Heavy Turnings	18.25	Mach Shop Turnings.	15.00	(Delivered consumer's plant)	Structural Plate Scrap	19.00
Cast Grades		Mined Deplace Puppings	15.00	Heavy Melting Steel \$17.32	Saran Dalla Dandom	18.50
(Fob Shipping Point)		Mixed Borings, Turnings	15.00	No. 1 Busheling 17.32	Berap Rans Random	20.50
Heavy Breakable Cast.	16.50	No. 1 Cupola Cast	°20.00	Hydraulic Bundles 17.32	Rerolling Ralls	20.50
Charging Box Cast	19.00	Heavy Breakable Cast	°16.50	Flashings 17.32	Angle Splice Bars	24.00
Cupola Cast	20.00	Cast Iron Borings	16.00	Machina Turninga 19.29	Solid Steel Axles	24.00
Unstripped Motor Blooks	17 50	Billet, Bloom Crops	25.00	Chant Chavel Thumburg 14.99	Cupola Cast	20.00
Mullanbla	11.00	Sheet Bar Crops	22.50	Short Shovel, Turnings. 14.32	Stove Plate	19.00
Chemical Desings	22.00	Plate Scran, Punchings	22.50	Cast Iron Borings 13.32	Long Turnings	11.00
Chemical Borings	16.51	Railroad Specialties	24 50	Low Phos. Plate 19.82	Cast Iron Borings	13.00
NEW YORK.		Soran Dail	24,00	No. 1 Cast 20.00	Iron Car Whools	20.00
(Dantavat busine ant		Scrap Rail	21.50	Heavy Breakable Cast. 16.50	from car wheels	
(Dealers buying prices)		Axies	26.00		LOS ANGELES:	
No. 1 Heavy Melt. Steel	\$15.33	Rall 3 It. and under	23.50	CHICAGO:	(Tallerand semanant's f	(Inst
No. 2 Heavy Melt. Steel	15.33	Railroad Malleable	22.00	(Dellaward community along	(Denvered consumer s F	\$14.00
No. 2 Hyd. Bundles	15.33	•Shipping point.		(Delivered consumer's plant; cast	No. 1 Heavy Melt. Steel	12.00
No. 3 Hyd. Bundles	13.33			grades fob shipping point; railroad	No. 2 Heavy Melt. Steel	10.00
Chemical Borings	14 33	CLEVELAND:		grades fob tracks)	No. 1, 2 Dlr. Bundles.	12.00
Machine Turnings	10 33	(Delivered consumer'	s plant)	No. 1 R.R. Heavy Melt. \$19.75	Machine Turnings	5.50
Mixed Borings Turninge	10.00	No. 1 Heavy Melt, Steel	\$19.50	No. 1 Heavy Melt. Steel 18.75	Mixed Borings, Turnings	5.00
No 1 Cupolo	10.33	No. 2 Heavy Melt. Steel	19.50	No 2 Heavy Malt Steel 1875	No 1 Cost	20.00
Changing Day	20.00	No 1 Comp Bundles	10 50	No 1 Ind Bundlos 1975	NO. 1 Cast	
Charging Box	19.00	No 2 Comp Bundles	10.50	No. 0 Dis Dundles 10.15	SAN FRANCISCO:	
Heavy Breakable	16.50	No 7 Dushallag	19.00	No. 2 Dir. Bunules 18.75	(The line of a sense in the first in the sense of the sen	lant)
Unstripped Motor Blocks	17.50	No. 1 Busneling	19.50	Baled Mach. Shop Turn. 18.75	(Delivered consumer s )	\$15.00
Stove Plate	19.00	Mach. Shop Turnings	14.50	No. 3 Galv. Bundles 16.75	No. 1 Heavy Melt. Steel	14 00
		Short Shovel Turnings .	16.50	Machine Turnings 13.75	No. 2 Heavy Melt. Steel	15 50
BOSTON:		Mixed Borings, Turnings	14.50	Mix. Borings, Sht. Turn. 13.75	No. 1 Bushellng	12.00
(Fob shipping points. Boston	differ-	No. 1 Cupola Cast	20.00	Short Shovel Turnings., 15.75	No. 1. No. 2 Bundles	13.00
ential 99c higher, steeln	naking	Heavy Breakable Cast.	16.50	Cast Iron Borings 14.75	No. 3 Bundles	8.00
grades: Providence, \$1.09 h	(gher)	Cast Iron Borings	13 50-14 00	Scran Rails 20.25	Machine Turnings	7.00
No. 1 Heavy Melt Steal	\$14.06	Billet Bloom Crops	24 50	Cut Palle & foot 22.25	Billot Forge Crops	15.50
No 2 Heavy Malt Steal	14.00	Sheet Bar Crops	29.00	Cut Italis, 5 feet 22.20	Binet, Forge Crops tot	15.50
No 1 Bundles	14.00	Dieto Comp Dunchings	22.00	Describer Delle 00.05	Bar Crops, Flate	15.50
No. 1 Dundles	14.06	Flate Scrap, Functings.	22.00	Rerolling Ralls 22.20	Cast Steel	
No. 2 Bundles	14.06	Elec. Furnace Bundles.	20.50	Angles, Splice Bars 22.25	Cut, Structural, Plate,	18.00
No. 1 Busheling	14.06	WATTEN.		Plate Scrap, Punchings 21.25	1 It and under	7.00
Machine Shop Turnings.	9.06	(Delivered consument	a mlamath	Railroad Specialties 22.75	Alloy-free Turnings	14 50
Mixed Borings, Turnings	9.06	(Denvered consumer	s plant)	No. 1 Cast 20.00	Tin Can Bundles	15 50
Short Shovel Turnings.	11.06	No. 1 R.R. Heavy Melt.	\$21.00	R.R. Malleable	No. 2 Steel Wheels	13.00
Chemical Borings	13.31	No. 1 Heavy Melt Steel	20.00	CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR	Tron Steel Axles	25.00
Low Phos Clinnings	16 56	No. 1 Comp. Bundles.	20.00	ST LOUIS.	No. 9 Cost Steel	15.50
No 1 Cast	20,00	Short Shovel Turnings	17.00	SI. LOUIS.	No. 2 Cast Steer Switches	15.00
Class Auto Cost	20.00	Cast Iron Borings	16.00	(Delivered consumer's plant; cast	Uncut Frogs, Switchast	15.00
Clean Auto Cast	20.00	Machine Shon Turnings	15.00	grades fob shipping point)	Scrap Rails	15.50
Stove Plate	19.00	Tom Phose Dista	22 50	Heavy Malting \$17.50	Locomotive Tires	
Heavy Breakable Cast.	16.50	100 1 1103. 1 late	46.00	No 1 Loopmotive Tires 21.00		
BUERLY O.		MANSFIELD:		No. 1 Locomotive Tires 21.00	SEATTLE:	
DUFFALO;	1	(Delivered consumer'	e nlant)	Mise. Ralls 19.00	(Dollwared consumer's I	lan
(Delivered consumer's plan	0	Maching Chap Turning	etr no	Railroad Springs 22.00	Denvered Condatteel	51 12
No. 1 Heavy Melt. Steel	\$19.25	machine Stop runnings	\$13.00	Bundled Sheets 17.50	No. 1 Heavy Melt. Steel	14.12
No. 2 Heavy Melt. Steel	19.25	CINCINNATI:		Axie Turnings 17.00	No. 2 Heavy Ment. Steer	14.50
No. 1 Bundles	19.25	(Delivered consumer's	s plant)	Machine Turnings 10.50	Heavy Railroad Scrap.	)
No. 2 Bundles	19.25	No. 1 Heavy Melt, Steel	\$19.50	Shoveling Turnings 12.50	(Fob snipping point	20.00
No. 1 Busheling	19 25	No 2 Heavy Melt, Steel	19.50	Recolling Rails	No. 1 Cupola Cast	
		a second bill bill bill bill bill bill bill bil				

# LOGEMANN Presses for Sheet Scrap

### THE NATION NEEDS YOUR SHEET SCRAP!

In mills, industrial plants and scrap yards, LOGEMANN SCRAP PRESSES are working day and night to prepare sheet scrap for the furnaces.

Sheet mills particularly recognize the value of the years of 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 earlots 12.00c, Del. Conn., less carlots 12.124/c, refinery; dealers may add %c for 5000 lbs. to carload: 1000-4999 lbs. lc: 500-999 14/c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more: 12.00c less than 20,000 lbs.

Brass Isrot: Carlot prices, including 25 cents per hundred freight allowance; add ¼c for lass than 20 tons; 85-5-5 (No. 115) 13.00c; 85-10-2 (No. 215) 16.50c; 80-10-10 (No. 805) 15.75c; No. 1 yellow (No. 405) 10.00c.

Eine: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, chemical, 6.45c, corroding, 6.45, E. St. Louis for carloads; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenonha districts; add 15 points for Claveland-Akron-Detroit area, New Jersey, New York state, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester, Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 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) 10.50-11 00c; No. 12 foundry alloy (No. 2 grade) 10.50-10.75c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-971, 1) 11.75-12.00c; grade 2 (92-95%) 10.25-10.75c; grade 3 (90-92%) 8.50-9.00c; grade 4 (85-90%) 8.25-8.50c. Above prices for 30,000 lb or more; add Vac 10,000-30,000 lb; Vac 1000-10.000 lb; 1c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lb) 20.50c per lb, carlots; 22.50c 100 lb to c.l. Extruded 12-in. sticks 27.50c, carlots; 29.50c 100 lb to c.l.

