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# STEEL

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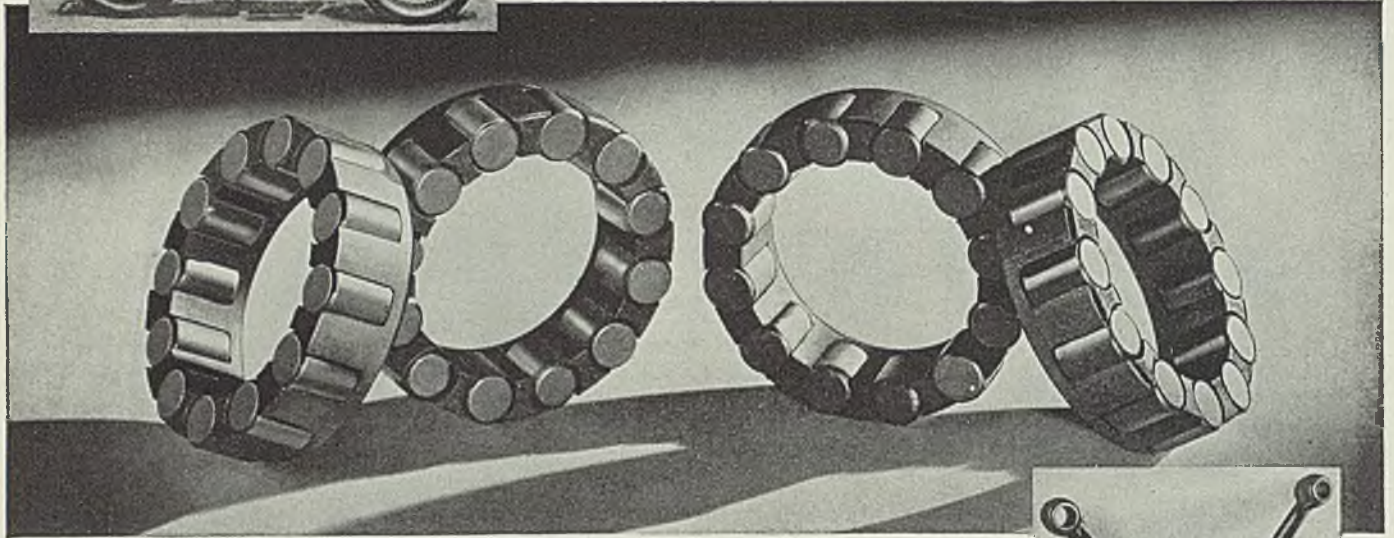


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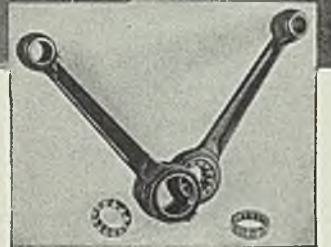
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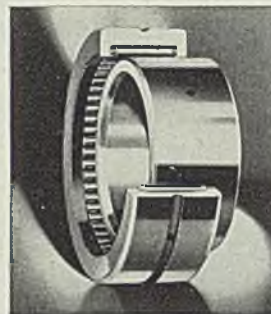
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# HIGHLIGHTING THIS ISSUE

■ THE BIG question of the moment among key industrialists is: When will the defense business break? Manufacturers in large numbers would like to prepare to mesh into the defense program and are held up because they do not know what will be expected of them. Many key executives (p. 36) are taking early vacations so as to be on hand when instructions come from Washington. In the meantime, details of the plan continue to shape gradually. For example, government purchases of iron and steel products in the week ended June 8 (p. 32) aggregated \$1,669,039.35. Identical bills authorizing construction of 84 new warships were introduced (p. 22) in both branches of congress.

♦ ♦ ♦

Progress is reported in eliminating some bottlenecks. For example, armor plate capacity (p. 24) is being expanded. Fred H. Chapin offers a constructive suggestion (p. 23) as to how the machine tool supply can be augmented by concentrating on "a basically standardized product, engineered for production line output." More sharply in focus is the need (p. 24) for training more skilled men. On the basis of orders in hand and others in sight, numerous companies are contributing to the greatest volume of industrial expansion (p. 26) this country has seen in many years. The national defense commission (p. 25) has recruited additional talent from industry.

♦ ♦ ♦

With Germany reported as offering steel to South America (p. 23) for guaranteed October delivery, the President (p. 22) instructed a cabinet committee to draft a plan for protecting Western Hemisphere trade interests; it would be built around United States' economy. . . .

## *Plan Trade Protection*

Suspension of production on most French orders for steel (p. 79) permitted mills to concentrate on other orders. New business so far in June is ahead of shipments. Steel production last week (p. 27) advanced 2 points to 88 per

cent of ingot capacity. . . . Despite the desires of some left-wingers, the government does not plan on going into manufacturing (p. 30) but will rely on private industry, reports Lynne Lamm from Washington.

♦ ♦ ♦

Timely, in view of the present emphasis on aircraft production, is the description (p. 44) by A. G. Cordy of heat treating methods that triple tensile strength, quadruple yield strength and double shear strength of aluminum alloys from which airplane parts are fabricated extensively. . . . L. J. Hess tells about unusual features (p. 47) of the new continuous pipe mill at Sparrows Point. It butt-welds 16 tons of pipe per hour. . . . A new zinc-base alloy is available (p. 59) for female dies used in production of sheet metal stampings. . . . Shorty Long reminisces on how Malcolm Finley McConnell, new manager of development, Carnegie-Illinois Steel Corp. (p. 68), got his start.

♦ ♦ ♦

Steels with piping areas are found to roll satisfactorily (p. 50) if properly heated, says Paul J. McKimm. He fails to find any difference in quality of finished product whether converted from hot or cold charged ingots. . . . One manufacturer (p. 59) is making plumbing fittings out of stainless steel, polishing them electrolytically. . . . E. W. P. Smith (p. 60) discusses the use of simple equipment which, using polarized light and celluloid models, indicate how welded structures may be designed for proper stress distribution. . . . George Ralph describes unique features which have been applied (p. 66) to mass production of electric watt-hour meters.

*EC Krentzberg*





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# DEFENSE PROGRAM EXPANDS; Move Toward Western Hemisphere Trade Solidarity

*Britain Expected To Take Over French Orders*  
*Congress Studies New \$1,200,000,000 Navy Bill*  
*Canada Mobilizes All Resources for War*  
*More Industrialists Aid Defense Commission*

■ COLLAPSE of French armed resistance to the German invasion has had less influence on the steel and metalworking industries here than had been anticipated. Work on French orders in many cases was suspended, but it is believed the great bulk of material placed will be taken over by Great Britain. Despite the suspension on French orders the national steelworks operating rate advanced two points to 88 per cent of capacity, highest this year.

Meanwhile, the United States moved swiftly to execute this country's national defense program, a program that constantly is becoming larger.

Congress received bills authorizing construction of 84 new warships to cost \$1,200,000,000. If approved the navy's strength will be raised to 618 fighting ships.

In Washington last week, some sources were predicting the Presi-

dent soon will send a new and larger defense program calling for greater expenditures for the creation of new industrial facilities and procurement of huge quantities of war material.

The national defense commission continued to call on the top ranks of industry for aid. In Washington and throughout the country the commission's activities are winning increasing respect. Observers close to the situation are more confident that the defense program will be executed efficiently and that the commission will be permitted to work with a minimum of interference from left wing New Dealers.

While relatively few defense orders have been placed, metalworking and aircraft companies are preparing their plants to build whatever may be required. A number have announced expansions.

Both industry and government are formulating plans for wide-

spread training of workers to alleviate the "human" bottleneck which threatens efficient expansion.

With the axis powers now controlling steelmaking facilities which last year produced more than 50,000,000 net tons and with attempts to penetrate South American markets already reported by totalitarian powers, this country began to formulate a western hemisphere trade monopoly program. According to the tentative plan approved in Washington the United States will provide most, if not all, the capital necessary to organize a gigantic cartel. The plan's success would depend on full co-operation by all the American republics. This is doubtful.

In Canada the legislature has passed the national resources mobilization act, providing for the conscription of man power, wealth and industry, to accelerate further the Dominion's war effort.

## *Mills Suspend Work on French Steel Orders*

■ LARGE orders for steel, placed by France within the past six weeks, were in a state of suspension last week pending final French reaction to German peace terms. The orders were not canceled, but many firms halted work on French material when that country sued for an armistice, and now are awaiting fur-

ther instructions before proceeding.

Should France be forced to capitulate completely, the great bulk of French orders will be taken over by the British, leading exporters believe. Meanwhile there are no visible prospects of decrease in steel production rate resulting from suspension of work on French orders.

Numerous mills are reported glad to sidetrack this business long enough to get a better foothold on domestic work and other export bookings. Allied governments had pressed for delivery, necessitating delay on other business.

Estimates are that France had purchased approximately 600,000



tons of steel this year, with 100,000 tons placed by May 1. Remainder was booked between May 1 and last week. Substantial portion of the 100,000 tons is said to have been rolled and shipped, but only about 1 per cent of the remainder has been processed.

Great bulk of the later orders, not yet fabricated, could easily be converted to Britain's account, necessitating only changed specifications. Shell steel, already rolled for the

French, cannot be easily converted to Britain's needs; its total produced but not yet shipped, however, is small.

Products such as sheets and plates, rolled to France's metric measurements and awaiting shipment, could be sheared with little loss, it is claimed, should Britain desire them.

Export demand, apart from further negotiations by Great Britain, has declined considerably. German military successes and Italy's en-

trance into war have practically wiped out continental Europe as an outlet. With good sprinkling of inquiries still coming in from South America, definite evidence points to general overstocking in Latin American countries.

Germany's offer to deliver steel at prices below American quotations to South America by October is not considered very seriously by leading exporters who have charged off much of the offer as propaganda.

## *New Navy Bill Calls for 84 Fighting Ships*

WASHINGTON

IDENTICAL bills authorizing construction of 84 new warships to cost \$1,200,000,000 and provide an additional 23 per cent increase in navy tonnage, were introduced last week in congress. Senator Walsh, Massachusetts, chairman of the naval affairs committee of the senate, and Representative Vinson, Georgia, chairman of the house committee on naval affairs, introduced the measures.

The bills would increase the composition of the navy by 399,600 tons, including 79,500 tons additional for aircraft carriers; 198,000 tons, cruisers; 80,000 tons, destroyers; and 42,000 tons, submarines.

Provision is made that increases in

tonnage for the various classes of vessels may be varied upward or downward amounting to 20 per cent of the total increase authorized as long as the total increases in tonnages of the various classes is not exceeded.

An expenditure of not more than \$50,000,000 "for essential equipment or facilities at either private or naval establishments for building or equipping any ship herein or heretofore authorized," is provided.

The 23 per cent fleet increase is over and above an 11 per cent increase provided in a bill signed by the President last week. If the new bills are passed, they would give the navy 618 fighting ships.

Senate naval affairs committee last

week also approved legislation to speed up naval construction by permitting negotiated contracts in place of competitive bidding. Also, advanced payment to contractors and overtime pay for workers. The same bill would limit shipbuilding and airplane manufacturing profits to 7 per cent. Under existing law 10 per cent net profit is permitted for ships and 12 per cent on army and navy planes.

Navy officials reported, last week, that Norfolk navy yard will build an aircraft carrier, 25,000 tons displacement. Work will start immediately, with vessel to be completed in four years. Reported cost, \$48,000,000, is exclusive of armor, armament and ammunition.

## *U. S. To Ask "Economic Monroe Doctrine"*

TENTATIVE program devised to block further German attempts at economic penetration and domination of Latin American nations received President Roosevelt's approval late last week. Drafted by a special cabinet committee consisting of Secretaries Wallace, Hull, Hopkins and Morgenthau, plan calls for establishment of a central agency to handle all export trade between Western Hemisphere and rest of the world.

Suggested cartel plan, based on a gigantic inter-American foreign trade monopoly, would include all nations in Western Hemisphere, including United States and Canada. It provides for a central clearing house through which trade of all American nations, excepting possessions of foreign countries, would pass.

Entire plan is based on formation of an inter-American trading corporation, which would handle all operations. All American countries would contribute to its cap-

ital, with United States principal contributor.

Corporation would purchase directly from member countries all commodities designed for export, at prices based upon average export price prevailing over a fixed period, probably past five years. These products would be in turn sold by the corporation to foreign customers at best prices it could get, with corporation absorbing any losses.

Plan's advocates contend that under such an arrangement, foreign customers would be confronted with but one supply source, which could, if it deemed necessary, withhold all exports. In this manner a virtual world monopoly could be set up on many agricultural products, and corporation could demand almost any price it chose.

Estimates as to plan's cost are as yet nebulous, vary from about one billion to more than two billion dollars. Plan's proponents are urging it to be put into effect, even

if United States must supply all capital, absorb all losses, which might reach half a billion annually. At worst, they claim, it would be the cheapest way to exclude and minimize foreign influences on this side.

Program's effectiveness would depend upon complete co-operation by all Western Hemisphere nations, would necessitate establishment of an export quota of some type, possibly based on their average exports over past five years. Prices paid for products handled would likewise be based on average over period of several years, would be as equitable and just as possible.

Entire program, as currently devised, is built around United States' economy, would not disrupt our domestic set-up. It might necessitate sale to other nations of various Latin American products at considerably below cost, or even dumping at total loss to the corporation.

Designed to meet the challenge presented by South American nations that they will be compelled



to trade with Germany unless United States offers a more even trade balance by taking their surplus products, largely agricultural, the entire set-up would obviate need for barter deals with European nations.

Argentina has already voiced approval of an inter-American trade policy. Considerable doubt has been expressed, however, that all Western Hemisphere nations will be favorable to the plan. Some sources

have expressed belief an economic tie-up of that nature must eventually lead to military co-ordination. Any such arrangement would be repugnant to many Latin American governments.

## Totalitarian Powers Gain Steel Capacity

■ REPERCUSSIONS from European war developments are already promising interference with United States' plans for inter-American trade solidarity. German steel companies are reported offering steel in South America at prices below American quotations. Cash guarantees of delivery by October are said to accompany the offers.

What effect Germany's greatly increased steelmaking facilities, gained largely through territorial conquest, will have upon United States' steel industry cannot as yet be determined. All evidence, however, points to Nazi determination to dominate world trade.

German steel output in 1939, including Austria, aggregated 26,880,000 net tons. This was less than 18 per cent of the world's output. Today Germany controls practically all of France's steel industry, which pro-

duced 9,408,000 net tons last year; steelmaking facilities in Poland, whose output last year was 1,792,000 tons; Czechoslovakia, with 1,400,000 tons produced in 1939; Luxemburg, with 2,016,000 and Belgium with 3,360,000 tons.

Aggregate steel output of nations acquired by Germany since Austria's occupation in 1938 totaled nearly 18,000,000 tons last year. This, added to her own production, totals nearly 45,000,000 tons, more than 30 per cent of last year's world total.

If, in addition, last year's production of nations allied with or dominated by the Nazi government is considered the Rome-Berlin axis is given an even larger share of the world's output. Italy last year produced 2,632,000 tons; Spain, 560,000; Sweden, 1,232,000 and Hungary, 840,000 tons. More than 50,000,000 tons were produced by these nations,

but steelworks still controlled by democratic governments produced 72,276,960 tons of steel last year. Although this was less than half of last year's actual production, it does not necessarily mean the democracies have been eclipsed.

With European nations feverishly engaged in war preparation, and with Japan actively at war all last year, it appears probable their production was practically at capacity. Excepting United Kingdom, their combined total was not as large as United States' rated capacity, 81,820,934 net tons. This, with Great Britain's productive capacity, is still considerably greater than the resources of all totalitarian nations.

United States last year produced 53,236,960 net tons of steel; Canada, 1,456,000; Great Britain, 15,120,000; India, 1,120,000 and Australia, 1,344,000 tons.

## Needed: Modern Tools, Standardization, Skill

■ MACHINE tool industry's ability to participate in the increased volume of business attendant upon Allied government and domestic orders is dependent, according to F. H. Chapin, president, National Acme Co., Cleveland, upon its adequacy with respect to two factors. These include the industry's common requirements of machinery, methods and men, and their mobility for quick adjustment to meet changed situations.

Promptness with which the industry was able to handle an accumulating volume of business, according to Mr. Chapin, has proved largely proportionate to individual plants' preparation on those counts. Three-fold problem of continuing services to old customers, meeting needs of United States government, and taking on desirable European business called for speedy adjustment in the same factors.

Primary requisite for participation in increased business, according to Mr. Chapin, lies in the availability of modern equipment. This is necessary if the builder wishes to turn out more machine tools rapidly, economically and efficiently.

Second requisite is a basically standardized product, engineered for production line output, and capable of expansion or restriction in volume with least modification of design or system.

Highly important, third requisite is for skilled workmen, available in numbers sufficient for rapid acceleration of all operations which a quickening market demands.

First two essentials, said Mr. Chapin, presented no particular difficulty to manufacturers accustomed to furnishing machinery to fast-moving industries as the automobiles and their allied suppliers, electrical and refrigeration manufacturers. For, points out Mr. Chapin, it is obvious machinery manufacturers who seek continuously to serve mass production accounts must first see to it their own equipment is modern and efficient.

Calling attention to the fallacious but frequent statement that "anyone can get business now," Mr. Chapin explained that business concerns paying highest wages and making best profit today are those which have adopted systematic programs for production tool modernization.

In leaner times as well, declared Mr. Chapin, those plants will continue as job makers, dividend earners, and will be the long-time survivors of a profitable business operation.

Commenting on the problem of obtaining skilled labor quickly, of paramount importance in stepping up machine tool production, Mr. Chapin said National Acme has found it better to train inexperienced men for specific jobs. While he does not deprecate the apprentice system in general, Mr. Chapin said, his company finds technical high school vocationally trained and otherwise "green" employes adapt themselves more quickly to today's requirements than do journeymen mechanics.

In most shops, he concluded, a fair balance of both will be found, with many employes who have served under the apprentice system serving as instructors for novices. However, for building skilled men most quickly when the open market does not afford them, Mr. Chapin advises technical high school graduates may be the best possibility.



# Industry Prepares To Train More Workers

■ CONCURRENTLY with growing demand for rearmament acceleration, industry is formulating plans for a widespread training program to insure supplies of skilled and semiskilled labor adequate for any eventuality which might arise. Without waiting for the government to set up a nation-wide training system, many industries are already inaugurating at their own expense, extensive training programs.

Present indications are that metal trades, most vital in rearmament, face possible shortages in highly skilled workers. Unemployment rolls include well over a million men listed as skilled and semiskilled. How many possess adequate skill and training to step directly into specialized work, as in the machine tool industry, is unknown. It is certain, however, that the number of unemployed skilled workers is in inverse ratio to their ability.

Federal committee on apprenticeship has adopted a policy expected to increase five times the number of apprentices in skilled trades, according to a report from Washington. Statement calls for immediate expansion of apprenticeship, particularly in defense industries. Need is said to exist for more than 500,000 apprentices, with fewer than

100,000 currently engaged in the skilled trades.

Committee's policy, set forth in a report to Secretary Perkins, calls for widespread training of semiskilled "specialists," and a comparatively smaller number of highly skilled men. "Mass of workers in modern production plants are semiskilled," says the report. "Smooth flow of work depends on an adequate working force of skilled craftsmen who are the 'lead' men—who are the 'set-up' men—and who know all of the operations in a particular trade."

Smith Welding Equipment Co., Elmer Smith, president, 2633 Fourth street, S.E., Minneapolis, has opened a technical training school for apprentice welders. This is a contribution to increasing the supply of skilled workers. No charge is made for use of equipment and school facilities and a small fee covers cost of material and instructors' time. The school is expansion of a training course operated by the company for some time. Technique of aircraft welding will be a leading feature.

Greenlee Foundry Co., Chicago, recently inaugurated a voluntary instruction course for molders and helpers. Company reports favor-

able results in improved attitude and workmanship.

Federal government, meanwhile, plans to participate in a national training program to help expedite rearmament. J. W. Studebaker, United States director of education, has proposed a \$127,000,000 educational program for training workmen. Mr. Studebaker is confident congress will make an appropriation for that purpose.

National youth administration is arranging to establish or extend mechanical training facilities, will cooperate with local industries in its work.

Prospects for universal compulsory government service for American youth between the ages of possibly 18 and 21 were increased last week by President Roosevelt's statement that he might send a message to congress concerning the matter within next few weeks.

Mr. Roosevelt made it plain he was not referring to combat training solely, but rather to a disciplined division of work, so that in time of war the nation would continue to function efficiently and with co-ordination. It would necessitate training for all the duties requisite to warfare, whether civil or military.

## Armor Plate Recognized as "Bottleneck"

■ ARMOR plate, admittedly one of the most dangerous bottlenecks in our national defense plan, is receiving the attention of both the government and the steel industry.

Republic Steel Corp., Cleveland, has announced plans to increase production of light armor plate for tanks and other equipment. Republic has under consideration extensive plans for expansion of its productive facilities in response to defense requirements. Plans for these expansions are being worked out in co-operation with government officials and the national defense commission.

Development of an airplane armor plate of rubber and steel has been announced by F. B. Davis Jr., president, United States Rubber Co., New York. Mr. Davis claims the new plate is superior in bullet penetration resistance to steel armor plate of 20 per cent greater weight.

Rapidly expanding navy, tank and scout car building programs, and plans to install armor plate on airplanes, presage a demand for this

type material which is expected to exceed present capacity to produce. Just what is the industry's armor plate capacity is not definitely known. Principal reason for the lack of knowledge on capacity is that armor plate varies widely in specifications. Certain alloy contents make it difficult to work and more time is required to finish large sections than the smaller pieces.

The heaviest plates are forged by only three companies, Carnegie-Illinois Steel Corp., Pittsburgh; Midvale Co., Nicetown, Philadelphia, and Bethlehem Steel Co., Bethlehem, Pa.

Difficulty in casting the large ingots required, the tremendous handling problems involved, as well as the large forging equipment necessary makes impossible early enlargement of capacity.

Extremely heavy armor plate, however, has only a few applications and some manufacturers believe present facilities working at capacity can supply our needs.

Lighter gages for use as aircraft

and tank armor can be produced on present strip-sheet mills with some alterations.

For example, Carnegie-Illinois' wide strip-sheet mill at the Irvin works, Dravosburg, Pa., now is set to produce material ¼-inch thick or less but production men say it would be possible to increase these limits substantially. The same applies to many other sheet-strip mills.

## Appoints Defense Resources Committee

WASHINGTON

■ A seven-man defense resources committee has been appointed by the secretary of the interior to co-ordinate department's efforts. Department has been adjusted so that priority will be granted on all matters affecting or pertaining to the national defense program.

The secretary has ordered his staff and the new committee to insure immediate right-of-way for all activities involving national defense



and to assist any agency of government the President has designated or may authorize to develop any phase of defense.

Included on the committee are the following: Dr. W. C. Mendenhall, director, geological survey, for mineral and oil resources; Dr. R. R. Sayers, director, bureau of mines, for mineral production, metallurgy, gas and antigas devices, explosives, helium and related subjects; and Joel D. Wolfsohn, assistant to the commissioner of the general land office, for power policy and administration of minerals found on public lands.

The functions of the committee will be to implement the depart-

ment's efforts in the defense program and to act as a clearing house for all defense activities. Contact with the interior department on defense matters will be made through the committee which will see that no authorized agency fails to receive the full benefits of the department's assistance because of lack of knowledge of the aid available. The committee also will co-operate with the national defense advisory commission to fix responsibilities and "avoid inaccuracies and misinterpretations of subject matter, requests for assistance or information and the responses to such inquiries from authorized sources should be transmitted in writing."

man; Dr. Caroline Ware, American university, for Miss Harriet Elliott; Karl W. Fischer for Ralph Budd, and Dr. H. B. Boyd, director of the insular division of the department of agriculture, for Chester Davis.

W. A. Hauck, formerly with Lukens Steel Co. and Bethlehem Steel Co., has been appointed assistant to Walter S. Tower, liaison officer between the advisory commission and the steel industry. The office of Mr. Tower is now in the munitions building.

#### **RFC MAY FINANCE NEW STRATEGIC MATERIALS PLAN**

Further complications have entered strategic materials situation, in an effort to speedily ensure this country a sufficient future supply of those critical materials which must be imported. It has been said, at Washington, that manganese, tin and rubber will be lifted from the strategic materials act's jurisdiction.

Separate corporation, it is asserted, will be set up under H. R. 9958, which amends Reconstruction Finance Corp. by allowing it to make loans to another corporation for acquiring and carrying critical, strategic and other raw materials. Bill also permits RFC to loan latter funds for plant construction, expansion and equipment, as well as working capital. Legislative action on the bill has been completed, but it still lacked, late last week, the President's signature.

#### **PRESIDENT NAMES DEFENSE RESEARCH COMMITTEE**

President Roosevelt last week announced the membership of the national defense research committee composed of leading college presidents and government experts. In addition to Dr. V. Bush, president, Carnegie institution, who will be the chairman, the committee will include: Dr. J. B. Conant, president, Harvard university; Dr. Richard C. Tolman, California Institute of Technology; Dr. Karl Compton, president, Massachusetts Institute of Technology; Conway P. Coe, United States patents commissioner; Dr. F. B. Jewett, president, National Academy of Sciences; the secretary of war and the secretary of the navy.

#### **RESTRICTIONS ON STEEL TIGHTENED BY BRITAIN**

*LONDON*

All steel deliveries in Great Britain now are strictly controlled, all regulations being tightened and no exceptions allowed. All orders pass through the control board and none is considered unless officially authorized. Only war purposes are given a hearing. Blast furnaces are concentrating on production of steel-making basic iron from native ore.

## **More Industrialists Enlisted To Formulate Defense Program**

■ ADDITIONAL talent from industry last week was added to the national defense commission.

Theodore P. Wright of Port Washington, N. Y., vice president and director of engineering, Curtis-Wright Corp. has been added to the aeronautical section of William S. Knudsen's division as an expert on airplanes.

A. E. Lombard Jr., professor of aerodynamics at California Institute of Technology, will be Mr. Wright's assistant.

Paul Johnston, co-ordinator of research of the national advisory committee for aeronautics, will be executive officer to Dr. George J. Meade, head of the aeronautical section of Mr. Knudsen's division.

To the staff of Robert T. Stevens, head of the textile section under Edward R. Stettinius Jr.'s division, the following have been appointed:

Arthur Besse, New York, president, National Association of Wool Manufacturers, and former chairman of the code authority, wool textile industry under NRA, will serve as a wool specialist.

Earl A. Stall, president of the F. W. Poe Mfg. Co., Greenville, S. C., and Charles A. Sweet, vice president, Wellington Sears & Co. Inc., New York, will be in charge of cotton textile manufacturing problems.

H. J. White, head of the Viscose-Rayon division of E. I. du Pont de Nemours & Co., will serve as a specialist on synthetic textiles.

Advisory commission has announced establishment of a central bureau of research and statistics to serve the seven defense commissioners. Its director will be Stacy May, assistant director for the Social Sciences of the Rockefeller Foundation.

This agency is designed to pro-

vide a channel assuring the orderly flow of requests from the various defense commissioners to the existing research and statistical agencies of federal, state and local governments as well as to trade associations and business enterprises.

The bureau of research and statistics plans to enlist the co-operation of existing agencies and their personnel to supplement and assist the army and navy munitions board in carrying on the basic statistical and research activities necessary to the proper decision of the problems with which the members of the defense commission are confronted.

The new bureau is organizing a staff having intimate knowledge of all government research activities.

They will include: Morris Copeland, executive secretary of the central statistical board; Howard McClure, executive assistant to the director of the census; and Robert Nathan, chief of national income division of the bureau of foreign and domestic commerce. Morris Leven, formerly of the Brookings institution, will be a member of the staff of the bureau. Mr. Copeland will act as liaison officer with the central statistical board.

Several of the defense commissioners have appointed assistants to advise them on economic and statistical questions and to act as liaison with the bureau of research and statistics in securing statistical and economic data. Dr. Theodore Yntema, professor at the University of Chicago and director of research for the Cowles commission, is serving in this capacity for Mr. Stettinius; William Knight Jr. for Mr. Knudsen; John Hamm of the Russell Sage foundation for Leon Henderson; Isadore Lubin, commissioner of labor statistics, for Sidney Hill-



# Canada Adopts Conscription To Increase War Material Output

TORONTO, ONT.

■ TO ENABLE more efficient prosecution of the war, the Dominion house and senate at Ottawa has passed a national resources mobilization act. The measure provides for conscription of Canadian manpower for home defense, conscription of wealth and the Dominion's industries to be used for war purposes.

Government officials want the act brought into effect immediately to further accelerate war material production. To this end, estimates of war expenditures for this year have been revised upward sharply. A few weeks ago Finance Minister Ralston estimated war expenditures at \$700,000,000; current estimates are in excess of \$1,000,000,000.

To achieve higher munitions and shell production, Canadian industry must obtain more machine tools from the United States. Canadian representatives are in Washington, charged with obtaining priority for Canadian plants. Dominion factories are using United States tools as far as possible and large orders already have been placed with United States builders. At the same time, Canadian toolmakers are operating at capacity.

C. D. Howe, minister of munitions and supplies, announces new processes are being developed to increase manufacture of antitank and anti-aircraft shells. These will not be forged but will be produced throughout by an "automatic process." Mr. Howe says munitions plants are operating at capacity and that expansions are under way to increase further output. Three plants producing antitank and anti-aircraft shells already have had capacity increased by one-third.

Canada and Great Britain, it is understood, will assume the full cost for construction of two large munitions plants announced last week, (STEEL, June 17, p. 26) as result of the French reverses.

Extensive orders for military trucks have been placed with the Canadian automotive industry. General Motors Products of Canada, Oshawa, Ont., and Ford Motor Co. of Canada Ltd., Windsor, Ont., are working full time on these vehicles. Chrysler Corp. of Canada Ltd., Windsor, also is reported to have received large contracts for war vehicles.

Production of 1940 passenger cars for the Canadian trade has been practically completed. However, tooling for 1941 models is well under way and production is expected to start within the next several

weeks. In some government quarters there are reports that these plants may be taken by the government for production of war vehicles exclusively. There also are reports that the Canadian automobile industry may install equipment for tank production. Rolling stock plants, locomotive works and the Canadian National and Canadian Pacific railroad shops are said to be equipped for immediate production of tanks and further large orders are expected to be placed immediately.

## Metalworking Companies Expand Facilities

■ Waterbury Tool Co., Waterbury, Conn., is building a 23,000-square foot addition to its plant which will substantially increase capacity and will be completed within four weeks.

Heald Machine Tool Co., Worcester, Mass., is beginning construction of a two-story and basement office building to be completed by September.

Gougler Machine Co., Kent, O., has inaugurated a plant expansion program to increase capacity by 20 per cent. Mechanical molding and welding departments will be en-

larged and a chromium plating department will be added.

Bullard Co., Bridgeport, Conn., will enlarge its foundry by a new one-story and basement building 90 x 360 feet to be completed within three months.

Dow Chemical Co., Midland, Mich., is constructing a new foundry building 80 x 200 feet to cost \$100,000 and to be ready within two months.

Purcell-Evans Tool Co., Detroit, is planning a building 50 x 64 feet at Hillsdale, Mich.

Metal & Thermit Corp., East Chicago, Ind., will erect a new building to cost \$200,000 to increase manufacturing and warehouse facilities. Austin Co., Cleveland, is engineer.

F. J. Littel Machine Co., Chicago, has purchased a \$38,000 two-story building adjacent to its present plant, increasing company's floor space by 23,500 square feet.

Marmon-Herrington Inc., Indianapolis, will double capacity of its plant making war tanks.

Allison Engineering Corp., Indianapolis, has been constantly increasing its floor space. A new unit will be occupied next month and other new units will be built.

International Nickel Co., Huntington, W. Va., will expand its merchant mill to provide for additional machine shop space in a program to cost \$250,000.

Chrysler Corp., Detroit, has let contracts for the construction of a \$1,000,000 machine shop in Highland Park, Mich.

## Production and Machine Tool Show To Be Held in Cleveland

■ A WIDE range of machine shop equipment of interest both to production executives and to tool engineers will be demonstrated at Public Auditorium, Cleveland, Tuesday, June 25, to Saturday June 29, inclusive. Known as the Production and Machine Tool Show, this exposition will feature new developments in metalworking machinery, including presses, also latest type of cutters; precision tools and gages; power drives; material handling equipment; mechanical parts and materials; and engineering department equipment. Hours will be from 9:00 a.m. to 5:00 p.m. on all five days. Admission will be by registration.

Manager of the show is Richard Bonner, associated with Grob Bros., Grafton, Wis. Exhibitors include the following:

Blank & Buxton Machinery Co., Jackson, Mich.; Henry P. Boggis & Co., Cleveland; Cassels Engineering & Machine Co., Wauwatosa, Wis.;

Clark Tractor Co., Battle Creek, Mich.

C. C. Craley Co., Shillington, Pa.; Delta Mfg. Co., Milwaukee; DeWalt Products Corp., Lancaster, Pa.; Doelger & Kirsten Inc., Milwaukee; Dumore Co., Racine, Wis.

Eastern Cutter & Salvage Co., Newark, N. J.; Ford Motor Co., Dearborn, Mich.; Fulton Foundry & Machine Co., Cleveland; Grob Brothers, Grafton, Wis.; Hamilton Mfg. Co., Two Rivers, Wis.; Jackson Machine & Tool Co., Jackson, Mich.; Mall Tool Co., Chicago; Master Tool Co., Cleveland.

Parker-Kalon Corp., New York; Porter-Cable Machine Co., Syracuse, N. Y.; A. Schrader's Sons, Brooklyn, N. Y.; Smith Power Transmission Co., Cleveland; Sunnen Products Co., St. Louis.

Wells Mfg. Co., Three Rivers, Mich.; The Weatherhead Co., Cleveland; The V. & O. Press Co., Hudson, N. Y.



## 1939 Most Beautiful Steel Bridges Selected

■ Twelfth annual awards for the most beautiful steel bridges completed and opened to traffic in 1939 were announced last week by American Institute of Steel Construction, New York.

Members of the prize jury were Prof. Hale Sutherland, Lehigh university, Bethlehem, Pa.; Prof. J. K. Finch, Columbia university, New York; Francis Keally, architect, New York; Louis E. Jallade, architect, New York; and Roger W. Sherman, managing editor, *Architectural Record*, New York.

Most beautiful monumental bridge was the \$10,000,000 Bronx-White-stone bridge across East river, New York. Engineers were Triborough bridge authority, O. H. Ammann, chief engineer; engineer of design, Allston Dana; consulting engineer on design, Leon S. Moisseiff; architect, Aymar Embury II; consulting engineers on construction, Madigan-Hyland, New York; engineer of construction, H. W. Hudson; fabricator, American Bridge Co., Pittsburgh. Highland Park bridge over Allegheny river, Pittsburgh, received honorable mention.

No award was made for the most beautiful medium-sized bridge but two bridges were given honorable mention: Howard street bridge, Baltimore, costing \$936,000; and Grove highway bridge, Grove, Okla., costing \$369,000.

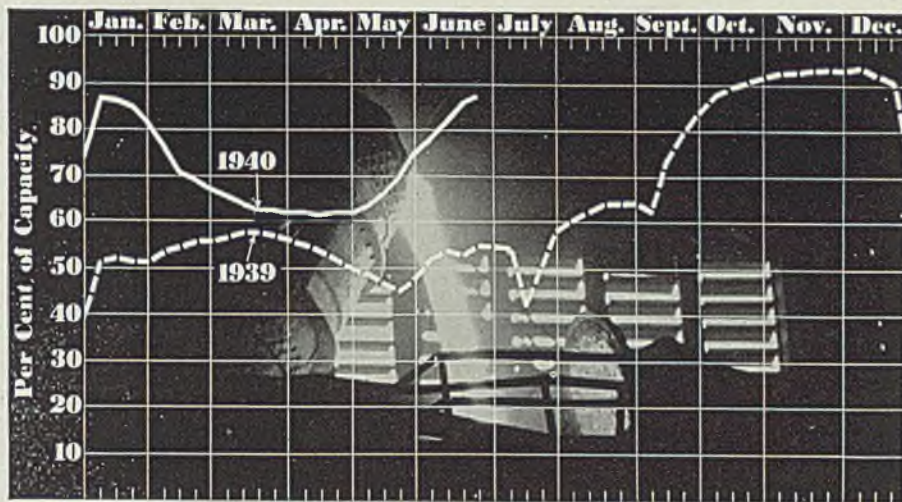
Most beautiful small bridge was Valley river foot bridge, Murphy, N. C. Engineers were Tennessee valley authority; fabricators, Lloyd E. Jones Co., Chattanooga, Tenn. Honorable mention was made of Waverly bridge, Lansing, Mich., and Alton railroad overhead bridge, Mazonia, Ill.

Most beautiful movable bridge was Second avenue bridge over Thunder Bay river, Alpena, Mich. Engineer was Clifford Paine; fabricator, R. C. Mahon Co., Detroit. Honorable mention was made of N. W. Twenty-seventh avenue bridge, Miami, Fla.

## Arthur G. McKee Co. To Build New Quarters

■ Arthur G. McKee Co., Cleveland, will build a new plant to cost \$150,000 to replace present quarters. The new building, designed by John W. Little, Cleveland, will be air-conditioned and will have three connected sections.

One section of building will be two stories and basement 40 x 100 feet, two will be wings each 42 x 92 feet. Construction is expected to start within a month.



## PRODUCTION... Up

■ STEELWORKS operations last week rose 2 points to 88 per cent, the best rate since the middle of December. Seven districts registered gains, one a slight loss and four were unchanged. A year ago the rate was 54.5 per cent; two years ago it was 28 per cent.

**Birmingham, Ala.**—Unchanged at 88 per cent, with 21 open hearths in production.

**Detroit**—Dropped 6 points to 89 per cent as three open hearths went down for repairs, leaving 23 in operation.

**St. Louis**—Steady at 68 per cent with 28 open hearths active.

**Chicago**—Gained 1½ points to 93 per cent, new high for the year and best since early December.

**Cincinnati**—Rose 9½ points to 85½ per cent, close to practical limit of production.

**Cleveland**—Edged up 2½ points to 84½ per cent, with output of some plants at capacity.

**Pittsburgh**—Continued at 81 per cent. Suspension of French orders has had no apparent effect.

**Wheeling**—Remained at 90 per cent, little change being indicated for this week.

**Central eastern seaboard**—Ad-

vanced 7 points to 83 per cent, the leading independent being near capacity.

**New England**—Increased 4 points to 70 per cent, indications being for a further rise this week.

**Buffalo**—Up ½-point to 90½ per cent, with the same rate scheduled for this week.

**Youngstown, O.**—Continued upward movement 8 points to 78 per cent, with schedule for 80 per cent this week. Carnegie-Illinois Steel Corp. will blow in its No. 2 blast furnace at Ohio works this week.

## A.S.M. Offers Services To National Defense

■ American Society for Metals, Cleveland, has volunteered its services to the government in connection with the national defense program. The offer was made in a telegram which James P. Gill, president of the society, sent to E. R. Stettinius Jr., national defense commission member in charge of raw materials procurement.

In a letter acknowledging the telegram, Mr. Stettinius referred to "the patriotic offer of the services of the society," and said the offer would be turned over to the consultant on metals for further consideration.

When the telegram was dispatched, Mr. Gill, who is chief metallurgist, Vanadium-Alloys Steel Co., Latrobe, Pa., commented that "the role of the metallurgist has been important in the peace-time industrial development of the nation. It will be even more significant as America builds its defense."

## District Steel Rates

	Percentage of Ingot Capacity Engaged In Leading Districts		Same week
	Week ended June 22	Change	
Pittsburgh ...	81	None	47 24
Chicago .....	93	+ 1.5	49.5 24.5
Eastern Pa. ...	83	+ 7	38 27
Youngstown ...	78	+ 8	54 32
Wheeling .....	90	None	79 38
Cleveland .....	84.5	+ 2.5	55.5 23
Buffalo .....	90.5	+ 0.5	39.5 28
Birmingham ..	88	None	71 42
New England..	70	+ 4	32 15
Cincinnati ...	85.5	+ 9.5	60 14
St. Louis .....	68	None	42 36.6
Detroit .....	89	- 6	57 29
Average .....	88	+ 2	54.5 28



# MEN of INDUSTRY

■ J. S. BILLINGSLEY, since 1930 identified with the Pittsburgh office of Crucible Steel Co. of America, New York, has been appointed manager at Pittsburgh. He succeeds the late M. Stuart Dravo. Mr. Billingsley joined Crucible's New York office in 1923 and later was engaged in sales activity at the Syracuse, N. Y., and Pittsburgh branches.



J. S. Billingsley

James E. Orr has been appointed advertising manager, Dorex division, W. B. Connor Engineering Corp., New York.