The: Prices ex-dock, New York in 5-ton lots, Add 1 cent for 2240-11,199 lbs., 13/c 1000-2239. 23/c 500-999. 3c under 500. Grade A. 99.8% or higher (includes Straits). 52.00c; Grade B. 90.8% or higher, not meeting specifications for Grade A. with 0.05 per cent maximum armenic, 51.871/c; Grade C. 99.65-99.79% incl. 51.621/c; Grade D. 99.50-99.64% incl., 51.50c; Orade E. 99-99.49% incl. 51.121/c; Grade F, below 99% (for tin content), 51.00c.

Antimony: American bulk carlots fob Larredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50c; 99.8% and over (arsenic, 0.05%, max. and other impurities, 0.1%, max.) 15.00c. On producers' sales add ¼c for less than carload to 10,000 lb.; ¼c for 9909-224 lb.; and 2c for 223 lb. and less; on sales by dealers, distributors and jobbers add ¼c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.5%, fob refinery 35.00c lb.; 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, \$103-\$107 per 76-lb flask,

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., \$14.75 lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods. slabs. sticks, and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls. discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, \$1.50 lb., for 550 lb. (bbl.); \$1.52 lb. for 100 lb. (case); \$1.57 lb. under 100 lb.

Indium: 99.9%, \$2.25 per troy ounce.

Gold: U. S. Treasury, \$35 per ounce.

er: Open market, N. Y. 70.625c per ounce.

m: \$35 per ounce.

Palladium: \$24 per troy ounce.

Iridium: \$165 per troy ounce.

#### **Rolled, Drawn, Extruded Products**

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lb or more.)

Shret: Copper 23.44c; ýellow brass 22.09c; commercial bronze, 90% 23.68c, 95% 23.89c; red brass, 80% 22.76c, 85% 22.97c; phosphor bronze, grades A and B 5%, 41.20c; Everdur, Herculoy, Duronze or equiv., 28.61c; naval brass 27.11c, manganese bronze 30.61c; muntz metal 25.36c; nickel silver 5% 31.31c.

Rods: Copper, hot-rolled 19.79c; cold-drawn 20.79c; yellow brass 17.06c; commercial bronze 90% 23.37c, 95% 23.58c; red brass 80% 22.45c. 85% 22.66c; phosphor bronze grades A and B 5% 41.45c; Everdur, Herculoy, Duronze or equiv., cold-drawn, 27.55c; naval brass 21.17c; manganese bronze 24.55c; muntz metal 20.92c; nickel silver 5% 32.94c.

Seamless Tubing: Copper 23.48c; yellow brass 24.85c; commercial bronze 90% 26.09c; red brass 80% 25.42c, 85% 25.63c.

Extruded Shapes: Copper 23.29c; architectural bronze 21.17c; manganese bronze 26.05c; muntz metal 22.17c; naval brass 22.42c.

Angles and Channels: Yellow brass 30.59c; commercial bronze 90% 32.18c; red brass 80% 31.26c, 85% 31.47c.

**Copper Wire:** Soft, fob eastern mills, carlots 15 371/2c, less-carlots 15.871/2c; weatherproof, fob eastern mills, carlots 17.00c, less-carlots 17.50c; magnet, delivered carlots 17.50c, 15,000 lb or more 17.75c, less carlots 18.25c.

Aluminum Sheets and Circles: 2s and 3s flat mill finish, base 30,000 lbs. 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	25.70e
11-12	28-48	24.20c	27.00e
13-14	26"-48"	25.20c	28.50e
15-16	26"-45	· 26.40c	30.40c
17-18	26"-48"	27.90c	32.90e
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31 70c	37.30c
23-24	3"-24"	25.60c	29,20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.25c, Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

Zine Products: Sheet fob mill, 13.15c; 36,000 lbs. and over deduct 7%; Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2%, 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 8 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

#### PLATING MATERIALS

Chromie Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu, 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu. 100-lb. kegs or bbls. 34.00c fob Niagara Falls.

Sodium Cyanide: 96%, 200-lb. drums 15.00c; 10.000-lb. lots 13.00c fob Niagara Fails.

Nickei Anodes: 500-2999 lb. lots; cast and rolled carbonized 47.00c; rolled depolarized 43.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbis. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystais: 400 lb. bbls. 39.00c fob Grasselli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del.; ton lots 35.50c.

Zine Cyanide: 100-lb. kegs or bbls. 33.00c fob Niagara Falls.

#### **Scrap Metals**

Brass Mill Allowances: Prices for less than 15,000 lbs. fob shipping point. Add %c for 15,000-40,000 lbs.; 1c for 40,000 or more.

		Clean Heavy	Rod Ends	Clean Turning
Copper		10.250	10.250	9.500
Yellow	Copper	8.75	8.75	7 875
Comme	rcial bronze	0.020	0.010	mone
90 %		9.375	9.125	8.626
95 %		9.500	9.250	8,759
Red Bi	rass, 85%	9.125	8 176	8.375
Red B	rass, 80%	9.125	8.810	S YID
Muntz	Metal	8.000	7 750	7.200
Nickel	SII, 5%	9,280	9.000	4 425
Phos.	br., A, B, 5%	11.000	10 780	9 190
Naval	brass	8.250	8.000	7.800
Mang.	bronze	8.250	1.000	7.800

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are fob shipping point; add % for shipment of 60,000 lbs. of one group and % for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) Soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbit-lined brass bushings 13.00c.

(Group 3) Admiralty condenser tubes, brass pipe, 7.25c; muntz metal condenser tubes 6.75c; old rolled brass 6.75c; manganese bronze solids: (lead 0.00%-0.40%) 5.50c; (lead 0.41%-1%) 4.50c; manganese bronze borings: (lead 0.00-0.40%) 4.00c; (lead 0.41%-1%) 5.00c.

Atuminum Scrap: Price fob point of shipment, truckloads of 5000 pounds or over: Segregated solids, 2S, 3S, 5c ib., 11, 14, etc., 3 to 3.50c lb. All other high grade alloys 5 ib. Segregated borings and turnings, wrought alloys, 2, 2.50c ib. Other high-grade alloys 3.50, 4.00c ib. Mixed plant scrap, all solids, 2, 2.50c ib. borings and turnings one cent less than segregated.

Lead Scrap: Prices fob point of shipment, For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

Zine Serap: New clippings 6.50c, old zine 4.75c, fob point of shipment, add ½c for 10.000 b or more. New die cast scrap 4.45c, radiator grilles 3.50c, add ½c for 20,000 lb or more. Unsweated zine dross, die cast slab 5.30c, any quantity.

Nickel, Monel Scrap: Prices fob point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over 4% copper 23.00c: 90-98% nickel, 23.00c per ib nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 25.00e for contained nickel only.

Monei: No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

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#### Sheets, Strip . . .

Sheet & Strip Prices, Page 162

Further acceptance of tonnage of sheets and strip for delivery this year is practically out of the question, delays by strikes having interfored with production to an extent that all capacity has been covered, with large carryovers into next year. Imposition of the freight embargo last week stops receipt of further material from mills and consumers can operate only by virtue of inventories, which are not large.

Philadelphia — In expectation of the freight embargo some consumers in great need of sheets have been willing to accept tonnage without complete processing if it could be moved before the deadline. Some sheet buyers have offered to accept sheets in double widths to save time involved in final slitting. Delay in production as a result of the coal strike is likely to force some sheet sellers who have been on a quarterly quota basis to bypass third quarter entirely. Some are sure they will be unable to set up quotas for that period before August.

Chicago — Demand for sheets persists despite the coal strike, which is affecting not only steel plant operations but also curtailing manufacturing operations. As manufacturing plants are limited to 24 hours a week by the order to conserve electric power, consumption of sheets will drop proportionately. Sheetmaking capacity dropped sharply this week with the closing by Carnegie-Illinois Steel Corp. of its sheet division in Gary because of insufficient power. Other mills are likely to reduce sheet mill operations within the next few days.

New York — The coal strike and other labor disturbances have further delayed expansion in sheetmaking facilities, badly needed installations for increased electrical sheet production have been delayed until it is clear that little new capacity can be counted on before late fourth quarter. Just before the coal strike it was expected that much of this expansion in electrical sheets would be completed by September. Work on important sheet rolling units is also being delayed, in some cases for several months. Demand for light flat-rolled products is more urgent than ever, although various large consumers are being forced to curtail operations because of shortage of fuel for their own plants. Boston—Narrow cold strip production,

Boston-Narrow cold strip production, for some time on the decline, will be further curtailed by lack of hot-rolled steel; most mills are out of more grades, and with schedules disrupted, definite delivery promises are impossible. Six to eight weeks have already been lost in the second stoppage, piling up carryovers with the most drastic pinch ahead for both producers of cold strip and consumers of that product. Demand is heavy, notably for round edge high carbon, but buying is affected by uncertainty in supply. More fabricators are revising earlier reconversion goals, not colly because of the potential steel supply, but also in component parts. Revival in ordnance inquiry is attracting slight attention. Springfield armory is readvertising 360 tons of cold-rolled steel on which no bids were received and 1120 tons of cartridge clip steel. Newman Steel Corp., Pawtucket, R. I., shares in part, 180 tons of an earlier 1786-ton

part under option A at 7.9326c. Cancellation of light gage hot-rolled sheet tonnage on a broad scale over the balance of this year, including warehouse commitments, has been made by one large producer. Coupled with sharply restricted production of carbon grades by some producers of specialties, including clad stock, heavy backlogs, more extended deliveries, losses in output and growing carryovers, prospects of fabricators getting enough sheet tonnage during the balance of this year to meet planned schedules are fading. In lighter gages, practically all grades, including specialties, electrical, enameling and polished stainless, are jammed, with deliveries based on quotas more extended. Cleveland—Flow of steel to finishing mills is doming up randy and by the

mills is drying up rapidly and by the end of this week nearly all hot-rolled sheet and strip mills will be closed. Cold rollers will be able to operate about one additional week before their supplies of hot-rolled material will be exhausted. Some have received only 10 per cent of requirements in recent weeks, necessitating heavy withdrawals from reserves. Sheets and strip produced from last Friday, when the freight embargo went into effect, until the mills close down, will move by truck. In some instances, consumers close to the mills will get most of these truck shipments. Due to the recent curtailment in production and losses sustained during the steelworkers strike, mill deliveries are from two to ten weeks behind schedule now will fall at least three additional weeks behind because it will take at least that long for mills to attain normal operations after the coal strike is settled. Indications now are that when order books are re-examined at the end of the present emergency many mills will be unable to accept any additional rollings for first quarter of next year.