John Weiler has been elected president, Mullins Body & Tank Co., Milwaukee. He succeeds C. J. Mullins who is no longer associated with the company.

M. E. Robbins, with the New York district sales office of Universal Gear Corp., Indianapolis, has been appointed assistant director of sales, and will have direct supervision of all eastern sales districts.

Frederick G. Hughes, general manager, New Departure division of General Motors Corp., Bristol, Conn., has been re-elected president, Manufacturers Association of Hartford county.

C. W. Simpson, formerly vice president and works manager, National Acme Co., Cleveland, has been promoted to executive vice president, succeeding the late W. R. Mitchell. R. C. Kinley has been made vice president and works manager.

R. F. Thalner has been named personnel director, Buick division, General Motors Corp., succeeding the late Elmer H. Kramer. Mr. Thalner has a record of more than 20 years in personnel service at the Buick plant.

W. J. Buechling is now chief metallurgist at Copperweld Steel Co.'s new steel plant at Warren, O. Mr. Buechling was graduated from Carnegie Institute of Technology in 1926. He was previously associated with Central Alloy Steel Corp. and Republic Steel Corp.

Edwin F. Barnes, an employe of American Steel & Wire Co., Worcester, Mass., works, for 43 years, was given a farewell dinner recently by 100 friends and associates. He will retire June 30. He began his career with the old Washburn &

board. In addition to his vice presidential duties, Mr. Hart will continue as general sales manager of the building materials department. The reorganization was effected to fill the vacancy caused by the recent death of P. A. Andrews, vice president in charge of building materials.

Hans Landsberger has become affiliated with the New York office of Delium Products Inc., New York, dealer in machinery, steel products and scrap for foreign and domestic trade. Mr. Landsberger has been active in the export field over ten years.

Frederick J. Ricker has been named general sales manager, Worcester Pressed Steel Co., Worcester, Mass. He succeeds the late Roland M. Cook. Mr. Ricker formerly was in charge of the body works of Chrysler Corp., and at one time was chief engineer, Edison Laboratories, Menlo Park, N. J.

Frederic A. Willis, of New York, has been elected vice president, Thompson Automatic Arms Corp., and its subsidiary, the Auto-Ordnance Corp. Mr. Willis has resigned his post as assistant to the president, Columbia Broadcasting system where he was an executive for ten years.

James A. Sterling has resigned as general merchandise manager for Norge division, Borg-Wagner Corp., Detroit, to become vice president of Seiler, Wolfe & Associates Inc., Detroit, Norge advertising counsel. He had been with Norge ten years, first as advertising and sales promotion manager and later in charge of merchandising for all products.

Edward H. Moll, associated with American Bosch Corp., Springfield, Mass., since 1938, currently as factory manager, has been named vice president in charge of production. Foster N. Perry, with the corporation since 1924, previously in charge of the New York and Chicago branch offices, has been made vice president in charge of sales.

James D. Mooney, vice president in charge of General Motors overseas operations, has been relieved of his responsibilities in this connection and transferred to Detroit, as executive assistant to C. E. Wilson, acting president. Mr. Mooney will have full charge of all negotiations involving defense equipment and all

Moens Mfg. Co.; was assistant superintendent, North works, from 1914 to 1915, and for the next 12 years was superintendent, Central works. He has been customer contact man on the manager's staff since 1929.

N. M. White, associated with Graybar Electric Co. Inc., New York, 18 years, and since 1926 affiliated with the Baltimore branch as quotation and service clerk, and service supervisor, has been transferred to the company's St. Louis office as service manager.

L. M. Cassidy and L. C. Hart have been elected vice presidents, Johns-Manville Sales Corp., New York. Mr. Cassidy also was appointed general manager of the building materials department and a member of the



George S. Rose

Whose appointment as secretary of the American Iron and Steel Institute, New York, was reported in STEEL, June 17, p. 23. He has been a member of the Institute staff six years



such liaison activities necessary in connection with engineering and production of defense needs.

Graeme K. Howard, vice president and general manager of overseas operations, will assume general supervision of this division.

Albert Bradley, vice president in charge of finance, New York, also has been transferred to Detroit, and will assume additional duties as executive assistant to the acting president.

James H. Critchett, vice president, Electro Metallurgical Co.; vice president of Union Carbide and Carbon Research Laboratories Inc., New York, and former president of American Electro Chemical society, has been appointed a member, National Research council. He will serve on the division of chemistry and chemical technology.

Carl J. Halborg has been elected president, Colonial Broach Co., Detroit, to succeed the late Otto Lundell. Formerly secretary, Mr. Halborg has been associated with Colonial since its organization in 1918. A. G. Lundell and Arvid Lundell have been made vice presidents, the latter in charge of manufacturing. David A. Nelson has been named secretary-treasurer.

J. Y. Dahlstrand, the past two years chief engineer, Universal Gear Corp., Indianapolis, has been appointed director of sales and engineering. Prior to that he was associated in engineering and sales capacities with Murray Iron Works Co., Kerr Turbine Co., Westinghouse Electric & Mfg. Co., and Allis-Chalmers Mfg. Co.

R. M. Brown, formerly superintendent of production, Packard Motor Car Co., Detroit, has been appointed plant manager of the company's marine and aircraft engine division, succeeding Wayne Eddy, resigned.

Floyd Bird, formerly manager of the Packard motor plant, becomes assistant to Mr. Brown. W. H. Clark is now in charge of the motor plant.

Walter J. Langdon and Elmer D. Selzer have been appointed assistant comptroller and assistant treasurer, respectively, AC Spark Plug division, General Motors Corp., Flint, Mich. Both men started in the automotive industry as time checkers, Mr. Langdon with AC in May, 1919, and Mr. Selzer with AC in 1934, prior to which he was with Buick Motor Co., Flint.

Martin J. Conway, fuel engineer for Lukens Steel Co., Coatesville, Pa., since August, 1926, has been

transferred to the sales department as special engineer for the petroleum industry. Born and educated in England, Mr. Conway came to this country in 1920, joining Pittsburgh Crucible Steel Co., Midland, Pa., as fuel engineer. In 1923 he joined the Steubenville, O., plant of Wheeling Steel Corp. in a similar capacity.

Sam C. Mitchell has been appointed manager, automobile division, Crosley Corp., Cincinnati. He formerly was with Nash-Kelvinator Corp., Detroit, serving in various executive capacities.

Roscoe L. Hambleton, formerly identified with the overseas division of General Motors Corp., has joined Crosley as manager, foreign division.

Dr. Lincoln T. Work, associate professor of chemical engineering at Columbia university, has been appointed director of research, Metal & Thermit Corp., New York, effective July 1. A graduate of Columbia in 1918, he has been successively



Dr. Lincoln T. Work

instructor, assistant professor and associate professor of chemical engineering there. He is a member of a number of societies, including American Institute of Mining and Metallurgical Engineers, Electro-Chemical society, American Institute of Chemical Engineers, American Society for Testing Materials and others. American section of the Society of Chemical Industry has elected him as its chairman for the coming year.

Marshall Adams has joined the Youngstown Pressed Steel division of Mullins Mfg. Corp., Warren, O., and will direct the merchandising of Youngstown all-steel kitchens. He was formerly associated with Westinghouse Electric & Mfg. Co. and American Radiator & Standard Sanitary Corp.

R. E. Densmore, formerly field

sales manager of all appliances for Norge Corp., Detroit, has been named national sales supervisor for Youngstown Pressed Steel division.

A. H. Kruger has rejoined the R-S Products Corp., Philadelphia, as sales manager for its industrial furnace division, after an absence of about seven years, during which time he was associated with the industrial furnace division, Philadelphia Drying Machinery Co.

T. E. Cook has been appointed sales representative in the Chicago district for Jessop Steel Co., Washington, Pa., with headquarters at 1742 Carroll avenue, Chicago. J. W. Stranahan has been appointed to the Cleveland district with offices at 1210 East Fifty-fifth street, Cleveland, and C. E. Spragg, formerly in the New York office of the company, has been transferred to the Boston district, with headquarters at 626 Capitol avenue, Hartford, Conn.

W. H. Raisbeck has been named sales representative in the Milwaukee district for Jessop, with headquarters in the Colby-Abbot building. He formerly was representative for Anderson Forge & Machine Co.

## War May Revive Emery Mining at Peekskill, N. Y.

■ Revival of domestic emery mining may result from extension of the war to the Mediterranean and the cessation of emery imports from Turkey and Greece.

Emery production in the United States in recent years has been confined to a deposit of spinel-bearing emery near Peekskill in Westchester county, New York. Competition of artificial abrasives and imported emery and corundum has caused a general downward trend in demand for domestic emery since the World war. Since 1933 sales have been only a few hundred tons a year, and in 1938 they failed entirely.

Closing the Mediterranean to American shipping and the cessation of emery imports, however, may bring about a situation approaching that existing from 1914 to 1918 when 20 or more mines were being operated near Peekskill, and shipments were valued at \$250,000 annually. A recent discovery of underground veins, it is believed, may reveal large reserves hitherto unknown. Some experts claim the deeper veins may produce emery approaching in quality the imported material.

Spokesmen for DiRubbio & Ellis, Peekskill operators, do not believe domestic emery mining will reach World war proportions, due to the advances made in artificial abrasives.



# Windows of WASHINGTON



By L. M. LAMM

Washington Editor, STEEL

## *Government Unlikely to Operate Plants, Despite Wishes of Left Wing New Dealers*

## *Wagner Act Change Held Vital to Defense*

## *Government Assumed Powers Gradually*

## *Japan Will Increase Iron, Steel Prices*

### WASHINGTON

■ LITTLE cause for concern to industry exists in rumors emanating from Washington that the government may attempt to manufacture various products instead of purchasing them. At the moment there is nothing further from the thoughts of the administration than going into manufacturing.

It is possible the government may erect some powder plants and it is, of course, well known that naval guns are manufactured here. In some other similar special lines the government does now and always has manufactured certain products. However, aside from these, there is little probability the government will go into manufacturing.

One evidence of this is the bill fostered by the administration granting reconstruction finance corporation power to make loans to industry for expansion purposes. Another is the fact that the President is putting industrialists in the key emergency jobs in Washington. It is inconceivable that such men as William S. Knudsen and E. R. Stettinius Jr. and the many others would stand for such a program as some of the stories indicate.

There have been wild rumors, perhaps spread by left wing New Dealers, to the effect that American business isn't able to deliver the goods during the present emergency.

From the same sources come suggestions that government can manu-

facture more expeditiously and cheaply than private industry. Needless to say in figuring out how much less the government can manufacture for than private industry, those who may be arguing on that side forget entirely the government would not have to pay taxes, dividends, and many other similar costs.

High officials of the defense commission stated last week that insofar as it is humanly possible all work will be cleared through the usual channels. These channels, of course, will have to be expanded to take care of the present situation.

It is believed some of these rumors started because some left wing New Dealers do not like industry in government any more than they did before the advisory commission was established. However, up to this time the President has fully backed the advisory commission in all its activities and there is every evidence that he intends to continue.

### **TRACES PIECE-MEAL GROWTH OF GOVERNMENT'S POWER**

Growth of government powers and responsibilities of the past decade has taken place in such piece-meal fashion that its full import has not been grasped, according to the report of a study made by the Brookings institution. Expansion of the role of government has not come up as a broad issue to be judged as such, but as a series of separate, individ-

ual questions. As a result, there has been a development of government functions which might not have been approved in its entirety had it been presented as a general program.

Although the initiation of a new function has sometimes encountered opposition which provided a test of public sentiment, enlargement and elaboration, if carried on gradually, rarely has had to meet such a test. Liquidation of mistakes has been difficult because of vested interests which have been built up.

The study concludes a broad investigation into the relationship of government to economic life, which traces the course of government assistance, regulation and control in the field of private business, as well as direct public production, from the beginning of the nation.

### **Analyzes Pressure Groups**

Pressure for larger appropriations and expanded activities has come from several sources. Government agencies, striving for their own expansion, have at times been a source of pressure. Outside groups, sometimes representing particular industries or local interests, and sometimes reflecting broad public sentiment, have been the motivating force in other instances.

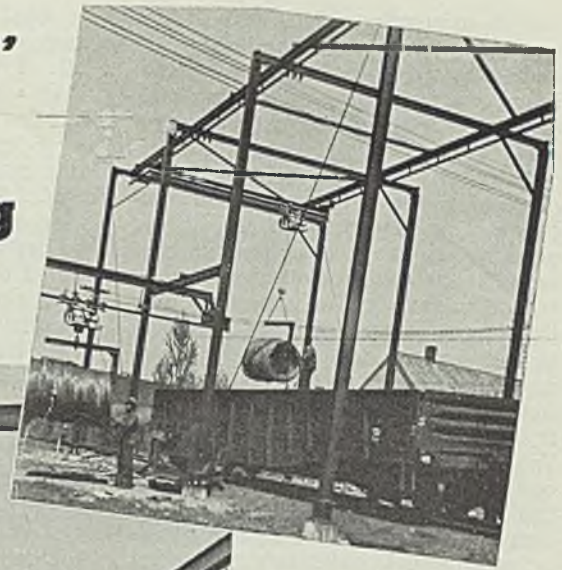
The tendency to grant broad discretionary powers to administrative agencies has been pronounced in recent years. It has raised the question of how such powers may be made sufficiently flexible to enable the agencies to carry out their authority effectively over the changing business scene without creating the threat of arbitrary action and a menace to civil rights.

A growing drift is seen toward attempts to protect members of various industries from the results of market competition by government regulation of prices and production. The study deals separately with dif-

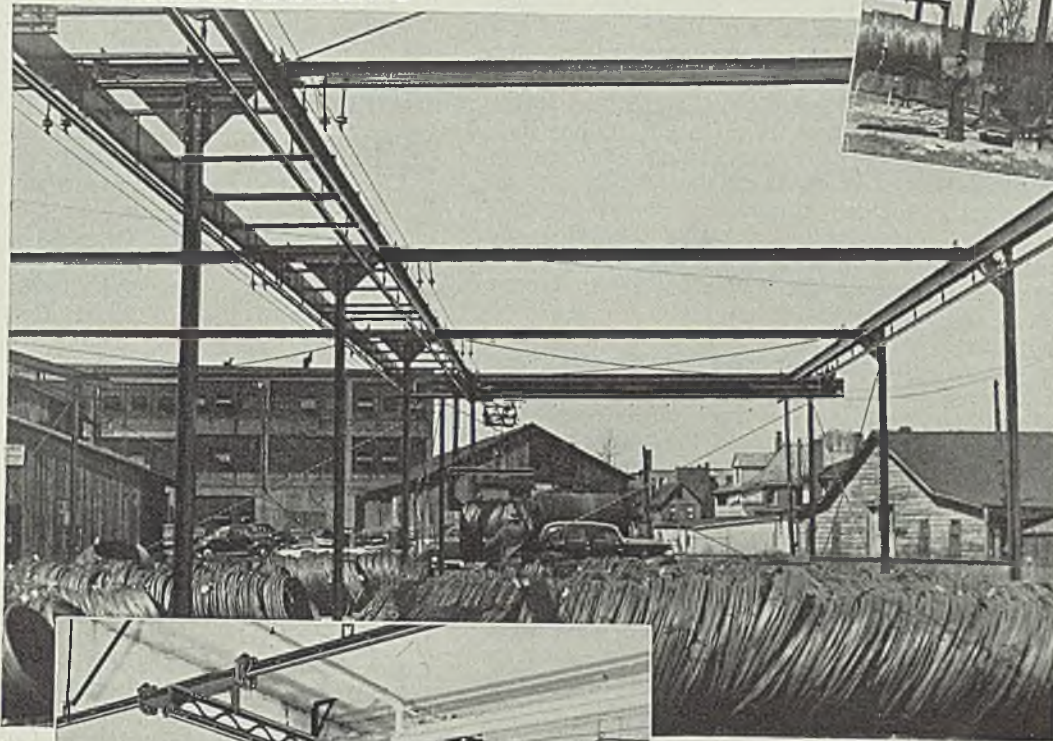


# "Saves 32c per ton!"

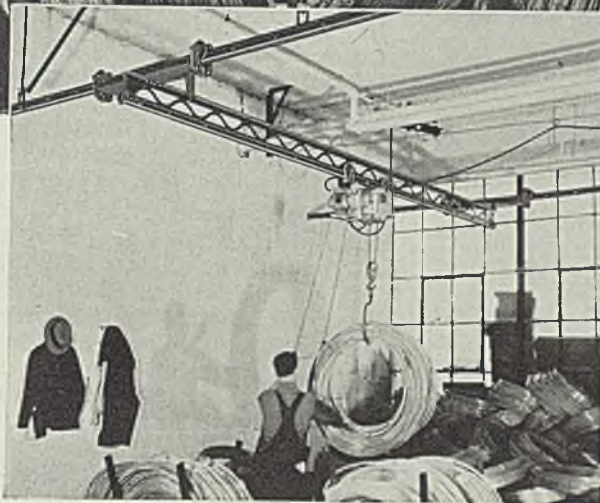
## in handling cost - - -



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ferent industries which have been specially dealt with, including bituminous coal, agriculture, petroleum, natural gas, and also with tariff protection of industry in general.

The study sets apart for separate discussion the relationship of government to industry in war time, pointing out that so extensive and so different are the relationships involved in carrying on a modern war that they cannot well be analyzed in terms of the conditions which prevail in times of peace. After tracing the course of government-industry relationships during the first World war, and the development of our present policies relating to war, the study warns that even preparation for war inevitably means greatly augmented government control of economic life.

As the range of public control is extended, the factors which need to be taken into consideration in framing and administering policy inevitably become more numerous and complex. In these circumstances, there is danger of arbitrary action or of stagnation and inefficiency. The limitations which these conditions impose on the effectiveness of public action, says the study, should constitute an important consideration in weighing the merits of any proposed program of governmental regulation, particularly those involving extensive managerial control or actual displacement of private enterprise.

The study is divided into three sections. The first, dealing with treatment of private enterprise by industries, considers special treatment of foreign commerce, public utilities, transportation, agriculture, bituminous coal, petroleum, natural gas, and food and drugs. The second part deals with the national recovery administration and with war relationships and controls. The third part is devoted to governmentally organized production, under which is discussed government production of goods and services, public relief, and social security.

#### **WAGNER ACT AMENDMENT HELD VITAL TO DEFENSE**

H. W. Prentis Jr., president, National Association of Manufacturers, last week sent a letter to Senator E. D. Thomas, chairman, senate committee on education and labor, stating that "no measure now pending before the congress is more vital to national defense" than the Smith bill amending the national labor relations act which has already passed the house.

Senator Thomas recently said he did not believe that the bill would pass the senate before adjournment, but the statement was made when

it was felt in many quarters that congress would adjourn on June 22. Mr. Prentis told Senator Thomas that prompt action on the Smith bill is imperative so that industry may "make its maximum contribution to national defense."

Mr. Prentis asked Senator Thomas that the Smith bill, now pending before his committee, be not pigeon-holed or throttled there. He called attention to the fact that his association does not agree with those who say there is not time to deal with the subject at the present session. "Congress should take the time," he said.

Mr. Prentis in his letter stated that there is no need for any further hearings; calling attention to the fact that the Smith special house committee spent several months investigating the whole situation with the result that the bill passed the house by a two to one majority.

"The National Association of Manufacturers," said Mr. Prentis, "earnestly hopes for the amendment of this law to the end that management, labor, and the public may be protected in this emergency against any group or groups who put selfish interests above national defense."

#### **ONLY 195 TONS TIN PLATE SCRAP EXPORTED IN MAY**

During May three tin plate scrap licenses were issued for export to Japan. The three licenses totaled 195 tons valued at \$3,627.00. During the first five months, 43 such licenses were issued for a total of 2784 tons valued at \$53,480.38. All of the tonnages went to Japan.

#### **JAPAN WILL INCREASE PRICES OF IRON, STEEL**

It is reported in the local steel trade that because of the rising price of imported materials, particularly scrap iron, Japan's official prices on iron and steel products will be increased, according to a report from the American commercial attache at Tokyo. It is stated further that the government has considered subsidizing the iron and steel industry in order to prevent the necessity of advancing prices, but as between 200 and 300 million yen was required, the plan was abandoned in favor of an increase in official quotations. Reports indicate also that the government will insist on a further reduction in dividends of iron and steel companies.

#### **REAFFIRM SIMPLIFIED PRACTICE RECOMMENDATION**

Division of simplified practice of the bureau of standards has announced that simplified practice recommendation R79-28, malleable foundry refractories, has been reaffirmed

without change by the subcommittee on malleable foundry refractories of the joint committee on foundry refractories, acting as the standing committee for the recommendation.

This simplification program establishes the shapes and sizes of various kinds of malleable foundry refractories used for door opening tile; tap-out blocks; side and bridge walls; bungs and roofs; and stacks. The recommendation was originally effective Feb. 1, 1928, and was reaffirmed in 1929, 1930 and 1936.

#### **GOVERNMENT IRON, STEEL AWARDS TOTAL \$1,669,039**

During the week ended June 8 the government purchased \$1,669,039.35 worth of iron and steel products under the Walsh-Healey act as follows: Consolidated Steel Corp. Ltd., Los Angeles, \$109,626; Omaha Steel Works, Omaha, Nebr., \$161,658; United States Steel Export Co., Washington, \$12,166.08; Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., \$135,522.98; Philips & Davies Inc., Kenton, O., \$43,563; Colorado Fuel & Iron Corp., Denver, \$251,674.25.

Key Co., East St. Louis, Ill., \$164,205.30; W. C. Norris Mfg. Inc., Tulsa, Okla., \$76,689.59; Aircraft Hardware Mfg. Co. Inc., New York, \$10,829.62; Ideal Clamp Mfg. Co. Inc., Brooklyn, N. Y., \$14,654.04; Republic Steel Corp., Cleveland, \$17,350.20; Nashville Bridge Co., Nashville, Tenn., \$24,412; Slag Co., Davenport, Iowa, \$16,492.84; Morris, Wheeler & Co. Inc., Philadelphia, \$57,812.68.

Crane Co., Washington, \$42,421.08; Treadwell Construction Co., Midland, Pa., \$16,000; American Steel & Wire Co., Columbus, O., \$19,257.60; Baldwin Locomotive Works, Eddystone, Pa., \$240,272; Gilbert & Barker Mfg. Co., Springfield, Mass., \$23,701.60; Lalance & Grosjean Mfg. Co., Washington; \$12,068; Columbia Steel Co., Seattle \$10,084.50 (estimated).

Crown Can Co., Philadelphia, \$29,845.95 (indefinite); National Can Corp., a subsidiary of McKeesport Tin Plate Corp., New York, \$26,255.75 (indefinite); Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., \$123,759.50; Stockham Pipe Fittings Co., Birmingham, Ala., \$69,957.62; Wheland Co., Chattanooga, Tenn., \$66,758.67; Standard Pressed Steel Co., Jenkintown, Pa., \$15,760.

■ April manufacturers' hardware sales increased 7 per cent over March and 19 per cent over April, 1939, according to department of commerce. First quarter sales of this year are 5 per cent above first quarter 1939. Wholesalers' sales in April were 8 per cent higher than March and 18 per cent above April, 1939.



# Activities of Steel Users, Makers

■ WESTINGHOUSE Electric & Mfg. Co., East Pittsburgh, Pa., plans to begin operations early in July in its new plant for production of coated rods for electric welding. Employing up-to-date facilities for quality control and rapid production, the new plant will have a capacity about four times as great as the previous output level.

George Scherr Co. Inc., New York, has been appointed national distributor for the complete line of Reed micrometers manufactured by the Reed Small Tool Works, Worcester, Mass.

William Jessop & Sons Inc., New York, has appointed Bissett Steel Co., Cleveland, sole selling agent and distributor for its line of Sheffield tool steels in northern Ohio, western New York and western Pennsylvania.

Allis-Chalmers Mfg. Co., Milwaukee, has established a new branch office in the Knight building, Charleston, W. Va. R. L. Halsted, formerly with the company's Cincinnati district office, has been made branch office manager.

Allegheny Ludlum Steel Corp., Pittsburgh, has appointed Murray-Baker-Frederic Inc., New Orleans, agent for its line of tool steels in the area comprising Louisiana, the larger portion of East Texas, as well as the southern portion of Arkansas.

Business of the Quickwork Co., Chicago, manufacturer of metal-working machinery, has been purchased by Whiting Corp., Harvey, Ill., and will be continued under the name Whiting Corp. For the present the business will be conducted at the Chicago address.

American Machine & Foundry Co., New York, has acquired a new plant at Glen Rock, Pa., for the manufacture of bakery machinery. The three-story building is 70 x 185 feet. Heavy boring mills and turret lathes have been acquired, and the building is equipped with a traveling crane. Walter F. Dehuff, originator of the Glen mixer, is in charge of the plant.

Elastic Stop Nut Corp., maker of self-locking nuts, has moved its general offices from Elizabeth, N. J., to its new plant in Union, N. J., a suburb of Newark. Transfer of manufacturing equipment has been

completed. A feature of interest is the fact that all of the steel construction is fastened with bolts and Elastic Stop nuts, instead of rivets.

The corporation's Houston, Tex., office has been moved to the Merchants and Manufacturers building.

Koppers Co., engineering and construction division, Pittsburgh, has been awarded contract by White Tar Co. of New Jersey Inc., Kearny, N. J., for the design and erection of modern naphthalene refining and disinfectant equipment to replace units recently damaged by fire. Construction will start at once and new equipment is to be ready for operation Sept. 1.

Arrow Head Steel Products Co., Minneapolis, manufacturer of pistons and other automotive equipment, has been acquired by Walter E. Schott and Joseph Karp, of Cincinnati, with approval of the United States district court, which has administered the company's affairs under voluntary bankruptcy since January, 1938. The company was established in 1914 and its payroll now exceeds 200. The company will continue operation under present policies and management.

Criterion Tool Sales, 403 North Foothill road, Beverly Hills, Calif., have completed facilities for the manufacture, sale and service of Vascoloy-Ramet carbide tipped cutting tools. Standard and special tantalum-tungsten carbide tools will be manufactured in the plant of Criterion Machine Works, which has installed toolmaking facilities and has stocked a large supply of Vascoloy-Ramet blanks in a variety of grades suitable for machining cast iron, steel and nonferrous materials. Criterion is said to be the only plant west of Chicago equipped for the manufacture of carbide tipped tools.

## Died:

■ LAWRENCE E. SCRANNAGE, 48, general manager in charge of sales and operations, forging division, Phoenix Mfg. Co., Catasauqua, Pa., June 16. Mr. Scrannage assumed the general managership of the forging division April 1 this year. He has had wide experience in management, design and plant operation. From 1929 to 1934 Mr. Scrannage was associated with Trundle Engineering Co., industrial and management engineers, Cleveland, and from 1934 until last year when he established

his own practice as a consulting and contracting engineer, he served as operating superintendent, Cleveland Hardware & Forging Co. Mr. Scrannage was a member, American Management association and Drop Forging association.

Orla E. Jennings, partner and general manager, Detroit Furnace Supply Co., Detroit, June 17 in that city.

George Mattlin, 66, for 27 years an erecting engineer for Allis-Chalmers Mfg. Co., Milwaukee, recently in that city.

John H. Richardson, 66, assistant vice president and head of the research department, United Shoe Machinery Corp., Boston, June 2 at Melrose Highland, Mass.

John C. Coleman, 85, founder of Wayne Steering Wheel & Bow Co. and the J. C. Coleman Co., maker of automobile parts, recently in Detroit.

Alvin J. Donnally, 75, retired manufacturer of automobile springs, May 24 at his home in Tenefly, N. J. He was president, Cook Spring Co., Ann Arbor, Mich., for 30 years.

Francis W. Dean, 88, consulting engineer and inventor, May 25 at his home near Boston. He was a charter member and past president, American Society of Mechanical Engineers.

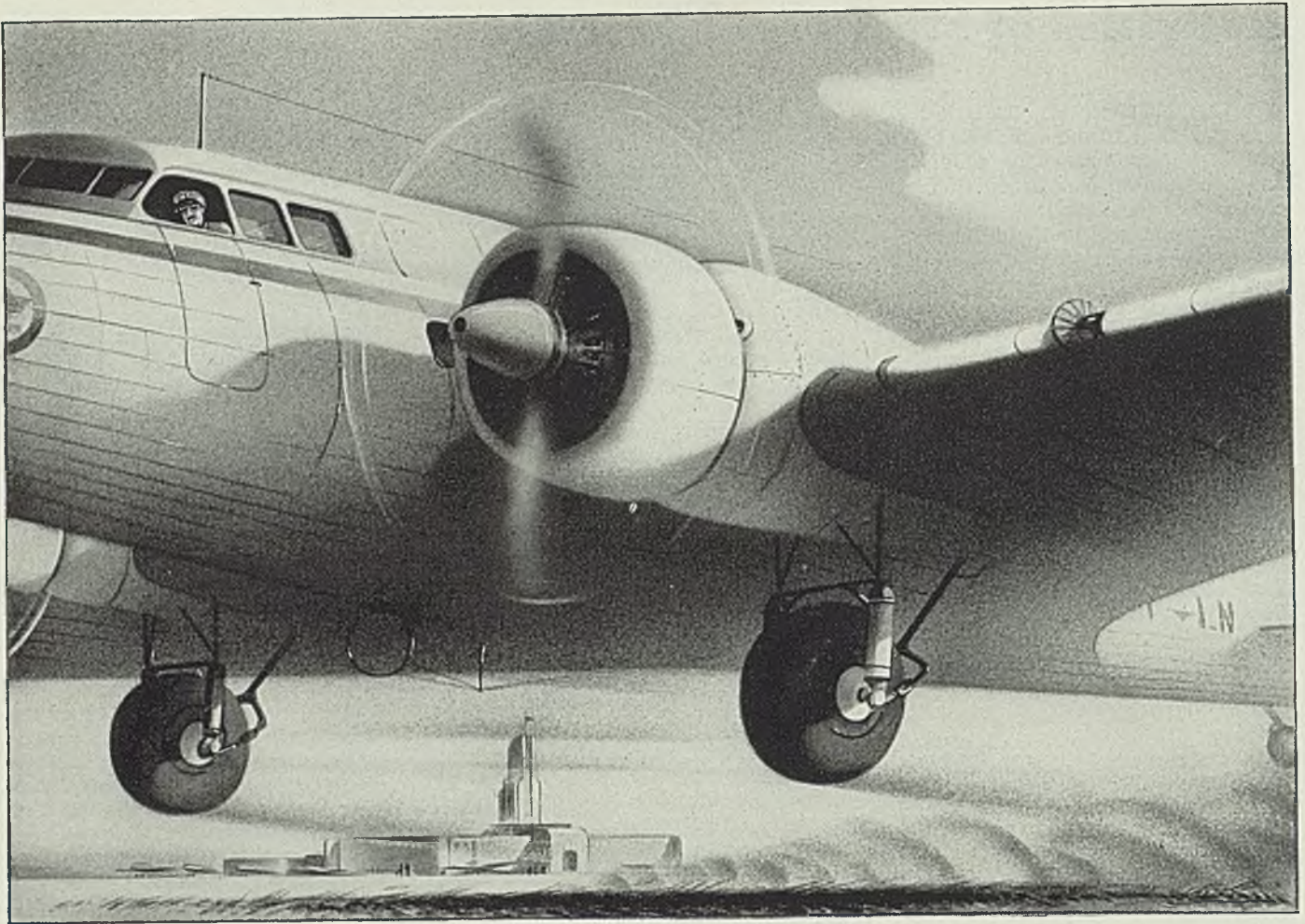
Hyman Botwinik, 51, president, Botwinik Bros., New Haven, Conn., maker of machinery and equipment, recently in that city. He was also president, Harris Iron & Metal Co., and a director, National Pipe Bending Co.

John B. Stayne, 73, for 20 years superintendent, Wellman Bronze Co., now the Wellman Bronze & Aluminum Co., Cleveland, June 12 in that city. He was well known in the foundry field before illness forced his retirement.

Harry B. Battersby, 58, for many years with Traylor Engineering & Mfg. Co., Allentown, Pa., and formerly vice president and treasurer of that corporation and its affiliate, the Cement Gun Co., in Allentown, June 1.

Harry E. Figgie, 53, vice president, Standard Steel Spring Co., Coraopolis, Pa., June 13 in White Sulphur Springs, W. Va., where he had gone to attend the convention of the American Society of Automotive Engineers. A graduate of Case School of Applied Science, he had been with the spring company 20 years.





## WHERE "GOOD ENOUGH" WON'T DO

There are no "unimportant" parts in an airplane engine. Efficiency and dependability demand perfect performance all along the line. Consequently the only standard for selecting materials should be ability to meet the requirements.

Nickel-Chromium-Molybdenum and Nickel-Molybdenum oil hardening steels are being chosen for many engine parts such as crank shafts, pins and accessory gears because of their demonstrated capacity for doing their jobs. Not only do they develop

the necessary strength and toughness, but also the requisite hardness, and they machine in the fully heat treated condition.

Thus they give the engine manufacturer confidence in the performance of the parts and help keep his production costs within reasonable limits.

Complete technical data about the various Molybdenum steels will be found in our book, "Molybdenum in Steel". This book will be sent free on request to executives and production heads.

PRODUCERS OF MOLYBDENUM BRIQUETTES, FERRO-MOLYBDENUM, AND CALCIUM MOLYBDATE

**Climax Mo-lyb-den-um Company**  
**500 Fifth Avenue • New York City**

# MOLY



# Mirrors of MOTORDOM



By A. H. ALLEN  
Detroit Editor, STEEL

## *Ford May Build Aircraft Engines at Highland Park Plant*

## *Chrysler Trains Engineers*

## *Murray Corp. Making Plumbing Ware*

## *GM Agrees to New Union Contract*

DETROIT

■HIGHLAND PARK plant of the Ford Motor Co. appears destined for a rebirth of activity in connection with Ford's proposal to launch construction of airplane engines. Practically idle since the transfer of most all passenger car and truck manufacturing operations to the Rouge plant, the buildings at Highland Park now house a few small independent manufacturing shops, as well as the large Ford commissary, recently expanded. There remains, however, a considerable amount of space which has been inhabited only by sweepers and painters during recent years.

Reports indicate engine manufacturing and assembly may be concentrated in what is termed the X-Y-Z building there, keeping the Rouge plant free for routine car and truck production except for some "robbing" of its equipment which may be needed at Highland Park.

All indications point to the fact that plans are already under way to begin manufacture of some slight variation of the Rolls-Royce Merlin engine. How soon production can get under way is a debatable point. At the time of the last war when Ford decided to build the Liberty engine, it took from March 3 to Oct. 16 to get engines rolling from the production line—about 7½ months. Naturally with the numerous technical advances made in the intervening years, it may be possible to cut this time down appreciably, but as yet few if any prints are out for equipment people to con-

sult. A responsible authority said here last week that eight months would be a conservative estimate of time required to get into full production, or about February of next year. Offhand, this sounds extremely conservative.

Present plans are said to be based on production of around 20 engines per 8-hour day. Assuming two-shift operations, this would mean, roughly, 800-1000 engines monthly. Newspapers carried reports last week that the British had placed an order for 6000 of the engines, the war department another 3000.

Considerable undercover activity on the Merlin engine has been in process around Detroit for the past eight months. Rolls-Royce interests have had offices here in the General Motors building, now have transferred to the Ford plant. Calls at this office elicit the information that nothing can be said officially of the development; calls to Ford headquarters meet the same blank response as far as news is concerned.

### **Merlin Engine Simplified**

Ford engineers are understood to have simplified the original Merlin design considerably, but the basic design of the engine is no secret, having been described in detail in the British press. Strangely enough, however, a checkup on this material at the Detroit public library revealed that the single copy of the publication containing the description had been surreptitiously mu-

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tilated and most of the pages on the Merlin engine torn out. There are, of course, other sources for this information.

The engine is a geared 12-cylinder upright-V type, with 5.4-inch bore and 6.0-inch stroke. Frontal area is 5.85 square feet, making the plant ideally suited to nose and nacelle installations. In England the engine has been installed in high-speed fighters, as well as in both medium and heavy bombers. Dry weight is 1335 pounds.

Without supercharger, it develops 880 horsepower at 3000 revolutions per minute. One supercharged design developed 1025-1065 horsepower at 2850 r.p.m.; another showed 1300-horsepower on takeoffs. The design lends itself readily to armoring, a British authority suggesting that ¼ to ½-inch armored cowling would be suitable.

Crankcase is of aluminum alloy, heat treated and of the split type. Bearings are steel shells lined with lead bronze by a new British process. Cylinder block also is of aluminum alloy, heat treated after initial machining operations. Cylinders are set at a 60-degree V, each V containing six "wet" cylinder liners of high-carbon steel, flanged at the top. Particularly enough, a V-type engine with steel cylinder liners is right up Ford's alley.

In British practice there are 93 separate machining operations on each block. Counterbalanced crankshaft is of forged chrome-molybdenum steel, machined all over and nitrided. Connecting rods are H-section nickel steel forgings. Camshaft is 5 per cent nickel steel case hardened and rifle bored; it is driven by an inclined shaft and gearing.

Each cylinder in the supercharged design develops approximately 100 horsepower. Two inlet and two exhaust valves are used per cylinder, the exhaust valves being sodium cooled with hardened caps of nickel steel.

Ford's determination to make a



quick move into airplane engine manufacture recalls to many the speed with which he moved over 20 years ago when undertaking manufacture of submarine chasers. These Eagle boats were 25½-foot beam, 200 feet long and 200 tons in weight. Buildings erected at the Rouge plant provided for the fabrication of ship steel, the progressive assembly on three separate lines of 21 ships, transfer of the hulls on their cradles by a transfer table to an unique hydraulic launching bridge, and the subsequent launching with hydraulic elevator. With a force of 8000 men, Ford kept his promise of building one ship a day, fully equipped with power plant and armament, ready for service. So efficient was the system it took only ten days to build a complete ship. Sudden cessation of the war in part dimmed the brilliancy of this industrial achievement.

■ CHRYSLER Institute of Engineering held graduation exercises last Friday, conferring master of automotive engineering degrees on 25 students, selected two years ago from 3000 applicants; awarding diplomas to ten students and certificates in special courses to 44 students, all students being employes.

The occasion also marked the appointment of H. T. Woolson, Chrysler executive engineer, as president of the institute, succeeding Dr. James Shelby Thomas. Mr. Woolson presided and introduced Major Edward Bowes, commencement speaker.

Since 1933, when the institute was founded, more than 150 students have been enrolled in the graduate school and 3500 in the undergraduate school. A waiting list of 2500 is now on hand for entrants to the graduate school, 1000 to the undergraduate group.

Primary purpose of the institute, of course, is to train men for future places in the corporation's plants, and in so doing the school is lending major aid in relief of the shortage of skilled men in nearly all industries. General Motors institute at Flint, Mich., and the Henry Ford Trade School at Dearborn are somewhat similar institutions sponsored by the motor industry to insure a supply of trained men.

Speaking of this educational activity, a Chrysler engineer recently told this writer one of the most difficult tasks encountered in the training of young men today is persuading them to roll up their sleeves and actually to do manual work. Too many of these young people seem to have the mistaken belief that a formal education is the passport to a comfortable seat in an air-conditioned office, with the only manual labor required being operation

of a row of convenient buttons at one side of the desk.

Equipment and supply interests in this district are "living on inquiries" these days, on both automotive and armament accounts. Production is being wound up on 1940 models and in the next week or two will have been just about completed. Meanwhile inquiries on 1941 material are plentiful and some initial requests for parts figuring in the defense program are being issued. The big question of the moment is:

## Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1938	1939	1940
Jan. ....	226,952	356,962	449,492
Feb. ....	202,597	317,520	422,225
March....	238,447	389,495	440,232
April....	237,929	354,266	452,433*
May.....	210,174	313,248	415,158†
5 mos....	1,116,099	1,731,491	2,179,540†
June.....	189,402	324,253	.....
July.....	150,450	218,494	.....
Aug.....	96,946	103,343	.....
Sept....	89,623	192,678	.....
Oct.....	215,286	324,688	.....
Nov.....	390,405	368,541	.....
Dec.....	406,960	469,120	.....
Year....	2,655,171	3,732,608	.....

\*Revised. †Estimated.

Estimated by Ward's Reports

Week ended:	1940	1939†
May 25 .....	96,810	67,740
June 1 .....	61,255	32,445
June 8 .....	95,560	65,265
June 15 .....	93,635	78,305
June 22 .....	90,060	81,070

†Comparable week.

When will the defense business break?

Plants are getting the decks cleared to handle a large volume of the latter; key executives are taking early vacations. Meanwhile all ears are bent toward Washington.

■ AN OLD-LINE automotive body builder and parts supplier, Murray Corp. of America, has started shipments of an entirely new line of pressed steel bathtubs, sinks, lavatories, floor and wall cabinets to the 600 retail outlets of Montgomery-Ward & Co. The new line, tentatively called All-American ware, has been designed by Murray engineers, and several floors of the large Murray main plant here have been re-equipped and given over to manufacturing operations.