Pittsburgh - Hot and cold-reduced sheet output at Carnegie-Illinois Steel Corp. plants here came to a halt last week. While other producers were able to maintain intermittent operations a sharp reduction was indicated for this week. Metalworking companies have been hard pressed because of dwindling inventories. However, freight embargo will have a more immediate adverse effect on operations. Many sellers are not booking new tonnage because of the uncertain production outlook, and fact that most are sold through remainder of this year. Equivalent to almost three months capacity output already has been lost by the steel and current coal strike. In line with extensive expansion programs under way for production of sheets and strip, pickling and annealing faciliand strip, picking and annealing factile ties, which already are a chokepoint in many instances, will have to be aug-mented. Some interests believe final disposition of the Geneva Works will have important bearing on decision of one large producer to construct a strip mill on the eastern seaboard.

St. Louis — All sheet and platemaking capacity in this area remains idle with a strike going into its eighth week. Business already on books will carry over at least five months into 1947. Schedules beyond will not be opened until some weeks after production is resumed.

Cincinnati — Sheet production is being continued close to capacity in this

district, although operations are now cutting deeply into reserves of fuel and iron. Two blast furnaces of integrated plants have been banked, with others on light schedules. Mills are trying to fill delivery commitments and can allot little tonnage against the tremendous pressure.

#### Steel Bars . . .

#### Bar Prices, Page 162

Small sizes in hot-rolled carbon bars are sold practically for the entire year, with large rounds and flats as well covered. Carryover into next year will be heavy. Many bar consumers are curtailing their operations because of lack of material. Embargo on shipments will add to this situation.

Philadelphia—Many producers of hotrolled carbon bars for some time have been filled for the remainder of the year, especially in smaller sizes. Mills generally have not opened books for next year but because of setbacks from strikes the carryover into 1947 will be heavy. Most bar sellers now have little to offer in large rounds and flats for this year. Schedules on small cold-drawn bars are highly congested. Large cold-drawn carbon bars are in better position, with fourth quarter delivery available. Hot-rolled alloy bars are quoted for July and August in some cases.

Pittsburgh—Coal strike forced complete shutdown of leading producers' bar mills last week, while intermittent operations were reported at other plants. Some consumers already have begun tapering production because of steadily dwindling inventories and this trend is expected to be more pronounced over the next two weeks. Reflecting reduced mill shipments in recent weeks, cold finishers have had to curtail production. Some of these interests have sufficient inventories to sustain production for two weeks. A critical supply situation is noted in bar sizes under 1-inch, with mills booked through this year and no tonnage accepted beyond that date.

Cleveland — Hot-rolled bar production will drop sharply by the end of this week, with only a few mills remaining in operation. Cold finishers will be able to continue shipments for a week to ten days longer by drawing on reserves. Hold-up shipment orders were being received from some consumers as their operations were curtailed by the fuel shortage and freight embargo. Bar producers estimate that normal operations cannot be attained until at least three weeks after the end of the coal strike, indicating that many mills will be unable to accept additional orders for rolling before the end of first quarter or early second quarter.

Boston—Centered heavily in smaller sizes, although deliveries of larger stock have lengthened, volume of new business accepted by fabricators depends increasingly on supply of bars over the balance of this year. Not only are carbon bars, hot and cold-drawn, sold through that period in small sizes, but also cold-drawn and ground alloys. Until production and deliveries experienced the latest series of upsets, larger bar shapes were available for fourth quarter; standard hotrolled stainless are in stock with some mills, three to four weeks delivery, if possible to ship, and cold-finished, six to eight. For some time wanted sizes in carbon bars have approximated sheets in scarcity and several consumers are badly in need of material, including some forge shops. There are some changes to alloy specifications, but not in pronounced volume. Steady extensions in cold-finished alloy have eliminated most advantage in wanted sizes. Despite tightness in bars, bolt and nut deliveries with integrated producers have been one of the easiest. Here also the size factor enters, smaller carriage and lag bolts, stove bolts and machine screws, also railroad track bolts, are in November, but numerous sizes and types are available for June and July, if they can be shipped.

St. Louis-Steel bar production con-

tinues at capacity and probably will not be affected by the coal strike for at least two weeks. Barmakers produce sufficient power to operate open hearths for ingots, but not enough for finishing mills. In event of a utility curtailment, predicted locally in three weeks, all shipments will cease. Meanwhile there is possibility the freight embargo will hold back the 60 to 65 per cent of steel deliveries normally made by rail. Demand continues to mount as consumers attempt to build reserves against a long coal strike. Barmakers are booked through first quarter and decline to sell beyond.

Scattle—Demand for merchant steel bars has not slackened, in spite of reduction in shipbuilding, deferred demand making up for that deficit. Jobbers move



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Workers can stay at their machine, while chewing Wrigley's Spearmint—even when their hands are busy. There is no lost time. And the pleasant chewing helps keep them alert and wide-awake. One Connecticut manufacturer with a dust problem reports group production up about 3% over normal, when workers were given chewing gum. Other plants and factories everywhere, claim stepped-up efficiency when chewing gum is made available to all.

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#### Steel Plates . . .

#### Plate Prices, Page 163

Plate mills are being closed by lack of fuel and heavy bookings are being pushed further into the future. Practically nothing can be bought for delivery this year, with an occasional promise for fourth quarter. Fabricators in many lines are beginning to suffer from lack of material.

Philadelphia -- Since the end of the war eastern plate producers have been carrying an abnormal proportion of the country's plate requirements as large platemakers in the Midwest have diverted steel to other products, particularly sheets and strip. With advent of the coal strike this situation has been further accentuated, with eastern mills receiving all-rail orders from as far away as the Pacific Coast and with buyers absorbing freight of \$28 or more per ton in some cases. Eastern mills now are being forced to curtail rapidly, due to the fuel situation, with two large units down, and additional capacity to be suspended this week. Some business still is being accepted for fourth quarter but some producers are booked for the entire year and the position of others is tightening rapidly. One eastern producer, who recently received OPA permission to increase price \$5 per ton, is applying this figure to plain carbon plates only, it is understood, while adding only \$2 on quality steel. Another, who had received permission to advance \$2 per ton, in applying the increase to all grades.

Pittsburgh — Carnegie-Illinois Steel Corp.'s plate mills here are idle, while output at Jones & Laughlin Steel Corp.'s plant is expected to be cut back sharply this week. Many important programs such as railroad cars and locomotives, and miscellaneous tank, ship repair and barge construction are expected to be seriously retarded unless the coal strike is soon terminated. In addition to the fact fabricators' inventories are nearly depleted, their operations will be quickly affected by the freight embargo. In most instances mills are booked well into third quarter with heaviest demand noted in light gages. No significant tonnage has been canceled or temporarily suspended as result of the new construction order. Pittsburgh Plate Glass Co. recently awarded a contract to Dravo Corp. for four acid barges, involving 630 tons.

New York — Eastern plate mills are faced by continued heavy demand, and with production tapering as a result of the coal strike practically all sellers have little capacity available before late in the year, some being out of the market completely. Boston — Plate fabricating shops have

Boston — Plate fabricating shops nave barely managed to maintain schedules in most instances, but decline in plate production and deliveries is beginning to be felt. Tank quality shipments are more extended and mills are reluctant to accept further tonnage in that grade, being heavily booked in small gages. Tonnage taking extras is given more consideration, but lighter sizes in these are also well filled. Selectivity in acceptance of volume and higher ceiling prices given mills normally supplying a substantial part of New England volume are complicating factors in the ability of fabricators to place tonnage in this area. Increasingly difficult also is co-ordination of plate and head deliveries to tank and boiler shops. Demand is heavy with heads frequently going to one supplier and plates to another. Contracts have been placed for the fabrication of additional water storage units, taking around 275 tons.

Birmingham — Even with the plate mill down, effective May 6, pressure for bookings remains heavy. No commitments are being made, however, and deliveries on an allocation basis, are running into the closing days of the year.

#### Tin Plate . . .

#### Tin Plate Prices, Page 163

Pittsburgh — There is a good prospect that the freight embargo will not include shipment of tin plate for food containers, for there are seasonal considerations with respect to getting delivery of domestic tin plate into container manufacturers' hands before the peak of the perishable food pack this summer. Despite fact the 80-inch hot mill at Carnegie-Illinois Steel Corp.'s Irvin Works has been shut down due to the coal strike, there are enough hot coils there to sustain tin mill schedules through remainder of this month. Output of tin plate by Jones & Laughlin Steel Corp. also is expected to be sustained through May. If the coal strike finally cuts into tin plate output, it is probable that the urgent domestic requirements will be jeopardized by export directive of 152,-000 tons which to date has not been revoked.

#### Wire . . .

#### Wire Prices, Page 163

New York—Rod mills in some instances stopped shipment of that product late last month, conserving semitinished for integrated finishing capacity, although pressure for tonnage has been heavy before likelihood of halt in shipments. Wire production is off substantially in some cases and will be reduced further, with possibilities of nearly complete stoppage in two to three weeks. Although stocks of wire with users varies, most are short, as indicated by requests for off-heat material or rejects, when possible to ship. Upholstery springmakers have offered to send trucks for wire rope rejects. Some consumers are reducing operations to hold employes with some work as long as possible with current supplies. Billet yards have been combed for steel to bolster supply.

Boston—Production schedules are in for another wave of drastic revisions when output again turns upward. Actually revisions and changes have been constant since the first of the year, with rod supplies tightening and selectivity in favor of more profitable items. Drawn wire operations are declining, with further sharp reductions immediately ahead. Recovery will depend on availability of rods and the outlook on that score is not bright, with mills normally shipping into this district practically off the Worcester base at current margins in rods. Shipments of wire rods are conservatively estimated at 135,000 tons under last year thus far in 1946. Users of wire generally have small inventories and operations will taper soon after further shipments are halted. Some are already slackening to stretch small supplies as long as possible. On the other hand, most wire mills with limited inventories of semifinished will be unable to build up stocks in volume during any embargo on shipments.

#### Tubular Goods . . .

#### **Tubular Goods Prices, Page 163**

Boston — Not having made substantial progress in making up six to eight weeks lost earlier this year, tubing and pipe deliveries are again losing ground. Users of tubing are hard put to increase production, several having heavy backlogs for finished products; one bicycle manufacturer would go to night shift operations in some departments to meet strong demand. Furniture and other industrial consumers of tubing have been shifting specifications as between seamless and welded, availability of material being a factor. There is not much choice now. Inventories with anti-friction bearing producers, in most cases, are in good shape. Pipe distributors' stocks are low, yet deliveries on quota basis have been equal to 1940, with building and industrial requirements uot cver large. Assumption is consumers have bought somewhat beyond immediate requirements. Springfield armory has had difficulty in placing large foot-



age of small steel pipe, but one contract for 44,100 feet of one inch went to Albert Pipe Supply Co., Brooklyn. Cast pipe buying is unusually heavy, led by 2625 tons for Seekonk, Mass.; deliveries with some foundries range up to six months. Pittsburgh — Pipe output at National Tube Co.'s plants has been sharply cur-tailed and although production sched-

tailed, and although production sched-ules by Pittsburgh Steel Co. and Jones & Laughlin Steel Corp. here have been fairly well sustained, output at these plants is expected to be substantially reduced this week. National Supply Co, began cutting back operations late last week which pat only further reduced week, which not only further reduced overall supply of needed pipe tonnage, but also oil well equipment and diversified steel products, including diesel engines. Due to limited production resulting from critical pig iron shortage and low profit margins, cast iron pipe order backlogs

are extended through remainder of this year. Many municipal projects, sched-uled for this spring and summer, must be postponed.

Cleveland - Three additional pipe mills were shut down at the end of last week and several others will be forced down at the end of this week. Due to cumulative losses in production since last fall, direct shipments are now two or more months behind schedule while shipments to jobbers on the May account have been negligible. It is estimated that about three additional weeks will be lost following end of the coal strike, indicating that no June quotas will be established. Jobbers' stocks are low.

Seattle — Shortage of cast iron pipe has been aggravated by closing of plants, due to lack of pig iron. In face of larg-est demand ever experienced here



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agencies are unable to make delivery promises and many major projects are being abandoned. Spokane, through I. S. Fetterman, purchasing agent, took bids May 9 for a tongarge of 4 8 and bids May 9 for a tonnage of 4, 6 and 12-inch cast pipe and 24-inch steel water pipe. Tacoma has 450 tons pending, awaiting definite delivery prospects.

#### Structural Shapes . . .

#### Structural Shape Prices, Page 163

Chicago - Last week witnessed a sharp drop in awards and inquiry for structural shapes. It is believed prospective builders are now convinced that to proceed with plans under present con-ditions is futile. Considerable tonnage is involved in bids already closed, but even this work seems destined for delay and awards are being withheld. Few fabricators are seeking new commit-ments, for the declining rate of steel production from the coal strike indicates that supply will be more uncertain. All fabricators are pleased at the decontrol of their industry accorded by OPA a week ago and expect to see no impor-tant movement pricewise. They are troubled, however, over the necessity of operating only 24 hours a week as a result of the power conservation order. Boston — Although the district is lib-

eral in authorizing industrial building under the construction limitation ruling, growing tightness in structural material and extended deliveries by fabricating shops, will delay some projects. Con-tributing also to delays has been the prolonged strike of drafting-room forces of the largest engineering firm in this area; detailing of much outside tonnage lags. There are also frequent revisions in sizes and design of work in progress. District fabricators have taken on addi-tional smaller tonnages; most are low on shapes, with warehouses also short of plain material has apples emerially. of plain material, bar angles especially. Maine has bridges taking 300 tons up for estimates; Vermont rejected bids on a 475-ton deck girder span. Awards for industrial expansions include 250 tons for an addition for Simonds Saw &

Steel Co., Fitchburg, Mass. Birmingham — Fabricators face com-plete shutdowns almost immediately with suspension of the structural mill at Fairfield works of Tennessee Coal, Iron & Railroad Co. A comparatively mult to anone of change is being meted small tonnage of shapes is being meted cut on a basis designed to take care of more pressing needs but not even in approximately sufficient volume.

proximately sufficient volume. Scattle — Fabricating plants are greatly handicapped by lack of steel, with no relief in sight. Some March shipments have just arrived but the sit-uation is so critical that shops are un-able to bid on pending projects. Some surplus material has been bought and output of local mills is absorbed imme-diately. diately.

#### Rails, Cars . . .

### Track Material Prices, Page 163

New York - Approximately 45,000 cars for export are now on order with Cars for export are now on order with American car builders, actually more by about 10,000 than for domestic account. Export bookings are composed princi-pally of the 36,750 cars for France, placed some time ago, but on which there has been no start so far, due to various strikes and attending delays. It is bestrikes and attending delays. It is be-

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lieved that should the coal strike end shortly, work on the French program may get under way in August, but no sooner. The remaining orders for export include between 2500 and 3000 for South America.

Meanwhile, a large additional number of cars is wanted abroad, at least in some countries, but the actual extent of buying is uncertain. Poland, for instance wants 20,000 as well as a large number of locomotives, but inasmuch as the loan of \$40,000,000 recently made to that country by the United States was far under the amount sought, there appears little question that Poland's equipment list will have to be revised rather sharply.

Holland recently fared much better, with a loan of \$200,000,000, but her transportation requirements were well down the list of items she proposes to purchase in this country. Consequently car builders do not look for any specially important buying by Holland.

Requirements of certain other European countries and those of China are sizable, but in a nebulous state. It is estimated in some quarters that South American countries may place around 3000 freight cars before the end of the year.

New York Central has placed orders for 20 diesel-electric passenger locomotives of 2000 horsepower each, with Electro-Motive Division of General Motors Corp,. La Grange, Ill., and in addition has placed a number of power units, not necessarily locomotives, with that company and also six each with Baldwin Locomotive Works, Eddystone, Pa., and American Locomotive Co., New York.

Operations by carbuilders are tapering, with shortages developing in components entering into railroad car construction. Disruption in schedules, however, will be felt most later, probably in August and later, when parts now scheduled for delivery in third quarter will be delayed by current production restrictions. Locomotive and car repair shops are closing or slackening, including the Boston & Maine shops at Billerica, Mass., and Concord, N. H., and Maine Central at Waterville, Me.

Pennsylvania railroad has bids and will place contracts soon for several passenger trains on which bids are in for lots of six, eight or ten cars, to be operated jointly by the Pennsylvania, Norfolk & Western and Fredericksburg & Potomac.

#### Reinforcing Bars . . .

#### Reinforcing Bar Prices, Page 163

Chicago — Reinforcing steel business has sagged to an extremely low level, with buyers as well as sellers staying out of the market. Suppliers have so little steel on hand and see so little available in the future that they are not interested in inquiries. Builders, on the other hand, apparently have concluded that the time is not expedient for additions and improvements. Bar fabricating interests are not permitted to operate more than 24 hours a week because of the order to conserve electric power in northern linois and Indiana. The general practice is to work the first three days of the week and close plants the remainder.