Most spectacular of the fabricating operations involved is that of stamping the bathtub. Produced in both 4½ and 5-foot sizes, the latter is formed cold from a 65 x 79-inch sheet of 14-gage enameling stock in a single operation. A new Lake

Erie hydraulic press has been installed for the work, exerting 1900 tons on the hold-down die and 1700 tons on the ram. High pressure on the hold down is necessary to avoid wrinkling the edges of the sheet which form the top edges of the tub.

The tubs and sinks are sent to a Clyde, O., enameling company for ground coat, finish coat and acid-resist final coat, applied with conventional baked enamel technique. The entire line is made in white only, cabinets and the like being of 20-gage steel with a sprayed "dulux" type of finish. New spray booths, bake ovens and conveyors have been set up in the Murray plant for this finishing work, and represent one of the most modern conceptions of such facilities. Operators in the well-lighted water-wash spray booths, for example, have thin, pliable helmets, open at the front and with a small air hose connected at the back to keep a positive pressure inside the helmet and thus exclude paint spray from settling on the operator's face, at the same time supplying him plenty of fresh cooled air to breathe.

## New Labor Accord for GM

New labor contract negotiated between General Motors and the UAW-CIO adheres fairly closely to the lines of the corporation's original proposal. The equivalent of 40 hours' pay will be given employes with one year of service "in lieu of vacation with pay" according to wording of the contract. An umpire to settle grievances, hired jointly by the corporation and the union, is a new feature. Clauses dealing with aliens and sabotage were dropped from the contract. Employes forced to leave their jobs for government services retain seniority. One union committeeman for each 250 employes is permitted, compared with one committeeman for each 400 in the 1937 contract. Dues collections will be allowed on company property but not during working hours.

The UAW claims its members will receive additional yearly payments of \$12,000,000 by virtue of the vacation pay agreement and wage increases which will be forthcoming. The new contract is reported to be the first major contract negotiated in the industry without recourse to a strike or suspension of work, and union leaders hailed it as the "greatest advance in the history of automobile unionism."

Thornton Tandem Co. here, builder of dual axle and locking differential drive units for motor trucks, has started construction of a 30,000 square foot addition to its present 39,000 square feet of manufacturing space. Foreign orders account for the need for more space.



# SERVICE PROVED



3 DIE CASTINGS ON THE JOB SINCE 1929



—RESULTED IN THE USE OF 17\* IN 1940

## —DIE CASTINGS DO THE JOB BEST

In 1929, a leading hardware manufacturer employed ZINC Alloy Die Castings for the first time—in a padlock. Not only is this padlock still being sold in volume, but many more products with die cast construction have been added to the manufacturer's line. In 1940, for example,\* we find a combination locker lock which is almost entirely constructed of ZINC Alloy Die Castings—17 in all!

Why have the engineers of this hardware concern steadily increased the number of die castings in their products? If you do not

know the answer to this question you may be overlooking the solution to some of *your own* production problems. Any commercial die caster will be glad to acquaint you with the physical and economic advantages offered by ZINC Alloy Die Cast parts—or write to The New Jersey Zinc Company, 160 Front Street, New York City.



The Research was done, the Alloys were developed, and most Die Castings are made with  
**HORSE HEAD SPECIAL** (  $\$9.99 + \%$  ) **ZINC**  
Uniform Quality



# 70 Per Cent of Metalworking Equipment Over Ten Years Old

■ SEVENTY per cent of the equipment in this country's metalworking plants is more than ten years old, according to a nation-wide survey by the *American Machinist*. Previous surveys by the magazine in 1925, 1930 and 1935 showed 44 per cent, 48 per cent and 65 per cent respectively as the amount of equipment more than ten years old.

Findings of the latest survey are especially significant at a time when the country is embarking on a gigantic armament program and when many of the equipment builders are working at near capacity.

As might be expected because of its comparative youth and because of the many advanced ideas involved in its operations, the aircraft and aircraft engine industry stands at the top of the list as far as the newness of its equipment is concerned. Only 28 per cent of the metalworking machinery now in use in the aircraft and engine industry is over ten years old.

In contrast, 82 per cent of the machinery used in the railway equipment shops is over ten years old. United States army arsenals run the railway equipment shops a close second with their average of 81 per cent of equipment over age. Motor vehicle plants stand in a middle position with an average of 62 per

cent of equipment more than ten years old.

While by no means the worst showing, there obviously is plenty of room for improvement in the plants wherein metalworking machines—including machine tools themselves—are manufactured. Seventy-one per cent of the machines used in these plants have passed the ten-year "milestone."

Considered geographically on the basis of machines per 1000 of population, New England, with many companies well past the century mark, shows an average of 78 per cent of its metalworking equipment over ten years old. The middle Atlantic and the east north central states run neck and neck with each other with 69 per cent; the west north central states, wherein industry is of comparatively recent development, nevertheless lag behind the last two sections, with 72 per cent; while the Pacific states, Washington, Oregon and California, reflect the aircraft industry influence with only 56 per cent over age.

## Engineering Enrollment Shows 30 Per Cent Gain

■ Significant trends, developments, and events in engineering education

which have had such profound influence on the present-day industrial development of the nation are continuing, according to the fifth annual progress report of the Society for the Promotion of Engineering Education. This report was released prior to the annual meeting of the society in Berkeley, Calif., June 24-28.

Increase in enrollment is significant; undergraduate students in approximately 150 engineering schools in the United States and Canada today number about 106,000, an increase of nearly 30 per cent in three years. Candidates for the master's degree number more than 4700, and for the doctor's degree 850, both more than doubled in the last three years.

Report states that this "undergraduate increase is presumably due partly to the employment situation but mainly to the growing regard for engineering training as a preparation for careers in industry, business and public service."

Mechanical engineering enrollment, which shows the greatest increase during this period, 89 per cent, "may be traced to the character of this curriculum and to the recent publicity given to aeronautics, diesel engines, and air conditioning. Most mechanical engineering curricula stress management and labor problems which may be an added explanation."

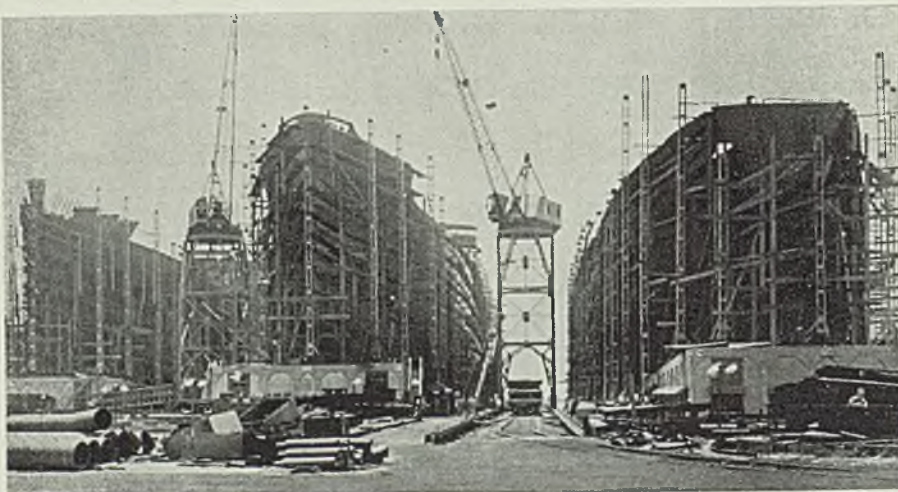
The report calls attention to research. It states that "prior to 1933 over half of new process and new product development came from Central Europe; in 1938, less than 5 per cent. Totalitarian influence on education is forcing American industry to a new dependence on research 'made in U.S.A.' The war in Europe may have an important influence here in the transplanting of refugee scholars."

## May Domestic Scrap Use Increases 22 Per Cent

■ Domestic consumption of iron and steel scrap in May rose to 3,353,000 gross tons, 22 per cent above the 2,753,000 tons in April and 48 per cent above the 2,263,000 tons of May 1939, according to estimates of Institute of Scrap Iron and Steel Inc., New York.

For first five months of 1940, domestic scrap use is estimated at 15,867,000 tons compared to 12,022,000 tons for the same period of 1939. Current scrap for domestic use amounts to 16 times that for export, which in April was 221,152 tons. Monthly exports thus far in 1940 average 212,563 tons compared to 298,119 for the same average in 1939.

## South Benefits by Shipbuilding Revival



■ Eight all-welded C-3 vessels taking 40,000 tons of plates are being built at Ingalls Shipbuilding Corp., Passagoula, Miss., an affiliate of Ingalls Iron Works Co., Birmingham, Ala. Three of four 8900-ton cargo vessels are shown here just before the first to be completed, the EXCHEQUER, center, was launched on June 8. Immediately following the launching, preparations were started for laying the keel of the first of four 9200-ton combination cargo-passenger ships. Steel is supplied by Tennessee Coal, Iron & Railroad Co., Birmingham, and Republic Steel Corp.'s Gadsden, Ala., plant



# MEETINGS

## HEALTH IN INDUSTRY THEME OF MUSKEGON CONFERENCE

■ INDUSTRIAL health problems, deemed vital now in the nation's defense production speed-up will be analyzed in Muskegon, Mich., June 28, at a meeting of medical experts and industrial leaders. It is said to be the first conference of its type ever held for the purpose of discussing methods for control of occupational and non-occupational injuries and diseases, and employe fatigue.

Co-sponsoring the meeting—to be known as a "Clinic on Health in Industry"—is the National Association of Manufacturers, Muskegon Employes association and Employers Association of Grand Rapids. Co-operating and participating also is the bureau of industrial hygiene, Michigan State department of health, and the committee on occupational disease and industrial health of the Michigan State Medical society.

Chairman of the sponsoring committee is G. W. Cannon, vice president, Campbell, Wyant & Cannon Foundry Co., Muskegon, and member of the N.A.M. committee on healthful working conditions. H. C. Beaver, president, Worthington Pump & Machinery Corp., New York, is chairman of the latter committee.

Meeting will be held at the Occidental hotel, with morning, luncheon and afternoon sessions. Approximately 200 business leaders and doctors in the Michigan area are expected to attend.

## A.S.M.E. FALL MEETING IN SPOKANE IN SEPTEMBER

Fall meeting of the American Society of Mechanical Engineers will be in Spokane, Wash., Sept. 3-6, with headquarters at Hotel Davenport. Papers of interest to mechanical, civil, electrical and mining engineers will be presented at sessions sponsored by the hydraulics, wood industries, heat transfer, fuels, power, and management divisions. A visit to Grand Coulee dam will be made on Sept. 4.

## ANTICIPATE WIDER BUYING FOR NEW YORK POWER SHOW

Advance reports indicate that the Fourteenth National Exposition of Power and Mechanical Engineering, to be held in Grand Central Palace, New York, Dec. 2-7, will be the largest since 1930. To date, nearly 250 companies have engaged exhibit space. With normal business improvement being further stimulated by the national defense program and foreign orders, 40,000 visitors are expected to show great

buying interest. Attendance is limited by personal registration and is confined to executives, engineers and operating men interested in equipment for the generation, distribution and utilization of power.

## Security Board Lists Skilled Labor Supply

■ Special efforts to meet temporary shortages in certain specialized skills in specific local areas will probably be necessary to increase defense industries' production on an emergency basis, according to Paul V. McNutt, federal security administrator.

This is despite more than 1,500,000 skilled and semiskilled workers listed in April as seeking employment, and to insure adequate general labor supplies for use in the future.

Basing his statement on data in process of compilation by the social security board, and already including 33 states but not such important manufacturing centers as California and New York, Mr. McNutt pointed out there is still a large reservoir of generally skilled workers for industry to draw upon. He cited the board's survey as it applied to 76 particularly essential occupations in aircraft, shipbuilding, munitions, machine shop and machine tool industries.

Survey, in April, listed 5300 tool and die makers, more than 2300 experienced engineers and designers, about 2000 workers experienced in other important skilled jobs in the same industries, and more than 17,000 machinists and mechanics seeking employment. More than 2100 workers with experience in 13 selected ship-building occupations were listed also, as were 1500 aircraft workers in 20 selected occupations and more than 23,000 skilled workers in a group of 33 machine shop and key manufacturing occupations.

Mr. McNutt explained that in this group more than one-fifth the engineers and designers were 45 or more, as were one-third the skilled machinists and mechanics and two-fifths the tool and die makers and workers in selected key construction and production occupations.

## Employment Service Is Reorganized, Expanded

■ To satisfy certain legal requirements of the several states in which it operates, the employment service of the Four Founder Engineering Societies has been incorporated in New York state and its name changed to Engineering Societies Personnel Service Inc. In 17 years,

the service, through its offices in New York, Chicago and San Francisco, has placed more than 20,000 engineers in private industry and from 1930 to 1939 more than 10,000 on WPA and other governmental projects.

At the first meeting of the corporation, George T. Seabury, secretary, American Society of Civil Engineers, was elected president; C. E. Davies, secretary, American Society of Mechanical Engineers, vice president; Otis E. Hovey, director, Engineering Foundation, treasurer; and A. H. Meyer, secretary.

Plans are being made to extend operations of the service. First step in this direction will be opening of a Detroit office about July 1. This will be located in Hotel Statler until such time as it can move into permanent quarters in the Engineering Society of Detroit building, now under construction. Louis E. Williams, a well-known Michigan engineer, has joined the staff and will be manager of the new office.

## Machine Tool Builders Activity Down Slightly

■ Machine tool builders' operations in May dropped to 92.5 per cent of capacity from the peak of 93.4 per cent in April, according to National Machine Tool Builders' association, Cleveland. May 1939 operations were at 63.6 per cent of capacity.

Capacity of the industry, measured in payroll hours, has increased month by month and now stands at 125 per cent, assuming capacity of September 1939 as 100 per cent.

## Keystone Steel & Wire Co. Honors 25-Year Employes

■ Keystone Steel & Wire Co., Peoria, Ill., honored veteran employes with the company 25 years or longer at the third annual banquet of the "Keystone 25 Year Club" held at Hotel Pere Marquette, Peoria, Ill., on June 14. Six new members were admitted into the club, bringing membership to 62.

Guest speaker was Henry A. Roemer, president, Pittsburgh Steel Co., Pittsburgh. Members received their first pay checks, canceled, as souvenirs.

■ Domestic sales of farm equipment for year ending next October are expected to increase 15 per cent above last year, according to reports based on sales in first part of season. For first four months 1940, agricultural implement industry payrolls were 18 per cent larger than same period 1939.



## *No Machine Tool Bottleneck, If—*

■ ELSEWHERE in this issue (p. 23) mention is made of a timely pronouncement by Fred H. Chapin, president, National Acme Co., Cleveland, as to the ability of the machine tool industry, in equipment, product and men, to meet the defense situation.

In Mr. Chapin's statement, one of three points emphasized is the desirability for "—a basically standardized product, engineered for production line output, and capable of expansion or retraction in volume with the least modification of design or system." He is thinking in terms of high production machine tools, and STEEL believes that here he has hit upon the crux of the matter.

Machine tools ordinarily have not been turned out by "mass production methods"—not because it could not be done, but rather, because in ordinary times the quantities required have not justified such production. However, many of the methods which are highly important in mass production long have been used successfully by leading machine tool builders in order to insure interchangeability of repair parts. This refers particularly to the use of jigs and fixtures in making machine tool parts.

### **Too Many Special Designs Thwart Mass Production Accomplishment**

During the first World war something approaching mass production was attained by certain builders who applied jigs and fixtures to what might be called "standardized-simplified" designs. In some cases these were being turned out in amazing numbers by the time the armistice was signed.

Decay of that sort of "standardization-simplification" then became very general, especially during the depression periods when machine tool builders reverted to the custom of designing and building special types and special sizes at the slightest provocation. This was especially true when customers falsely encouraged them in the belief that

"there's an order for 49 more of those special machines down in the bottom of the well."

If machine tool users will cease such thoughtless demands for "special" machines and will co-operate with machine tool builders who now are trying to get back again to "—a basically standardized product, engineered for production line output," the machine tool building phases of the national defense program can be handled in existing plants.

### **Standardized Types Will Help Industry Meet National Defense Needs Promptly**

It is true, as Mr. Chapin points out, that many additional workmen will be needed. With the type of product he has in mind however, it will not be necessary for the bulk of them to complete lengthy courses of training before they become useful. Jigs and fixtures which can be made in a relatively short time by the "solid core of skilled men" around which every machine tool organization constantly expands or contracts, will make it possible for new men of very limited skill quickly and accurately to turn out the bulk of the parts which will go to make up the standardized machine tools.

In the meantime, that same "solid core of skilled workmen," augmented by new men who have received advanced mechanical training in technical and trade schools, will be able to handle those certain few matters of manufacture and assembly which in the machine tool industry probably always will require "a final touch of a master hand." These same skilled men likewise can be depended upon to take care of the relatively small number of modified machines and special tooling setups which will continue to be necessary to meet certain unusual requirements.

The American machine tool industry is a tremendous national asset. Let's use it properly!



# The BUSINESS TREND



## Production Indexes Move To Higher Levels

■ STIMULATED by an influx of orders from abroad and a sharp increase in domestic buying, industrial activity is moving upward at an encouraging pace. Domestic consumers are generally setting three months as a minimum coverage on raw materials and six months to the end of the year as a maximum.

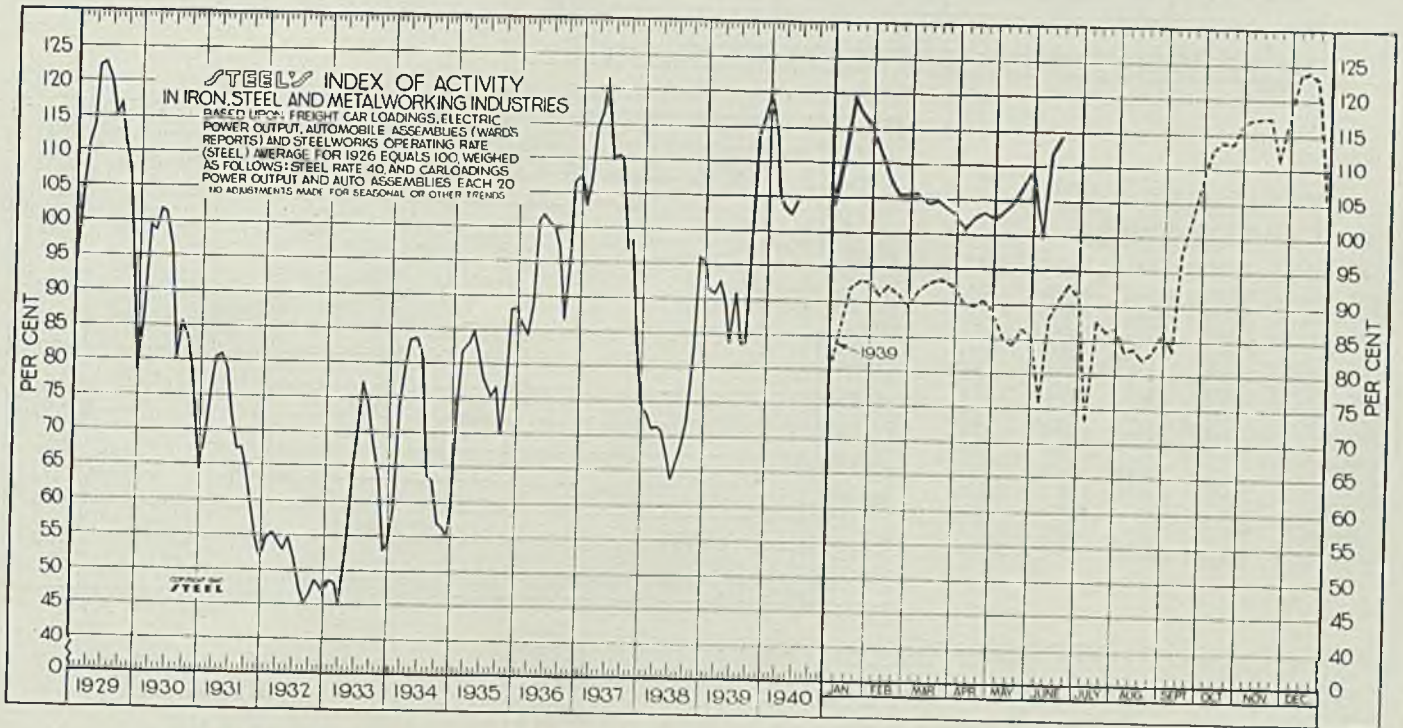
To-date, the general improvement in business has been somewhat out of balance in that a number of con-

sumer's lines have failed to show material gains. Capital goods' industries notably steel, shipbuilding, machine tool, heavy industrial equipment and aircraft have so far been the chief factors in the general upturn of industrial activity.

The gains in steelmaking operations have been particularly encouraging. Since the first of May the national steel rate has advanced about 27 points, or 45.4 per cent. Sharp up-

turn in private construction, involving plant and residential building, is also an important factor in the current outlook.

Excluding Memorial day week, STEEL's index of activity recorded the sixth consecutive weekly increase during the period ended June 15. The index now stands at 114.6 a gain of 2.7 points over the previous week and is at the highest level since the period ended Jan. 27.



STEEL'S index of activity advanced 2.7 points to 114.6 in the week ended June 15:

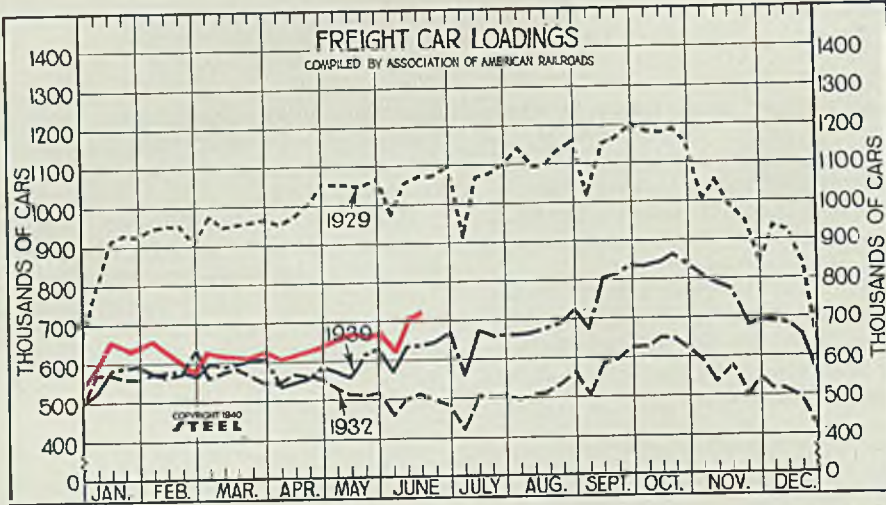
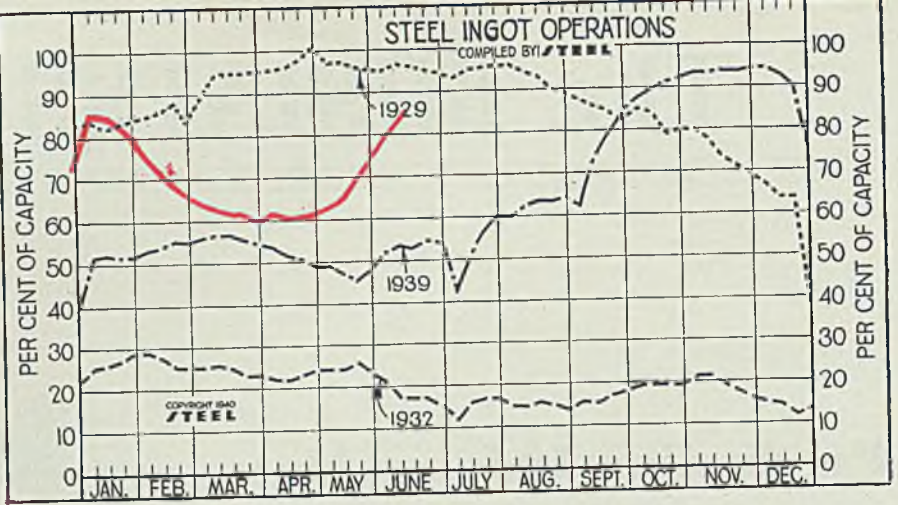
Week Ended	1940	1939	Mo. Data	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Apr. 6	101.8	90.0	Jan.	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6	104.1
Apr. 13	102.7	89.7	Feb.	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2	111.2
Apr. 20	103.4	90.4	March	104.1	92.6	71.2	114.4	88.7	83.1	78.9	44.5	54.2	80.4	98.6	114.0
Apr. 27	102.8	89.2	April	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7	122.5
May 4	103.3	85.1	May	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2	122.9
May 11	104.8	84.2	June	.....	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8	120.3
May 18	106.8	86.6	July	.....	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9	115.2
May 25	109.1	85.4	Aug.	.....	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4	116.9
June 1	99.2	75.9	Sept.	.....	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7	110.8
June 8	111.9	88.2	Oct.	.....	114.0	83.6	98.1	94.6	77.0	56.4	63.1	48.4	59.2	78.8	107.1
June 15	114.6	90.9	Nov.	.....	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0	92.2
			Dec.	.....	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3	78.3



### Steel Ingot Operations

(Per Cent)

Week ended	1940	1939	1938	1937
Mar. 16....	62.5	56.5	32.0	89.0
Mar. 23....	62.5	55.5	35.0	90.0
Mar. 30....	61.0	54.5	36.0	91.5
Apr. 6....	61.5	53.5	32.0	91.5
Apr. 13....	61.0	51.5	32.0	91.5
Apr. 20....	61.5	50.5	32.5	91.5
Apr. 27....	61.5	49.0	32.0	91.0
May 4....	63.5	49.0	31.0	91.0
May 11....	66.5	47.0	30.0	89.0
May 18....	70.0	45.5	30.0	91.5
May 25....	75.0	48.0	28.5	75.0
June 1....	78.5	52.0	25.5	75.0
June 8....	81.5	53.5	25.5	74.0
June 15....	86.0	52.5	27.0	75.5



### Freight Car Loadings

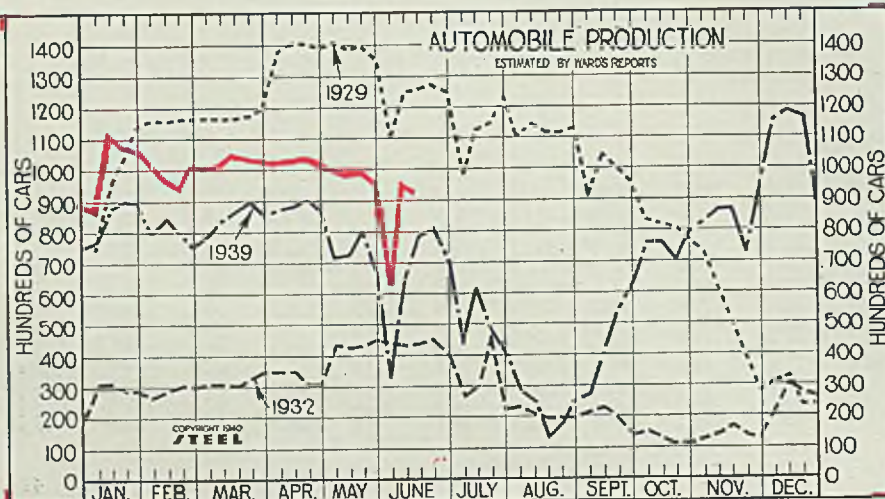
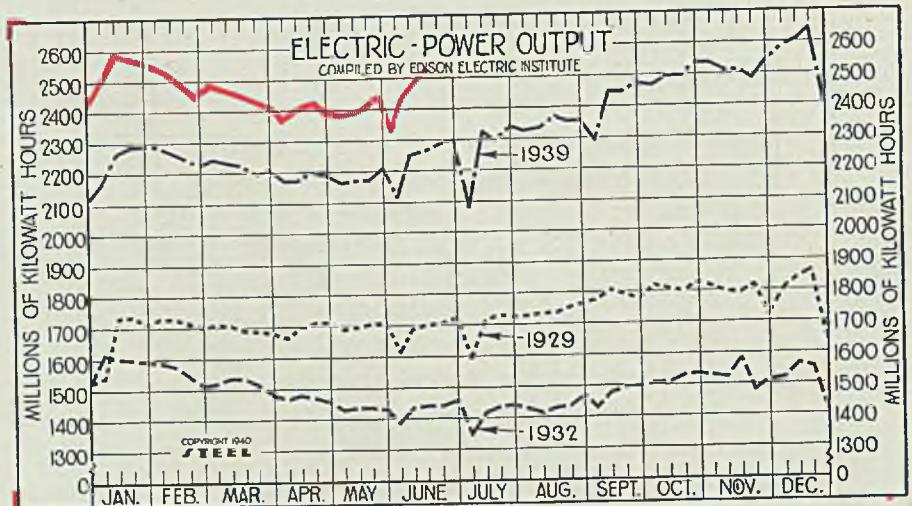
(1000 Cars)

Week ended	1940	1939	1938	1937
Mar. 16.....	619	595	540	759
Mar. 23.....	620	605	573	761
Mar. 30.....	628	604	523	727
Apr. 6.....	603	535	522	716
Apr. 13.....	619	548	538	751
Apr. 20.....	628	559	524	761
Apr. 27.....	645	586	543	782
May 4.....	666	573	536	767
May 11.....	681	555	542	774
May 18.....	679	616	546	779
May 25.....	687	628	562	795
June 1.....	639	568	503	692
June 8.....	703	635	554	754
June 15.....	712	638	556	756

### Electric Power Output

(Million KWH)

Week ended	1940	1939	1938	1937
Mar. 16...	2,460	2,225	2,018	2,211
Mar. 23...	2,424	2,199	1,975	2,200
Mar. 30...	2,422	2,210	1,979	2,147
Apr. 6...	2,381	2,173	1,990	2,176
Apr. 13...	2,418	2,171	1,958	2,173
Apr. 20...	2,422	2,199	1,951	2,188
Apr. 27...	2,398	2,183	1,939	2,194
May 4...	2,386	2,164	1,939	2,176
May 11...	2,388	2,171	1,968	2,195
May 18...	2,422	2,170	1,968	2,199
May 25...	2,449	2,205	1,973	2,207
June 1...	2,332	2,114	1,879	2,131
June 8...	2,453	2,257	1,992	2,214
June 15...	2,516	2,265	1,991	2,214

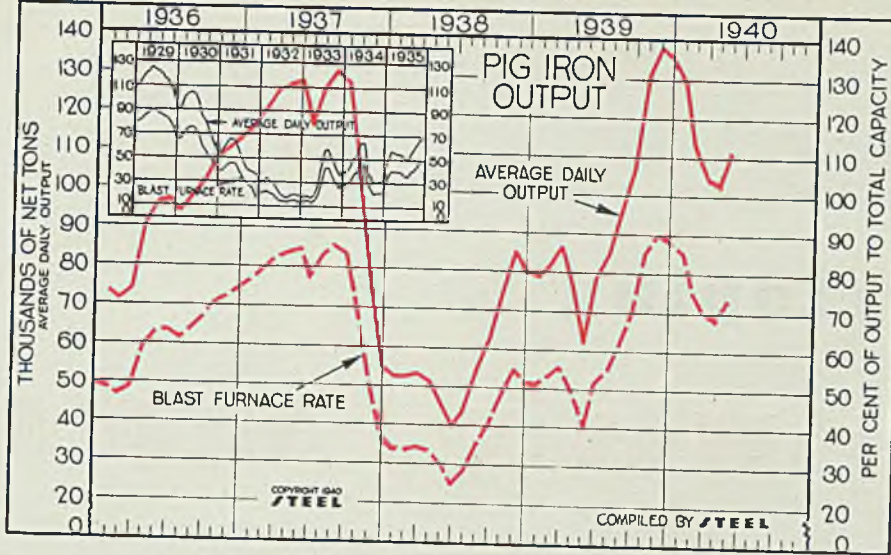


### Auto Production

(1000 Units)

Week ended	1940	1939	1938	1937
Mar. 16....	105.7	86.7	57.5	99.0
Mar. 23....	103.4	89.4	56.8	101.0
Mar. 30....	103.4	86.0	57.5	97.0
Apr. 6....	101.7	87.0	70.0	99.2
Apr. 13....	101.9	88.0	62.0	125.5
Apr. 20....	103.7	90.3	60.6	133.2
Apr. 27....	101.4	86.6	50.7	139.5
May 4....	99.3	71.4	53.4	140.2
May 11....	98.4	72.4	47.4	140.4
May 18....	99.0	80.1	46.8	131.3
May 25....	96.8	67.7	45.1	131.4
June 1....	61.3	32.4	27.0	101.7
June 8....	95.6	65.3	40.2	118.8
June 15....	93.6	78.3	41.8	111.6





**Pig Iron Production**

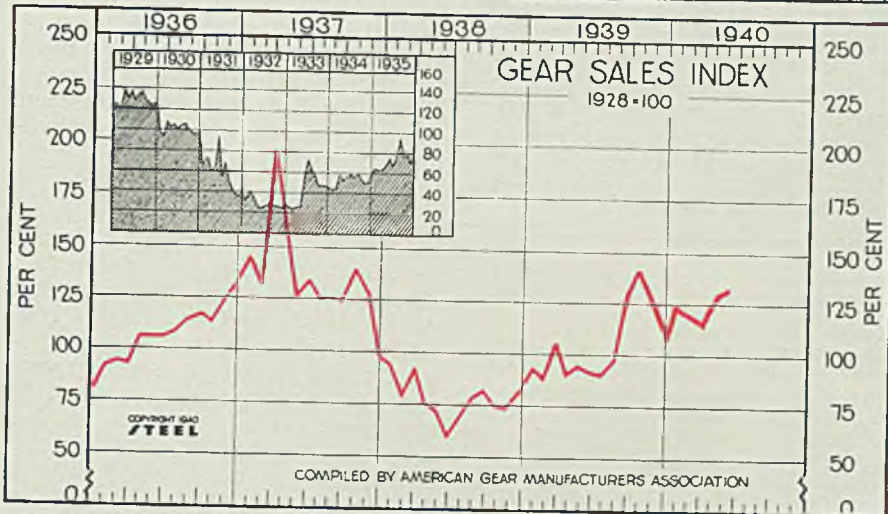
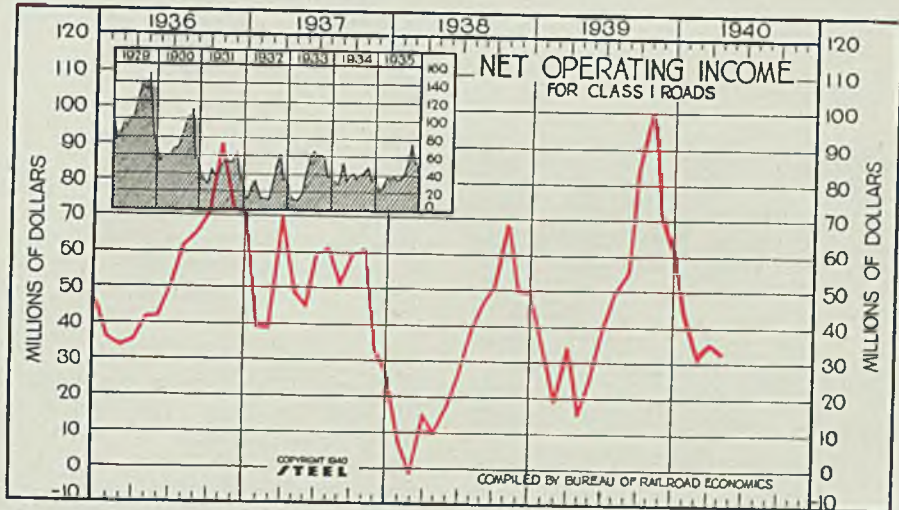
	Daily average Net Tons			Blast furnace Rate (%)		
	1940	1939	1938	1940	1939	1938
Jan.	129,825	78,596	52,201	85.4	51.0	33.6
Feb.	113,943	82,407	52,254	75.0	53.5	33.6
Mar.	105,502	86,465	53,117	69.5	56.1	34.2
Apr.	104,635	76,732	51,819	68.9	49.8	33.4
May	112,613	62,052	45,556	74.1	40.2	29.4
June	.....	79,125	39,601	.....	51.4	25.5
July	.....	85,121	43,827	.....	55.0	28.2
Aug.	.....	96,122	54,031	.....	62.4	34.8
Sept.	.....	107,298	62,835	.....	69.7	40.5
Oct.	.....	131,053	74,697	.....	85.2	48.0
Nov.	.....	138,883	85,369	.....	90.3	55.0
Dec.	.....	136,119	79,943	.....	88.5	51.4
Av.	.....	86,375	51,752	.....	62.6	37.3

**Class I Railroads  
Net Operating Income**

(Unit: \$1,000,000)

	1940	1939	1938	1937
Jan.	\$45.57	\$32.89	\$7.14	\$38.87
Feb.	32.62	18.59	1.91*	38.78
Mar.	36.73	34.32	14.73	69.88
April	33.82	15.32	9.40	48.36
May	.....	25.10	16.67	44.24
June	.....	39.10	25.16	59.35
July	.....	49.01	38.43	60.99
Aug.	.....	54.59	45.42	50.76
Sept.	.....	86.43	50.36	59.62
Oct.	.....	101.62	68.57	60.86
Nov.	.....	70.35	49.67	32.44
Dec.	.....	60.95	49.37	25.99
Average	.....	\$49.02	\$31.02	\$49.18

\*Indicates deficit.



**Gear Sales Index**

(1928 = 100)

	1940	1939	1938	1937	1936
Jan.	123	91.0	93.0	144.0	90.5
Feb.	116	86.0	77.0	130.5	93.0
Mar.	114	104.0	91.0	195.0	92.0
April	128	88.0	74.0	164.0	105.0
May	133	93.0	70.0	125.5	105.0
June	.....	90.0	58.0	134.0	105.0
July	.....	89.0	67.0	124.0	107.5
Aug.	.....	96.0	76.5	125.0	113.0
Sept.	.....	126.0	80.5	123.0	115.5
Oct.	.....	141.0	72.5	139.5	112.5
Nov.	.....	126.0	72.0	127.5	122.5
Dec.	.....	111.0	81.0	97.0	132.5
Ave.	.....	103.5	76.0	135.5	107.5

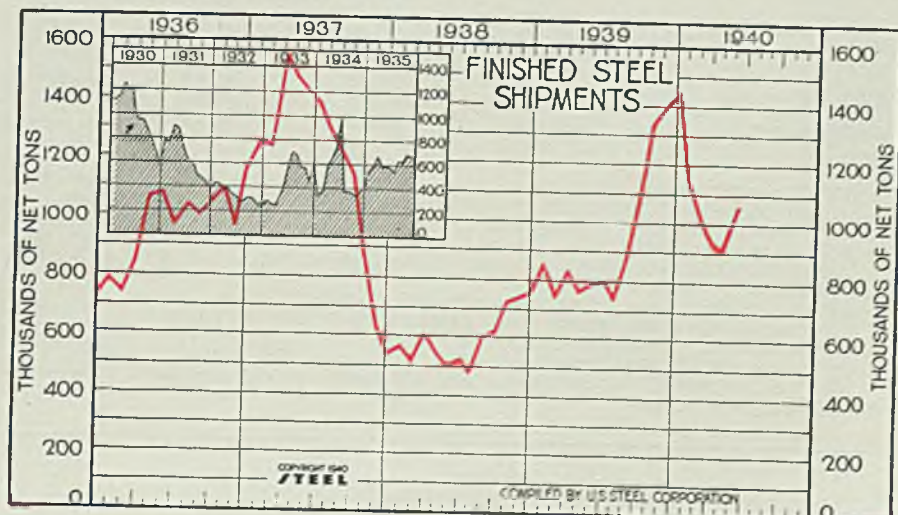
**Finished Steel Shipments**

U. S. Steel Corp.

(Unit 1000 Net Tons)

	1940	1939	1938	1937	1936
Jan.	1145.6	870.9	570.3	1268.4	795.2
Feb.	1009.3	747.4	522.4	1252.8	747.4
Mar.	931.9	845.1	627.0	1563.1	863.9
Apr.	907.9	771.8	550.5	1485.2	1080.7
May	1084.1	795.7	509.8	1443.5	1087.4
June	.....	807.6	525.0	1405.1	978.0
July	.....	745.4	484.6	1315.3	1050.1
Aug.	.....	885.6	615.5	1225.9	1019.9
Sept.	.....	1086.7	635.6	1161.1	1060.7
Oct.	.....	1345.9	730.3	876.0	1109.0
Nov.	.....	1406.2	749.3	648.7	947.3
Dec.	.....	1444.0	765.9	539.5	1178.6
Total†	.....	11707.3	7315.5	14097.7	11905.0

†After year-end adjustments.