Boston—First contracts for the Maine tumpike from Kittery to Portland have been let and the second for structures, including bridges, will be out in July. Among others, bridges will be required for the Saco, York and Kennebec rivers. Howard, Needles, Tammen & Bergendoff, New York, are consulting engineers for the Maine Turnpike Authority. Bitt hurdh

Pittsburgh — Present unprofitable price level for reinforcing bars has forced producers to use only off-heat steel. Some revision in reinforcing bar prices is expected soon, to bring this product into closer relationship with merchant bars. Producers state a substantial increase in prices will be necessary if output is to be stepped up sufficiently, after coal strike is over, to meet current heavy demand. One interest is not accepting new business because of the uncertain production outlook, and is not making definite delivery promises on tonnage booked. Most mills have sufficient orders to sustain prestrike production through late this year. Overall output has been drastically reduced and still further curtailment in production is indicated this week unless the coal strike is terminated. Rerollers are having trouble getting rerolling rails.

Seattle — Reinforcing bar demand is strong, several thousand tons pending for the Columbia Basin project, 3000 tons or more for the idle-fleet piers at Puget Sound and Tongue Point navy yards, 1000 tons for a department store addition and 700 tons for a Seattle school stadium. Many orders for 100 tons or less are being booked and production is as high as lack of skilled labor will permit.





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#### Pig Iron . . .

#### Pig Iron Pricese, Page 165

Pig iron supply is diminishing rapidly, additional blast furnaces being banked or blown out almost daily, with only a small proportion still active. Foundries are curtailing operations or closing, because of lack of iron, coke and scrap. Even after the coal strike ends some time will be required to resume operations as receipt of supplies will be delayed two or three weeks at best.

Pittsburgh — The one merchant pig iron producer here has sufficient coal stocks to keep its blast furnace in operation until about May 26. To do this, however, this interest is no longer selling coke in open market, producing only enough for operation of its blast furnace. Pig iron stocks are in more critical supply than coke at most foundries. Only 23 out of 54 blast furnaces were active here at the close of last week and some of these were on reduced wind. Tomage involved in export inquiries continues heavy, but little can be done to supply this demand.

Chicago - The immediate future for many foundries in this area is uncertain, but it is certain that production of castings is about to drop sharply. All shops are restricted to maximum operation of 24 hours per week by orders of the Illinois Commerce and Indiana Publie Service commissions, to conserve electric power. Operation for some time has been on a hand-to-mouth basis as regards pig iron and coke, and iron, sand and other supplies are now shut off by the freight embargo effective May 10. In some instances, even 24 hours a week may not be possible. Central and Southern Illinois and Indiana and Wisconsin foundries are not restricted on power but all will suffer from the freight embargo. Currently, 18 of the district's 41 blast furnaces are operating, as com-pared with 19 a week ago and 34 before the strike. Inland Steel Co. banked a second stack last week and plans to remove a third this week.

New York — Pig iron sellers believe that it will take more than a month after the coal strike ends for blast furnaces to get back to even a fair average rate of operations, to say nothing of a precoal strike level. The melt of pig iron consumers in this district in May will be substantially less than in April. Pig iron production not only is being curtailed, but consumer inventories are reaching the vanishing point in some cases.

Philadelphia — Several blast furnaces have suspended operations in this district, with at least two blown out. Others are scheduled to go down this week, with little production remaining. Various foundries are being forced to curtail, some being down completely. In some cases they have been applying the first week of idleness to vacations. Most now down expect to remain closed for at least two or three weeks, as they see little hope of replenishing supplies of coke and pig iron.

toke and pig iron. Boston — By reducing melting schedules, steelworks and foundries may stretch depleted pig iron supplies two to three weeks; already out of iron are several smaller foundries. But one small open hearth is operating at Bridgeport. Shipments have been dwindling while coke and lime are even tighter than iron. With heavy backlogs of castings and cast pipe, reduced melt schedules will unquestionably throw back deliveries of these products, precluding acceptance of substantial additional orders offered, subcontracts and otherwise. One large builder of textile equipment has been able to place only a fraction of subcontracts offered. Pig iron rationing will be drastically revised, affecting supply over the remainder of the year, with slight immediate prospect of building inventories to the 30-day limit.

**Buffalo** — District pig iron output broke to 45 per cent of capacity with only seven out of 16 stacks in blast. Even if the coal strike is settled shortly, producers claim the industry cannot escape feeling its effects for some time. Two producers, who use little coal for their own operations, are hoping to maintain present output with large coke supplies accumulated during the steel strike from a coke firm which was permitted to operate because it supplied gas for domestic purposes. Dwindling ore supplies, however, are becoming more of a factor also, despite the emphasis on coal and coke. In the same light foundries report lack of coke would act as a check on melt, even if iron was available. In most instances, however, foundries report coke supplies are better than iron.

Cleveland-Shortages of pig iron, coke and scrap, coupled with effects of the freight embargo, will force closing of most foundries within two weeks. Due to special circumstances, one foundry closed last week, while a few plan to operate until mid-June. In order to spread supplies, some foundries have reduced their work week and others have shifted to lighter jobs. Operations have risen sharply in April, attaining the highest level in many instances since the beginning of the war. Holdup orders on shipments have started to come in, senergially from the automative industry especially from the automotive industry, but production of castings will continue as long as supplies last. Operations have been disrupted to some extent by the fact that receipts of pig iron often are not the usual grade, necessitating a change in the mix. Foundrymen estimate that at least two weeks will clapse following termination of the coal strike before pig iron supplies start moving in sufficient volume to resume foundry operations.

Cincinnati-Some furnaces have made no shipments of foundry iron into this district since the latter part of April. Reserves are rapidly being exhausted and scrap cannot be had in sufficient tonnage. Melters are near shutdowns and drastic curtailments.

Birmingham — Pig iron grows scarcer each week. Another furnace was banked last week by Sloss-Sheffield Steel & Iron Co., aggravating an already serious situation. Pig iron shortage and the railroad embargo together have slowed pipe plant production. Most smaller industries are hard pressed for even a fair tonnage of iron.

#### Scrap . . .

#### Scrap Prices, Page 166

Reduction of consumption as steel nills close has not affected demand for scrap as consumers seek all they can get for reserve after the coal strike ends. Melters are paying larger freight charges to obtain material from a distance. Freight embargo will stop shipments for a time and thus cut off further supply.

Chicago — A more rapidly declining steelmaking rate and complete closing of two steel plants because of electric power shortage have failed to slacken demand for scrap. Consumers are taking all material offered and aggressively seeking more. This situation is not expected to change, although the freight embargo effective May 10 will halt movement of material. Within a few days less scrap will be available as production was cut this week when manufacturing plants were ordered to operate not more than 24 hours per week to conserve electric power and thereby stretch almost exhausted coal supply. Ceiling prices prevail on all standard grades. Pittsburgh — Demand for scrap con-

Pittsburgh — Demand for scrap continues heavy despite curtailment in steel mill and foundry operations. Indicative of the eagerness of mills to obtain badly needed scrap is report of shipments of low phos scrap into this district at a freight equalization of \$4 above former level. Brokers and dealers are unable to meet requirements of larger consumers as production scrap is scarce. Inadcquate supply of pig iron has forced many foundries to increase the proportion of cast scrap, further tightening supply. Freight embargo would abruptly halt scrap shipments from all points.

Detroit — Dealers and brokers have been busy in closing monthly automotive and railroad scrap lists, but tonnage of automotive material is disappointing, and some observers are inclined to believe auto builders are not too much interested in accelerating production in the face of an impossible price situation, materials shortages and continuing apathy on the part of labor. Prices hold at ceilings. Forthcoming freight embargo is seen as practically forcing suspension of all industrial operations.

Cincinnati — Foundries are making strong demands for iron and steel scrap in efforts to avoid shutdowns. Brokers and dealers, faced at the same time with shrinking tonnage, are tapping all resources, especially for cast and rails. Emergency actions such as trading of scrap, borrowing, and substitutions have helped to maintain the melt at a fair level. The supply situation is extremely tight. Railroad offerings are being apportioned in small tonnages. Mills which recently had adequate reserves have been cutting into them and are in the market for all offerings.

Philadelphia — Demand for scrap remains heavy despite decline in consumption. Buyers expect a shortage of pig iron for some time after the end of the coal strike and are anxious to build up inventories as much as possible. Shortage of cast scrap never has been more acute. Flow of scrap is expected to be restricted seriously by the freight embargo.

Boston — Steel scrap inventories average about one month and in other grades less with many consumers; exceptions include several larger melters of cast, although most of these are limited as to iron and coke. Steelworks complain of alloy troubles, copper and nickel, also upgrading in recent shipments. The latter is apparent in low phos. Yard dealers are keen for that grade, involving a differential and higher price. Demand is strong for heavy melting and cast by truck deliveries. Dealers continue to pay over ceiling prices for unprepared, and for prepared if further yard processing permits an eventual even beak. This high bidding applies to future accumulations up to July in some instances. For 1000 tons of unprepared at Portsmouth naval shipyard Luria Bros. & Co. bid \$12.11 per gross ton.

Buffalo — Full labor forces are being maintained by scrap dealers to process available yard stocks. Leading dealers report equipment electrified and not affected by the coal shortage. Two more boatloads of approximately 10,000 tons have arrived from the upper lakes. This makes a total of three boats this season, which is far short of water receipts a year ago. Only one barge fleet has arrived so far from the eastern seaboard.