# Developing

# MAXIMUM

By A. G. CORDY

Superintendent  
Heat Treating Department  
Curtiss Aeroplane Division  
Curtiss-Wright Corp.  
Buffalo

■ WHILE proper heat treatment is essential to develop desired physical properties in many metals, probably the use of heat treatment to increase tensile, yield and shear strengths is nowhere of greater importance than in connection with the high-strength aluminum alloys such as 17S (duralumin), 24S, Alclad 17S and Alclad 24S—materials especially developed for aircraft work.

Referring to Table I, it will be seen that the soft or annealed tempers as denoted by the letter "O" following the dash in the alloy symbols have their physical properties greatly improved by heat treatment (denoted by "T") and by combinations of heat treatment and cold work (denoted by "RT"). Tensile strength, of 24S for instance,

is nearly tripled by a combination of heat treatment and cold work while yield strength of this material is increased more than four times by heat treatment and more than five times by a combination of heat treatment and cold work. Shear strength also jumps from the neighborhood of 17,000 pounds per square inch to approximately 42,000. Physical characteristics as given in Table I are neither maximum nor minimum values but are typical test

values somewhere near the maximum obtainable.

Where these aluminum alloys are used in such highly stressed structures as aircraft, proper heat treatment to develop maximum physical characteristics thus is seen to be a most important operation. Not only is this true with the 17S and 24S alloys (compositions given in table) but also with the Alclad form of both alloys. Alclad sheet consists of a high-strength core of the type denoted by the symbol number but with a thin layer of pure aluminum applied on both sides. This form of aluminum alloy is used by the navy for all navy aircraft since it is more highly resistant to corrosion from exposure to salt water and salt water atmospheres.

## Worked in Soft Condition

As with other metals heat treated for maximum physical properties, aluminum alloys are fabricated and worked in the soft or annealed condition. In the soft temper these materials will withstand severe forming. While they can be worked in the heat-treated and even in the heat-treated and rolled condition, the operations are much more critical and bend radii are smaller. For most structures, therefore, the material is blanked, punched, drawn and formed in the soft or annealed condition. In some instances where work originally in the soft temper has been work hardened by cold forming or drawing, it becomes necessary to anneal it before forming or drawing can be completed.

Perhaps one of the most complete and up-to-date heat-treating departments used to develop maximum physical properties in aluminum alloys for aircraft is the Buffalo plant of Curtiss Aeroplane division, Curtiss-Wright Corp. As shown in layout diagram, Fig. 1, ample facili-

Table I—How Physical Properties of Some Aluminum Alloys Are Affected by Heat Treatment and Cold Work

Alloy	Tensile Strength p.s.i.	Yield Strength p.s.i.	Shear Strength p.s.i.	Elongation % in 2 in.
17S-O	26,310	10,180	18,000	20
17S-T	61,200	36,500	35,400	19
17S-RT	64,920	47,100	38,080	13
Alclad 17S-O	30,000	10,040	16,800	8
Alclad 17S-T	56,100	33,270	31,800	18
Alclad 17S-RT	57,340	40,660	32,000	11
24S-O	26,190	10,140	17,890	20
24S-T	68,070	43,080	40,800	19
24S-RT	70,300	54,870	42,070	13
Alclad 24S-O	25,200	10,130	17,600	19
Alclad 24S-T	62,070	41,100	40,300	18
Alclad 24S-RT	66,400	49,960	41,060	11

### Note:

17S (Duraluminum) ordinarily is 4.0 per cent copper, 0.5 per cent magnesium, 0.5 per cent manganese, about 1.0 per cent iron and silicon, remainder aluminum.

24S normally is 4.4 per cent copper, 1.5 per cent magnesium, 0.6 per cent manganese, remainder aluminum.

Alclad form of both alloys consists of the high strength core with a layer of pure aluminum on both sides.

S indicates the alloys are wrought products.

Last part of the alloy symbol, separated by a dash, denotes temper:

"O" is "soft" or "annealed" temper

"T" is for heat-treated material

"RT" is for material heat treated and also cold worked a definite amount by temper rolling the sheet.



*Correct heat treatment of utmost importance as it nearly triples tensile strength and quadruples yield strength of certain aluminum alloys while more than doubling shear strength obtainable*

# PHYSICALS

## In Aircraft Parts

ties are provided for all types of heat-treating operations including production work on aluminum alloys, steel parts as well as the usual tool and die work. Since the aluminum alloy parts to be heat treated vary in size from small extruded sections up to large formed sheets for wing and fuselage surfaces, heat-treating facilities necessarily must provide work chambers of comparatively large cubical content.

### Annealing Conditions Vary

Thus the main furnace for annealing the aluminum alloys before or in between fabricating operations has a working chamber approximately 17 feet long, 7 feet wide and 7 feet high. Annealing temperatures used range between 600 and 800 degrees Fahr. Annealing of many parts both of 17S and 24S is handled in the lower range. However, for completely annealing work already heat treated or work hardened, temperatures up to 800 degrees may be employed. Work in this upper range is held at temperature for 2 hours with subsequent furnace cooling to about 500 degrees Fahr. with rate of cooling not in excess of 50 degrees Fahr. per hour. Cooling after the 500-degree temperature has been reached and cooling work annealed in the lower temperature range is done in air and the rate is not critical.

Aluminum alloy parts are hardened in either salt bath or a forced convection air furnace. The choice depends upon the service requirements of the particular parts and also upon size and quantities involved. Production schedules also influence this choice. Another fac-

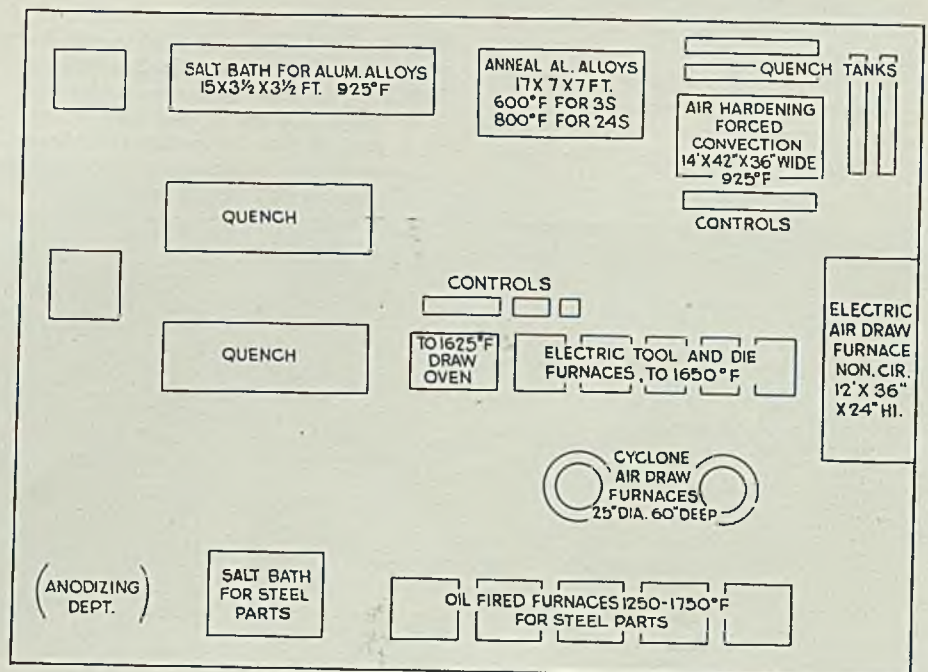
tor is distortion. Developing maximum physical properties in sheet alloy parts most liable to distortion is handled in the air furnace because of the extremely uniform heating in this unit while much of the extruded work, although given similar heat-treatment cycle, is handled in the salt bath. Light extruded parts are immersed in the salt bath 30 to 35 minutes while the heavy extruded sections are held from 40 to 45 minutes before being removed and quenched.

To accommodate large pieces, salt bath unit shown at the extreme right in Fig. 2 has a working chamber 15 feet long, 3½ feet wide and 3½ feet deep. The cover is divided into two sections, each motor operated for convenience. Thus for smaller parts, only one-half the cover need be raised, thus conserving heat. The solution heat treatment

given 24S and other aluminum alloys involves operating the salt bath at 925 degrees Fahr. The unit is electrically heated with immersion heaters and has automatic controls to maintain the temperature within plus or minus 2 degrees of the desired point.

Immediately adjoining the salt bath are water and oil quench tanks. Both 17S and 24S aluminum and Alclad material must be water quenched immediately after heating with only a few seconds' time intervening. This is important to keep grain boundaries as sharply defined as possible and so to prevent any possibility of subsequent intergranular corrosion in service. Most all the work going into this fused nitrate salt bath is hung on wires and racked individually. All parts of 24S are quenched in water except Alclad 24S which is quenched

Fig. 1—Layout of equipment in heat treating department at Curtiss plant. Not complete or to scale





in oil from the air furnace. However, all work done for the navy, whether of Alclad or not, is quenched in water for maximum corrosion resistance. Most parts are quenched in water.

By far the largest portion of aluminum alloy sheet heat treated for maximum physical properties is handled in the air furnace. This is a forced convection, electrically heated, 3-zone unit made by Lindberg Engineering Co., Chicago. It has a working chamber 14 feet long, 42 inches wide and 36 inches high. Doors at each end provide maximum accessibility. Construction of this unit is somewhat different from conventional air furnaces in that the electric heating elements for each of the three zones are mounted in the upper part of the furnace with an individual fan to set up the forced convection currents. The arrangement of the fan and electric elements is such that air is forced through the heater and down past adjustable baffles through a perforated ceiling. After being forced down through the work, it is drawn up through return ducts at each side of the furnace.

#### Two Return Ducts for Each Fan

There are two return ducts for each fan, one on each side of the furnace, a total of six return ducts. There are four baffles for each fan and heating element, and these baffles are adjustable from the outside of the furnace.

Heating elements are coiled wire units with handles at the top extending from the furnace so any heating unit can be removed while the furnace is in operation without disturbing the work. This permits replacement of units while the furnace is in operation, thus assuring that important heat treating need not be interrupted for repairs to the heaters.

Automatic temperature control is provided by three pyrometer indicating controllers and three pairs of thermocouples, a pair for each

indicator controller. A pair of thermocouples is located directly above the baffles in each of the three zones. They operate the electric heating unit automatically through the controlling equipment for each of the three zones. Of course, each zone is a completely independent unit as far as the electric heater, thermocouples, indicating and controlling pyrometer are concerned. However, a single 3-point recorder makes a permanent record of the temperature in all three zones on a single chart.

#### Fans Driven Individually

Each zone is set at 925 degrees Fahr., which temperature is held within plus or minus 2 degrees, although a range from 910 to 930 degrees Fahr. is permissible for hardening 24S aluminum alloy material. Each zone of the furnace is controlled by an automatic input controller. Each of the three electric heaters is rated 40 kilowatts and is connected 3-phase delta to a 220-volt 25-cycle system. The fans are individually driven by 3-horsepower motors through Texrope drives with motors and drives outside the furnace where they must withstand temperatures only slightly above room temperature.

All work going into the air furnace is handled by hand as these are mostly comparatively light pieces and therefore no hoist is used with this unit. All aluminum alloy material going into this furnace has been annealed for stamping, punching, drawing and forming. Usually from 400 to 500 pounds of parts are loaded into the furnace at a time. Work in kept in the furnace for one hour, the last 45 minutes of which the material is at full heat as the furnace easily brings

the work to temperature in 15 minutes.

Immediately adjoining the furnace are two large water quench tanks and two oil quench tanks. Work coming from the furnace is immersed in the quench quickly as only a few seconds are allowed between furnace and quench bath. All 24S sheet material is quenched in water and the Alclad sheet quenched in oil except that for navy planes. All navy work is quenched in water to give maximum corrosion resistance.

Effectiveness of the forced convection heating system employed in this furnace results in only a 30-degree temperature drop during the time it takes to unload and reload the furnace. After reloading, the furnace recovers full temperature in from 5 to 6 minutes. This extremely fast recovery assures maximum output from the furnace and also means that it is possible to hold the furnace temperature accurately.

#### Rivets Packed in Dry Ice

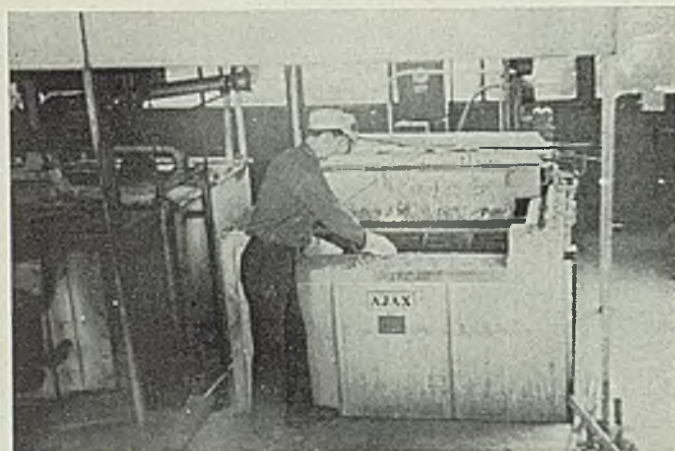
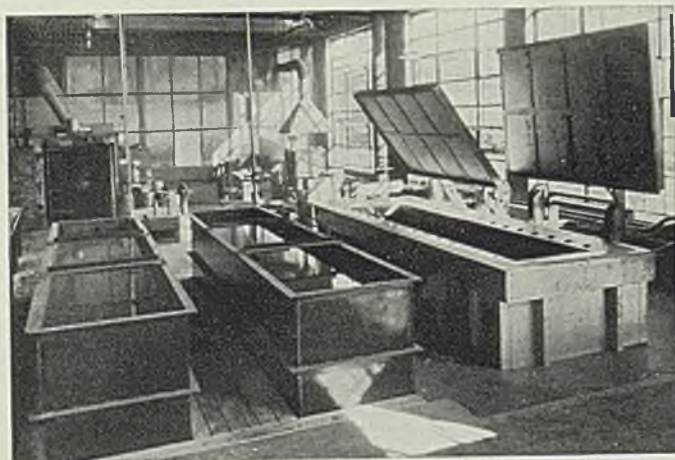
Work from the air furnace has been found exceptionally satisfactory. There are no rejections. Continued careful examination of microstructure shows sharp grain boundaries, thus eliminating any possibility of intergranular corrosion in service. Also the parts show tensile strengths, yield points, and shear strengths near the maximum values.

One of the unusual heat-treating operations in this plant is that given 17S-O aluminum alloy rivets. These are heated to a temperature of 940 degrees Fahr. for one hour and are poured from this temperature into cold running water to quench them at an extremely rapid rate. After being water-quenched and dried, rivets are packed in dry ice and delivered directly to a refrigerator on the assembly floor.

Subsequently all of these rivets not used after 48 hours go back to the heat-treating department where

*(Please turn to Page 72)*

Fig. 2. (Left)—Big salt bath used for aluminum alloy parts. Fig. 3. (Right)—Salt bath for hardening dies and other steel parts. To left of this unit is one of a row of high-temperature oil-fired furnaces





# *Installs New* **Continuous Pipe Mill**

*Butt welding 16 tons of pipe per hour, this new plant features a double looping bed. Limit switches automatically control feed rolls between loops to maintain secondary loop of constant length*

■ A CONTINUOUS mill incorporating a number of new features for the production of butt-welded pipe was recently put into operation at the Maryland plant, Sparrows Point, Md., of Bethlehem Steel Co.

Here pipe in sizes from  $\frac{3}{8}$  to 3 inches nominal diameter is produced. The mill is designed to roll skelp from  $1\frac{1}{2}$  to 12 inches wide, in gages ranging from 0.068 to 0.312-inch at rates up to 16 tons per hour. Construction work has also been started on a second unit which will supply butt-welded pipe in a higher range of sizes.

The new plant is in a 110 x 550-foot structure built entirely of protected metal, except for one side where the first 10 feet of the wall are brick. The floor is 6-inch concrete with a hardener on the surface. Two rows of windows on each side and a continuous sash in the monitor roof furnish an abundance of light and ventilation with alumi-

By L. J. HESS  
Superintendent Pipe Mills  
Maryland Plant  
Bethlehem Steel Co.

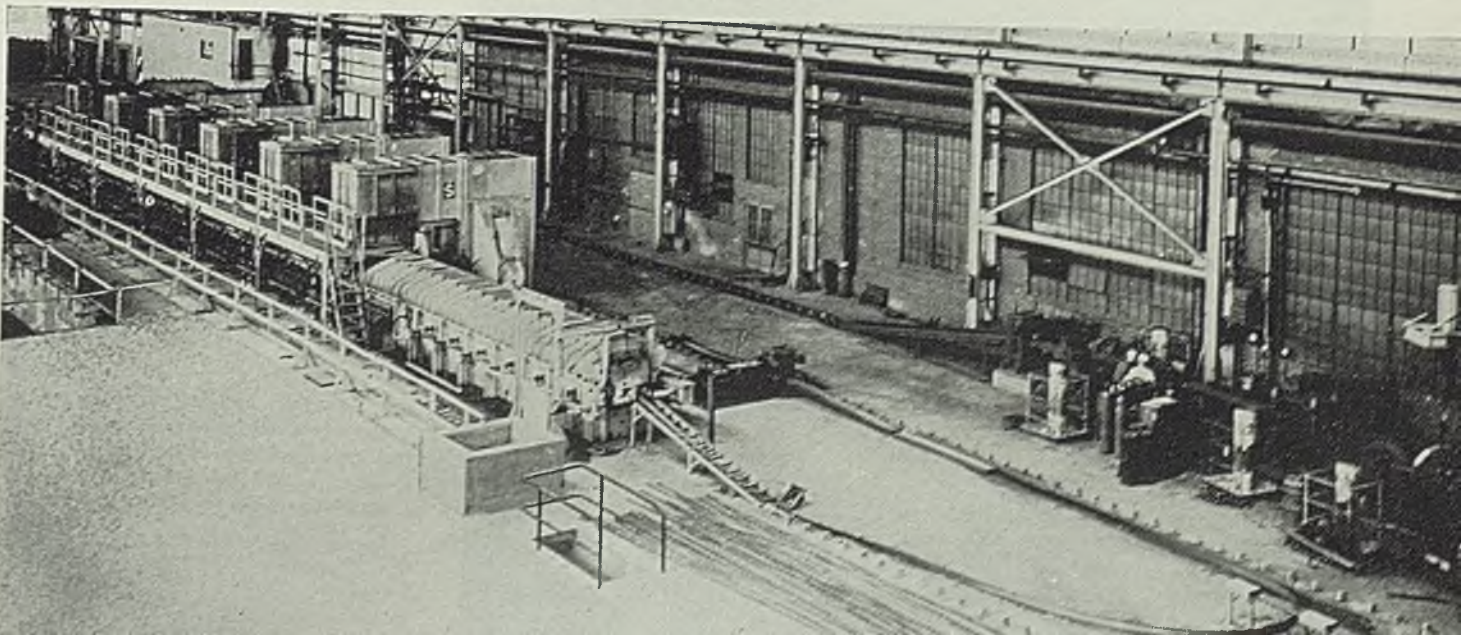
num paint giving added brightness to the interior. At one end of the building is the pipe storage, a 165 x 100-foot brick structure of high-low bay construction with air-crete roof and monitor sash.

Due to the continuous operation of the mill, the skelp is supplied in coils of 35 and 48-inch diameter instead of in flat lengths. Coils weigh from 600 to 2400 pounds each and contain from 185 to 750 feet of skelp. They are delivered from storage, weighed and placed conveniently near the coil box. As needed they are lifted into the coil box by

Heating furnace with recuperators and double looping bed. Butt welder along wall at right. Note limit switch setup at end of loop, extreme right

an air-operated jib crane. The end of the skelp is passed through a roller leveller into an upcut shear which trims the ends if necessary. The skelp then goes to an electric flash welder where it is butt-welded to the end of the preceding coil to form a continuous strip. A plow-type trimmer removes the flash. Welding of a new coil to the preceding coil takes from  $3\frac{1}{2}$  to 17 seconds. To insure uninterrupted operation, the welder is placed at a distance of 10 feet from the roller leveller, allowing the skelp to be easily adjusted in welding.

A double looping bed immediately after the flash welder provides sufficient feed for the mill during the welding operation. The looping bed at floor level is paved with granite blocks which offer good resistance to wear. Primary loop is 162 feet long and secondary loop, 55 feet long. A pinch roll between the two loops keeps the skelp moving from





one to the other. A pair of limit switches actuated by the secondary loop controls the action of the pinch rolls to maintain this loop at constant length.

The heating furnace is 147 feet long and has a heating chamber 21 inches high, 2 feet 3 inches wide at the top and 18½ inches wide at the bottom. It is equipped with 274 nozzle-mixing burners spaced on 9-inch centers the full length of the furnace except for a 30-foot section at the charging end, which serves as a preheating zone. The burners are arranged in groups of 11, connected to a common header. Each burner has a small gas cock and a blast gate for adjusting the preheated air. This permits accurate control of heating. Total burner capacity is about 100,000 cubic feet of 500-B.t.u. mixed gas per hour, delivered at 4 to 8-ounce pressure.

Furnace is enclosed on the sides in ¼-inch steel plates braced with 6-inch I-beam buck stays. Side walls are of 13½-inch high-quality fire

brick backed with a graduated amount of insulation. The bottom is made up of 4½ inches of plastic chromite, 15½ inches of fire brick and 3 inches of graduated insulation. For removal of slag and scale, the hearth slopes sharply toward clean-out doors.

The arched furnace roof is made up of a number of longitudinal cast iron sections, lined with 13½ inches of fire brick, backed up with 2½ inches of insulation. Each section is 4 feet 6½ inches long and each section frame is provided with holes for inserting crane hooks. This construction is commonly termed a bung-top furnace.

In the preheating zone, the skelp is carried on three alloy steel rolls and three water-cooled plain steel rolls. These have individual chain and sprocket drives to prevent stopping of all rolls in case of chain failure. A 5-horsepower motor serves all rolls. In the heating zone, the skelp slides over 12 water-cooled skid pipes which can be removed

and replaced without interrupting the operation of the mill. A hole, covered with an 18 x 9 x 3-inch tile is provided in the furnace roof sections directly over each skid pipe.

At the entrance of the furnace is a door lined with fire brick. At the discharge end is a water-cooled door of structural plates sliding in water-cooled buck stays. This door has a central opening through which the skelp passes. In addition a supplementary water-cooled door is provided. By adjusting the two doors it is possible to obtain a reasonably tight top and bottom closure. All doors are manually operated.

#### Pipe Cut by a Hot Saw

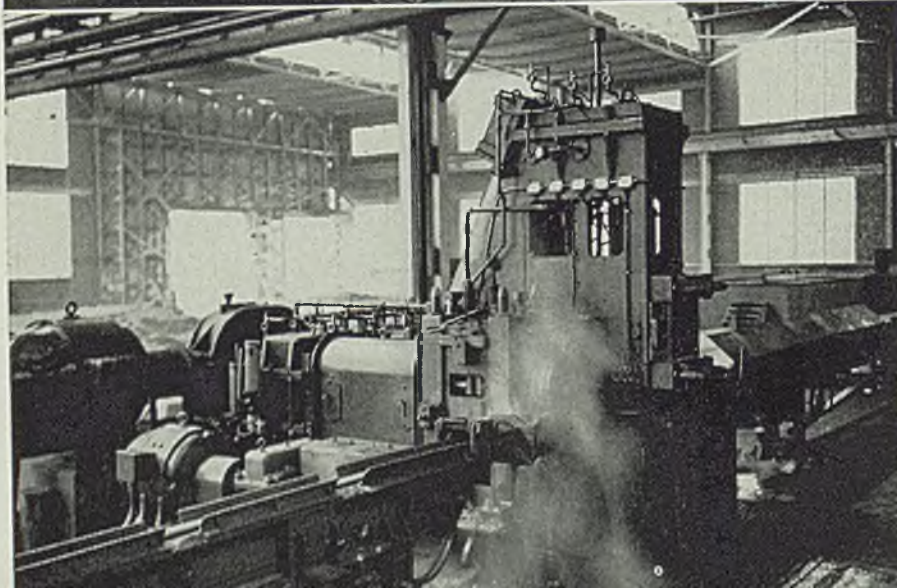
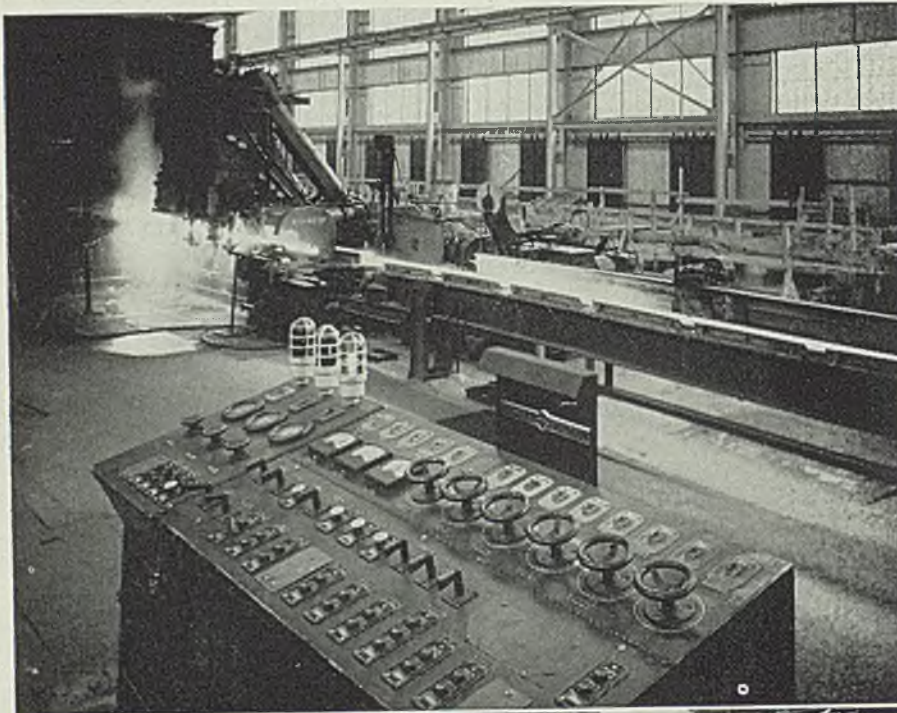
As the skelp passes through the furnace, the flames impinge directly upon the edges. These are therefore quickly brought to welding temperature, that is, close to the softening point. The central portion of the strip, however, does not reach this temperature and consequently retains sufficient mechanical strength to withstand the pull exerted by the welding rolls as these draw the skelp through the furnace. This condition differs radically from that encountered in the conventional welding furnace used in heating cut lengths of skelp.

As the heated skelp leaves the furnace, it is drawn through a series of six roll passes, consisting of three pairs of horizontal and three pairs of vertical rolls. The first roll pair takes the place of the forming bell of the conventional butt-welding mill while the welding takes place in the remaining five roll pairs. To intensify the heat at the weld and to blow off scale, a blast of air is directed against the edges of the skelp as it emerges from the furnace.

As the pipe leaves the rolls it passes a flying hot saw where it is cut to the exact lengths desired. The saw traverse is driven by a welding mill motor and is synchronized with the speed of the pipe.

From the saw, the cut lengths pass over a narrow cooling rack of the chain and sprocket type. It is then carried by a short conveyor to a sizing mill and descaler where the scale is cracked loose both from the inside and the outside and the final size is obtained. This is followed by a second cooling rack of the same type as the first but 30 feet long. The pipe is now ready for the regular finishing operations.

The continuous process permits  
(Please turn to Page 78)



From heating furnace at extreme left, upper view, skelp passes through forming and welding rolls, past hot saw. Control pulpit in foreground. Lower view shows sizing mill and descaler



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## ...the MEN

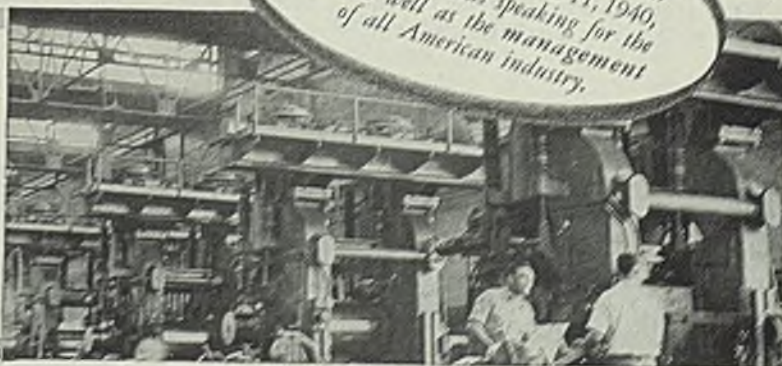
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# Heating of Steel

*Steels with piping areas, if properly heated, are found to roll satisfactorily. No difference is noticed in the quality of the finished product whether converted from hot or cold charged ingots*

PIPING and/or laminations can be attributable to heating. Pipe in piping steel is inherent from the ingot; lamination in rimmed steel is due to large cavities in the ingot predominant toward the top section of the ingot. They are of such size and condition that welding is out of the question and in rolling they are flattened and elongated resulting in laminations in the slab and ultimately in the final product. But laminations and distinct pipe can be caused by improper heating. With piping steels the reason for the difficulty is traced to the steelworks but where pipe exists, inspection of the split ingots will show that under the visual primary pipe or if secondary pipe is present between the two pipe areas there still exists a heterogeneous area. If properly heated such areas will yield a commercial product but if cold a physical fracturing will ensue thereby decreasing yield or loss of product.

With rimmed steel where no inherent pipe exists, often times large

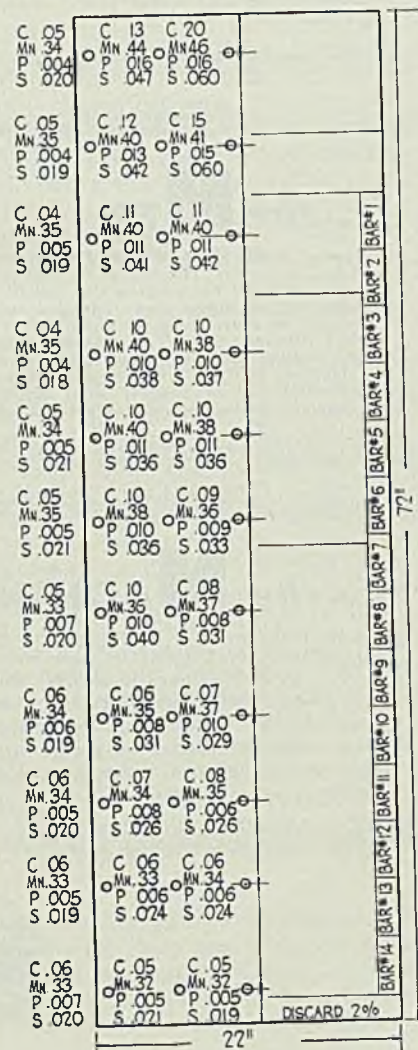
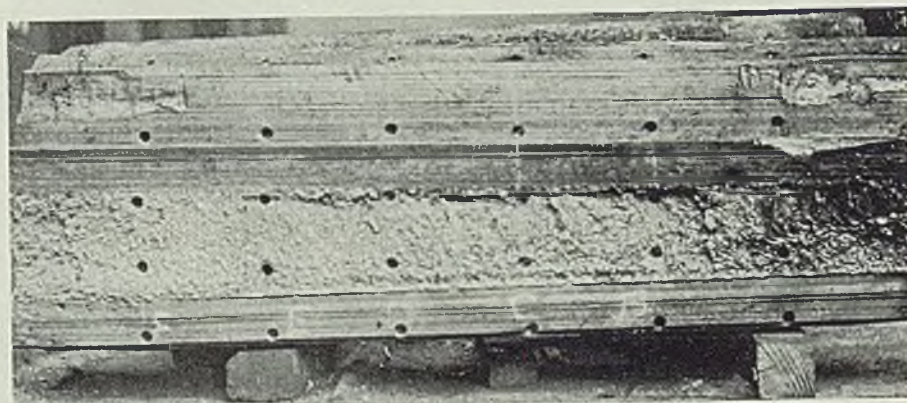
## PART II

By PAUL J. McKIMM  
Cleveland

holes exist in the top areas of rimmed ingots especially in poorly made steel and that such would yield laminations is to be expected. Or in low silicon (0.03 to 0.07 per cent) and complete deoxidation done with aluminum, it is evident that heating is a factor. If properly heated and soaked a suitable yield will be obtained while if improperly heated considerable loss of yield or a loss of finished product will follow. Here is a logical example and one met in practice: where excessive loss of yield occurs after rolling a few ingots of a heat, and a delay is forced to permit further heating, when further rolling takes place the prime yield increases. This yield may vary from 60 to 85 per cent from ingot to slab or bloom in the same heat of steel. That is, that part of a heat is rolled yielding only 60 to

65 per cent considering the loss for pipe and then time is allowed for higher temperature and increase soaking which results in a normal yield for the rest of the heat. This has been found to occur on many occasions and is worthy of consider-

Fig. 18. (Below)—Split ingot used for segregation test. Fig. 19. ((Right)—Relative location from which test bars were cut from ingot





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Fig. 20. (Left)—Photomicrograph of carburized area of low-carbon slab. Fig. 21. (Center)—Photomicrograph of carburized area of high-carbon slab. Fig. 22. (Right)—Unetched specimen of steel with cavities

ation when a little further time in heating converts a heat that would yield less than 70 per cent to one that yields better than 80 per cent. It must also be considered that at 1900 or 2000 degrees Fahr., especially in the lower carbon steel there exists no possibility whatever of welding the inherent cavities and a much higher temperature is required. Steel heated and soaked at temperatures approximating 2250 degrees Fahr., are most conducive to the welding of these cavities as well as the general workability of the material. Piping or laminations due to these conditions should be avoided because the difference in yield is costly and when found as laminations in the finished product the cause is always attributed to steelworks practice.

#### Carbonized or Decarbonized Steel

The author has never found in practice a single case of steel being carbonized nor decarbonized considering the wide ranges of fuels and heating conditions. Many contend that steel is decarbonized during heating because of the larger grain surface areas but we have never found it in practice. It might be possible to create either of these two conditions experimentally but it is doubtful whether they occur in nor-

mal practice; if so then it is only to such a slight degree that they would have no effect on ultimate results, physically, micrographically or otherwise. Of course with high-car-

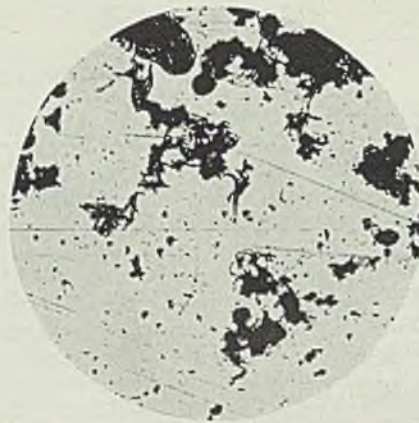


Fig. 23—Unetched specimen of overheated steel

bon steels this system may be suggestive, more so than actual, but the tendency may be to some slight degree in either direction depending

on the heating furnace atmospheres. Results obtained on several tests for decarbonization or carbonization on one heat follow.

A heat having a ladle analysis of: Carbon 0.08; manganese 0.35; phosphorus 0.007; sulphur 0.024; copper 0.09; chromium 0.024; nickel 0.05; and tin 0.01 per cent respectively was used. Fig. 18 is a photograph of a split ingot of this heat and Fig. 19, the chemical heterogeneity of the ingots used in the test.

One ingot was allowed to cool at atmospheric temperature after stripping it from the mold. Drillings for chemical analyses were taken at different depths at the middle of the face and then charged with the drilled side facing the flame for the normal heating cycle of nine hours. It was then withdrawn from the pits and again drilled to corresponding depths. Analyses show no decarbonization.

Depth, inch	Analysis Before and After Heating	
	% Carbon	% Sulphur
1/4	Before	0.05 0.019
	After	0.05 0.020
1/4 to 1/2	Before	0.05 0.019
	After	0.05 0.020
1/2 to 3/4	Before	0.05 0.018
	After	0.05 0.020
3/4 to 1	Before	0.05 0.018
	After	0.06 0.020

A further test was made by charg-

Fig. 24. (Left)—Etched specimen of overheated steel showing spiky microstructures. Fig. 25. (Center)—Specimen of normal microstructure. Fig. 26. (Right)—Photomicrograph of steel heated and cooled in oxygen-treated atmosphere. Black areas are voids





ing another cold ingot of the same heat. It was drilled the same as before but heated up once and then rolled. Number of test corresponds with the bar numbers at the right of Fig. 19.

Analysis of Drillings Before Charging

Depth, inch	% Carbon	% Sulphur
1/8	0.07	0.019
1/8 to 1/4	0.06	0.019
1/4 to 1/2	0.05	0.018
1/2 to 3/4	0.05	0.018

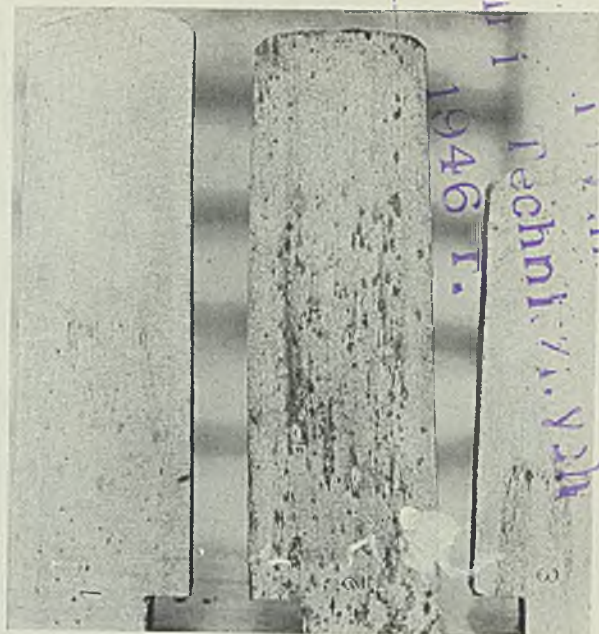
Bar No.	Center Surface to surface		Edge Surface to surface	
	% carbon	% sulphur	% carbon	% sulphur
1	0.11	0.039	0.05	0.019
2	0.11	0.034	...	...
3	0.10	0.030	...	...
4	0.09	0.031	...	...
5	0.10	0.030	...	...
6	0.09	0.031	...	...
7	0.09	0.028	...	...
8	0.09	0.029	...	...
9	0.09	0.028	...	...
10	0.08	0.028	...	...
11	0.07	0.025	...	...
12	0.07	0.025	...	...
13	0.07	0.025	0.05	0.021
14	0.06	0.023	0.05	0.020

A third ingot was charged hot to the soaking pits about one and one quarter hours after pouring and heated to normal rolling temperatures. The bars were tested chemically as in the case of the second ingot, all being drilled through from surface to surface.

Bar No.	Center		Edge	
	% carbon	% sulphur	% carbon	% sulphur
1	0.09	0.031	0.05	0.017
2	0.09	0.029	...	...
3	0.08	0.029	...	...
4	0.09	0.030	...	...
5	0.08	0.030	...	...
6	0.08	0.028	...	...
7	0.08	0.028	...	...
8	0.08	0.027	...	...
9	0.07	0.027	...	...
10	0.08	0.027	...	...
11	0.07	0.027	...	...
12	0.07	0.026	...	...
13	0.06	0.024	...	...
14	0.06	0.024	...	...

If segregation is thoroughly understood as well as the results of bar tests where drillings were taken from surface to surface at center line this affording a comparison of the low-carbon surface and the higher-carbon core with those of the split ingot it is evident that no ap-

Fig. 27—Specimens of a slab at various stages of processing



preciable decarbonization or carburization has taken place. The ladle carbon of 0.08 per cent was a killed test which generally is 1 1/2 to 2 points higher in carbon than a rimmed or open test.

Our purpose is not to totally ignore surface carbonization or decarbonization under all heating processes because it is often encountered in heat treating steels usually over 0.35 or 0.40 per cent carbon.<sup>5</sup>

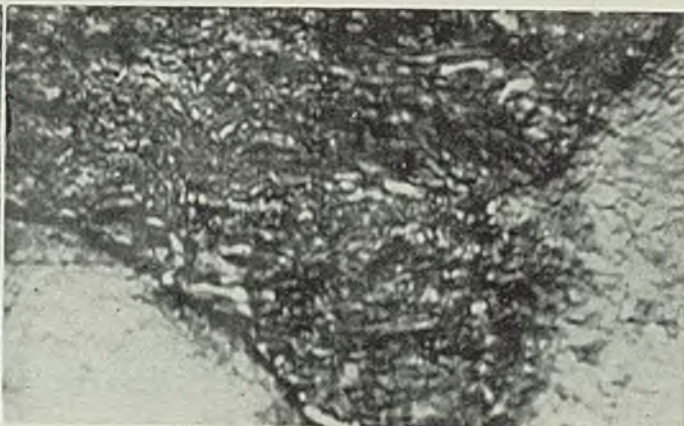
Two photomicrographs of a carburized area on two slabs are presented in Figs. 20 and 21, one having a ladle carbon of 0.08 per cent and another 0.30 per cent carbon. These show an area in both cases after scarifying with cutting gas. This composite is from the scarified surface inward and shows that the gas carburized the steel in both cases to a slight depth.