New York — While some steel scrap may be shipped during the embargo, on diesel-powered and electrified railroads, aggregate shipments are sharply reduced. Most cast is delivered normally by truck and that grade is less affected by transportation, athough the supply is tighter than in melting steel. Demand is heavy, with prices at ceiling except for some alloys, notably nickel grades. Industrial scrap production, turnings and borings, is declining at accelerated rate. Most consumers will take in scrap when transportation returns to normal, storing tonnage in cases where melt recovers

7º Offset Higher Costs

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BRASCO Cold Rolled Sections offer substantial savings in both labor and material wherever fabricated metal piece parts are used. High-speed, modern rolling technique assures a fast, continuous supply of mouldings and sections, light in weight and usually of equal or greater strength than costlier metal forms.

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We roll simple or difficult shapes in every metal, in gauges from .187 down to .006. The variety is practically unlimited. Hundreds of stock dies available or special sections rolled from dies designed and made in our own shops.

BRASCO MANUFACTURING CO. (Dept. R) - HARVEY (Chicago Suburb) ILLINOIS



slowly. The Pennsylvania railroad takes bids May 20 on 13,655 tons, including 4500 tons of No. 1 rail steel, 1500 tons of car wheels, 795 tons of No. 2 sheet scrap and 1300 tons of cast.

St. Louis - Scrap demand is heavy, with increasing pressure for cast. Consumption in this area has not been affected by the coal strike as open hearths here use gas or oil. Scrap shipments show a moderate increase but not sufficient to allow shipment outside the immediate district. Mill reserves are 30 to 45 days but are not being increased. Some melters pay high freight charges to obtain scrap from a distance. Industrial scrap production has virtually ceased

Birmingham - Bad weather of the past 10 days has further complicated the scrap situation. Shipments are off considerably and not much tonnage has been prepared at best because of high yard costs. Rain has slowed the preparation even further. Cast grades are especially scarce.

#### Warehouse . . .

#### Warehouse Prices, Page 164

Chicago - In the present emergency in northern Illinois and Indiana to conserve electric power, the order limiting operations of manufacturing plants to 24 hours per week applies also to steel warehouses. Individual warehouses are maintaining the hours which serve their customers best. Some are running three eight-hour days, then closing; others are working fewer hours and remaining open more days. Demand holds steady despite restricted operations of manufacturers. With the freight embargo effective May 10, receipts from mills will drop to nothing after material enroute arrives.

New York - Lacking material, layoffs are starting at some steel warehouses. Mill deliveries have been decreasing for ten days and to meet heavy consumer demand inventories include substantial ratio of sizes and products for which inquiry is lightest. Alloy stocks average better balance than carbon. For future delivery distributors are unable to place orders in light gage sheets in all finishes, small bars, strip and some heavier products, shapes and thin plates. Rationing of depleted stocks is tightening. Cut nails have been removed from the OPA price list for both manufacturer and distributor; there have been some markups, but no runaway in prices. There is no gain yet in production of building nails, already scarce, in anticipation of the tremen-dous volume likely to be needed for the federal housing program.

Boston - Warehouse distributors are in less favorable position to fill emergency requirements in the growing shortage of wanted sizes and grades than during the steel strike. First quarter in-ventories have not been rebuilt after depletion and warehouses frequently have but 35 to 40 per cent of January inventory in tons, products or sizes. Deliveries have been on the down trend for ten days and have included limited tonnages in sizes and grades on which re-conversion demand has long been centered.

St. Louis - Sharp reduction in mill shipments to consumers produces unprecedented demand on warehouses for steel. Inventories are thin and reducing rapidly, with many sizes missing. Sheets in all gages and varieties are prac-tically unobtainable. Small bars are scarce and strong demand for light plates has reduced such stocks. Warehouses are receiving less as mills curtail pro-duction because of lack of fuel. Manufacturers from outside this district seek to place orders here. Material moves out as fast as received.

Scattle --- Warehouses report strong demand for all items but are unable to obtain replacements from mills. Galvanized sheets are in particularly critical position and shortage of nails is retarding construction.

Cincinnati - Shipments of steel to warehouses in this district grow steadily lighter. Already stocks are badly out of balance, with some items almost unobtainable. Customers' demand is so heavy that substitutions are readily accepted, when available. Jobbers antici-pate a drop in sales volume this month.

#### Nonferrous Metals . . .

#### Nonferrous Prices, Page 168

New York - Ranging up to 18 per cent, higher ceiling prices have been granted on copper, copper-clad and cop-per alloy wire, while a 14 per cent in-terim increase has been given armored cable. Establishment of higher prices for copper, lead and zinc are expected to be announced soon. In anticipating an increase, some foreign buyers have placed orders here at higher prices, at an average of about one cent a pound over the prior week. Uncertainty as to prices has retarded new business.

Lead production is not likely to show improvement until next month, at least, and metal available in June will be no heavier than that distributed under vol-untary rationing this month. Until sup-ply improves CPA has asked that cad-mium be rationed. Production has dropped to an average of 350,000 pounds per month from 662,000 pounds. The government stockpile has been frozen for usual commercial uses.

#### Iron Ore . . .

#### Iron Ore Prices, Page 164

Lake Superior iron ore moved during April totaled 729,902 gross tons, 6,552,-172 tons less than in April, 1945, according to the Lake Superior Iron Ore Association, Cleveland. Ore was loaded at only two United States ports, Duluth and Two Harbors. Escanaba, usually the first to send out cargoes, because of its situation below the Soo locks and the Straits, did not participate in April tonnage. Canadian ore was loaded at Michipicoten and Port Arthur, the total being 76,140 tons, compared with 46,962 tons in April of last year. Details of April movement are as foi-

lows

	Gross	Tons
A	pril, 1946	April, 1945
Escanaba		560.043
Marquette		417,111
Ashland		507.334
Superior		2,053,653
Duluth	327.100	1,795,579
Two Harbors	326.662	1,901,422
Total U. S. Ports	653,762	7,235.142
Michipicoten	64,063	46,932
Fort Arthur	12,077	
Total Canada	76,140	46,932
Grand Total	729,902	7,282,074
Decrease from year ado	6 552.17	2 gross ton

# Spring Wire Prices Rise 35 cents to \$4 Basis

Leading sellers of spring wire have advanced prices, effective as of April 3, to the basis of \$4 per 100 pounds, fob Pittsburgh, Chicago and Cleveland. This represents an increase of 35 cents per 100 pounds.

#### Steel in Europe . . .

London—(By Cable) — March steel output in Great Britain was at the annual rate of 13,295,000 tons, pig iron at 7,660,000 tons. Exports were 211,344 tons, compared with 189,467 tons in February. New business is still expanding.

United States Rubber Co., New York, has announced a mechanical cranberry picker which operates on the principle of the vacuum cleaner. It is said to be more than twice as efficient as a human picker.

#### STRUCTURAL SHAPES ...

STRUCTURAL STEEL PLACED

- 9500 tons, office building, Louis W. Abrons, 39th and Broadway, New York, to Bethlehem Steel Co., Bethlehem, Pa.
- 9000 tons, 26-story building, John Hancock Insurance Co., Stuart street, Boston, to Bethlehem Steel Co., Bethlehem, Pa.; Turner Construction Co., Boston, general contractor.
- 1850 tons, tunnel kiln building, Fulton, Mo., for Harbison-Walker Refractories Co., Pittsburgh, to American Bridge Co., Pittsburgh.
- 805 tons, steel superstructure, Penobscot river bridge, Howland-Enfield, Mc., to American Bridge Co., Pittsburgh, \$144,304.84.
- 800 tons, building, Fairchild Press, New York, to Ingalls Iron Works, Verona, Pa.
- 750 tons, engineering and experimental building. La Grange, Ill., for ElectroMotive Division, General Motors Corp., to Joseph T. Ryerson & Son Inc., Chicago; bids April 19.
- 275 tons. turbine foundations, Newark, N. J., for Public Service Electric & Gas Co., to American Bridge Co., Pittsburgh.
- 250 tons, warehouse addition, Chicago, from James McHugh Construction Co., to American Bridge Co., Pittsburgh.
- 250 tons, building, Rheem Mfg. Co., Sparrows Point, Md., to Bethlehem Steel Co., Bethlehem, Pa.; Brown & Mathews, New York, general contractors.
- 157 tons, gate frames, Spec. 1205, Davis dam, Louise, Ariz., for U. S. Bureau of Reclamation, to American Bridge Co., Pittsburgh.
- 150 tons, bridges, Nos. 851½ and 853, Vail and Denison, Ia., for Chicago & North Western Railway Co., to American Bridge Co., Pittsburgh.
- 150 tons, bridge No. 398, Robertsville, Mo., for St. Louis-San Francisco Railway Co., to American Bridge Co., Pittsburgh.
- 125 tons, telephone exchange buildings, Portsmouth and Nashua, N. H., to Lyons Iron Works, Manchester, N. H.; Davison Construction Co., Manchester, general contractor.
- 115 tons, one-story 145 x 240-foot plant building, American Steel & Alloy Co., Hartford, Conn., to National Steel Products Co., Hartford; F. H. McGraw Co., Hartford, general contractor.
- 100 tons, power station, Bluffton, O., for Central Ohio Light & Power Co., to Duffin Iron Co., Chicago; Sargent & Lundy, engineers; bids April 8.

#### STRUCTURAL STEEL PENDING

3700 tons, bridge, Milan, Ill., for state; bids May 3.