<sup>5</sup> "Surface Decarburization of Steel at Heat-Treating Temperatures," by W. E. Jominy, March, 1931; department of engineering research, University of Michigan.

In the ordinary process of low-carbon steel absorbing heat under reducing atmospheric conditions it is generally assumed to be somewhat carburizing due to the carbonaceous substance of the combustible element or more toward this end with the elimination of free oxygen. If this were correct there would develop a light film or layer of richer carbon. Hence, when the maximum heat value for the lower carbon is attained the outer layer of higher-carbon, lower-melting material would melt and the carburizing process continue at a gradual increasing rate, with the melting rate correspondingly rapid. In this event the steel could be washed or a considerable depth melted away with no detrimental effect to the quality. The detrimental factor would be the loss of metal in the pit or reheating furnace.

In other words, a low-carbon steel can be heated to its melting point under suitable conditions without damaging its quality, because it would melt before overheating could take place. The author has successfully heated ingots far above their

Fig. 28. (Left)—Photomicrograph of void area. Fig. 29. (Right)—Photomicrograph of black area containing a constituent





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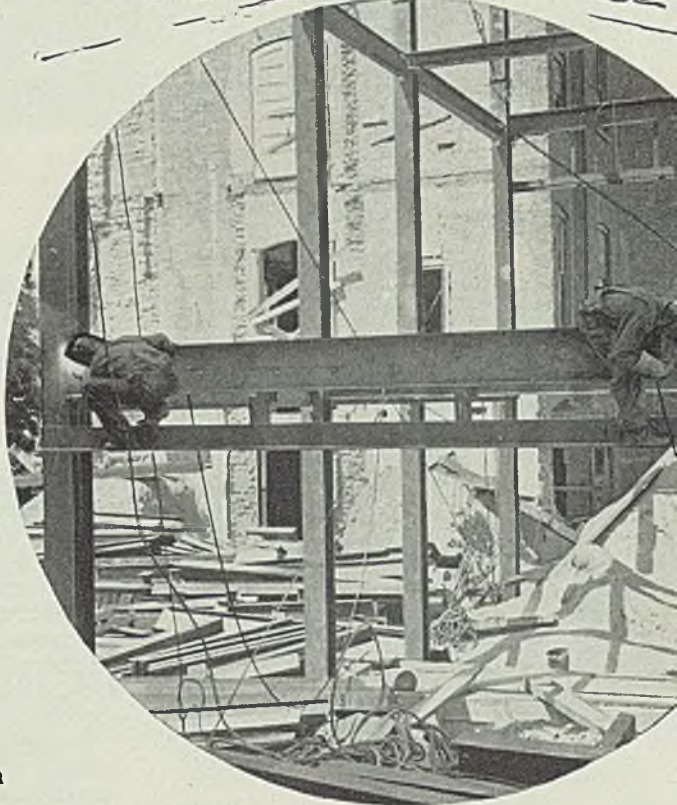
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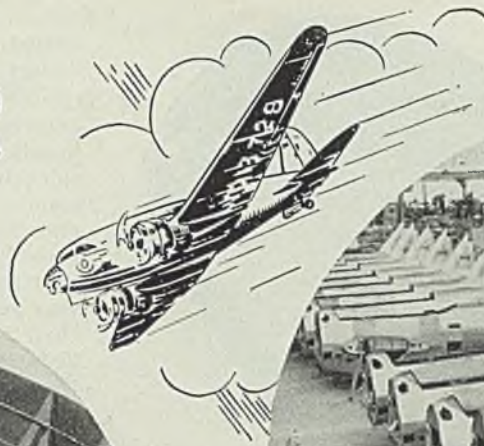
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W-25

F or L

## For Horizontal Fillets and Joints of All Types in Flat Position

This type of work requires an electrode capable of high-speed production and one that produces finished welds of fine appearance. Electrodes used in welding low-alloy steel must permit deposited weld metal to wash into sides of joints in order to prevent stress concentrations. These electrodes are available for either manual or automatic welding on single- or multipass operations.

### Qualifications

A.W.S. Filler Metal, Grade 10.  
 A.S.M.E. Paragraphs U-68, U-69 and U-70.

### Approvals

Permitted on work requiring the approval of:  
 Hartford Steam Boiler Inspection and Insurance Co.  
 Lloyds Register of Shipping, Section 4, Par. 1-9.  
 Others. (Details on Request.)

USE G-E

W-24

W-22-F

or

W-3

## For Mild Steel—in Flat Position Only

Major portion of this type of work involves butt welds and fillets in flat position, often requiring multipass operations; usually a heavily coated electrode is preferable.

### Qualifications

A.W.S. Filler Metal, Grade 10 and 30.  
 A.S.M.E. Paragraphs U-68, U-69 and U-70.

### Approvals

Permitted on work requiring the approval of:  
 Hartford Steam Boiler Inspection and Insurance Co.  
 American Bureau of Shipping, Groups HIF and BIF.

USE G-E

W-23

W-4

or

Type H

## For Low-alloy Steels

These special steels require high-speed electrodes that will produce welds having high tensile strength and ductility, and that are suitable for welding in all positions.

Qualifications: A.W.S. Filler, Grade 4.

USE G-E

W-52

W-54

# GENERAL ELECTRIC

673-9



melting point eliminating approximately 2-inch depth of metal and the resulting slabs had perfectly normal grain structure with no trace of overheating or burning; on the other hand steel of the same heats were severely burned at temperatures as low as 1900 degrees Fahr. Consequently it is maintained that irrespective of degree of temperature the only possible way of so-called burning of steel is with oxygen. Hence, the nomenclature of that of oxygenization or where steel quality is damaged by extremely oxidizing atmospheres.

### Burning, Overheating, Oxygenization

Most steelmakers conversant with sand bottom heating practice will recall that the rolling temperatures were generally higher than ordinarily encountered even to the extent that the corners were melted away. These slabs were well soaked and rolled in an excellent manner. Overheating in varying extent from slightly to that which is extremely serious. The characteristics are commonly encountered and thoroughly understood by the forging industry. This is usually of the higher-carbon (forging) grades, but when encountered, forging is controlled accordingly, that is if overheating is not too extensive, it is processed by lighter reductions and often times a combination of lighter reductions and several intermediate heatings thereby "curing" the injured material. With rolling procedure this policy is out of the question and therefore heating has to be such to yield a quality product with a more or less constant mill setup.

It is only logical to offer here steels heated to high temperatures without evil effects and follow in with those damaged by oxygeniza-



Fig. 30—Etched specimen showing cracked edge area

tion at any hot rolling temperature.

How high a temperature can be reached before steel quality is damaged? It is possible although not good practice that considerable depth of the section could be melted away without incurring any evil effects. A test was made at a plant where rarely temperatures as low as 2150 degrees Fahr., were followed in heating low-carbon steel; generally 2200 to 2300 degrees Fahr., was used. The combustible element was producer gas and occasionally when excess coke-oven gas existed it was cut-in. The practice was to thorough soak to these high temperatures under a smoky condition. In this test a heat was used which analyzed; carbon 0.08; manganese 0.40; phosphorus 0.010; and sulphur 0.047 rimmed in 24 x 54 x 78-inch molds. One ingot was bisected lengthwise giving two halves, 12 x 54 inches so that heterogeneity and segregation could be determined. This ingot had a wall of normal thickness about 2 inches from the surface to the near-



Fig. 31—Unetched section of specimen showing saw-tooth edge and pin holes along top

est cavities while segregation was normal.

Half of this heat was charged to the pits hot; the balance cold. It was determined to following normal heating practice but reaching considerable higher temperatures than usual with both hot and cold charged ingots allowing a much greater time factor in heating the cold ingots. The first ingot drawn was soaked at 2315 degrees Fahr., then 2330, 2350, and finally reaching 2400 degrees respectively. All of these rolled exceptionally well with slabs showing no ill effects either by visual inspection or by thorough microscopic examination. At this stage it was decided to go to still higher temperatures and this was accomplished by decreasing the air somewhat and alternating it on and off at short intervals and allowing further time. The first ingot drawn had a temperature of 2510 degrees Fahr., the second and third 2600, the fourth 2710, and the fifth 2740 degrees. After reaching 2600 degrees it was necessary to increase the air. The ingots that were over 2600 degrees had considerable depth of metal washed off with the 2710 and 2740-degree ingots approximating 20 inches thick instead of the original 24 inches.

### How Temperature Was Measured

At the time this test was conducted and often since many disparaging comments have developed concerning these exceedingly high temperatures. The temperatures quoted were obtained by two metallurgical pit observers, one with Leeds & Northrup optical pyrometer and the other with a Pyro-optical pyrometer. These readings are surface temperature and it is not maintained that the ingot could have been soaked at this degree of heat, nevertheless it must have been fairly close. It definitely was far hotter than that under normal procedure. Further, it was so hot that material of this type could not be practically rolled as it was only handled with great difficulty because it was much like "jello." This mill was a 45-inch slabbing mill with edging rolls. The result in slabs was excellent with no sign whatever either with the surface or interior of overheating.

No scale existed on the ingots when they were withdrawn but they soon developed a good layer of air scale while in transit from the pit to the mill.

In the test no difference could be noted in quality between the hot and cold charged ingots.

In a further study of heating ingots it was decided to damage quality at various temperatures using two ingots of the same heat and several full heats of similar analysis.

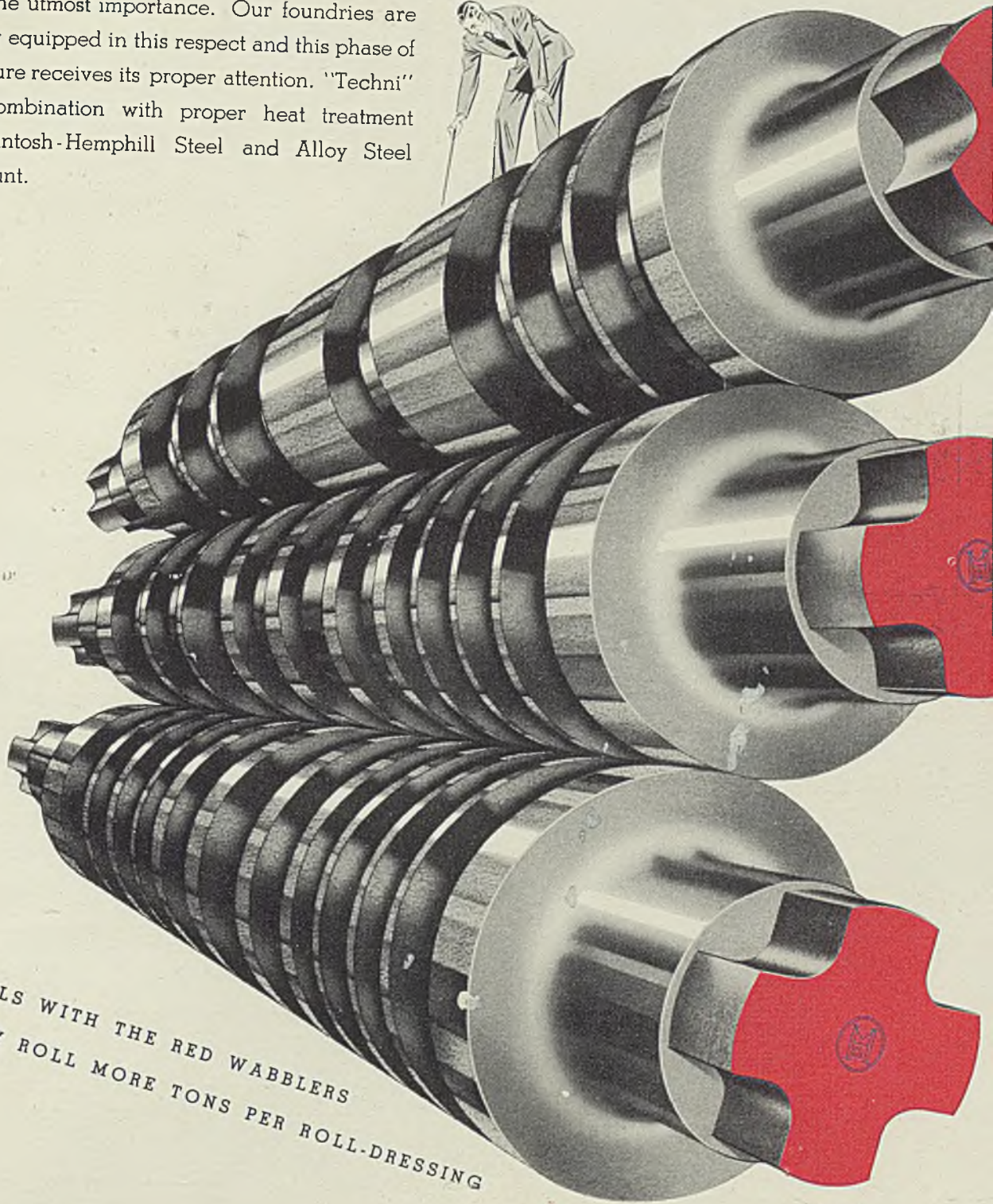


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LOWER COST PER TON . . .

# Techni

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or ALLOY STEEL ROLLS  
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THE ROLLS WITH THE RED WABBLERS  
THEY ROLL MORE TONS PER ROLL-DRESSING

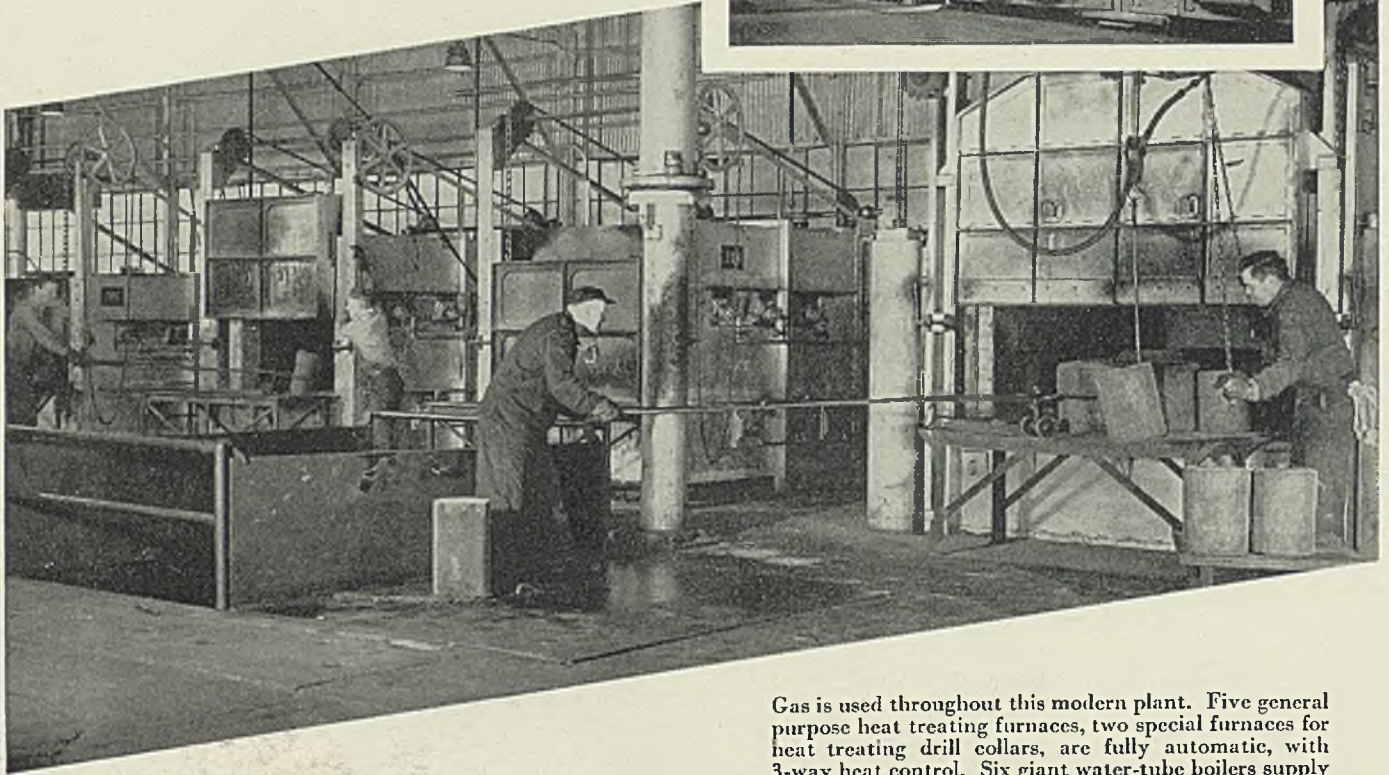
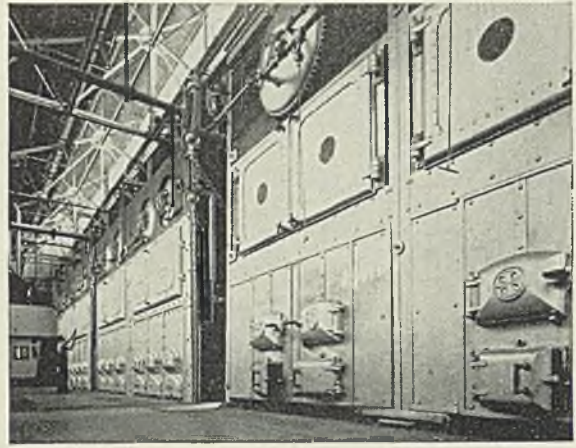
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Gas is used throughout this modern plant. Five general purpose heat treating furnaces, two special furnaces for heat treating drill collars, are fully automatic, with 3-way heat control. Six giant water-tube boilers supply steam for forge and other equipment.

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In this test we obtained a varying degree and extent of badly overheated steel at temperatures starting at 1900 degrees Fahr., up to 2250 degrees. The steel crumbled badly during rolling and everyone is familiar with the appearance of such slabs or blooms. The photomicrograph, Fig. 22, will indicate that which was encountered. Fig. 22 is an unetched specimen at X150 showing cavities. Fig. 24, an etched specimen, shows the extreme spiky microstructure indicative of excessive overheating.

Overheating is most detrimental to steel quality because it necessitates conditioning of the surfaces before further processing and it is evident that this does not totally eliminate defective areas but only that portion that is visible to inspection. In other words, burned steel will not yield a prime finished product and such affected sections might just as well be eliminated at the crop shears or scrapped. Anyways there is no excuse for such heating conditions that ruin a steel that would otherwise be a prime product.

### Traced to Oxygenization

The most fruitful cause of damage to steel quality during heating is that of extremely oxidizing atmospheres rather than the degree or extent of temperature. That is, the oxygen is the injurious element and will be referred to as oxygenization. In this consideration steel is damaged and often beyond salvage by excessive oxygen or where the oxygen is stratified in the furnace atmosphere. Naturally with a given amount of excess oxygen as time and/or temperature is extended the greater is the extent of defectiveness. In fact the majority of "burned" steel is heated at lower temperatures because due to demand for rolling steel it will be forced; so that the rolling temperature is usually found below normal.

The oxygenizing condition of furnace atmosphere is excessively increased thereby producing an ingot or slab that has been changed from a normal plastic condition to one that is "dry" and "bony" and will readily rupture and crumble under any draft even if lighter than normal rolling practice. The breaking usually takes place first at the corners or if steel is badly damaged it occurs over the face of the section.

Steel under the action of the rolls is sufficiently plastic to flow when stressed in tension due to the metal being forced forward from the center line of the rolls and backward at a point near end of radius at top of roll arc. Hence, the metal is oxygenized to such extent that

it has a deficiency of these characteristics that an actual tearing takes place.

Heavy-walled ingots, Fig. 5, can be consistently produced. Where open-hearth procedure is established along the lines of producing heavy walled ingots, which is accomplished by maintaining less deoxidation permitting the metal to be more oxidized, thin-walled ingots will never occur. Therefore it is evident that any slip in deoxidation practice would be to a lesser degree; in other words more and more oxidized thereby yielding a "drier" or "bonier" ingot. If this dryness progresses to certain degrees the ingots cannot be successfully heated. They can be soaked up to such temperature that they can hardly be seen in the pits and will lose temperature rapidly, sometimes by the time they reach the mill or after several passes. With this quality ingot extensive tearing will follow. These ingots have a "sandy" and dry appearance.

Another example of steel damaged by excessively oxidizing atmospheres is shown in Fig. 27. The specimen stenciled No. 1 is of a slab before reheating and possessed normal characteristics. That stenciled No. 2 is a section of the same slab after reheating in an oxidizing atmosphere, namely 9 per cent oxygen and before any reduction. The increase in porousness is evident. The sample stenciled No. 3 is after the first roughing pass on a continuous hot strip mill. By close examination along the surface and edges numerous minute cavities are evident as pinholes. The face of the slab, however, was practically covered with minute fissures or tears which yields a finished hot strip with open surface and if processed further by cold rolling will serve in slivers<sup>6</sup>.

### Two Specimens Studied

In order to further determine the effects of oxygen on steel quality a sample of steel was sectioned yielding two adjacent specimens. One was heated to 2400 degrees Fahr., in a sealed electric furnace and permitted to cool to room temperature. The microstructure shown in Fig. 25 is normal in all respects for a low (0.08 per cent) carbon steel heated and cooled under these conditions.

The other sample, Fig. 26, was heated and cooled the same as the specimen in Fig. 25 except that tanked oxygen was fed into the furnace during the heating and cooling.

This photomicrograph clearly shows the difference of microstructure. The ferrite grains are of much larger size and the large black areas

<sup>6</sup> "Slivers in Cold Reduced Steel," *Blast Furnace and Steel Plant*: Vol. 28, March, 1940, page 243 and April, 1940, page 338.

are definitely *void* areas. The sample was  $\frac{3}{4}$ -inch thick and 8 inches wide and the differential etching and examination microscopically of each black area showed positively void areas or pockets except one which is indicated by arrows.

Fig. 28, a photomicrograph at X1800, is representative of the void area. Fig. 29 is a micrograph at X1800 showing a black area that contains a constituent. Fig. 31 is the unetched condition at the edge of sample and clearly indicates what happens under abnormal heating atmospheres to an otherwise sound-solid piece of steel. The heavy saw-toothed edge is first evident but by further examination the minute pinholes more numerous along the top and to a lesser degree at the bottom.

Fig. 23, unetched at X100, shows how metal is attacked. Fig. 30 (Etchant Stead's reagent, X100) is an area toward the interportion at the end of the fissure. The white line material in the black V-area is a phosphide formation and is often found in steel that has been overheated to the extent of the subject specimen.

Without technical explanation it is felt that the foregoing shows in a simple, practical manner that heating is vitally essential as it affects steel quality.

## Develops New Alloy for Metal Stamping Dies

■ Originating because of aircraft demands, but useful in other industries, is a zinc base alloy, developed by Morris P. Kirk & Son Inc., 2717 South Indiana avenue, Los Angeles, subsidiary of National Lead Co., for use in forming female dies employed in the production of sheet metal stampings.

The alloy is said to lower cost of die maintenance and improve the quality of drop hammer stampings. The metal, called Kirksite A, is made of zinc having a purity of 99.99 per cent and contains aluminum, copper and magnesium as alloying ingredients. It has an unusually high tensile strength and brinell hardness.

## Plumbing Fittings Are Now of Stainless Steel

■ Stainless steel now is used by Schaible Foundry & Brass Co., 1086 Summer street, Cincinnati, in the manufacture of plumbing fittings. They are finished by electrolytic polishing as developed by metallurgists of American Rolling Mill Co., Middletown, O., and Rustless Iron & Steel Corp., Baltimore, which reduces cost of polishing. Two finishes are available—mirror or silvery satin.





# Visual Stress Analysis

*Use of polarized light and celluloid models affords means of direct visual comparison of stress distribution in different joints with no mathematical work and with simple equipment*

■ **COST** per unit of performance can be reduced by cutting the actual dollars-and-cents cost for a given performance or by increasing the performance for a given dollars-and-cents cost. This discussion hinges about the possibilities of increasing performance for a given dollars-and-cents cost by employing more efficient stress distribution.

Logically, the most efficient welded design is one which will give equal maximum stress distribution throughout all parts of the structure. While it is not always possible to obtain this desired result, many times the actual distribution can be greatly improved by proper study and changes in design. Maximum stress is the governing factor in determining the load capacity of a member or part. Thus if this same stress can be distributed more uniformly, additional load can be carried or a smaller section used for the same load. This reduces the cost per unit of performance.

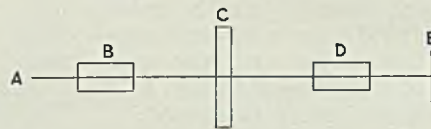
Thus design of an efficient welded structure should be aimed not at merely keeping the maximum stress below a certain limit but at obtaining a design wherein the stresses are as uniformly distributed as possible. This uniformity should apply whether the maximum stresses are high or low.

While stress problems can be solved mathematically, many problems can be solved much quicker and easier by means of photoelastic or visual stress analysis using celluloid models and polarized light. While this method is particularly suitable for use with 2-dimensional stress problems, it is easily extended to 3-dimensional stress problems by heating the stressed 3-dimensional model in a stressed condition and letting it cool, "freezing" the stresses in the specimen. Then the

By E. W. P. SMITH  
Consulting Engineer  
Lincoln Electric Co.  
Cleveland

3-dimensional model is sliced into 2-dimensional sections, which are analyzed in the same manner as ordinary 2-dimensional specimens.

Polarized light is obtained by passing light through certain optical systems which have the peculiar property of breaking a common beam of light into two rays, each of which becomes "plane polarized".



Simple setup for visual stress analysis: A, light source; B, Nicol prism; C, celluloid model; D, Nicol prism set at right angles to B; E, viewing screen

Each of the two rays of light consists of light vibrations in one plane or in one direction only, instead of vibrating in all directions as does a normal light beam. The system is arranged to absorb one ray, emitting a single plane polarized ray.

If two such optical systems are set "parallel", a ray of light emerging from the first will pass through the second unchanged. However, if the second is rotated 90 degrees around its axis or "crossed" with the first, the ray of light emerging from the first will enter the second

and be reflected to one side without passing through.

Certain materials such as glass, celluloid and bakelite which normally transmit light equally in all directions are found to break any beam of light into two rays which are plane polarized just as do the optical systems mentioned.

Consider now a setup similar to that in accompanying illustration. Light from a source at A passes through a polarizing system at B and emerges as a plane polarized ray, vibrating in a vertical plane. Suppose first there is nothing at point C and the ray emerging from B enters D which is another polarizing device exactly like B but set at right angles to it. The ray then is absorbed at D so no light passes through to the screen at E.

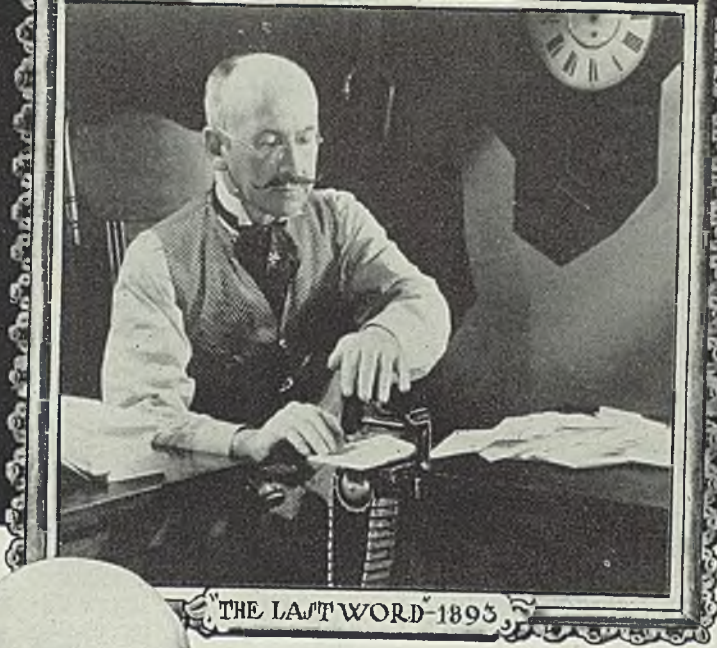
Next suppose a stressed celluloid model of, say, a welded joint is placed at C. The ray from B strikes a certain point on the model and is broken into two rays which pass through the model and then recombine. Assume that at this point, the difference in the principal stresses is such that the rays are one-half wave length apart. They will produce a ray vibrating horizontally which will pass through D giving a light spot on the screen.

Suppose next that the principal stresses at another point are such that the rays emerge one wavelength apart. These will combine to produce a ray vibrating vertically which will not pass through D and there will be dark spot on the screen.

Thus the image on the screen will consist of a series of light and dark bands indicating those points on the model where the shear or difference in principal stresses is such as to make the two rays at that point emerge  $\frac{1}{2}$ -wavelength apart (light

From paper presented at joint meeting of American Society of Automotive Engineers and American Welding society at Detroit, May 20, 1940.








"Why Lad, when I was your age that Addressograph was the last word."


"So was the nickelodeon, Pop. But the last word today is Progress."





 "Maybe, Lad, but that old 'Addressograph' was a humdinger. Just give her the gun and, presto, your envelope was addressed and the next name on the belt shifted into place. THAT was Progress, Lad!"


 "I'd say that's arming for increased sales, Lad. But I'd like to see the model they bring out when you're my age. Bet yours of today will then bring on the smiles like my old timer."


 "Fine, Pop. But this new 'Addressograph' turns out pay-rolls, tax applications, billing forms and other records—and its welded steel printing arm puts it years ahead in speed and quality of work."

 "You'll see Progress a'plenty before that, Pop. Many designers are just starting to go places with welding."

 "You're prejudiced for welding, Lad. I'm from Missouri."

 "But suppose my route to Progress isn't via *increased rigidity* of a printing arm."

 "I'm prejudiced for Progress, Pop. I can show you sharper, more uniform printing and 10 good carbon copies per impression where it used to be 3, because deflection of the printing arm has been cut from .018 inch to .003 inch by going to welded steel."

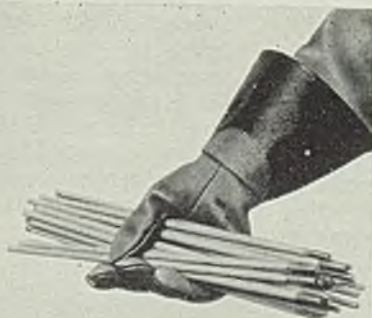
 "OK. Regardless of what metal product you manufacture, you can make headway via *increased strength, reduced weight, improved appearance, quicker deliveries or lower operating costs*. And you can take the bee-line by lining up with the A-1 welding line of THE LINCOLN ELECTRIC COMPANY, Dept. Y-25, Cleveland, Ohio. Largest Manufacturers of Arc Welding Equipment in the World."

**FORMER MODEL.** This "Addressograph" has been superseded by the streamlined, welded steel design shown. Parts such as the vertical magazine have been moved away from the printing path for greater operating speed and wider range of application.

**1/6 THE DEFLECTION.** Above: former cast iron printing arm and base assembly. Weight 170 lbs. Deflection .018 inch. Below: new welded steel printing arm and base unit with box section as shown at left. Weight 70 lbs. Deflection .003 inch.

**ELECTRODE PROGRESS.** In line with Lincoln's progressive policy of ever reducing the cost of welding, this Company recently announced reductions up to 1/6¢ per pound for "Fleetweld"—the world's most popular welding electrode. Write for latest price list.

**HOW TO MAKE HEADWAY.** This 2-page bulletin gives valuable suggestions on welded design. Includes experienced scores of executives and engineers. Shows large number of actual welded parts of various types. Write for your free copy.





band), two  $\frac{1}{2}$ -wavelengths apart (dark band), three  $\frac{1}{2}$ -wavelengths apart (light band), four  $\frac{1}{2}$ -wavelengths apart (dark band), etc. The dark and light bands gradually merge into each other since the rays also emerge at other than  $\frac{1}{2}$ -wavelengths apart.

If white light is used, the image of the model shown on the screen shows a series of color bands which indicate the distribution of shearing stresses. While it is possible to obtain actual stresses by additional work, points of stress concentration are evidenced by marked crowding together or abrupt curving of the color bands.

Reflection-type polariscopes such as the one described above can be constructed very cheaply for demonstration and comparative studies.

### Stresses Can Be Shown

Using appropriate models, it is possible to demonstrate the serious stress concentration caused by notches, holes, incomplete penetration of welds, too much building up of welds, abrupt changes in cross section and similar irregularities. The method also is applicable to studies of all types of standard as well as unusual types of welded joints.

A designer of welded structures might well think of the distribution of loads as similar to the flow of water in that stress concentrations must be avoided just as is turbulence in the flow of water. Thus gradually changing sections and omission of irregularities are most important whether these irregularities be interior cavities, indentations or protuberances.

The important things to remember are: The pattern indicates shear directly and not tension or compression stress. Wherever lines crowd together or change direction abruptly, *there is a point of high stress values*. The surface of stress-carrying members must change direction gradually. It must not be interrupted abruptly either internally or externally.

A method used quite frequently is to place two joints on the same specimen so they are both subjected to the same load. A direct comparison can thus be made without any load calculations whatever. Merely studying the relation of the two specimens supplies the information desired. Such specimens are easily cut to the desired shape from heavy celluloid sheet.

In a typical study of a standard single-V weld with about 20 per cent reinforcement against a heavily reinforced double-V weld, the analysis will show extremely heavy reinforcement does not utilize metal so effectively even though the cross section is much larger. Stress at

the outer edges of the reinforcement and in the center of the joint is quite low, indicating an uneven stress distribution and poor use of the material and of course a relatively high cost of the joint. Here reduction in amount of reinforcement results in improved quality as well as cost reduction.

Lack of fusion at the bottom of a single-V weld, inexcusable in work by a good welder, shows failure to fuse the bead completely to the sides and bottom of the V, resulting in a notch effect. There will be bending with consequent aggravation of the conditions resulting in a higher stress at this point than at any other point in the joint. Good welding procedure will correct this and permit better utilization of the metal, effecting a cost reduction.

Undercut is in effect two nicks or notches on each side of the weld or bead. This notch effect produces uneven stress distribution and therefore gives an expensive joint as far as use of metal is concerned. Just a slight change in procedure or reasonable precaution will correct this defect and result in better utilization of the metal and a lower cost.

Lack of fusion in the center of a double-V butt weld is a symmetrical condition. While the previous discussion of heavy reinforcement on

both sides also is a symmetrical condition, it is noted that the stress disturbance caused by lack of fusion in the center is much greater than would be imagined. Again a matter of correct welding procedure, proper supervision to avoid this defect will result in superior use of metal and lowered costs.

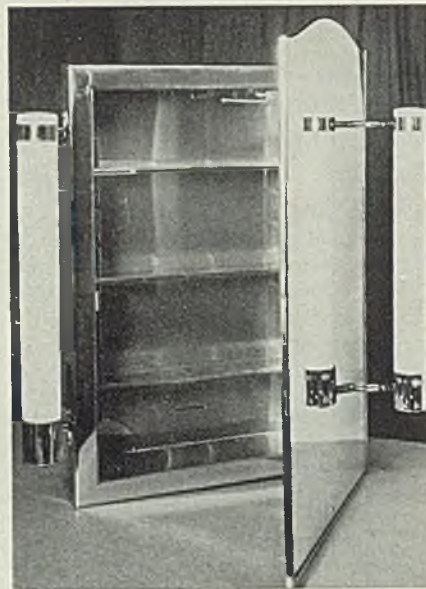
A study of stress distribution in a plate or bar attached to another member by means of fillet welds and as attached by complete fusion will indicate that stress distribution is relatively uniform except at the place of interruption, assuming a transverse load. To correct this nonuniform stress distribution between the two fillet welds, it is merely necessary to change to the completely fused joint, which, of course, gives extremely uniform stress distribution. Thus merely by changing design and procedure, excellent results are obtained with better use of the material.

Visual analysis as described above will permit detailed investigation of stress conditions existing in a joint or part of a mechanism and will give the designer the means of obtaining lower cost and better performance.

Besides, the method is not difficult. It is especially useful in checking welded designs due to the ease with which the shape of the welded part can be controlled to utilize every possible advantage in weight reduction and cost cutting.

It is especially useful in checking expected performance of unusual types of joints, odd-shaped pieces, plates or shapes of different thicknesses, and in many other unthought of instances.

## Stainless Cabinet



Shown above is what National Products Co., Waterloo, Iowa, believes the "choosey" home builder may select in the line of cabinets for his bathroom. The cabinet body and frame are of stainless steel, set off by a plate glass mirror. It is further enhanced by tube lighting fixtures with concealed wiring connections.

## Develops Two New Clays for Iron Enamels

Two new domestic clays, Ferro Green Label and Black Label, are announced by Ferro Enamel Corp., 4150 East Fifty-sixth street, Cleveland, to replace and supplement German Vallendar clay. Unique feature of the clays is that one may be blended with the other to permit adjustment of the enamel slip to meet conditions of the weather and the individual plant.

Green Label clay is recommended for use in both cover coat and ground coat sheet iron enamels—Black Label clay is for blending with the green clay in the ground coat enamel to the degree necessary to produce the proper set in the coat slip.

The clay is supplied in powdered, purified and dehydrated form, packed carefully in moisture-resistant bags.





*Pennsalt Cleaner*  
 saves \$170<sup>35</sup> per month in a  
 single cleaning operation for  
 Bohn Aluminum & Brass Corp.



**T**HE Capitol Brass Works Division of Bohn Aluminum & Brass Corp. makes the kind of plumbers' brass goods that helps to bring chrome-plated beauty to modern kitchens and bathrooms. The metal cleaning operation prior to plating involves some special problems, one of which is the removal of the buffing compound used to polish the brass castings.

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By saving time and materials, it saves an average of \$170.35 per month in the cost of a single metal cleaning operation.

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They all have tremendous dissolving and emulsifying action; unusual lasting power; and insure quick, efficient cleaning. Why not test their savings in your own processes? Write Dept. E. Pennsalt Cleaner Division, Pennsylvania Salt Mfg. Co., Widener Building, Phila., Pa.



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Mineral Acids	Kryolith
Caustic Soda	Sal Ammoniac
	Soda Ash
	Acid-Proof Cements

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**PENNSYLVANIA SALT**  
**MANUFACTURING COMPANY**  
*Chemicals*





# Meter Manufacture

*Skeleton steel scrap is delivered direct to bailer by a chute going from the press through building wall. Special conveyors and wooden trays protect work. Certain parts designed for automatic assembling*

■ MASS production of electric watt-hour meters used to measure current consumption in homes presents a number of manufacturing problems as extremely high accuracy standards are imposed by designing engineers, utilities and state laws. To meet these requirements in mass production, many unique procedures have been developed by the operating department of Sangamo Electric Co., Springfield, Ill. A number of these are of special interest as they may be adapted to manufacture of a wide variety of other products with increased manufacturing efficiency or lowered costs as a result. Special provisions for handling are featured.

Design of Sangamo watt-hour meters, Fig. 1, incorporates five basic elements: Enclosing case, electromagnetic element, moving element, damping magnets and register.

Fabricating the electromagnetic element is one of the best examples of how labor and floor space are conserved in this plant through proper operating methods. For this structure, high-silicon steel laminations, 0.014-inch thick, are stacked 0.70-inch high to form the core of the electromagnetic element.

The blanking operation presents the first of a series of handling problems. Sheets of high-silicon steel are 30 inches wide, 120 inches long. A die necessary to blank laminations from stock 30 inches wide would be too expensive to maintain, to say nothing of the first cost of making it. Therefore a two cavity progressive die, with the blanks interlaced to conserve material, was designed to use strip material just wide enough for the part.

To obtain the strip material, the 30-inch wide sheets are wheeled to rotary slitting shears on trucks the

By **GEORGE RALPH**

Process Engineer  
Sangamo Electric Co.  
Springfield, Ill.