- 2000 tons, supports for Bacon tunnel, Coulee City, Wash., for U. S. Bureau of Reclamation.
- 2100 tons, including 450 tons structural silicon steel, lift span and towers, Passaic river bridge, route 25A, Newark and East Newark, N. J., 280 feet center to center of rear column shoes, 81 feet, four inches wide, center to center of trusses; bids June 4, Spencer Miller Jr., state highway commissioner, Trenton; project also takes 165 tons of sheaves, shafts and bearings; 63 tons of operating machinery; 48 tons of wire ropes and rope sockets; 16,000 square feet of roadway grating; 37 tons of cast steel shoes, and 35 tons of reinforcing steel.
- 650 tons, New Jersey state bridge near Newark, N. J., contract No. 2, route 25; Poirier & Mc-Lane, New York, low on general contract.
- 600 tons, bridge over Kaskaskia river, Vandalia, Ill., for state; bids May 3.
- 475 tons, 605-foot four-span continuous girder bridge and highway, Sheldon Falls, Vt.;
  R. F. Carpenter, Alburg, Vt., low on combined bid, \$521,078.73, rejected; no bids on bridge only, lump sum; required also 205-tons of reinforcing steel.
- 420 tons, truss span and repairs, bridge No. 656, St. Louis, for Missouri-Kansas-Texas Lines.
- 350 tons, warehouse for Charles Lenning & Co., Philadelphia.
- 300 tons, state bridges, Maine, including one 250-ton unit, Houlton; bids in.
- 290 tons, bridge superstructure, Blue Ridge Parkway, Watauga county, N. C.; bids May 14, Public Roads Administration, Arlington, Va.
- 190 tons, New Jersey state bridge near Newark,

N. J., contract No. 4, route 25; S. J. Groves & Sons, low.

- 180 tons, bridge, Harlan county dam and reservoir, Nebraska; bids to U. S. engineer, Kansas City, Mo.
- 150 tons, miscellaneous work in connection with new building for Philadelphia Inquirer, Philadelphia; McCloskey & Co., Philadelphia, general contractor.
- 150 tons, power plant for Luzerne County Gas & Electric Co., Hunlock Creek, Pa.; United Engineers & Constructors Inc., Philadelphia, contractor.

#### **REINFORCING BARS...**

#### **REINFORCED BARS PLACED**

275 tons, paving, Marion county, Iowa, for state, to Des Moines Steel Co., Des Moines; Booth & Olson Inc., Sioux City, Iowa, contractor.

REINFORCED BARS PENDING

- 10,000 tons, billet steel; bids in to procurement unit, Burcau of Reclamation, Denver, inv. F-38,490-A-1.
- 6500 tons, sewage plant, Chicago, for Sanitary District of Chicago; bids taken April 11 rejected, new bids May 23.
- 2500 tons, stamping plant, Detroit, for Fisher Body Division, General Motors Corp.
- 925 tons, including 750 tons wire mesh and 175 tons bars, highway construction in La Salle and Kendall counties, Illinois, for State Highway Commission; Arcole-Midwest Corp., Chicago, low on general contract; bids April 23.
- 560 tons, milk plant, Wichita, Kans., for Rounds & Porter.
- 260 tons, high school, Racine, Wis., for city.250 tons, sewage disposal plant, Dayton, O., for city.







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- sleeves, bushings, collets or cams—

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182 tons, expansion, Washington, Pa., for E. I. du Pont de Nemours & Co. Inc.

150 tons, building, Hamilton county, Ohio, for Mt. St. Joseph College.

118 tons, bridge, Cedar City, Iowa, for state.

#### PLATES . . .

#### PLATES PENDING

4000 tous, gas storage container, East Chicago, Ind., for Northern Indiana Public Service Co.; bids May 6.

#### PIPE . . .

- STEEL PIPE PLACED
- 940 tons, 16-inch, Braintree, Mass. to R. D. Wood & Co., Florence, N. J.
- 890 tons, six to 12-inch, Westboro, Mass., to Warren Pipe Co., Everett, Mass.
- 425 tons, six to 12-inch, Weston, Mass., to Warren Pipe Co., Everett, Mass.

#### STEEL PIPE PENDING

- 2625 tons, six to 12-inch, also 100 tons of fittings, class 150 pipe, Scekonk, Mass.; bids in.
- 1015 tons, six to 12-inch, Braintree, Mass.; bids in.

#### RAILS, CARS . . .

- LOCOMOTIVES PLACED
- Atchison, Topeka & Santa Fe, one 6000-horsepower diesel-electric locomotive to Fairbanks Morse & Co.
- New York Central, 20 diesel-electric passenger locomotives of 2000 horsepower each, to Electro Motive Division, General Motors Corp., La Grange, Ill.; also twenty-eight 1500-horsepower units, (not complete locomotives) with Electro Motive; and six 1500horsepower units each with Baldwin Locomotive Works, Eddystone, Pa., and American Locomotive Co., New York.

RAILROAD CARS PENDING

Baltimore & Ohio, 200 fifty-foot, six-inch auto box cars.

- Delaware & Hudson, 200 to 400 fifty-ton gondolas.
- Donner-Hanna Coke Corp., 100 seventy-ton triple hoppers.
- Missouri-Kansas-Texas, 100 seventy-ton covered hoppers.
- New York City Board of Transportation, 200 trackless trolley coaches for Brooklyn; Marmon-Herrington Co. Inc., Indianapolis, low.

Norfolk & Western, 250 fifty-ton box cars.

# Research Program Enlists Aid of Private Facilities

#### (Concluded, from Page 73)

A study of the physical nature of the lubrication process and the development of new lubricants, including the water-soluble variety;

Development of hydraulic fluids satisfactory under all service conditions, and free of fire hazard;

Fundamental study on the physical and chemical principles of paints;

Better, cheaper batteries to carry out one of the lessons of the war-that batteries have many more potential power uses than previously realized;

An expansion of the study of polymer chemistry to include, among other objectives, that of developing rubber for use at high or low temperatures and not seriously impaired by contacts with oils and explosives;

An extensive study of the thermodynamic properties of gases from actual measurements at working temperatures instead of by extrapolation of measurements at near-room temperatures;

A study of the purely chemical aspects of chemical warfare agents, and methods of decontamination;

A study of the development of hypervelocity guns, with stress on the need for propellants which will operate with minimum erosion in the gun; the study is to bear in mind the assumption that rockets, operating on solid propellants, have an important future;

Also, a number of other studies, on explosives of higher potential energy rating per pound, improved piezo electric crystals for use in sound-ranging devices and in experimental apparatus, etc.

Another major project is research in the application and mathematical techniques to problems of naval warfare and numerous instruments now used in submarines, on surface ships, and in the air. Problems which could be solved only by wind tunnels, by water tunnels, or by other experimental methods, says ORI, "have been solved successfully by mathematical calculations, especially procedures using mathematical computers; mathematical calculators have given way to electromechanical computers which in turn are being replaced by electronic computers."

The exploitation of mathematical facilities is still in its infancy, says the ORI. Since the use of mathematics saves much time necessary in arriving at solutions, research must find improved ways of putting mathematics to work, "especially in the field of supersonic flight in aerodynamics, hydrodynamics, mechanics and electromagnetism and, in particular, radiation." While the approach is to be fundamental, the principal subheads of the study include: Ballistics; fire control; computing devices; mathematical physics; and mathematical computation.

Other major projects in the program embrace fundamental research in the field of medical sciences, in physics, in fluid mechanics, geophysics, in propulsion and missiles—also in certain highly restricted fields concerned entirely with naval warfare.

The propulsion and missile project is one that holds great potentials for civilian industry in the future. It will deal with jet and other types of propulsion in the air, on the water and in the water, with control systems for guiding long-range missiles, etc.

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TYPE 4A CAP. 3/8"-5/8" DIA. (11/16" Dia. in soft stock)

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# CONSTRUCTION AND ENTERPRISE

#### ARKANSAS

EL DORADO, ARK.—Lion Chemical Corp., El Dorado, is converting former Ozark Ordnance Works plant into fertilizer manufacturing plant at cost of \$1 million. (Noted Apr. 8.)

#### CALIFORNIA

- LOS ANGELES—Security Engineering Co. is building a heat treating plant costing \$7000 and machine shop costing \$35,000, at 108 West Whittier Boulevard.
- LOS ANGELES—Jackson Iron Works is building a plant addition 25 x 75 feet, to cost \$8500, at 4839 East Patata St., Cudahy district.
- LOS ANGELES—Parent Bros. are building a machine shop addition 40 x 100 feet, costing about \$10,000, at 3335 Union Pacific Ave.
- LOS ANGELES-Sta-Hi Corp., 1024 Crocker St., is building a machine shop 29 x 75 feet, to cost about \$7500.
- LOS ANGELES—Technical Products Co., 1144 North Las Palmas Ave., is building a machine shop addition 50 x 63 feet, to cost about \$12,000.
- SAN GABRIEL, CALIF.—Clary Multiplier Corp. has plans for a new plant on a 41/2acre site on Dalton Rd., to cost about \$250,-000.

#### GEORGIA

- ATLANTA, GA.-Westinghouse Electric Corp., 1299 Northside Dr., has let contract to Aero Construction Co., 1667 Virginia Ave., for a warehouse and office building, to cost about \$160,000. R. J. Locatell, 644 Highland Ave. NE, is architect.
- GORDON, CA.-City plans construction of sewage disposal plant and collection system, including pumping station to cost over \$100,-000.
- MACON, GA.—Armstrong Cork Co., Lancaster, Pa., will let contract soon through Harry Boettcher, architect, Lancaster, for a manufacturing plant, to cost about \$4 million. Rust Engineering Co., Clark Bldg., Pittsburgh, is engineer.

#### ILLINOIS

- CHICAGO—Automatic Electric Co., 1033 West Van Buren St., has let contract to N. Dickman, 1126 South Kedzie Ave., for a fivestory 30 x 144-foot assembly building, to cost about \$60,000. F. Randall, 205 Wacker Dr., is engineer.
- CHICAGO—Chicago Apparatus Co., 1737 North Ashland Ave., will build a four-story plant addition costing about \$200,000. E. C. Bruno, 4739 Washington St., Skokic, Ill., is architect.
- EAST PEORIA, ILL.—Caterpillar Tractor Co., East Peoria, plans erection of five additional plant buildings, to cost over \$1 million, with equipment.

#### INDIANA

- INDIANAPOLIS—Metal-Auto-Parts Co., 1438 West Henry St., has let contract to A. V. Stackhouse Co., 2611 Winthrop Ave., for a one-story plant building 100 x 200 feet, to cost about \$150,000.
- LOGANSPORT, IND.—Muelhausen Spring Co., 827 Michigan St., has plans by H. C. Wolf, 316 Heath St., for a one-story 146 x 192foot plant, to cost about \$150,000.

#### IOWA

DUBUQUE, IOWA.—Virginia-Carolina Chemical Corp., has let contract to Ulrich Willys, Dubuque, for a fertilizer plant, to cost about \$145,000.

#### MARYLAND

BALTIMORE-Consolidated Gas, Electric

Light & Power Co. plans \$6,500,000 addition to Riverside steam generating station.

SPARROWS POINT, MD.—Rheem Mfg. Co., 570 Lexington Avc., New York, has let contract to Brown & Mathews, 122 East 42nd St., New York, for a one-story 180 x 300-foot manufacturing plant, to cost about \$300,000.

#### MICHIGAN

- BENTON HARBOR, MICH.—Benton Harbor Malleable Industries has plans under way for a malleable foundry plant to cost about \$500,000.
- DETROIT-Stuart Foundry Co., 138 South Junction Ave., has let contract to Bennage & McKinstrie, 4611 Woodward Ave., for a foundry addition to cost about \$60,000.
- DETROIT—Ford Motor Co., 3000 Schnefer Rd., Dearborn, Mich., plans additions 170 x 960 feet and 88 x 600 feet at its Highland Park plant, to cost about \$500,000.
- RIVER ROUGE, MICH.—Sun Oil Co., 5848 Brooklyn St., Detroit, plans bulk oil storage plant and dock on Rouge river, to cost about \$100,000.
- ST. JOHNS, MICH.—Wire Assemblies Corp., St. Johns, has plans under way by St. Claire Pardce, Clinton Ave., for a one-story 150 x 225-foot wire plant, to cost about \$150,000.

#### NEW JERSEY

BURLINGTON, N. J.—Hercules Powder Co., 900 Market St., Wilmington, Del., will build a chemical plant here, to cost about \$1,-500,000.

#### **NEW YORK**

MOUNT VERNON, N. Y.—Metaplast Co., 250
West Nineteenth St., New York, has let contract to Lanning Construction Corp., 199
Main St., White Plains, N. Y., for a plant building 154 x 234 feet, to cost about \$200,-000. Sohn & Weston, 44 Court St., Brooklyn, N. Y., are architects.

#### OHIO

- AKRON-Goodyear Tire & Rubber Co., 1144 East Market St., E. J. Thomas, president, will build a one-story addition to building No. 112, 101 x 221 feet, for a rim plant, to cost about \$180,000.
- CINCINNATI—Trainmobile Co., Robertson Rd. and 31st St., has plans by A. M. Kinney Inc., Enquirer Bldg., for plant additions costing about \$350,000.
- CLEVELAND—Gabriel Co., 1407 East 40th St., has let contract to the Austin Co., 16112 Euclid Ave., for plant alterations estimated to cost about \$450,000.
- CLEVELAND—Towmotor Corp., 1226 East 152nd St., has let contract to Peck & Udell, 4500 Euclid Ave., for a two-story 157 x 220-foot plant building, to cost about \$185,-000. C. B. Rowley & Associates, Keith Bldg., are architects. (Noted Apr. 14.)
- CLEVELAND—Frantz Mfg. Co., 3650 East 93rd St., will move its gray iron foundry here from Minerva, O., and aluminum foundry from Canton, O. Walter Frantz is president. Company's product is washing machine parts.
- CLEVELAND—Wheel-Hime Inc., 954 Ansel Rd., has been incorporated by H. C. Horn, agent, to manufacture house trailers.
- CLEVELAND—Lake Erie Screw Corp. has been incorporated by Thomas M. Kennedy, attorney and representative, 1409 NBC Bldg., and will establish a plant for manufacture of screws, bolts and nuts.
- CLEVELAND—Adalet Mfg. Co., 1448 East 49th St., has bought site in Lorain Ave. for plant to be erected when materials are available. Henry B. Stecher is in charge.
- HUBBARD, O.—Powell Pressed Steel Co., W. J. Powell in charge, will build a die shop costing \$75,000, one story, 60 x 134 feet.

- LEETONIA, O.—Leetonia Tool Co., West Main St., C. E. Holt Sr., secretary, will build a plant 100 x 240 feet to consolidate operations now scattered, with addition of considerable new equipment.
- MANSFIELD, O.—Ohio Public Service Co., Joy A. Herbert, division manager, 10 South Park St., will build 33,000-kva substation as part of \$310,000 program, when materials are available.
- MT. GILEAD, O.—Hydraulic Press Co. will let contract soon for a pattern shop and vocational training school 87 x 120 feet, to cost about \$35,000.
- WARREN, O.—Evans Appliance Co. Inc. has been incorporated by Evan W. Evans, 210 East Market St., Statutory agent, with \$7000 capital, to manufacture electric appliances.
- WOOSTER, O.—Timken Roller Bearing Co., 1801 Dueber Ave., will build plant additions soon, including tube mill with 35,000 square feet, die plant with 3000 square feet and substation with 6000 square feet. William E. Umstattd is president.
- YOUNGSTOWN—Youngstown Sheet & Tube Co., J. Cohn, purchasing agent, Stambaugh Bldg., will build three additions to Poland Ave. plant, to cost about \$86,000. Buildings will be 40 x 50 feet, 40 x 30 feet and 20 x 30 feet.

#### OREGON

- BEAVERTON, OREG.—Voters have approved a \$200.000 bond issue to finance a \$65,000 reservoir and water system improvements, the remainder to be used for improvement and expansion of power plant.
- EUGENE, OREG.—City plans early construction of disposal plant postponed since 1941, to cost about \$250,000.
- PORTLAND, OREG.—General Tool Co., Flanders and NW Fifteenth Sts., has let contract to Reimers & Jolivette, Builders Exchange Bldg., for a tool plant addition, to cost about \$50,000. Wolff & Phillips, Pearson Bldg., are architects.

#### PENNSYLVANIA

PITTSBURGH—H. C. Frick Coke Co., Frick Bldg., plans a one-story 108 x 245-foot coal washing plant at Robena mine, Greea county, Pennsylvania, to cost about \$3 million.

#### RHODE ISLAND

FROVIDENCE, R. I.—Monowatt Corp., 66 Bissell St., will build a one-story 80 x 135foot plant building costing about \$100,000.

#### TEXAS

- DALLAS, TEX.—Verson Allsteel Press Co., 1355 East 93rd St., Chicago, plans a onestory plant building, to cost about \$450,000. H. B. Geib & Associates, Texas Bank Bldg., are architects.
- FORT WORTH, TEX.—City has filed application with FWA for advance for planning of sewage treatment plant to cost about \$1 million. Freese & Nichols, 407 Danciger Bldg., Fort Worth, are engineers.
- HOUSTON, TEX.—Shell Oil Co. Inc., Shell Bldg., has let contract to M. W. Kellogg Co., Esperson Bldg., for a lubricating oil manufacturing plant to cost about \$6 million
- HOUSTON, TEX.—Sun Oil Co., Esperson Bldg., has plans in preparation for a flare gas processing plant, to cost about \$150,000.
- HOUSTON, TEX.—Ceco Steel Products Corp., 2814 Pease Ave., has bought eight-acre site for later erection of plant for fabrication of reinforcing bars.
- HOUSTON, TEX. Southwestern Greybound Bus Co. has let contract to Arch Munn & Sons, 5319 Junius St., Dallas, Tex., for a shop building to cost about \$100,000.

#### WISCONSIN

GREEN BAY, WIS.—Hoberg Paper Mills Inc., 800 Elm St., plans a boiler plant costing about \$500,000, with equipment. Helmick, Edeskuty & Lutz, 412 Essex Bldg., Minneapolis, are consulting engineers. USE HEADED AND THREADED FASTENERS FOR ECONOMY AND RELIABILITY

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May 13, 1946









May 13, 1946

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**Oportunities** 

**Oportunities** 

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Well connected, Indianapolis Headquarters, desires additional line of finished production parts, castings, screw machine

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## **OPPORTUNITIES** AND PROFITS

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FACTORY MANAGER WANTED FOR A ME-dium sized concern located in Oklahoma City, manufacturing strip and wire products. Must be thoroughly capable of taking over complete charge of plant operation. Give full details, qualifica-tions, past experience, salary requirements. Ref-erences held confidential if requested. Address Box 527, STEEL, Penton Bldg., Cleveland 13, O.

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#### L E R E SAY IT

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