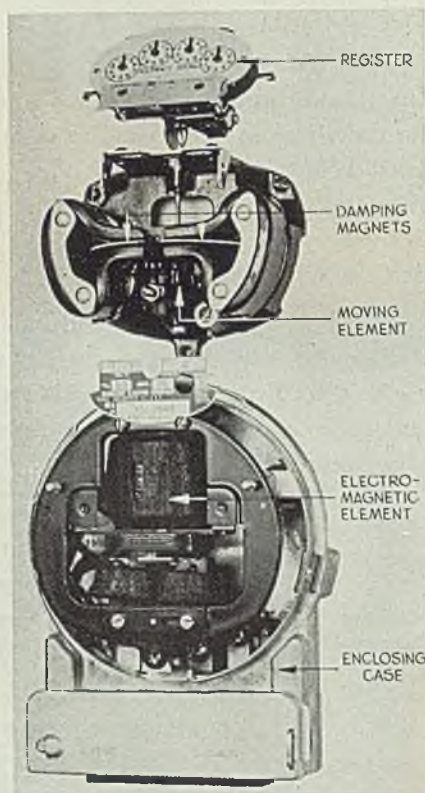


Fig. 1—Parts and subassemblies going into the makeup of household watt-hour meter

size of the sheets. After being fed through the shears, sheets are cut to strips, 5.24 inches wide, which are received on another truck on the opposite side. This truck is pushed up to blanking press mentioned.

As it is imperative that the blanks

do not become damaged along the edges, a special stacking rod was designed to receive the blanks as they leave the die. A unique feature of this particular die is the divider which delivers the blank from one die cavity to the back and the blank from the other die cavity to the front of the press. Each rod holds enough laminations to make seventeen electromagnetic elements.

Getting rid of the scrap steel presented another problem. To eliminate handling the skeleton strip scrap, one end of a chute is attached to the press with the other end extending through the wall of the building and into a shed outside where it is bailed into bundles of size convenient for handling during shipment.

This laminated core is laced through a coil of fine enameled-copper wire. The coil, laminated core and four soft steel brackets, which are riveted to the core under 2300 pounds hydraulic pressure, constitute the electromagnetic element.

A group of 15 operators working on a 28-foot bench produce 1800 electromagnetic elements in 8 hours. If the 15 operations involved in this assembly were performed separately, it would require three 28-foot benches, handling of the electromagnetic elements in process would be excessive and the processing time would be considerably longer. With the present setup a test was made by tagging an electromagnetic coil at the head of the assembly group. As each operator finished an operation, the partially assembled element was passed to the next operator. It required only 2.25 minutes to complete the finished element.

Wooden compartment trays holding 35 elements transport the fin-



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Adding further to the advantages of Exide-Ironclads is the Exide System for better handling and easier maintenance through the use of specially developed Exide efficiency equipment. Write for free booklet, "The Exide System for Better Material Handling."



**THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia**  
*The World's Largest Manufacturers of Storage Batteries for Every Purpose*  
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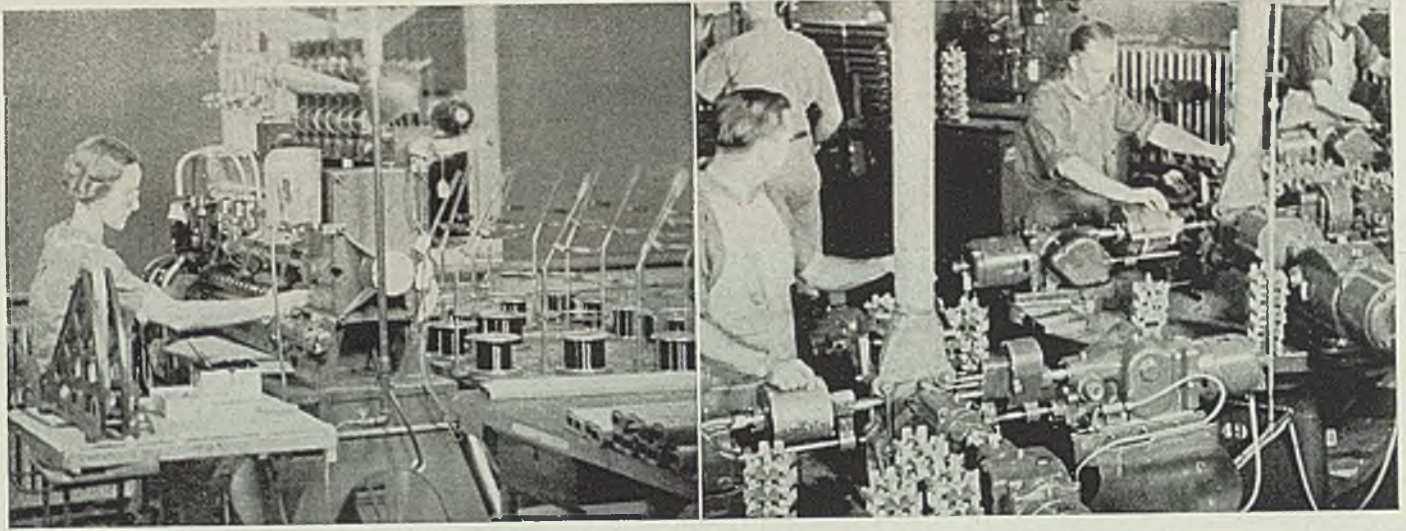


Fig. 2. (Left)—Special coil-winding machine eliminates many handling operations. Small size enameled wire from spools back of arbor is wound into 14 magnet coils simultaneously. Fig. 3. (Right)—Handling operations are cut here by using a special setup with four drilling heads to drill holes for mounting. High accuracy makes subsequent assembly and calibration easy

ished product from this assembly group to its final destination, the assembly conveyor. Several additional operations are performed before it is finally ready for the assembly conveyor.

Adding the protective finish of insulating varnish to the large volume production of electromagnetic element assemblies is done economically by drying, dipping, baking and cooling in one operation. A chain conveyor transports bars of finished elements successively through a gas-fired preheat oven to dry out any moisture in the coil, through a dip tank of insulating varnish, then through a gas-fired baking oven and finally back over the top of the oven to allow a cooling period. Entire series of operations takes 9 hours with the chain traveling at a speed of 6 inches per minute.

#### Conveyor Loaded Every Hour

A variety of other parts taking the same finish are loaded into this oven along with the electromagnetic elements. It is necessary to place about one-ninth of the day's load on the chain each hour in order to have some of each part available as needed for assembly. This type of finishing equipment eliminates the trucking and individual dipping operation required by old style box-type ovens.

Transfer of finished elements and other parts from the manufacturing department to the assembly department is accomplished on a 24-inch belt conveyor which travels from the first floor of the building housing the manufacturing department to the third floor of an adjacent building which houses the assembly and test conveyors. Parts are delivered over this inclined belt conveyor at regular hourly intervals to fit into the assembly conveyor schedule.

Removal of grease and oil from metal parts made by the primary departments, namely, the automatic

screw and punch press departments, is done by the solvent degreasing process. A stabilized nonflammable chlorinated hydrocarbon heated liquid is used in a 2-chamber degreaser. The liquid solvent is steam heated to 86 degrees Cent. in one chamber, with clean cool solvent in the second chamber. Parts to be cleaned are placed in a wire mesh basket and immersed in the boiling solvent. The constant boiling and bubbling action of the solvent quickly removes all traces of grease and dirt from the parts. Basket of work then is rinsed in the cool solvent.

As a final cleansing, the parts are held in the vapors over the boiling solvent momentarily before being withdrawn from the degreaser, clean, hot and dry. This cycle is completed in less than one minute. Three operators take turns loading and immersing the baskets in the solvent. An automatic distilling process reclaims the contaminated solvent, reduces cost of operation, and prevents bad finishes on subsequent plating and other finish operations.

Designing dies for efficiency is important. Designers of blanking dies for punch press operations are always looking for ways to overcome unnecessary handling operations. For instance, the brackets for fastening the electromagnetic elements to the meter enclosing cores are blanked in pairs. Progressive station dies blank, perforate and form these brackets in one continuous operation from a strip of soft steel. The parts drop through an opening in

the die block where they are separated into rights and lefts by a separator attached to the underneath side of the die before being deposited in steel tote pans.

The 100-tooth gear used in the watt-hour meter register is an example of precision dies made especially to eliminate handling operations and to increase the quality of the finished product. This is a progressive station die which perforates a hole in the gear for a hub and lightens the gear by removing

(Please turn to Page 77)

## Announces Availability Of Fabric-Backed Steel

Stainless steel material with a fabric back is now available in thicknesses of 0.015 to 0.018-inch according to Formica Insulation Co., Spring Grove avenue, Cincinnati.

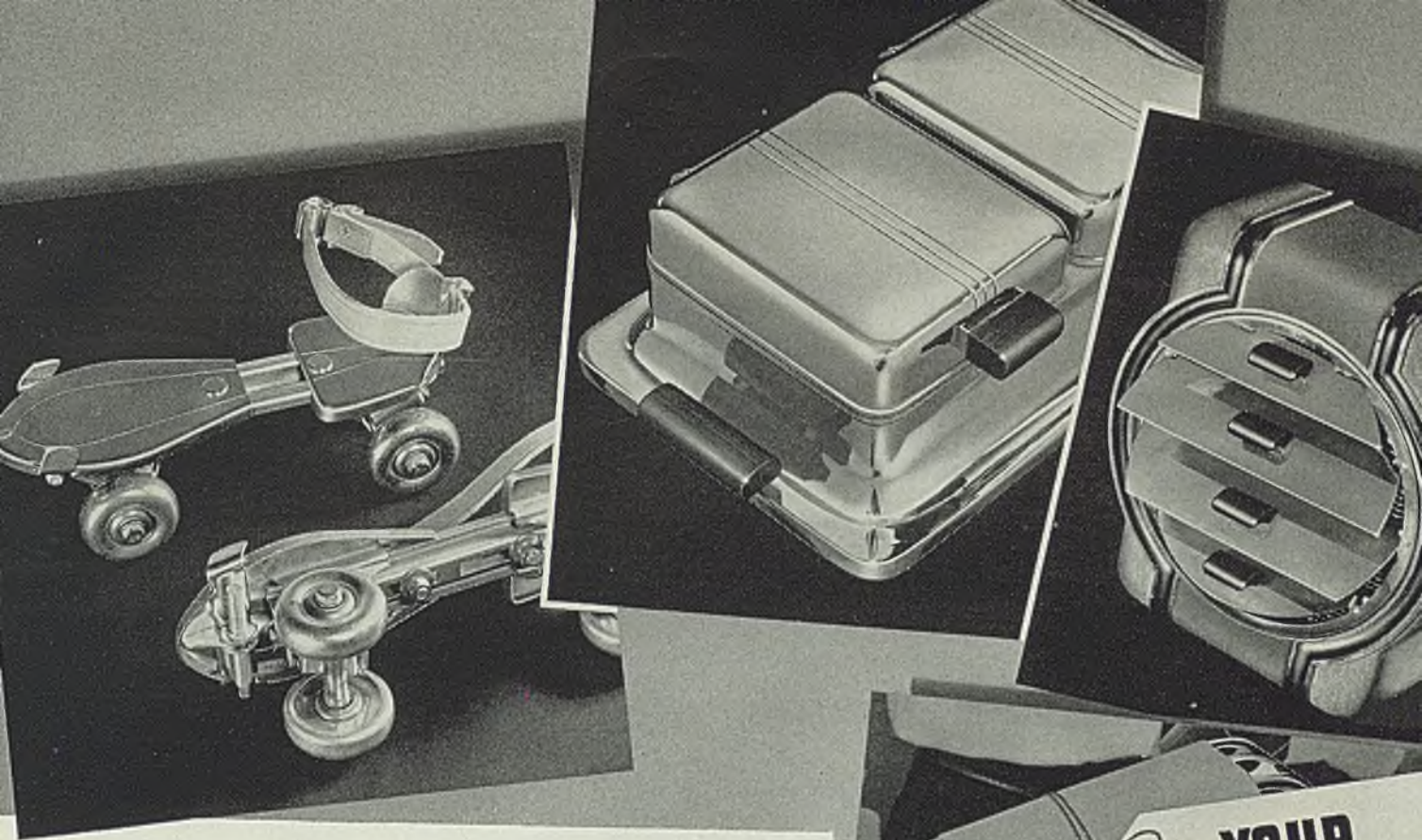
The sheet sizes are 24 x 84, 24 x 96, 36 x 84 and 36 x 96 inches, and come in several finishes. The price range on these sheets, depending upon the type of finish specified is from \$1.46 to \$1.92 list, per square foot, subject to the usual discounts.

## Steel Forms Provide Smooth Concrete Slabs

New development for laying concrete slab floors is a steel form announced by Steelox Co., Middletown, O. This features an interlocking flange that lines up the panels of the form automatically, thus making it easier to assemble.

Because of its strength, the form needs little bracing and its wood backing provides a flat surface. The nonporous surface of the metal presents a smooth-faced concrete slab, ready to paint. The forms are manufactured for this company by American Rolling Mill Co., Middletown, O.





**4 PRODUCTS  
4 PROBLEMS**

## *1 Simple Answer*

**A**LL products made to sell must have "Box Office" appeal. To bring in the customers they must be durable, efficient, attractive and priced right. Many manufacturers are finding the answers to these requirements by fabricating parts and products from Cold Rolled Strip Steel.

American Quality Cold Rolled Strip Steel is made in a complete range of edges, tempers, finishes and

widths. It is a low-cost material that forms easily and gives excellent results in high-speed, continuous operations.

You may have a problem that American Quality Cold Rolled Strip Steel will solve. Our representatives offer you a valuable service that you are free to use at any time. Call the man from American Steel & Wire Company—today.

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**AMERICAN *Quality* COLD ROLLED**

**STRIP STEEL**

**UNITE  
STATE  
STEEL**



# BETWEEN HEATS

WITH *Shorty*



## ■ Say fellers:

A youngster home from college for his summer vacation stopped in at the mill recently to see if we had anything for him in the way of a job. Had a nice talk with the lad and found him pretty level-headed. His views weren't distorted like some of the boys recently home from the university.

Of course, it's not the kids' fault. They've almost got to take what's handed out to 'em in the class room and when some befuddled professor tries to cram down their throats some of that rebellious poison that y' hear from the speakin' platform up in the public square at noontime, then it 's time y' started lookin' over your hirelings with a fine-tooth comb when they apply for a job.

At any rate, this young lad's thinkin' was clear and so we put 'im to work runnin' color carbons over in the "lab" while some of the boys were on their vacations.

I watched the youngster as he went out the gate the day he called at the office and then before I could turn my chair back facin' my desk, an incident that happened 38 years ago leaped across my mind and re-enacted itself jus' as though it was an occurrence of a moment ago.

'Twas 'bout this time of the year when a young lad—let's call 'im Tim McDonald—arrived home from old WUP, then known as Western University of Pittsburgh. His mother had died when he was a lad and he made his way under the guidance of his dad and a kindly aunt who looked after the home.

Y' think he was for loafin' during the summer? Not Tim. Somethin' wrong when his hands and face were clean and his stride sorta slow. He was used to doin' his bit when the mill whistle started blowin' in the mornin'.

And so, after Tim got his trunk unpacked he hikes down to the office of the Carnegie Steel Company and says to the girl at the information desk, "Morning, Sis. I'd like to see Mr. John Ousler." Jus' like that.

In the course of time he was ushered into the front office and directed to a

chair on one side of a long mahogany table. On the other side sat "Dad" Ousler, his eyes sparkling and with a big smile ready to break. After a cordial greetin', Dad sez, "Well, son, what's on your mind at this hour of the day?"

And Tim told him he was through with his schoolin' and was endeavorin' to line up a job. Was there any vacancy? Was there any kind of a job open? Any room down in the machine shop for a feller who wasn't afraid of gettin' his hands dirty? And so persistent did he hammer away that Dad sez, "Alright, my lad, I'll see what's in you. Go down to the machine shop and tell Bigby to put you to work."

## Didn't Make Connections

Tim strutted 'cross the yard 'past the old Red Jacket blast furnace and disappeared in the maze of smoke and dust for the stove gang was dumpin' the dust catcher at the time.

An hour or so later as Tim was retracing his steps toward No. 2 gate on his way out of the plant he heard a voice calling, "Did Bigby fix y' up alright, Tim?" It was Dad doin' the speakin'.

"No, Mr. Ousler, I didn't land anything. Y' see the best Mr. Bigby could do was 25 cents an hour and I'm hopin' to get more."

"Yeah, I see, Tim. Guess I misunderstood y'. When we were talkin' a while ago, y' asked me for a job, didn't y'? I'm 'fraid you're more interested in money than a job. Tellya what you do. Before you close your eyes tonight do some thinkin', 'n then if y' change your mind by mornin', come on down and see me."

And with this advice at an end, Dad went in the direction of his office; Tim continued on his way out the gate.

\* \* \*

"Good mornin', Mr. Ousler," greeted Tim. "I've got my workin' clothes on, my lunch box under my arm and all I'm needin' is a pass and a brass check 'n then I'll be on my way to

Mr. Bigby to tell 'im it's okey, boss. I'm startin' this mornin' in your shop at the figure y' mentioned."

"Let me tellya somethin', Tim," chuckled Dad. "Y' never did anything better in your life than to think this thing through as you've done."

Truer words never were uttered. For, fellers, from now on there was no stoppin' this boy, Tim McDonald. He served a few months in the machine shop and when the steam engineer started on his vacation, Tim stepped into that office on the second floor of a little brick building near the bessemer department and kept things goin'.

Meanwhile, Dad Ousler attended the monthly meeting of the company's blast furnace superintendents in Pittsburgh, and was asked by one of his friends with a plant on the Ohio river if he knew where he could get a steam engineer for a month or so.

The following week Tim McDonald was on his way to the works of the company on the Ohio river as a matter of accommodation, but he never returned to the plant where he started thinkin'.

For 4 years he plugged away 'n then they made 'im assistant super of the plant. He stayed on this job 25 years 'n then on the morning of July 1, 1926, when Tim came to work he found his desk had been moved into the front office and in the pigeon hole was fresh stationery with the title "general superintendent" in the upper left-hand corner. 'N that's not all.

The company brought him up the river Aug. 7, 1933 and made him general "super" of the Homestead works. Y' think that 's all? No it isn't. On May 6, 1940 they 'pointed 'im manager of technical development of the Carnegie-Illinois Steel Corporation.

Wanta know his real name? Well, I'll tellya. It's Malcolm Finley McConnell, "Fin" for short.

'N that's the story of a lad fresh out of college of yesteryear who had an occasion to think 'imself into a job. Pity we don't do more thinkin' ourselves, huh? Maybe we'd have fewer dictators in the world today if we did. Maybe there wouldn't be so many refugees on the march in tank infested countries.

So, fellers, when the lad home from school knocks at your office door, bid 'im welcome, listen carefully to what he has to say and give 'im a lift if y' can, 'cause y' never can tell what potentialities are hidden within. Well, I'll be seein' you.

*"Shorty" Long*



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SLOW UP **P**roduction



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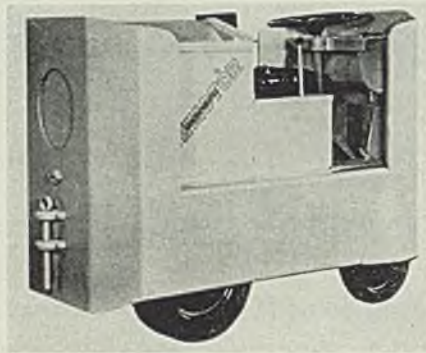
30 ROCKEFELLER PLAZA, NEW YORK, N. Y. • BUSH HOUSE, ALDWYCH, LONDON, W. C. 2, ENGLAND





## Industrial Tractor

■ Towmotor Co., 1247 East 152nd street, Cleveland, has introduced a new CS industrial tractor with special frame and bumpers. It is especially advantageous in handling unwieldy loads of steel in tubes or

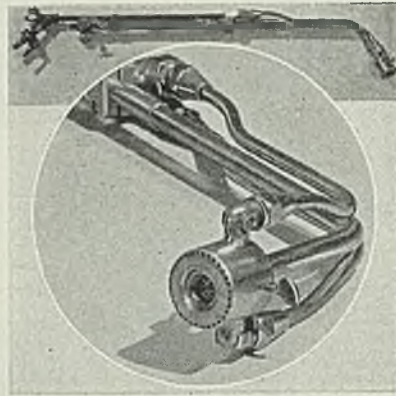


sheets with long overhang. All truck contours are rounded to avoid catching obstructions, and shields give driver and steering wheel more protection on sharp turns. Its overall width is 42 inches, overall length 71½ inches and outside turning radius is 74 inches. Two ¾-inch steel plate bumpers 48½ inches high by 42 inches wide form the integral end members of a box type steel frame. Underclearance of 5 inches at bumpers and near axles plus 8 inches at center of machine allows ample clearance for floor obstructions. The tractor has a drawbar pull of 4000 pounds and will pull 130 tons on level concrete. Its power plant is built for peak capacity service 24 hours per day. Equipped with a 3-speed transmission, the tractor operates at any speed up to 8 miles per hour.

## Flame Torches

■ Victor Equipment Co., 844 Folsom street, San Francisco, announces three torches for flame application. One is designed to flame harden

surfaces of rock plant screening plates. Its wide roller facilitates operation and prevents tilting of nozzle as it passes over holes in the plate. The second, which is illustrated, is a large, circular, multi-

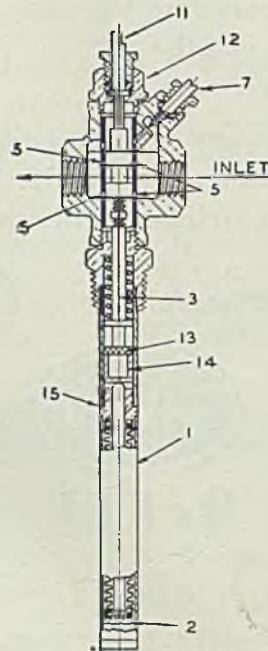


ple-flame heating nozzle designed to take out buckles in plates. This particular torch has a water-cooled tip and can be provided with integral quenching head.

The third is a flame dehydrating and descaling nozzle. It is comprised of removable sections permitting the width of the ribbon of flames to be adjusted to meet specific requirements.

## Brine Blender

■ Sarco Co. Inc., 183 Madison avenue, New York, has introduced type BB blender for control of brine cooling. It functions at low temperatures, does not over expand, has a wide range of adjustment. Warm

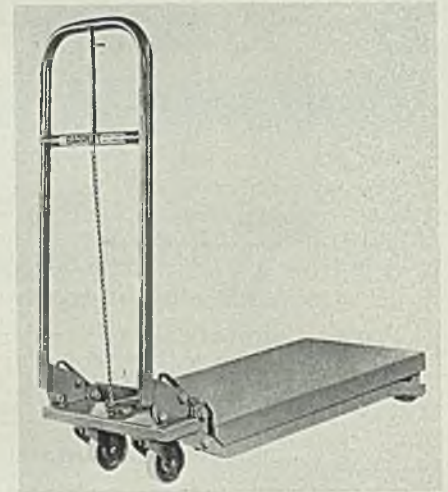


used brine and cold new brine flow into blender from opposite inlets. If resulting mixture is above the de-

sired temperature, thermostat over which mixture flows expands and narrows the opening through which the warm brine enters. At the same time, the opening which admits the cold brine is increased proportionately. This throttling action continues until the proportion of cold brine to warm brine entering the blender is such as to form a mixture of the desired temperature. The blended mixture is recirculated to the brine cooler.

## Lift Truck

■ Barrett-Cravens Co., 3250 West Thirtieth street, Chicago, has placed on the market a new ¼-ton lift truck for general handling. It serves as a combination lift-truck with a full 2-inch lift for big loads that are handled on skids, and as a floor truck for bulkier single objects. Front wheels are swivel type and U tubular steel handle lifts loaded skid when pulled down to an angle



slightly more than 45 degrees. Truck platform is lowered by trigger chain. Truck itself is all-welded steel construction and light in weight. It is readily moved about even under capacity load.

## Electric Hoists

■ Detroit Hoist & Machine Co., 8201 Morrow street, Detroit, announces a new line of small electric hoists known as Titans, for handling capacities of 250, 500 and 750 pounds. Hoists are available with hoisting speeds up to 60 feet per minute.

All working parts of each hoist, including the load block, are totally enclosed, while sheave and hoisting ropes are well guarded. Compactness and light weight of the Titan also is traceable to the cone-drive worm gear. All hoists of the line are provided with an electric sole-



noid brake capable of sustaining the full rated load. In addition, the locking action of the cone-drive worm gearing in the hoisting mechanism positively holds the load at any point.

The hoists are controlled by push button control. They are available for upper hook suspension, with lug or with 4-wheel trolley, for any size standard I-beam monorail tracks.

## Reciprocating Tool

■ H & H Research Co., 1925 Buena Vista, Detroit, has developed a new model reciprocating head tool which may be used to file, burr, hone, snag, polish, saw and chip. It has a stroke length of  $\frac{3}{4}$ -inch and develops a 30 pound push or pull. Under full load it travels at 1250 to 1400 strokes per minute.

Designated as series C, the tool is powered with 1/30-horsepower 110-volt motor. It is available complete with built-in toggle switch and 6 feet of cord and plug. It measures 2 $\frac{3}{4}$  inches in diameter and is 10 inches long.

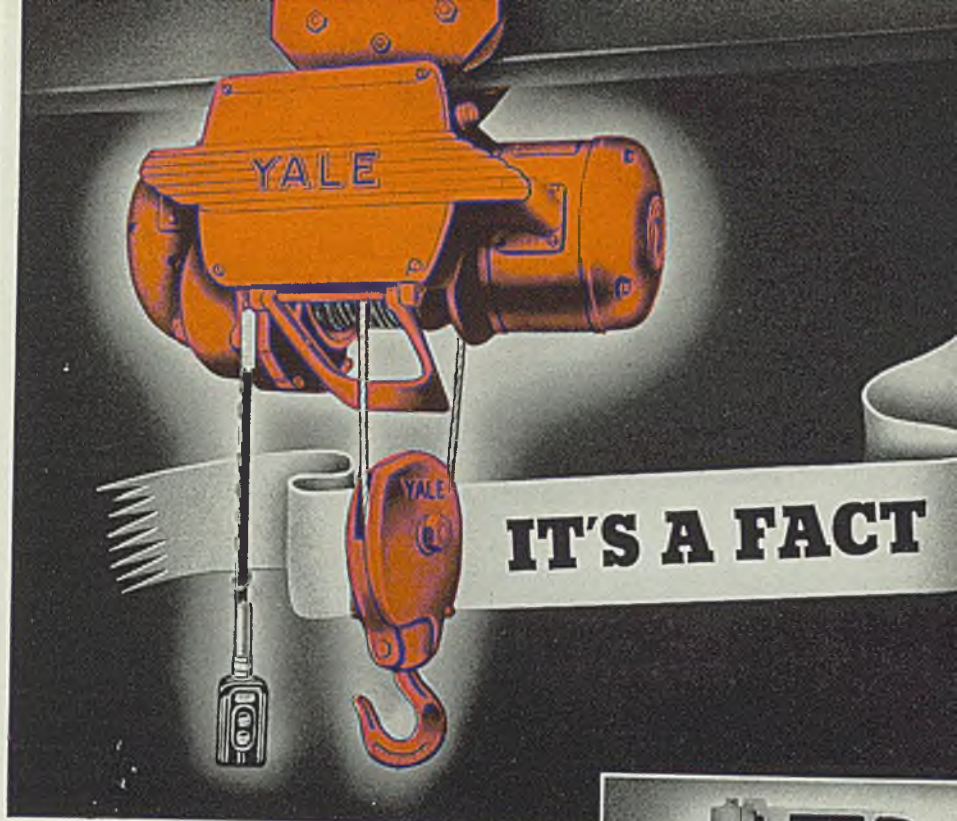
## Intensive Mixer

■ National Engineering Co., 549 West Washington boulevard, Chicago, announces a new portable No. O Simpson intensive mixer which has a capacity of approximately 150 to 200 pounds of sand per batch. Its mixing time ordinarily is 2 to 4 minutes, depending upon the class of sand to be prepared. The machine is a self-contained motor driven unit, mounted on wheels and arranged so it may either be pushed on the floor or picked up by the crane and moved from one location to another. It is powered by a 5-horsepower motor.

## Sinter Meter

■ Harry W. Dietert Co., 9330 Rose-lawn avenue, Detroit, announces a sinter meter for determining the refractoriness of molding and core sands, clays and refractory materials such as mortars and bricks. The refractoriness of a material is determined by placing the sample under the platinum-rhodium ribbon of the meter. This is heated to increasing elevated temperatures until the sample in contact with the ribbon is fused.

The temperatures of the ribbon is measured with an optical pyrometer. It is heated with an electric current which is controlled with a transformer and varitran.



## THE CABLE KING HOIST BRINGS YOU ALL THESE FEATURES:

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|------------------------------|--------------------------------|
| 1. Air-cooling               | 8. One point lubrication       |
| 2. Lifetime gearing          | 9. Large diameter drum         |
| 3. "Precision" type bearings | 10. Upper limit stop           |
| 4. Self-adjusting load brake | 11. Safety bottom block & hook |
| 5. Heavy duty motor brake    | 12. All-weather controllers    |
| 6. Weather-proof motor       | 13. Ribbed steel hoist frame   |
| 7. 30 Minute motor rating    |                                |

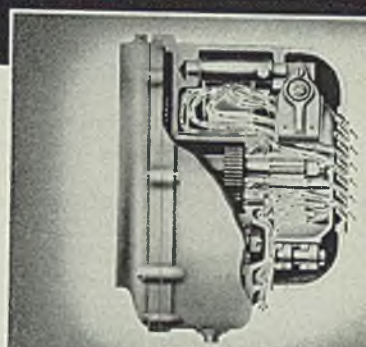
These features make the Cable King the electric hoist that meets *all* specifications engineers demand. A proved hoist . . . it's proved by exhaustive laboratory and field tests.

Air-cooling, an exclusive Cable King feature, eliminates excess brake heat, and enables the Cable King to operate on a heavier duty cycle than any other hoist in the same class. It accomplishes more in a given operating hour, which means greater savings.

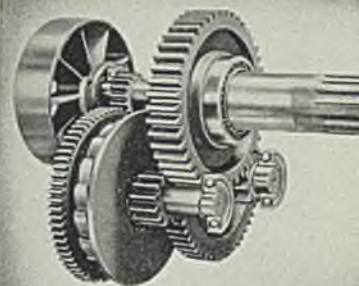
Another Cable King feature is Yale precision construction. All gears and pinions are drop-forged, chrome nickel steel, heat treated for maximum wear and long life. And the bearings at *all* friction points are "precision" ball or roller type, specially sheathed and shielded from dust.

These are only a few of Cable King's exclusive features. Ask your Yale distributor to tell you about *all* of them. Or write direct to us for descriptive catalog.

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## Maximum Physicals

(Continued from Page 46)

the treatment is repeated so at no time are there rivets on the assembly floor which have been heat-treated more than 48 hours previously.

Metallurgically the reason for this practice is simply to retain maximum workability. This permits the rivets to be driven and headed easily and is quite important as this material age hardens rather rapidly at room temperatures. In fact, aging can be noted in periods as short as an hour or two after heat treatment if kept at room temperature. By holding the rivets in a chamber cooled by dry ice to a point considerably below zero Fahr., the maximum workability of the material is retained until they are used.

### Dies Made from Boiler Plate

In addition to developing maximum physical properties in aluminum alloys, all the usual tool and die work in a large production plant is handled in this heat-treating department, using the row of electric tool and die furnaces shown down the center of the heat-treating department in Fig. 1. Most of these operate up to 1650 degrees Fahr. with automatic controls.

One of the more unusual types of die work handled here is preparation of dies made from boiler plate instead of expensive tool steel or ordinary low-carbon steel with work surfaces carburized, a slow operation. Boiler plate, case hardened in the salt bath unit shown in Fig. 3 saves from 60 to 75 per

cent in the cost of many dies. This saving is most important because many of the dies in this plant are never called upon to make more than 1000 or 2000 pieces.

Heat treatment given such dies made from boiler plate consists of case hardening the pieces in a bath of Perliton No. 11 to give about 0.017-inch case. From the salt bath, the work is quenched in oil. Distortion is kept so low that pieces are easily aligned. Many of these are shear dies, and a good proportion of them are combination cutting and forming dies used with a thick sponge-rubber upper pad in a hydraulic press to cut and form aluminum alloy sheets and sections in one operation. Where the lower die upon which the sheet is placed is provided with rounded corners, the sheet is simply formed over these projections by the sponge-rubber pad during the "squeeze." When it is desired to shear or trim edges at the same time, the lower die is provided with a sharp corner at those places. The high stresses set up during the squeeze then cause material to part along this sharp line.

In addition to the tool and die work, ample facilities are provided for conventional hardening operations on a large volume of production work in steel parts of various analyses. In fact, five oil-fired furnaces in a row along one side of the heat-treating department are

provided for this work as well as a large electric draw furnace of the noncirculating air type with a working chamber 12 feet long by 36 inches wide by 24 inches high, located along one end of the department. Also two vertical Cyclone draw furnaces are provided, each with a working chamber 25 inches in diameter and 60 inches deep. Fig. 4 shows one of these units with plan, Fig. 1, showing relative position of the various furnaces.

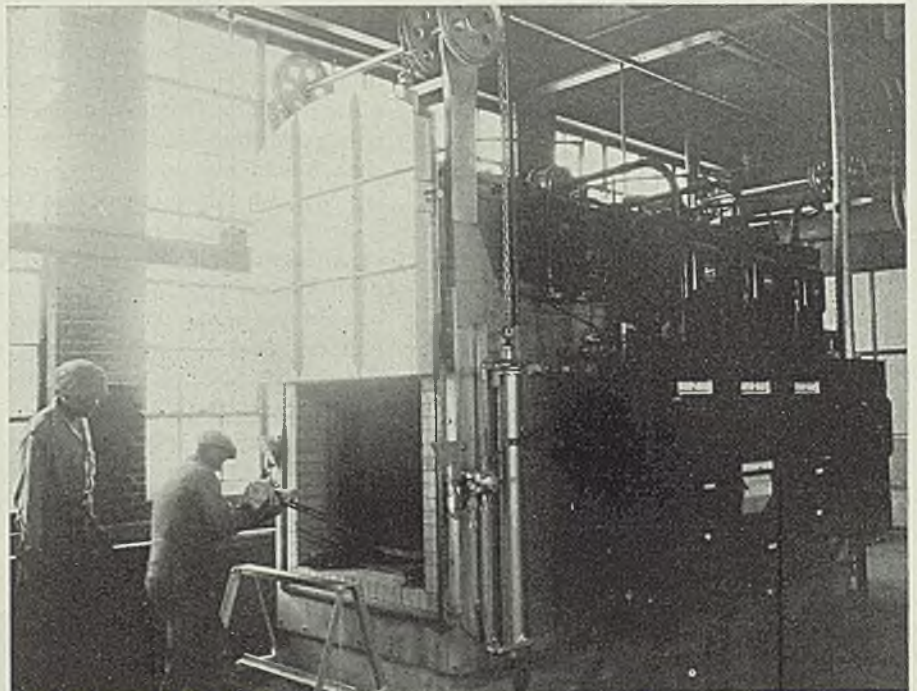
Typical of production heat-treating work is the cycle given a landing gear cylinder, a part forged from SAE 4340 steel and weighing about 125 pounds in the rough.

### Normalizing, First Operation

First operation in heat-treating these parts is to normalize them at temperature of 1625 degrees Fahr. in one of the oil-fired high-temperature furnaces in the row of five. These units are capable of operating up to 1750 degrees Fahr. After being normalized for 1 to 5 hours according to size and weight, the work is allowed to cool in air.

Annealing operation follows. Work is loaded into one of the oil-fired furnaces when furnace is cold and is allowed to come to heat with the furnace. Usual practice is to load the furnace, let it come up and remain at heat during the day. Then the furnace is shut down at the end of the day and the work is allowed to cool in the furnace overnight. The next day another load is given the same treatment. Annealing takes place at a temperature of 1350 degrees Fahr., and the work is allowed to cool in the furnace to approximately 400 degrees Fahr. From this point on, work is air cooled.

Fig. 4. (Left)—One of the two vertical air drawing furnaces. Fig. 5. (Right)—This is the large 3-zone furnace for hardening aluminum alloy parts. Photo courtesy Lindberg Engineering Co., 221 North Laflin street, Chicago





About two tons of these forgings constitute an ordinary furnace load.

From this point the forgings are sent to the machine shop for rough machining during which operation about 65 to 75 pounds of metal is removed from each of the 125-pound forgings.

Next the desired physical properties are developed by hardening and drawing. In one of the oil-fired units, the work is brought up to a temperature of approximately 1200 degrees Fahr. From this point, the temperature is increased gradually over a period of about 2½ hours until it reaches 1550 degrees Fahr. Then the forgings are quenched in oil and removed from the quench while still warm to be given a subsequent draw to the required hardness.

Drawing is done in one of the two vertical circular Cyclone furnaces. As seen in Fig. 4, these units are sunk in the floor so the top of the furnace is at convenient working height. Since these loads are quite heavy, a jib crane with an electric hoist is provided for loading. Working chamber is approximately 25 inches in diameter and 60 inches deep so a charge of about 1000 pounds can be accommodated.

#### Heat-Treating Cycle Varied

Drawing is done at a temperature of 900 degrees Fahr., from which temperature the work is oil quenched to stop temper embrittlement and to avoid cracking.

This heat treatment gives a tensile strength of 180,000 pounds per square inch with allowable hardness tolerance ranging from 38 to 42 Rockwell C.

This typical heat-treating cycle for forged parts of course is varied slightly on other items according to the particular physical requirements, size and shape of the piece and type of steel. After final heat treatment, work is finish machined by grinding on those surfaces which are critical. Total amount of finish machining, however, is extremely small as very little distortion occurs in the heat-treating operations. The forced convection air furnaces used for drawing have been found to give work extremely uniform in character throughout a charge as well as from batch to batch.

Oil quench baths include three tanks, one 3½ x 3½ x 12 feet, one 2 x 4 x 14 feet and one 3 x 10 x 8 feet, in addition to several smaller ones. A cooling system handles 300 gallons per minute of either oil or water. The material to be cooled is pumped through a heat exchanger consisting of a smaller pipe carrying the material to be cooled surrounded by a larger pipe through which cold water flows. The heat exchanger is connected to an 1800-

gallon reservoir in the basement where the heat exchanger also is located. Cooling system is connected to draw the hot oil off the top of the quench tanks and to pump the cool oil in at the bottom in a continuous recirculating arrangement.

The heat exchanger and the 1800-gallon tank reservoir, which provides a ballasting or leveling off of heat variations, is capable of holding temperature of quench baths to a maximum of 70 or 75 degrees even with full production in the department. Control of the cooling system is manually operated.

In the basement below the heat-

treating department also are located a turbine blower to supply air to the oil-fired furnaces and two 12,000-gallon fuel oil storage tanks as well as a number of other smaller storage tanks.

A rather unique control setup is employed in the heat-treating department. Here is provided a single switch which kicks off all furnaces and equipment in the entire department. Thus in event of an emergency, all furnaces can be shut down instantly. In addition, fire extinguishers are supplied adjoining all oil quench baths and at other places about the department.

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## Reader Comments

(Concluded from Page 4)

article, it is questionable whether the setting up of a pension plan from these points of view only would be justified as an undertaking on the part of private business.

Unquestionably, good private pension plans are valued by employes as a means of assisting them in meeting the financial problems of their declining years. Quite naturally the value which employes place on such pension plans is reflected to some extent in their attitude toward the

job. Certain detailed items listed in the article as advantages resulting from a pension plan, are, however, subject to differences of opinion on the part of various pension authorities, at least with respect to the degree in which such advantages are attained . . . However, it is perhaps true that pension plans may have some effect on strikes or the willingness of workers to strike, but it seems at least questionable whether they are of material importance in all companies or under varying conditions.

With respect to the effect of pen-

sions on wage increases, it is my opinion that a private industrial pension plan should not in any way affect wage treatment accorded employes. As previously stated, a pension plan is designed for a particular purpose, to meet the expenses of superannuation of a business and payments begin after the employe has left the service of the company. This is a distinct and inevitable expense of conducting the business, whether it is met by a pension plan or otherwise. In my opinion, pension plans under which only certain employes ultimately attain the necessary ages and service to qualify for pensions, should not affect wage treatment, which is intended to reimburse adequately all employes for the current services which they are rendering the company. I further believe that pensions should be kept within reasonable limits, so as not to destroy the desirable qualities of individual initiative and resourcefulness.

### Many Factors to Consider

There are, of course, many factors which should be considered in connection with deciding on adoption of pension plans and determining the kinds of plans which are best adapted to different industries. These include such matters as the treatment to be given for past service; whether the plan should be contributory or non-contributory and the proportion of expense to be assumed by the employe; the advisability of actuarial funding of pension costs in advance of retirement, either through a trustee created by the company or an outside insurance agency; the desirability of providing additional forms of benefits in connection with disability and death; co-ordination of savings, thrift and insurance plans; and many other considerations which can only be decided intelligently in the light of the various conditions and circumstances which may apply to a given company or industry.

The above comments represent only my personal views and are submitted merely as an indication of some of the numerous details which, I believe, should be duly considered before the establishment of a pension plan. They are not intended, of course, in any way as a criticism of the very good general article which Mr. Klein prepared.

C. J. SCHAEFER JR.

Chairman,  
Employes' Benefit Committee,  
American Telephone & Telegraph  
Co., New York.

Allegheny Ludlum Steel Corp., Pittsburgh, has named the Peden Iron & Steel Co., Houston, Tex., agent in that area for its line of tool and high speed steels.



Two new Ajax forged steel Flexible Couplings with  $1\frac{1}{8}$ " and  $1\frac{3}{8}$ " maximum bores provide extreme strength and a high factor of safety for heavy duty service. They meet the trend of using alloy steel shafts carrying a high percentage of their torque capacity. Rubber bushings and graphite-bronze bearings give resilient flexibility, positive drive, free end float, and eliminate backlash, noise and lubrication problems.

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# < < HELPFUL LITERATURE > > >

## 1. Foundry Conveyors

Chain Belt Co.—16-page illustrated bulletin No. 370 describes conveyors of all types for handling foundry molds. Such products as gravity, power and belt conveyors, elevators, bins and hoppers and sand conditioning equipment are explained in detail. Typical complete foundry installation is shown.

## 2. Bearings

Ahlberg Bearing Co.—96-page illustrated catalog No. 440 contains dimension data on ball, tapered roller, straight roller, and thrust bearings and ball bearing pillow blocks. Mounted roller section describes machine units, flange mountings, take-up units and hanger bearings. Engineering section includes useful information for designers and engineers.

## 3. Shell Holding Equipment

Logansport Machine, Inc.—20-page illustrated bulletin on "Logan Shell Holding Equipment" presents details of air and hydraulic operated equipment for all sizes and types of shells or similar forgings. Drawings and engineering data are included.

## 4. Molding Presses

F. J. Stokes Machine Co.—4-page illustrated folder No. 909 contains description of standard semi-automatic molding presses for use in the production of plastic moldings and mechanical rubber goods. Specifications and features of these machines in capacities from 20 to 300 tons are included.

## 5. Centrifugal Pumps

Fairbanks, Morse & Co.—6-page illustrated bulletin No. 5972 describing figure 5972, two-page centrifugal pumps for head conditions above the range of the single-stage type for all classes of general pumping service where liquid is of low viscosity and free from foreign matter. Large cross-sectional illustration shows features.

## 6. Shovel and Dragline

Lima Locomotive Works, Inc.—16-page illustrated bulletin No. 121-A describes the "Lima" type 1201 shovel and dragline which is mounted on a crawler truck designed to suit all ground conditions. Full details of this unit for capacities from ¾ to 3 yards as shovels, 13 to 60 tons as cranes and variable dragline loads are given.

## 7. Collets and Parts

Modern Collet & Machine Co.—30 page spiral-bound illustrated catalog No. 40 details and gives list prices and discounts on spring collets, feed fingers, collet tubes, pusher tubes, chucking fingers, cams and parts or tools for all types of screw machines.

## 8. Stainless Steel Tubing

Carpenter Steel Co.—16-page illustrated bulletin "Carpenter Welded Stainless Tubing" presents properties and details uses of this product in industry. Design and working instructions as well as complete engineering data are presented in useful tabular form. This tubing is available in various analyses, shapes, and sizes.

## 9. Grinders

Landis Tool Co.—36-page illustrated catalog, entitled "Landis Grinders for the Airplane Industry," describes and presents close up sectional views of crank, cam, piston and other grinders and explains their application to airplane parts in production work. Drawings show actual operations.

## 10. Stock Gears

Boston Gear Works, Inc.—288-page illustrated catalog No. 53 contains specifications and list prices of stock gears, chain and sprockets, motorized speed reducers, speed reducers, flexible couplings, universal joints, pillow blocks and ball bearings. Essential calculations for figuring gear and speed reducer applications are given.

## 11. Synchronous Motors

General Electric Co.—4-page illustrated bulletin No. GEA-3307 gives construction and operating details of small self-starting synchronous motors for operating instruments, control devices and for applications requiring low-speed torque or power at constant speed.

## 12. Nickel Alloys

International Nickel Co.—12-page illustrated bulletin No. T-5 is entitled "Engineering Properties of Monel" and contains technical information on Monel, nickel and nickel alloys. Physical constants, composition, corrosion, and working properties are presented in useable form.

## 13. Magnetic Separators

Stearns Magnetic Manufacturing Co.—Illustrated bulletin No. 46-B describing an extensive line of magnetic separators and magnetic transmission devices. Separators are designed for cleaning secondary metals, reclaiming mixed materials and purifying materials from contained iron.

## 14. Flexible Metal Hose

Chicago Metal Hose Corp.—38-page illustrated catalog No. G-21 describes "Rex-Weld" and "Rex-Tube" metal hose for transportation of steam, fluids, chemical and for special purposes. Gives data on standard hoses and couplings, stainless steel connections and bellows, diesel exhaust hose, and fuel and oil hose.

## 15. Copper, Brass and Bronze

Revere Copper & Brass Inc.—32-page handbook "Revere Weights and Data" is replete with practical and complete tables of weights and data on copper, brass and bronze products. This book is available to engineers, draftsmen, estimators and designers, for whom it is expressly written.

## 16. Steel Stock List

Joseph T. Ryerson & Son, Inc.—256-page "stock list" is a buyer's guide to all "Certified Steel" products carried in stock. Products, analyses, sizes, machinability charts, weight tables and standard gauge comparisons are some of the features included in this reference file.

## 17. Adult Education

International Correspondence Schools—32-page illustrated booklet, "The Business of Training Men," presents the history and purpose of ICS. Directors, faculty heads and available courses are listed. Widespread use of ICS textbooks is explained.

## 18. Foundry Equipment

American Foundry Equipment Co.—12-page illustrated catalog No. 60 presents a complete summary of models and sizes of the following products: "Tumblasts," "Tablasts" and special cabinets, dust collectors, sandcutters, core machines, flasks and jackets, rod straightener and shear machines, and sand blast equipment.

## 19. Electric Welding

Air Reduction—32-page illustrated bulletin No. 103 describes complete line of "Alrco" electrodes, "Wilson" electric welding machines and welding accessories. With description of each electrode are: general description, suggest applications, welding procedure, physical properties, and specification table. Welding symbols and instructions for their use are included.

## 20. Wire Annealing Furnaces

Lee Wilson Engineering Co.—8-page illustrated bulletin "Wilson Annealing Furnaces for Wire and Strip." Describes and shows installations of cylindrical bell type units fired with vertical radiant tubes in all types including those for bright annealing with controlled atmospheres.

## 21. Materials Handling

Hayward Co.—8-page illustrated bulletin No. 705 contains suggestions for using latest type of electric clam shell for speeding rehandling. Gives details of electric motor bucket in sizes ranging from 7½ cubic feet up to 3 cubic yards, which can be used with overhead cranes.

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## 22. Plating Solutions

Hanson-Van Winkle-Munning Co.—Illustrated bulletin "Simple Methods of Analyzing Plating Solutions," fifth edition, 1940. Revised edition contains detailed instructions and includes methods of analysis of the "H-VM-W" semi-nickel solution.

## 23. Self-Locking Nuts

Elastic Stop Nut Corp.—4-page illustrated bulletin No. L40-10 contains concise explanation of construction and self-locking action of "Elastic Stop Nuts" and a graphic listing of advantages to be obtained through their use.

## 24. Speed Reduction Motors

Reliance Electric & Engineering Co.—4-page illustrated bulletin No. 404 presents complete data on double and triple reduction type S "Reliance Gearmotors" for alternating and direct current circuits. Features and checking points are given.

## 25. Gas Engines

Worthington Pump & Machinery Corp.—8-page illustrated bulletin No. S-550-B7 shows construction and design features of "Worthington" vertical four-cycle gas engines with cylinder ratings of 125 hp and 150 hp. per cylinder.

## 26. Oil Well Casing

A. O. Smith Corp.—24-page illustrated bulletin No. 537 relates development of "Smith" welded casing for oil wells. Shows savings to be effected and includes graphs to aid calculations. Design data for casing strings, threaded and coupled, are given.

## 27. Conveying Systems

Metzgar Co.—4-page illustrated bulletin "Metzgar Wheel Conveying Systems" describes fixed and movable types of wheel conveyors for transporting cartons, boxes and packaged materials in plants and warehouses.

## 28. Metal Spray Equipment

Metallizing Co. of America—16-page illustrated "Metallizing Mogul Equipment and Accessory Manual" gives full information on the new "Mogul" model P and S metal spraying guns. Features of units are explained.

## 29. Switchgear

Westinghouse Electric & Manufacturing Co.—16-page illustrated booklet No. 32-100 describes indoor and outdoor oil-filled metal-clad, horizontal draw-out truck and cubicle type switchgear. Standards covering design and manufacture are listed. Application recommendations are made.

## 30. Shell Equipment

Landis Machine Co.—8-page illustrated bulletin "Shell Threading and Tapping Equipment" describes collapsible taps and "Landmatic" heads to thread shell bases, lifting plugs and adapters for munitions operations.

# HELPFUL LITERATURE

(Continued)

## 31. Monorail Equipment

American MonoRail Co.—254-page illustrated loose-leaf fabric bound catalog No. C presents details of two complete lines of equipment for overhead handling systems. Installation, design and application data on standard "Mono-Rail" line for loads up to two tons and for "RailMaster" line for heavier capacities are given.

## 32. Synchronous Motors

Allis-Chalmers Manufacturing Co.—28 page illustrated bulletin No. B-6033 on large coupled and engine type synchronous motors. In addition to covering their detailed construction, installations are shown. Starting equipment, including metal-clad and cubicle switchgear, is described.

## 33. Carburizing Containers

Michigan Steel Casting Co.—4-page illustrated folder entitled "Miscellaneous Carburizing Containers of Iconel" explains how these units increase furnace efficiency and reduce cost per heat hour. Details of containers are given.

## 34. Floor Resurfacer

Flexrock Co.—4-page illustrated bulletin "Flexible Concrete" gives applications and instructions for resurfacing old wood floors with "Flexrock," which is available in seven standard colors and dries overnight.

## 35. Die Casting

Madison-Kipp Corp.—32-page illustrated bulletin No. 100 outlines complete die casting service of this company and presents engineering data on fresh oil lubricators and high speed air tools. Section on die casting practice is included.

## 36. Valves

Homestead Valve Manufacturing Co.—4-page illustrated bulletin No. 21540 shows applications and designs of various types of valves in plants. Losses resulting from leaks of various sizes in steam, water and air lines are tabulated.

## 37. Conveyor Equipment

Saginaw Stamping & Tool Co.—50 page illustrated catalog No. 140 includes details of the complete line of overhead materials handling equipment as well as descriptions and engineering data on wheels and trolleys for all types of overhead installations.

## 38. Valve Controls

Philadelphia Gear Works—66-page illustrated catalog on "Limitorque Automatic Valve Controls" gives complete information on line of controls for operating valves from 3 to 96 inches in diameter as well as for remote control applications.

## 39. Stainless Electrodes

Crucible Steel Co. of America—6-page illustrated bulletin No. SS50 describes "Rezilal" stainless steel electrodes. Identification chart gives complete list of name, grade, type number, analysis and color of tip. Prices and selection data are included.

## 40. Refractories

General Refractories Co.—4-page illustrated bulletin No. 209 presents comprehensive data on "Sillimanite" refractories in brick, cement and plastic form for high temperature applications.

## 41. Leather Packings

Graton & Knight Co.—12-page illustrated catalog on "Sparton" leather packings gives application and selection information on various types of packings such as waterwell cups, valve leathers and oil and gin mill press crimps.

## 42. Wire Rope

Broderick & Bascom Rope Co.—96-page illustrated "Rigger's Handbook" contains information on safety slings, wire rope slings and fittings. Instructions for socketing and splicing wire rope are included. Engineering data are presented on all types of slings.

## 43. Die Casting Machines

G. & M. Manufacturing Co.—12-page illustrated portfolio type manual entitled "New Efficiency and Economy in Die Casting," describing die casting machines of all-welded construction. Shows details of hydraulically operated units with locking pressures up to 250 tons.

## 44. Metal Cleaners

Cowles Detergent Co.—Bulletin, "The Chemical Classification and Selection of Alkaline Metal Cleaners," explains classification, relation of pH, class limits and applications of classifications of cleaners for ferrous and non-ferrous metals.

## 45. Single Phase Motors

U. S. Electrical Motors, Inc.—8-page illustrated bulletin "Design and Operation of U. S. Single Phase Motors" deals with mechanical and electrical characteristics of single phase, capacitor start motors. Diagrams and charts explain features of these units.

## 46. Steel Barges

Dravo Corp.—Illustrated bulletin No. 213 tells story regarding use, design and construction of welded steel barges. Twenty types of barges, covering harbor service and river transportation as well as towboats, derrick boats, dump scows and ferry flats are described.

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## Meter Manufacture

(Concluded from Page 66)

portions of the metal so as to form five spokes. The pitch diameter of the gear is 1.3051 inches and the diametral pitch is 76.6 which gives an idea of how exacting the die dimensions must be.

The hub in this gear is staked on a punch press. Both hub and gear are fed from hoppers to a revolving disk with 12 identical stations. All operations are carefully synchronized and are entirely automatic after the punch press is started. The operator simply keeps the hoppers full and stops the machine only if defective parts develop. Production averages 3000 pieces per hour; about three times as fast as hand fed operations on punch presses. The assembled hub and wheel is ejected from the disk into a container by a jet of air.

Specially designed wooden trays are used to carry the gear and staff assemblies to the assembly room. Compartment trays are used for the electromagnetic element. In fact, all parts requiring careful handling are transported between operations in especially designed containers. A number of these can be seen in accompanying illustrations. Operations throughout the entire shop are grouped as closely as possible to eliminate unnecessary handling thus decreasing cost of manufacture and increasing the quality of the finished product.

## Safety Goggle Orders To Be Placed Direct

NFA and NASO safety goggles may now be obtained direct from their manufacturer, American Optical Co., Southbridge, Mass. Previously, these goggles were made exclusively for National Founders association to be sold to members and customers as part of the association's service. The association, however, has discontinued this practice and notified its members that orders should be placed direct.

## Rust Preventing Paint Sticks on Hot Metal

Kemick, a chemical rust-preventing paint for metal surfaces that are subject to high temperatures is announced by American Chemical Paint Co., Ambler, Pa. It sticks to the metal even when it gets red hot.

When heated, the paint decomposes, volatiles expelled and chemicals are liberated to react on the metal surface, becoming part of it and neutralizing rust producing agents. It is suitable for use on steel,

iron, copper, brass aluminum, zinc or galvanized iron, and is applied by brush or spray. Its color, when first applied, is black. After being heated it retains a dark gray cast.

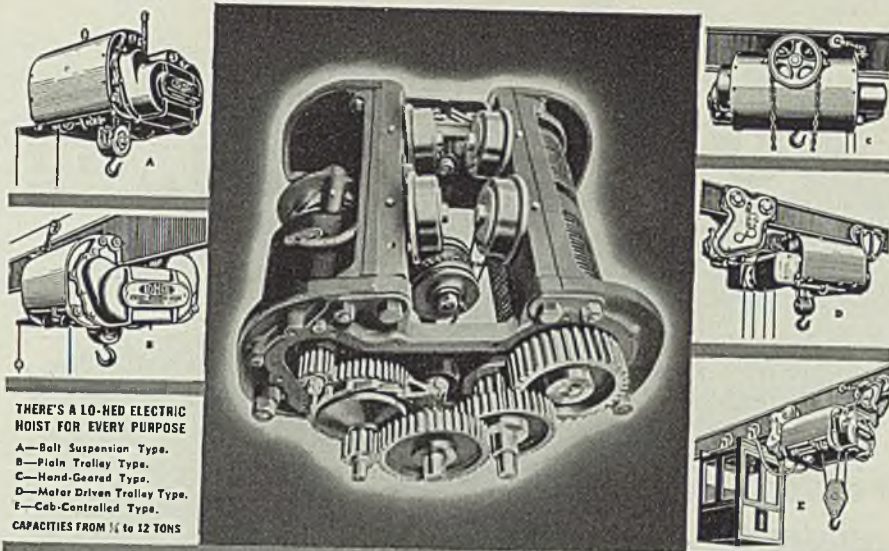
## Potassium Cyanide Now Offered Commercially

General Chemical Co., 40 Rector street, New York, announces that it is in a position to supply commercial quantities of potassium cyanide of its own manufacture. Important consumers, including heat treaters and electroplaters,

previously had been entirely dependent upon foreign sources of supply and had faced stoppage of imports due to war conditions.

General Chemical's product approaches reagent grade in quality and is of 94.96 per cent strength in KCN. It is granular in form, all screened through 8 mesh. It is readily soluble in water and low in insolubles.

The company also has conducted a number of experiments in the use of varying percentage mixtures of potassium and sodium cyanides to meet special requirements of low-melting heat treating baths.



# WANT LOW HEADROOM?

## Get the ORIGINAL low headroom hoist

Low headroom is probably the greatest single advantage a hoist can have though, like the fourth gear on your car, you may not always use it. As long as you want it, and it costs no more to have, insist on low headroom. LO-HED is the all purpose hoist with the original low headroom feature.

Low headroom in a Lo-Hed is achieved by a unique type of construction in which the weight of motor and drum are neatly balanced on opposite sides of the rail, so that the hook can be pulled up between them. Take a look at this time-tested principle in the open-view of the Lo-Hed Hoist on this page. Then check carefully all these other

time-tested features you gain when you buy a Lo-Hed: Heavy duty type hoist motor, automatic lowering brake, anti-friction bearings, stub tooth spur gears, plow-steel cable, 100% positive automatic upper limit stop, dust and moisture-proof controller. (Construction varies slightly for classes of Lo-Hed.)

Investigate Lo-Hed time-tested construction. Write today for the complete Lo-Hed Catalog shown below.



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## New Pipe Mill

(Concluded from Page 48)

closer temperature control than is possible in the old method of butt welding due to the burner arrangement, the small cross section of the heating chamber and the rapid travel of the skelp—75 to 300 feet per minute giving an actual heating time of only  $\frac{1}{2}$  to 2 minutes. The shorter heating time reduces scale losses, too.

Since proper heating is of utmost importance, the furnace is equipped with an elaborate system of control.

Each of the three heating zones is connected to the main gas supply through a diaphragm flow regulating valve which maintains a gas pressure of 4 to 8 ounces. A potentiometer connected to a thermocouple in the furnace roof near the discharge end automatically actuates the valves, increasing or cutting back the flow of gas as the temperature falls below or rises above the desired figure. Simultaneously, the air supply is regulated to maintain a predetermined air-fuel ratio.

However, a manual-automatic valve has also been provided to per-

mit manual control of any one or all of the three heating zones.

Six recuperators, two for each heating zone, preheat the air to about 900 degrees Fahr. These are equipped with tubular silicon carbide elements. A measured supply of air is drawn through the tubes by means of three fans of the double-inlet type, one fan for each two recuperators. These fans deliver the air to the headers of the respective zones at approximately 4-ounce pressure. Thermocouples in the outlet ducts from each fan are connected with potentiometers which record and control the temperature of the preheated air. Cold air is automatically drawn in if the temperature in any duct exceeds the preheated figure, thus protecting the fan.

### Flue Gases Removed from Top

Flue gases are taken off at top of the furnace and pass down around the recuperator tubes into an underground flue leading to an ejector stack outside the building. Thermocouples in the discharge flues from the recuperators are connected with a 6-point potentiometer recorder. An automatically operated damper in the ejector stack maintains a furnace pressure of approximately 0.130-inch of water.

Operation of the uncoiler, leveler, trimmer and flash welder is controlled ahead of the furnace while the mill itself and all other equipment are operated from a pulpit near the discharge end of the furnace. Push buttons are also provided at this point for turning the gas on or off the furnace, also various controls for regulating the amount of air, steam and water required. Adjacent to the pulpit is a central board mounting:

Indicating Instruments—A 5-unit instrument for each heating zone showing flow of gas to each zone, flow of air to recuperators 1 and 2, draft on recuperators 1 and 2. Pressure gage, gas to furnace. Six manual-automatic controls, one for the gas and one for the air regulators of each zone.

Recording Instruments—A 6-point potentiometer for measuring the temperature of the flue gas leaving the recuperators. A recording and integrating meter showing the total gas flow. A recording furnace pressure gage. A recording pyrometer showing the temperature of the skelp leaving the furnace.

Recording and Controlling Instruments—a potentiometer recording and controlling the furnace temperature. A potentiometer recording and controlling the temperature of the air leaving each fan.

Controls—An air-fuel ratio regulator for each zone. A furnace pressure regulator.

# NOW... Pickling Combs

## in ANY SHAPE YOU LIKE



*Welded Monel construction permits wide latitude in design*

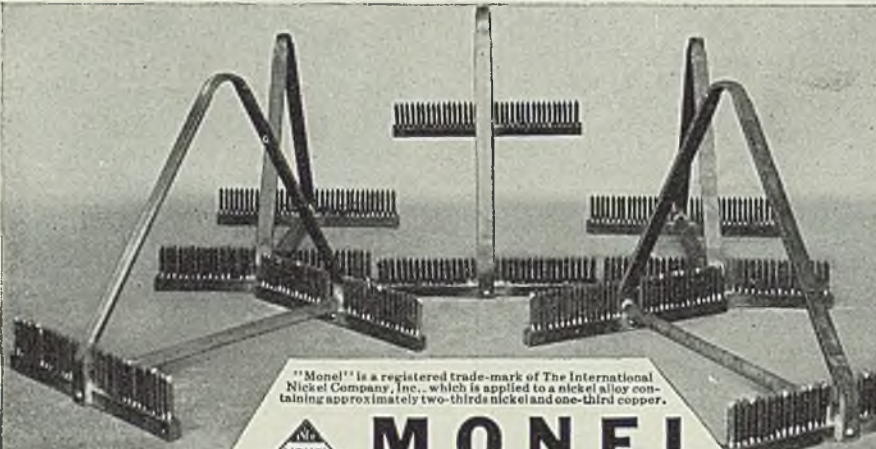
Not much you can do about improving design of pickling combs if you're limited to only one method of fabrication. But use Monel and you can turn out just the kind of comb you need.

Available in all standard mill forms, Monel is easy to work with. Cut it, bend it, shape it any way you like. Then permanently join the parts by means of strong, sound welds. Result: A comb

shaped *exactly* the way you want it ... and good for extra-long service because Monel is both tough and resistant to corrosion.

For more information on the use of Monel for pickling equipment write for "Equipment Designs for the Pickle House" and for welding data. Address:

THE INTERNATIONAL NICKEL COMPANY, INC.  
67 Wall Street New York, N. Y.



"Monel" is a registered trade-mark of The International Nickel Company, Inc., which is applied to a nickel alloy containing approximately two-thirds nickel and one-third copper.

# MONEL



# Demand, Production Continue To Expand

*French situation without marked influence on steelmaking. Railroad equipment and building construction aid domestic demand*

■ SUSPENSION of production against most French orders for steel has had little effect on steel plant operations. Ingot output last week rose an additional 2 points to 88 per cent, the eighth consecutive upturn.

Since work had not started on the major part of recent French purchases, the holdup brought about by war developments has not caused serious complications in mill schedules. In some instances producers have been instructed to complete these orders, with consignment changed to British destination, but such tonnages comprise a relatively small portion of the total. Possibility is seen, however, that additional lots will be released in this manner.

Lifting of pressure for steel shipments to France permits mills to give increased attention to domestic business and other export bookings, fairly large backlogs of which are at hand. Orders have run ahead of deliveries so far this month.

Some buying hesitancy appeared early last week on receipt of the adverse French news, but this was dissipated quickly. Scrap markets, highly sensitive to European developments, have lost some of their recent bullishness, despite further price advances in several districts, which moved the composite up 42 cents to \$19.75, new high for the year. Some scrap originally destined for export is moving back to domestic mills.

Flat-rolled steel producers have extended to July 31 the deadline for shipment of tonnage placed this spring at price concessions. Specifications must be entered by June 30. This extension has been a factor in promoting active demand for sheets and strip.

While the increase in steelmaking since May 1 has been almost as rapid as that after last Sept. 1, mill backlogs have had a more gradual expansion recently. Buyers' inventories are heavier than they were last fall, and the urgency to increase stocks is not supported by strong expectations of early price advances—one of the stimulating factors at the outbreak of the war. At the same time, buying in anticipation of future delays in deliveries is influencing consumers to order ahead and to bolster supplies.

Railroad equipment markets are starting to quicken. Freight car awards last week involved 2549 units, the largest purchases being 1250 cars for the Mobile & Ohio and 875 for the Nickel Plate. The latter also dis-

tributed orders for 3800 tons of rails. Only a few large inquiries for cars are pending, headed by 1100 for the Chesapeake & Ohio, but with freight traffic expanding and the transportation outlook fairly good, better activity in equipment building and repairs is in prospect.

Building steel demand continues relatively heavy despite the lag in requirements for public projects compared with the volume a year ago. Small industrial jobs are numerous, some of them resulting from expansion necessitated by war orders. However, such work usually involves only moderate steel tonnages. Included among recent concrete bar orders are 1350 tons for the Chicago subway, 1300 tons for a Delaware bridge and 1000 tons for Mississippi river guide walls.

Work on 1941 automobile models so far is affecting steel demand but slightly. Meanwhile assembly of current models continues to recede gradually, influenced by the season, large stocks and a slightly less favorable trend in retail markets the past six weeks. Last week's output of 90,060 units was a reduction of 3575 from the week before but more than 10 per cent larger than a year ago.

Lake Superior iron ore shipments continue heavy. On June 15 all but six of the 297 American bulk freighters were in commission, the most active engagement since 1937. Despite sizable shipments during May stocks of iron ore on hand at furnaces and at Lake Erie docks on June 1 were nearly 3,500,000 tons smaller than a year ago.

No possibility is seen of a coke shortage. Last fall so many beehive ovens were rehabilitated and placed in operation that a coke surplus developed, and these units again are available for service.

Except for a 6-point drop to 89 per cent at Detroit, all leading steelmaking districts showed unchanged or higher operations last week. Gains included 1½ points to 93 per cent at Chicago, 9½ points to 85½ at Cincinnati, 8 points to 78 at Youngstown, 7 points to 83 in eastern Pennsylvania, 2½ points to 84½ at Cleveland, ½ point to 90½ at Buffalo and 4 points to 70 in New England. Unchanged were Birmingham at 88, Pittsburgh at 81, Wheeling at 90 and St. Louis at 68.

## MARKET TABLOID

### Demand

*Sustained or heavier in many products.*

### Prices

*Firm; scrap less bullish and higher.*

### Production

*Up 2 points to 88 per cent.*







Buffalo	2.05c
Birmingham	2.05c
Gulf ports	2.40c
Pacific Coast ports	2.70c
<b>Iron</b>	
Chicago	2.25c
Philadelphia, del.	2.37c
Pittsburgh, relinead.	3.50-8.00c
Terre Haute, Ind.	2.15c

<b>Reinforcing</b>	
<i>New Billet Bars, Base</i>	
Chicago, Gary, Buffalo, Cleve., Birm., Young., Sparrows Pt., Pitts.	1.90c
Gulf ports	2.25c
Pacific Coast ports	2.30c
<i>Rail Steel Bars, Base</i>	
Pittsburgh, Gary Chicago, Buffalo, Cleveland, Birm.	1.80c
Gulf ports	2.15c
Pacific Coast ports	2.20c

**Wire Products**

<i>Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads</i>	
Standard and cement coated wire nails (Per pound)	\$2.55
Polished fence staples	2.55c
Annealed fence wire	3.05c
Galv. fence wire	3.40c
Woven wire fencing (base C. L. column)	67
Single loop bale tier. (base C.L. column)	56
Galv. barbed wire, 80-rod spools, base column	70
Twisted barbless wire, column	70

**To Manufacturing Trade**

<i>Base, Pitts. - Cleve. - Chicago - Birmingham (except spring wire)</i>	
Bright bess., basic wire	2.60c
Galvanized wire	2.60c
Spring wire	3.20c
Worcester, Mass., \$2 higher on bright basic and spring wire.	

**Cut Nails**

Carload, Pittsburgh, keg.	\$3.85
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**Cold-Finished Bars**

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

**Alloy Bars (Hot)**

<i>(Base, 20 tons or over)</i>			
Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.70c		
Detroit, delivered	2.80c		
<b>Alloy</b>			
S.A.E. Diff.	S.A.E.	Alloy Diff.	
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20
4100 0.15 to 0.25 Mo.			0.53
4600 0.20 to 0.30 Mo.			1.50
2.00 Ni.			1.10
5100 0.80-1.10 Cr.			0.45
5100 Cr. spring flats			0.15
6100 bars			1.20
6100 spring flats			0.85
Cr. N., Van.			1.50
Carbon Van.			0.85
9200 spring flats			0.15
9200 spring rounds, squares			0.40
Electric furnace up 30 cents.			

**Strip and Hoops**

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

<b>Hot Strip, 12-inch and less</b>	
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.10c
Detroit, del.	2.20c
Philadelphia, del.	2.42c
New York, del.	2.46c
Pacific Coast ports	2.75c
Cooperage hoop, Young., Pitts.; Chicago, Birm.	2.20c
<b>Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown</b>	
Chicago	2.80c
Detroit, del.	2.90c
Worcester, Mass.	3.00c
Carbon Cleve., Pitts.	
0.26-0.50	2.80c
0.51-0.75	4.30c
0.76-1.00	6.15c
Over 1.00	8.35c
Worcester, Mass. \$4 higher.	
<b>Commodity Cold-Rolled Strip</b>	
Pitts.-Cleve.-Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.35c
Lamp stock up 10 cents.	

**Rails, Fastenings**

*(Gross Tons)*

Standard rails, mill.	\$40.00
Relay rails, Pittsburgh 20-100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	\$40.00
Do., rerolling quality	39.00
<b>Cents per pound</b>	
Angle bars, billet, mills.	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham	3.15c
Tie plates, base	2.15c
Base, light rails 25 to 60 lbs., 20 lbs., up \$2; 16 lbs. up \$4; 12 lbs. up \$8; 8 lbs. up \$10. Base railroad spikes 200 kegs or more; base plates 20 tons.	

**Bolts and Nuts**

*F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.*

<b>Carriage and Machine</b>	
1/2 x 6 and smaller	68.5 off
Do. larger, to 1-in.	66 off
Do. 1 1/2 and larger	64 off
Tire bolts	52.5 off
<b>Stove Bolts</b>	
In packages with nuts separate 72.5 off; with nuts attached add 15%; bulk 83.5 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.	
Step bolts	60 off
Plow bolts	68.5 off
<b>Nuts</b>	
Semifinished hex. U.S.S. S.A.E.	
1/2-inch and less	67 70
3/4-1-inch	64 65
1 1/2-1 1/2-inch	62 62
1 1/2 and larger	60
<b>Hexagon Cap Screws</b>	
Upset, 1-in., smaller	70.0 off
Square Head Set Screws	
Upset, 1-in., smaller	75.0 off
Headless set screws	64.0 off

**Piling**

Pitts., Chgo., Buffalo	2.40c
Gulf ports	2.85c
Pacific Coast ports	2.95c
<b>Rivets, Washers</b>	
<i>F.o.b. Pitts., Cleve., Chgo., Bham.</i>	
Structural	3.40c

1/2-inch and under	.65-10 off
Wrought washers, Pitts., Chl., Phila., to jobbers and large nut, bolt mfrs. l.c.l. \$5.40; c.l. \$5.75 off	

**Welded Iron Steel Pipe**

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2 1/2 and 1 1/2 less, respectively. Wrought pipe, Pittsburgh base.

<b>Butt Weld</b>			
<b>Steel</b>			
In.	Blk.	Galv.	
1/2	63 1/2	54	
3/4	66 1/2	58	
1-3	68 1/2	60 1/2	
<b>Iron</b>			
1-1 1/2	30	13	
1 1/2	34	19	
2	38	21 1/2	
2	37 1/2	21	
<b>Lap Weld</b>			
<b>Steel</b>			
2	61	52 1/2	
2 1/2-3	64	55 1/2	
3 1/2-6	66	57 1/2	
7 and 8	65	55 1/2	
9 and 10	64 1/2	55	
11 and 12	63 1/2	54	
<b>Iron</b>			
2	30 1/2	15	
2 1/2-3 1/2	31 1/2	17 1/2	
4	33 1/2	21	
4 1/2-8	32 1/2	20	
9-12	28 1/2	15	
<b>Line Pipe</b>			
<b>Steel</b>			
1 to 3, butt weld	67 1/2		
2, lap weld	60		
2 1/2 to 3, lap weld	63		
3 1/2 to 6, lap weld	65		
7 and 8, lap weld	64		
10-inch lap weld	63 1/2		
12-inch, lap weld	62 1/2		
<b>Iron</b>			
1/2 butt weld	25	7	
1 and 1 1/2 butt weld	29	13	
1 1/2 butt weld	33	15 1/2	
2 butt weld	32 1/2	15	
1 1/2 lap weld	23 1/2	7	
2 lap weld	25 1/2	9	
2 1/2 to 3 1/2 lap weld	26 1/2	11 1/2	
4 lap weld	28 1/2	15	
4 1/2 to 8 lap weld	27 1/2	14	
9 to 12 lap weld	23 1/2	9	

**Cast Iron Pipe**

*Class B Pipe—Per Net Ton*

6-in., & over, Birm.	\$45.00-46.00
4-in., Birmingham	48.00-49.00
4-in., Chicago	56.80-57.80
6-in. & over, Chicago	53.80-54.80
6-in. & over, east fdy.	49.00
Do., 4-in.	52.00

*Class A Pipe \$3 over Class B Std. ftgs., Birm., base \$100.00*

**Semifinished Steel**

*Rerolling Billets, Slabs (Gross Tons)*

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Young., Birm., Sparrows Point	\$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00
<b>Forging Quality Billets</b>	
Pitts., Chl., Gary, Cleve., Young., Buffalo, Birm.	40.00
Duluth	42.00
<b>Sheet Bars</b>	
Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00
<b>Wire Rods</b>	
Pitts., Cleveland, Chicago, Birmingham No. 5 to 1/2-inch incl. (per 100 lbs.)	\$2.00
Do., over 1/2 to 1 1/2-inch incl.	2.15
Worcester up \$0.10; Galveston up \$0.25; Pacific Coast up \$0.50.	

*Skelp*

Pitts., Chl., Youngstown, Coatesville, Sparrows Pt.	1.90c
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**Coke**

*Price Per Net Ton*

<b>Beehive Ovens</b>	
Connellsville, fur.	\$4.35-4.60
Connellsville, fdry.	5.00-5.75
Connell prem. fdry.	5.75-6.25
New River fdry.	6.25-6.50
Wise county fdry.	5.50-6.50
Wise county fur.	5.00-5.25
<b>By-Product Foundry</b>	
Newark, N. J., del.	11.38-11.85
Chicago, outside del.	10.50
Chicago, delivered	11.25
Terre Haute, del.	10.75
Millwaukee, ovens	11.25
New England, del.	12.50
St. Louis, del.	11.75
Birmingham, ovens	7.50
Indianapolis, del.	10.75
Cincinnati, del.	10.50
Cleveland, del.	11.05
Buffalo, del.	11.25
Detroit, del.	11.00
Philadelphia, del.	11.15

**Coke By-Products**

*Spot, gal., freight allowed east of Omaha*

Pure and 90% benzol	15.00c
Toluol, two degree	27.00c
Solvent naphtha	26.00c
Industrial xylo	26.00c
<i>Per lb. f.o.b. Frankford and St. Louis</i>	
Phenol (less than 1000 lbs.)	14.75c
Do. (1000 lbs. or over)	13.75c
<i>Eastern Plants, per lb.</i>	
Naphthalene flakes, balls, bbls. to jobbers	7.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	\$28.00



## Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malle-able	Basic	Besse-mer
Bethlehem, Pa. ....	\$24.00	\$24.50	\$23.50	\$25.00
Birdsboro, Pa. ....	24.00	24.50	23.50	25.00
Birmingham, Ala. § .....	19.38	.....	18.38	24.00
Buffalo .....	23.00	23.50	22.00	24.00
Chicago .....	23.00	23.00	22.50	23.50
Cleveland .....	23.00	23.00	22.50	23.50
Detroit .....	23.00	23.00	22.50	23.50
Duluth .....	23.50	23.50	.....	24.00
Erle, Pa. ....	23.00	23.50	22.50	24.00
Everett, Mass. ....	24.00	24.50	23.50	25.00
Granite City, Ill. ....	23.00	23.00	22.50	23.50
Hamilton, O. ....	23.00	23.00	22.50	.....
Neville Island, Pa. ....	23.00	23.00	22.50	23.50
Provo, Utah .....	21.00	.....	.....	.....
Sharpsville, Pa. ....	23.00	23.00	22.50	23.50
Sparrow's Point, Md. ....	24.00	.....	23.50	.....
Swedeland, Pa. ....	24.00	24.50	23.50	25.00
Toledo, O. ....	23.00	23.00	22.50	23.50
Youngstown, O. ....	23.00	23.00	22.50	23.50

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

### Delivered from Basing Points:

Akron, O., from Cleveland .....	24.39	24.39	23.39	24.89
Baltimore from Birmingham .....	24.78	.....	23.66	.....
Boston from Birmingham .....	24.12	.....	.....	.....
Boston from Everett, Mass. ....	24.50	25.00	24.00	25.50
Boston from Buffalo .....	24.50	25.00	24.00	25.50
Brooklyn, N. Y., from Bethlehem ..	26.50	27.00	.....	.....
Canton, O., from Cleveland .....	24.39	24.39	23.39	24.89
Chicago from Birmingham .....	†23.22	.....	.....	.....
Cincinnati from Hamilton, O. ....	23.24	24.11	23.61	.....
Cincinnati from Birmingham .....	23.06	.....	22.06	.....
Cleveland from Birmingham .....	23.32	.....	22.82	.....
Mansfield, O., from Toledo, O. ....	24.94	24.94	24.44	24.44
Millwaukee from Chicago .....	24.10	24.10	23.60	24.60
Muskegon, Mich., from Chicago, Toledo or Detroit .....	26.19	26.19	25.69	26.69
Newark, N. J., from Birmingham ..	25.15	.....	.....	.....
Newark, N. J., from Bethlehem ..	25.53	26.03	.....	.....
Philadelphia from Birmingham ..	24.46	.....	23.96	.....
Philadelphia from Swedeland, Pa. ..	24.84	25.34	24.34	.....
Pittsburgh district from Neville Island .....	Neville base, plus 69c, 84c. and \$1.24 freight.	.....	.....	.....
Saginaw, Mich., from Detroit .....	25.31	25.31	24.81	25.81

	No. 2 Fdry.	Malle-able	Basic	Besse-mer
St. Louis, northern .....	23.50	23.50	23.00	.....
St. Louis from Birmingham .....	23.12	.....	22.62	.....
St. Paul from Duluth .....	25.63	25.63	.....	26.13

†Over 0.70 phos.  
Low Phos.  
Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., \$28.50, base; \$29.74 delivered Philadelphia.

Gray Forge	Charcoal	
Valley furnace .....	\$22.50 Lake Superior fur. ....	\$27.00
Pitts. dist. fur. ....	22.50 do., del. Chicago .....	30.34
	Lyles, Tenn. ....	26.50

†Silvery  
Jackson county, O., base; 6-6.50 per cent \$28.50; 6.51-7—\$29.00; 7-7.50—\$29.50; 7.51-8—\$30.00; 8-8.50—\$30.50; 8.51-9—\$31.00; 9-9.50—\$31.50; Buffalo, \$1.25 higher.

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

## Refractories

Per 1000 f.o.b. Works, Net Prices	Ladle Brick (Pa., O., W. Va., Mo.)	
Fire Clay Brick	Dry press .....	\$28.00
Super Quality	Wire cut .....	\$26.00
Pa., Mo., Ky. ....	Magnesite	
First Quality	Domestic dead - burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk .....	22.00
Pa., Ill., Md., Mo., Ky. ....	net ton, bags .....	26.00
Alabama, Georgia .....	Basic Brick	
New Jersey .....	Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.	
Second Quality	Chrome brick .....	\$50.00
Pa., Ill., Ky., Md., Mo. ....	Chem. bonded chrome .....	50.00
Georgia, Alabama .....	Magnesite brick .....	72.00
New Jersey .....	Chem. bonded magnesite .....	61.00
Ohio	Fluorspar	
First quality .....	Washed gravel, duty pd., tide, net ton .....	\$25.00-\$26.00
Intermediate .....	Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail .....	20.00
Second quality .....	Do. barge .....	20.00
Malleable Bung Brick	No. 2 lump .....	21.00
All bases .....		
\$56.05		
Silica Brick		
Pennsylvania .....		
Joliet, E. Chicago .....		
Birmingham, Ala. ....		
47.50		
55.10		
47.50		

## Ferroalloy Prices

Ferromanganese, 78-82%, carlots, duty pd. ....	\$120.00	Tenn. 24% \$3 unitage .....	75.00	Ferro-carbon-titanium, 15-18% ti., 6-8% carb., carlots, contr., net ton .....	\$142.50	Silicon Metal, 1% iron, contract, carlots, 2 x ½-in., lb. ....	14.00c
Ton lots .....	130.00	Ferrochrome, 66-70 chromium, 4-6 carbon, etc., lb., contained cr., del carlots .....	11.00c	Do, spot .....	145.00	Do., 2% .....	12.50c
Less ton lots .....	133.50	Do., ton lots .....	11.75c	Do, contract, ton lots .....	145.00	Spot ¼c higher	
Less 200 lb. lots .....	138.00	Do., less-ton lots .....	12.00c	Do, spot, ton lots .....	150.00	Silicon Briquets, contract carloads, bulk, freight allowed, ton .....	\$69.50
Do., carlots del. Pitts. 125.33 (effective on contracts July 1)		67-72% low carbon:		Do, spot .....	160.00	Ton lots .....	79.50
Spiegel Eisen, 19-21% dom.		Car- Ton Less loads lots ton		Do, contract, ton lots .....	160.00	Less-ton lots, lb. ....	3.75c
Palmerton, Pa., spot ..	36.00	2% carb. ....	17.50c 18.25c 18.75c	Do, spot, ton lots .....	165.00	Less 200 lb. lots, lb. ....	4.00c
Do., 26-28% .....	49.50	1% carb. ....	18.50c 19.25c 19.75c	Alsifer, contract carlots, f.o.b. Niagara Falls, lb. ....	7.50c	Spot ¼-cent higher.	
(effective on contracts July 1)		0.10% carb. ....	20.50c 21.25c 21.75c	Do, ton lots .....	8.00c	Manganese Briquets, contract carloads, bulk freight allowed, lb. ....	5.00c
Ferrosilicon, 50% freight allowed, c.l. ....	69.50	0.20% carb. ....	19.50c 20.25c 20.75c	Do, less-ton lots .....	8.50c	Ton lots .....	5.50c
Do., ton lot .....	82.00	Spot ¼c higher		Spot ¼c lb. higher		Less-ton lots .....	5.75c
Do., 75 per cent .....	126.00	Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. ....	0.95	Chromium Briquets, contract, freight allowed, lb. spot carlots, bulk .....	7.00c	Spot ¼c higher	
Do, ton lots .....	142.00	Calcium molybdate, lb. molyb. cont., f.o.b. mill .....	0.80	Do., ton lots .....	7.50c	Zirconium Alloy, 12-15%, contract, carloads, bulk, gross ton .....	\$97.50
Spot, \$5 a ton higher. (contracts on 50 p.c. up \$5 and on 75 p.c., \$9, effective July 1; spot \$5 higher)		Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots .....	\$1.23	Do., less-ton lots .....	7.75c	Do, spot .....	102.50
Silicomanganese, c.l., 2½ per cent carbon .....	103.00	Do., less-ton lots .....	1.25	Do., less 200 lbs. ....	8.00c	(up \$5, effective July 1)	
2% carbon, 108.00; 1%, 118.00		20-25% carbon, 0.10 max., ton lots, lb. ....	1.35	Spot, ¼c higher		34-40%, contract, carloads, lb., alloy .....	14.00c
Contract ton price \$12.50 higher; spot \$5 over contract.		Do, less-ton lots .....	1.40	Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. ....	\$2.50	Do, ton lots .....	15.00c
(contracts up \$15 July 1, with spot \$5 higher)		Spot 5c higher		Do., smaller lots .....	2.60	Do, less-ton lots .....	16.00c
Ferrotungsten, stand., lb. con. del. cars .....	1.90-2.00	Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls .....	\$2.25	Vanadium Pentoxide, contract, lb. contained .....	\$1.10	Spot ¼c higher	
Ferrovannadium, 35 to 40%, lb., cont., 2.70-2.80-2.90		Do., less-ton lots .....	2.30	Do, spot .....	1.15	Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. ....	\$2.60
Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, \$3 unitage, 58.50; electric furn., per ton, c. l., 23-26% f.o.b. Mt. Pleasant,		Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill .....	0.80	Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. ....	84.00c	Do, 100-200 lb. lots ..	2.75
				Do., spot .....	89.00c	Do, under 100-lb. lots ..	3.00
				88% chrome, contract ..	83.00c	Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant .....	80.00c
				Do., spot .....	88.00c		



# WAREHOUSE STEEL PRICES

*Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials*

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets			Cold Rolled Strip	Cold Drawn Bars		
							Hot Rolled	Cold Rolled	Galv. No. 24		Carbon	SAE 2300	SAE 3100
Boston	3.98	3.86	4.86	3.85	3.85	5.66	3.51	4.48	4.66	3.46	4.13	8.63	7.23
New York (Met.)	3.84	3.76	3.76	3.76	3.75	5.56	3.38	4.40	4.05	3.31	4.09	8.59	7.19
Philadelphia	3.85	3.75	4.25	3.55	3.55	5.25	3.35	4.05	4.25	3.31	4.06	8.56	7.16
Baltimore	3.95	4.05	4.45	3.70	3.70	5.25	3.55	....	5.05	....	4.05	....	....
Norfolk, Va.	4.15	4.25	....	3.90	3.90	5.45	3.75	....	5.40	....	4.15	....	....
Buffalo	3.35	3.62	3.62	3.62	3.40	5.25	3.05	4.30	4.00	3.22	3.75	8.15	6.75
Pittsburgh	3.35	3.40	3.40	3.40	3.40	5.00	3.15	....	4.45	....	3.65	8.15	6.75
Cleveland	3.25	3.30	3.30	3.40	3.58	5.18	3.15	4.05	4.42	3.20	3.75	8.15	6.75
Detroit	3.43	3.23	3.48	3.60	3.65	5.27	3.23	4.30	4.64	3.20	3.80	8.45	7.05
Omaha	3.90	3.80	3.80	3.95	3.95	5.55	3.45	....	5.00	....	4.42	....	....
Cincinnati	3.60	3.47	3.47	3.65	3.68	5.28	3.22	4.00	4.67	3.47	4.00	8.50	7.10
Chicago	3.50	3.40	3.40	3.55	3.55	5.15	3.05	4.10	4.60	3.30	3.75	8.15	6.75
Twin Cities	3.75	3.65	3.65	3.80	3.80	5.40	3.30	4.35	4.75	3.83	4.34	8.84	7.44
Milwaukee	3.62	3.53	3.53	3.68	3.68	5.28	3.18	4.23	4.73	3.54	3.88	8.38	6.98
St. Louis	3.62	3.52	3.52	3.47	3.47	5.07	3.18	4.12	4.87	3.41	4.02	8.52	7.12
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	....	5.00	....	4.30	....	....
Indianapolis	3.60	3.55	3.55	3.70	3.70	5.30	3.25	....	4.76	....	3.97	....	....
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	....	5.25	....	4.31	....	....
Chattanooga	3.80	4.00	4.00	3.85	3.85	5.68	3.70	....	4.40	....	4.39	....	....
Tulsa, Okla.	4.44	4.34	4.34	4.33	4.33	5.93	3.99	....	5.71	....	4.69	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.83	3.45	....	4.75	....	4.43	....	....
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	4.80	5.00	4.60	....	....
Houston, Tex.	4.05	6.20	6.20	4.05	4.05	5.75	4.20	....	5.25	....	....	....	....
Seattle	4.00	3.85	5.20	3.40	3.50	5.75	3.70	6.50	4.75	....	....	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	4.75	....	5.75	....	....
Los Angeles	4.15	4.60	4.45	4.00	4.00	6.40	4.30	6.50	5.25	....	5.75	....	....
San Francisco	3.50	4.00	6.00	3.35	3.35	5.60	3.40	6.40	5.15	....	6.80	10.65	9.80

	—SAE Hot-rolled Bars (Unannealed)—				
	1035-1050 Series	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.18	7.50	6.05	5.80	7.90
New York (Met.)	4.04	7.35	5.90	5.65	....
Philadelphia	4.10	7.31	5.86	5.61	8.56
Baltimore	4.10	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.10	5.65	5.40	7.50
Pittsburgh	3.40	7.20	5.75	5.50	7.60
Cleveland	3.30	7.30	5.85	5.85	7.70
Detroit	3.48	7.42	5.97	5.72	7.19
Cincinnati	3.65	7.44	5.99	5.74	7.84
Chicago	3.70	7.10	5.65	5.40	7.50
Twin Cities	3.95	7.45	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.82	7.47	6.02	5.77	7.87
Seattle	5.85	....	8.00	7.85	8.65
Portland, Oreg.	5.70	8.85	8.00	7.85	8.65
Los Angeles	4.80	9.40	8.55	8.40	9.05
San Francisco	5.00	9.65	8.80	8.65	9.30

**BASE QUANTITIES**

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds; 1900-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland, Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in Birmingham.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Kansas City and St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 300-4999 in San Francisco, Portland; any quantity in Twin Cities; 300-1999 in Los Angeles.

Galvanized Sheets: Base, 1500-3499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-4999 in Portland, Seattle, San Francisco; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 1500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; 10 to 24 bundles in Philadelphia.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

## CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, June 20

Export Prices f.o.b. Port of Dispatch—

Domestic Prices at Works or Furnace—

*By Cable or Radio*

*Last Reported*

	British gross tons U. K. ports		Continental Channel or North Sea ports. gross tons		French Francs	Belgian Francs	Reich Mar						
	£ s d	Quoted in dollars at current value	£ s d	**Quoted in gold pounds sterling									
Foundry, 2.50-3.00 Sl.	\$21.30	6 0 0	\$33.23	3 18 0	\$19.70	5 11 0(a)	\$17.18	788	\$31.44	950	\$25.33	63	
Basic bessemer	....	....	....	....	18.57	5 4 6(a)	....	....	29.79	900	27.94	(b) 69.50	
Hematite, Phos. .03-.05	22.19	6 5 0	....	....	5.62	1 11 8	4.91	225	10.92	330	7.64	19	
Billets	....	....	....	....	33.25	9 7 6	25.35	1,163	42.20	1,275	38.79	96	
Standard rails	....	....	....	....	1.76c	11 3 0	1.60c	1,602	2.06c	1,375	2.38c	132	
Merchant bars	....	....	....	....	2.21c	14 0 0††	1.45c	1,454	2.06c	1,375	1.98c	110	
Plates, ¼ in. or 5 mm.	....	....	....	....	1.96c	12 8 0††	1.41c	1,414	2.06c	1,375	1.93c	107	
Plates, ½ in. or 5 mm.	....	....	....	....	1.98c	12 10 6††	1.85c	1,848	2.42c	1,610	2.29c	127	
Sheets, black	....	....	....	....	2.77c	17 10 0‡	2.19c	2,193	2.85c	1,900‡	2.59c	144‡	
Sheets, galv., corr., 24 ga. or 0.5 mm.	....	....	....	....	3.29c	20 16 3	3.59c	3,589	4.80c	3,200	6.66c	370	
Plain wire	....	....	....	....	3.08c	19 10 0	2.34c	2,340	3.00c	2,000	3.11c	173	
Bands and strips	....	....	....	....	2.33c	14 15 0††	1.63c	1,632	2.48c	1,650	2.29c	127	
†British ship-plates. Continental, bridge plates. ‡24 ga. †1 to 3 mm. basic price.													
British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel.													
(a) del. Middlesbrough. ‡s rebate to approved customers. (b) hematite. †Close annealed.													
††Rebate of 1s on certain conditions.													
**Gold pound sterling not quoted. ††No quotations.													

British ferromanganese \$120.00 delivered Atlantic seaboard duty-paid.



# IRON AND STEEL SCRAP PRICES

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

## HEAVY MELTING STEEL

Birmingham, No. 1.	16.00
Bos. dock No. 1 exp.	16.25-16.75
New Eng. del. No. 1	15.75-16.25
Buffalo, No. 1.....	19.50-20.00
Buffalo, No. 2.....	17.50-18.00
Chicago, No. 1.....	18.50-19.00
Chicago, auto, no alloy	17.50-18.00
Cincinnati, dealers.	16.00-16.50
Cleveland, No. 1.....	19.00-19.50
Cleveland, No. 2.....	18.00-18.50
Detroit No. 1.....	†16.00-16.50
Detroit No. 2.....	†15.00-15.50
Eastern Pa., No. 1.	20.00-20.50
Eastern Pa., No. 2.	18.50-19.00
Federal, Ill., No. 2.	15.50-16.00
Granite City, R. R. No. 1.	16.50-17.00
Granite City, No. 2.	15.25-15.75
Los Ang., No. 1, net	13.00-13.50
Los Ang., No. 2, net	12.00-12.50
N. Y. dock No. 1 exp.	16.00
Pitts., No. 1 (R. R.)	21.50-22.00
Pittsburgh, No. 1 ..	20.50-21.00
Pittsburgh, No. 2 ..	19.50-20.00
St. Louis, No. 1.....	16.50-17.00
St. Louis, No. 2.....	15.25-15.75
San Fran., No. 1, net	13.00-13.50
San Fran., No. 2, net	12.00-12.50
Seattle, No. 1.....	16.00
Toronto, dirs., No. 1	11.00
Valleys, No. 1.....	20.50-21.00

## COMPRESSED SHEETS

Buffalo, new.....	17.00-17.50
Chicago, factory.....	17.50-18.00
Chicago, dealers.....	15.50-16.00
Cincinnati, dealers.	15.25-15.75
Cleveland.....	18.50-19.00
Detroit.....	†17.50-18.00
E. Pa., new mat.....	20.00-20.50
E. Pa., old mat.....	16.50-17.00
Los Angeles, net.....	10.00-10.50
Pittsburgh.....	20.50-21.00
St. Louis.....	14.00-14.50
San Francisco, net.....	10.00-10.50
Valleys.....	19.00-19.50

## BUNDLED SHEETS

Buffalo, No. 1.....	17.50-18.00
Buffalo, No. 2.....	15.50-16.00
Cleveland.....	15.50-16.00
Pittsburgh.....	19.50-20.00
St. Louis.....	12.50-13.00
Toronto, dealers.....	9.75

## SHEET CLIPPINGS, LOOSE

Chicago.....	13.00-13.50
Cincinnati, dealers.	11.00-11.50
Detroit.....	†14.00-14.50
St. Louis.....	11.50-12.00
Toronto, dealers.....	9.00

## BUSHELING

Birmingham, No. 1.	15.00
Buffalo, No. 1.....	17.50-18.00
Chicago, No. 1.....	16.50-17.00
Cincin., No. 1 deal.	12.00-12.50
Cincin., No. 2 deal.	6.50- 7.00
Cleveland, No. 2...	12.00-12.50
Detroit No. 1 new.	†16.50-17.00
Valleys, new, No. 1	18.00-18.50
Toronto, dealers....	5.50- 6.00

## MACHINE TURNINGS (Long)

Birmingham.....	5.00
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Buffalo.....	12.00-12.50
Chicago.....	12.00-12.50
Cincinnati, dealers.	8.00- 8.50
Cleveland, no alloy.	11.50-12.00
Detroit.....	†10.50-11.00
Eastern Pa.....	13.50
Los Angeles.....	4.00- 5.00
New York.....	†8.50
Pittsburgh.....	14.50-15.00
St. Louis.....	9.00- 9.50
San Francisco.....	5.00
Toronto, dealers....	7.00- 7.25
Valleys.....	11.50-12.00

## SHOVELING TURNINGS

Buffalo.....	13.00-13.50
Cleveland.....	12.00-12.50
Chicago.....	12.50-13.00
Chicago, spl. anal.	15.50-16.00
Detroit.....	†12.00-12.50
Pitts., alloy-free ..	16.50-17.00

## BORINGS AND TURNINGS

<i>For Blast Furnace Use</i>	
Boston district.....	†5.75- 6.25
Buffalo.....	11.50-12.00
Cincinnati, dealers.	7.00- 7.50
Cleveland.....	12.00-12.50
Eastern Pa.....	12.00-12.50
Detroit.....	†10.50-11.00
New York.....	†7.50- 8.00
Pittsburgh.....	11.50-12.00
Toronto, dealers....	6.75

## AXLE TURNINGS

Buffalo.....	16.00-16.50
Boston district.....	†9.00- 9.50
Chicago, elec. fur....	17.50-18.00
East. Pa. elec. fur....	17.50-18.00
St. Louis.....	12.50-13.00
Toronto.....	6.00- 6.50

## CAST IRON BORINGS

Birmingham.....	8.00
Boston dist. chem....	†8.50- 8.75
Buffalo.....	11.50-12.00
Chicago.....	10.75-11.25
Cincinnati, dealers.	7.00- 7.50
Cleveland.....	12.00-12.50
Detroit.....	†11.00-11.50
E. Pa., chemical.....	14.50-15.00
New York.....	†8.00- 8.50
St. Louis.....	8.75- 9.25
Toronto, dealers....	6.75

## RAILROAD SPECIALTIES

Chicago.....	21.50-22.00
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## ANGLE BARS—STEEL

Chicago.....	21.00-21.50
St. Louis.....	18.50-19.00

## SPRINGS

Buffalo.....	23.00-24.00
Chicago, coil.....	22.50-23.00
Chicago, leaf.....	22.00-22.50
Eastern Pa. crops....	25.00
Pittsburgh.....	25.50-26.00
St. Louis.....	20.00-20.50

## STEEL RAILS, SHORT

Birmingham.....	17.00
Buffalo.....	23.00-24.00
Chicago (3 ft.).....	21.50-22.00
Chicago (2 ft.).....	22.50-23.00
Cincinnati, dealers.	23.00-23.50
Detroit.....	†22.50-23.00
Pitts., 3 ft. and less	25.50-26.00
St. L., 2 ft. & Less..	21.50-22.00

## STEEL RAILS, SCRAP

Birmingham.....	15.50
Boston district.....	†14.50-15.00

Buffalo.....	19.00-19.50
Chicago.....	18.50-19.00
Cleveland.....	22.00-23.00
Pittsburgh.....	22.00-22.50
St. Louis.....	†19.00-19.50
Seattle.....	18.00-18.50

## PIPE AND FLUES

Chicago, net.....	12.50-13.00
Cincinnati, dealers.	12.50-13.00

## RAILROAD GRATE BARS

Buffalo.....	13.50-14.00
Chicago, net.....	13.00-13.50
Cincinnati, dealers.	11.50-12.00
Eastern Pa.....	17.00-17.50
New York.....	†12.50-13.00
St. Louis.....	13.50-14.00

## RAILROAD WROUGHT

Birmingham.....	14.00
Boston district.....	†9.50-10.00
Eastern Pa., No. 1..	20.00-21.00
St. Louis, No. 1.....	†14.00-14.50
St. Louis, No. 2.....	15.25-15.75

## FORGE FLASHINGS

Boston district.....	†11.00-11.50
Buffalo.....	17.50-18.00
Cleveland.....	18.00-18.50
Detroit.....	†15.75-16.25
Pittsburgh.....	17.50-18.00

## FORGE SCRAP

Boston district.....	†7.00
Chicago, heavy.....	22.50-23.00

## LOW PHOSPHORUS

Cleveland, crops.....	24.50-25.00
Eastern Pa., crops ..	26.00-26.50
Pitts., billet, bloom, slab crops.....	25.50-26.00

## LOW PHOS. PUNCHINGS

Buffalo.....	21.50-22.00
Chicago.....	20.50-21.00
Cleveland.....	20.50-21.00
Eastern Pa.....	25.00-25.50
Pittsburgh.....	24.50-25.00
Seattle.....	15.00
Detroit.....	†18.00-18.50

## RAILS FOR ROLLING

5 feet and over

Birmingham.....	16.50
Boston.....	†15.75-16.00
Chicago.....	22.00-22.50
New York.....	†18.00-18.50
Eastern Pa.....	23.00-23.50
St. Louis.....	†21.00-21.50

## STEEL CAR AXLES

Birmingham.....	18.00
Boston district.....	†18.00-18.50
Chicago, net.....	22.50-23.00
Eastern Pa.....	25.00-25.50
St. Louis.....	†21.50-22.00

## LOCOMOTIVE TIRES

Chicago (cut).....	22.00-22.50
St. Louis, No. 1.....	†18.00-18.50

## SHAFTING

Boston district.....	†18.50-19.00
New York.....	†19.50-20.00

Eastern Pa.....	24.50-25.00
St. Louis, 1 1/4-3 3/4"	19.00-19.50

## CAR WHEELS

Birmingham, iron... 13.00
Boston dist., iron... †14.75-15.00
Buffalo, steel..... 23.00-23.50
Chicago, iron..... 18.50-19.00
Chicago, rolled steel 22.00-22.50
Cincin., iron, deal... 18.50-19.00
Eastern Pa., iron... 22.00-22.50
Eastern Pa., steel .. 25.00
Pittsburgh, iron... 20.50-21.00
Pittsburgh, steel... 25.50-26.00
St. Louis, iron..... 17.50-18.00
St. Louis, steel..... 20.00-20.50

## NO. 1 CAST SCRAP

Birmingham.....	15.50
Boston, No. 1 mach.†	16.50-17.00
N. Eng. del. No. 2..	15.00-15.50
N. Eng. del. textile	18.75-20.00
Buffalo, cupola....	18.50-19.00
Buffalo, mach.....	20.00-20.50
Chicago, agri. net... 15.00-15.50	
Chicago, auto net... 17.00-17.50	
Chicago, railroad net	16.00-16.50
Chicago, mach. net.. 16.50-17.00	
Cincin., mach. deal.. 20.00-20.50	
Cleveland, mach.... 22.50-23.00	
Detroit, cupola, net.†	17.00-17.50
Eastern Pa., cupola.	22.00-22.50
E. Pa., No. 2 yard..	19.00
E. Pa., yard fdry... 19.00-19.50	
Los Angeles.....	16.50-17.00
Pittsburgh, cupola.. 20.50-21.00	
San Francisco..... 14.50-15.00	
Seattle.....	12.00-14.00
St. L., agri. mach... 18.00-18.50	
St. L., No. 1 mach.. 19.00-19.50	
Toronto, No. 1 mach., net dealers	18.00-18.50

## HEAVY CAST

Boston dist. break.. †	15.00-15.50
New England, del... 15.50-16.00	
Buffalo, break..... 16.50-17.00	
Cleveland, break, net	15.50-16.00
Detroit auto net... †	17.50-18.00
Detroit break..... †	16.00-16.50
Eastern Pa.....	21.00
Los Ang., auto, net.. 13.00-14.00	
New York break... †	16.50-17.00
Pittsburgh, break... 17.50-18.00	

## STOVE PLATE

Birmingham.....	10.00
Boston district.....	†11.00-11.50
Buffalo.....	16.00-16.50
Chicago, net.....	11.50-12.00
Cincinnati, dealers.	12.00-12.50
Detroit, net.....	†11.00-11.50
Eastern Pa.....	17.00-17.50
New York fdry.....	†12.75
St. Louis.....	†12.50-13.00
Toronto dealers, net	12.00

## MALLEABLE

New England, del... 21.50-22.00	
Buffalo.....	23.00-23.50
Chicago, R. R.....	21.50-22.00
Cincin. agri., deal.. 16.00-16.50	
Cleveland, rail..... 22.50-23.00	
Eastern Pa., R. R... 23.00-23.50	
Los Angeles.....	12.50
Pittsburgh, rail.... 24.00-24.50	
St. Louis, R. R.... 19.50-20.00	

## Ores

<b>Lake Superior Iron Ore</b>	
Gross ton, 51 1/4 %	
<i>Lower Lake Ports</i>	
Old range bessemer ..	\$4.75
Mesabi nonbessemer ..	4.45
High phosphorus.....	4.35
Mesabi bessemer.....	4.60
Old range nonbessemer.	4.60

<b>Eastern Local Ore</b>	
Cents, unit, del. E. Pa.	
Foundry and basic	10.00
56-63%, contract..	
<b>Foreign Ore</b>	
Cents per unit. c.i.f. Atlantic ports	
Manganiferous ore.	
45-55% Fe. 6-10%	
Mn. (asking price; no sales).....	19.00
North African low	

phos. (asking price; no sales)..	19.00-20.00
Spanish, No. African basic, 50 to 60% (asking price; no sales).....	19.00-20.00
Chinese wolframite, short ton unit, duty paid.....	\$23.50-24.00
Scheelite, imp. ....	\$25.00
Chrome ore, Indian, 48% gross ton, cif.	\$28.00-30.00

## Manganese Ore

<i>Including war risk but not duty, cents per unit cargo lots.</i>	
Caucasian, 50-52% ..	nom.
So. African, 50-52% ..	57.00
Indian, 49-50%.....	nom.
Brazilian, 46%.....	50.00-53.00
Cuban, 50-51%, duty free.....	71.00-73.00
<b>Molybdenum</b>	
Sulphide conc., lb., Mo. cont., mines ..	\$0.75



# Sheets, Strip

Sheet & Strip Prices, Pages 80, 81

**Pittsburgh**—Sheet mill operations are moving upward rapidly as local mills attempt to clear low-priced tonnage by the end of the month. It is apparent there will be some hold-overs on this, but the amounts will be relatively small. Meanwhile, miscellaneous manufacturers have been releasing at a fair rate and some export business has been booked. Mill operating rate is estimated at 70 per cent, with galvanizing lines running at 60 per cent.

**Cleveland**—Sheet and strip specifications continue active, a large part of them being against low-priced contracts. Specification deadline for the latter has been extended to June 30, with shipments to be completed by July 31. Deliveries on most flat-rolled products are three to four weeks.

**Chicago** — Releases continue heavy. New buying is light, but prices are firm at published quotations. First 1941 model automotive requirements are beginning to be felt, with release of a substantial strip tonnage by a large Detroit interest late last week.

**Boston**—Cold strip orders are heavier, with more advance buying. Some consumers are asking protection through the remainder of the year. Producers in several instances are ear-marking alloy billets for later estimates of finished material to be shipped at open prices. New sheet demand is light, activity being centered around low-priced tonnage shipments. Inventories with small tank builders and other users are rather substantial, although consumption is gaining in most industrial lines.

**New York** — Sheet sellers report little change in volume. While some consumers have been adding to inventories, this has been offset by seasonal declines in some lines and by easing in limitations on shipment of orders booked at concessions late in April. Most producers are now willing to accept specifications against these orders until the end of the month for shipment by July 31.

Acceptance of late releases against low-priced blanket cold strip contracts will prevent shipment of all this tonnage by June 30 and deliveries will be made in July. Buying has developed in good volume with consumers seeking more advanced coverage. Early improvement is also expected in automotive buying which has been lagging for several weeks.

**Philadelphia** — A large automo-



● Shaft 57 feet long, largest diameter 11 3/4 inches, weight 17,300 pounds — forged and rough machined by Standard

**STANDARD** is equipped to produce steel forgings and castings of any size and shape to suit your requirements. . . . The steel used in Standard's forgings and castings is acid open hearth, produced in our own furnaces under close metallurgical control.

CASTINGS • FORGINGS • WELDLESS RINGS • WROUGHT STEEL WHEELS

**STANDARD STEEL WORKS**

Division of THE BALDWIN LOCOMOTIVE WORKS  
P H I L A D E L P H I A





tive interest has started work on 1941 Studebaker bodies but only preliminary runs on other makes. General Motors has held up releases on truck fenders for a French order. Miscellaneous sheet orders are holding up well. Shipments are heavy to meet the July 31 deadline on low-priced tonnage.

**Cincinnati** — Specifications for sheets call for capacity mill schedules. Some carryover of low-priced tonnage into third quarter is predicted, attributed to rearranging of

schedules to meet urgent calls for material. Little export business likely to be affected by recent war developments has been rolled. Buying for third quarter, principally on account of domestic industries, is expanding.

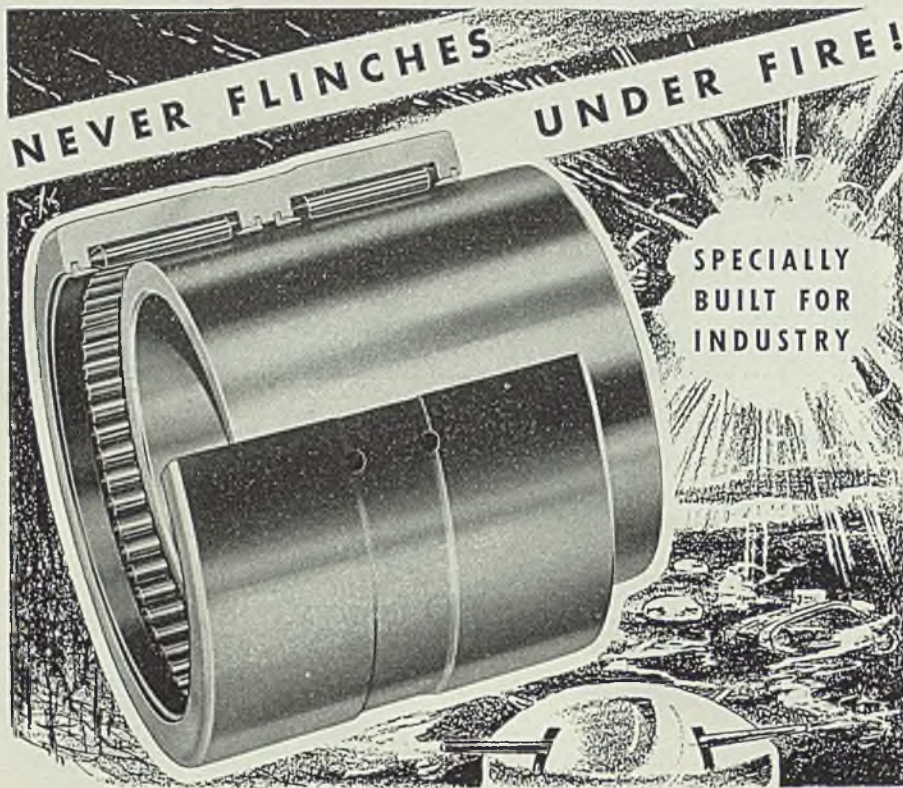
**St. Louis** — Sheet buying is well maintained, and specifications steadily increasing, though not sufficiently to tax mill schedules. Heavier orders by warehouses figure in the general expansion in recent business. Galvanized material is rela-

tively less active at the moment than other descriptions.

**Buffalo** — Sheet and strip releases are in increased volume. Mills are rolling at a capacity pace on a five-day week basis. In addition to active buying by diversified domestic consumers exports to Canada are substantially ahead of 1939.

**Birmingham, Ala.** — Sheet demand and releases are heavier and production is somewhat over 80 per cent.

**Toronto, Ont.** — Sheet demand continues high, with most sales for war business. Canadian mills now are booked almost solid for third quarter. The Canadian automotive industry has practically closed its lines on production of passenger cars, turning to truck production and sheet demand on this account has gained in volume.



## AMERICAN *Full-Roller* BEARING

Here's a bearing that dares you to put it to the severest test you can think of, in the most exacting bearing application you have in your plant. Like other American Heavy-Duty Bearings, the Full-Roller type has never been found wanting when super bearing performance is required. Pioneered by American, and proved in countless installations, this bearing will "fill the bill" in your next full-roller application. Our specialized engineering experience is at your service.



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**AMERICAN**  
*Heavy-Duty* ROLLER BEARINGS

## Plates

Plate Prices, Page 80

**Pittsburgh** — Construction needs, government shipbuilding and the national defense situation, keep plate mill backlogs high. According to production men here, it may be necessary later on to press continuous sheet mills into production of plates.

**Cleveland** — Plate business tends upward, with mill backlogs growing and deliveries extended to three weeks or more. Moderate orders have been placed for railroad equipment repairs. Except for 1100 units for the Chesapeake & Ohio little freight car business is active, but some improvement in car building and repairs is looked for the next few months.

**Chicago** — Plate demand increased notably last week. Deliveries have become more extended and requests for future coverage more urgent. Fabricators have increased needs. Considerable government work has helped bolster new buying, but ordinary domestic business, such as tank, railroad car, oil industry, and equipment manufacture, also is better.

**Boston** — Plate buying maintains recent improvement with the outlook considerably enhanced by additional shipbuilding contracts and miscellaneous industrial building needs. Floor plate demand is also sharing the moderate gains. Boiler and structural shop buying, however, remains spotty and light and railroads are slow to increase releases.

**New York** — Eastern plate sellers, reporting a general improvement in buying, assert their deliveries are being gradually extended. Whereas early in the month they were mak-



ing deliveries within a week, they now are unable to do much under two weeks and at least one seller reports an average of two to three weeks. Ship work continues a feature, the latest development involving the award of three tankers to the Sun Shipbuilding & Dry Dock Co., Chester, Pa., by the United States maritime commission. They are to be built for affiliates of the Keystone Tankship Corp.

**Philadelphia** — Sun Shipbuilding Co. will require 15,000 tons of plates, shapes and bars for three additional ships for the Keystone lines. Baldwin Locomotive Works has yet to distribute orders for 700 tons of plates, for 12 locomotives for the Western Maryland. The Virginian has distributed 6800 tons of plates with several mills, for its car program. Railroad buying has increased, including revived interest by the Pennsylvania. France placed 30,000 tons of plates just before capitulating but none was rolled and it is understood Great Britain will not take over this tonnage.

**Birmingham, Ala.**—Miscellaneous plate demand is exceptionally good, especially from tank manufacturers. Shipbuilding and sundry smaller work have held the output at a remarkably steady pace for weeks, close to capacity.

**Seattle** — Preliminary contracts have been placed with local interests for Richfield Oil Co.'s proposed Seattle marine storage terminals. No announcement has been made covering awards for fabricating 11 tanks, 500,000 barrels, but it is expected this business will shortly be given to California plants.

**San Francisco**—The plate market was active and 2810 tons were placed, bringing the total for the year to 32,593 tons, compared with 17,408 tons for the same period a year ago. California Corrugated Culvert Co. secured 1800 tons for a 60-mile pipe line for Calaveras Cement Co. Interest centers around opening of bids June 25 on 3300 to 6100 tons for a welded steel pipe line for the Los Angeles water district.

### Plate Contracts Placed

1800 tons, 8-inch, 10 gage sheets, 60-mile pipe line Calaveras Cement Co., Calif., to California Corrugated Culvert Co., Berkeley, Calif.

710 tons, 195 mooring buoys, schedule 1706, navy department, Tiburon, Calif., to Western Pipe & Steel Co., San Francisco.

100 tons, seven smokestacks, specification 3412, water and power department, Los Angeles to Southwest Welding & Engineering Co., Alhambra, Calif.

### Plate Contracts Pending

803 tons, schedule 4105, Panama Canal, C. Z.; bids opened.

354 tons, armor plate, chief. bureau of



*Jessop sales are soaring*

## NEW PLANT EQUIPMENT INSTALLED . . . . . PRODUCTION CAPACITY GREATLY INCREASED

**O**RDERS for JESSOP STEELS are coming in fast these days . . . and the mills are busy rolling tons of bars, sheets and plates.

Despite the increased demands on production, shipments are being made with clock-like regularity. Nor is one pound of steel shipped that does not measure up to the highest standards of quality.

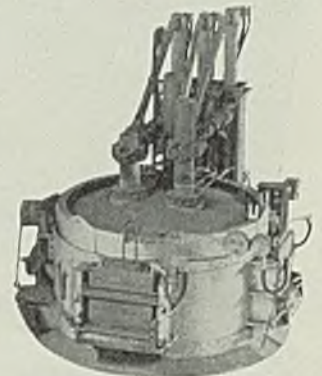
This has been made possible by Jessop's carefully planned expansion program, whereby production capacity has been greatly increased. Examples of new equipment now in operation are illustrated at the right.

Furthermore, the Jessop sales engineering staff has been recently enlarged . . . assuring prompt servicing of all accounts.

Let us quote on your requirements for tool steels, alloy steels, stainless steels, composite steels and specialties. All orders promptly filled . . . whether you order by the pound, or in tonnage lots.

JESSOP STEEL CO., 584 Green St., Washington, Pa.. (Established 1901). Representatives in principal industrial areas.

*"JESSOP Sets Standards in Fine Quality STEELS"*



ELECTRIC FURNACES



SHEET AND PLATE POLISHER



PICKLING AND PLATING TANKS

**Jessop Steels of America**

**CARBON- HIGH SPEED- SPECIAL ALLOY-  
STAINLESS- and COMPOSITE STEELS**



ordnance, navy department, spec. 240, bids July 10, Washington.

300 tons, 55,000-bbl. tank, Southern Pacific Co., San Francisco; bids opened.

100 tons, all-welded 20,000-barrel tank for gasoline storage, with floating pan type roof, Panama, spec. 4107; bids June 27, Washington.

100 tons, 300,000-gallon elevated steel tank, piping and accessories, inv. 6910-20, constructing quartermaster, Southeast Air Depot, Mobile, Ala.; bids July 9.

Unstated tonnage, 250,000-gallon elevated steel tank and tower, veterans' hospital, Marion, Ill.; bids July 16, construction service, veterans' administration, Washington.

## Bars

Bar Prices, Page 80

**Pittsburgh**—Bar mills have had considerable French business on the books, particularly in cold-finished. While work has been suspended on some of this, for the most part orders have gone through to maintain production on these orders and get them out as rapidly as possible. Meanwhile, specifications from neutrals and from the domestic market continue to increase and it is ap-

parent that current output is falling behind orders.

**Cleveland**—Bar demand is heavy despite a letdown in automotive needs. Backlogs are accumulating more slowly than was true last fall, and with deliveries on carbon material generally available in less than four weeks, buyers are not being stampeded into extensive forward coverage. However, some anticipatory demand and stocking is indicated.

**Chicago**—Buying increased the past week. Producers note a tendency to enlarge stocks in order not to risk possible future shortages. Prices remain firm. Government requirements, noted indirectly, are a prominent part of current domestic buying. Farm machinery needs continue among the most prominent, as tractor and combine production is high. Forgers are operating slightly lower but are expected to speed up when 1941 auto model production gets underway.

**Boston**—For chain-making and heavier government shop needs demand for alloy bars is mounting, new inquiry including 751 tons of nickel-steel bars, Boston navy yard, closing June 25. Machine tool builders and shipyards are increasing specifications and miscellaneous private buying also shows gains. Deliveries on some special finishes of alloys are further extended. Demand for tool and drill steel is also improving, as are general marine hardware requirements.

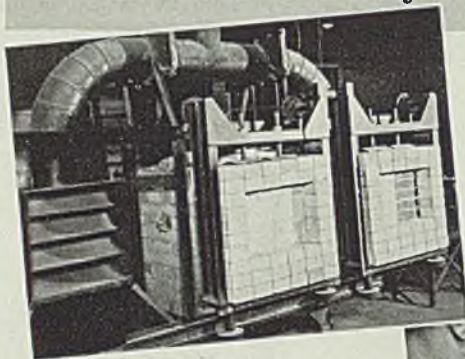
**New York**—Commercial bar deliveries are steadily becoming more extended. Most producers can offer little under four weeks on hot carbon and cold-drawn carbon grades and under six to seven weeks on alloy bars. Where special heat treatment is necessary, deliveries run much further, 15 weeks or more in some cases.

Machine tool specifications continue outstanding both in point of volume and dollar value; the airplane equipment industry is consuming substantial amounts, especially in point of dollar value, and government shop specifications continue to expand, as they start operating on longer schedules.

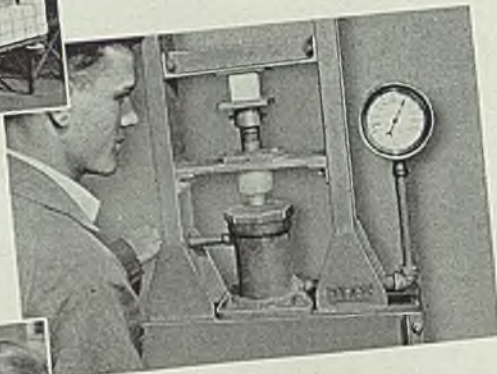
**Philadelphia**—Deliveries on carbon bars have been extended to five weeks and on all other grades six to eight weeks. Demand from machine tool builders, bearing makers, material handling manufacturers and forge shops is fairly active. Inquiries are reported pending through district forge shops for 5000 to 20,000 tons of 4½-inch shell rounds for the United States. England is inquiring for 12-inch shells requiring 75,000 tons of billets on which a district locomotive builder

## These 4 Tests Prove ARMSTRONG'S BRICK STAND UP

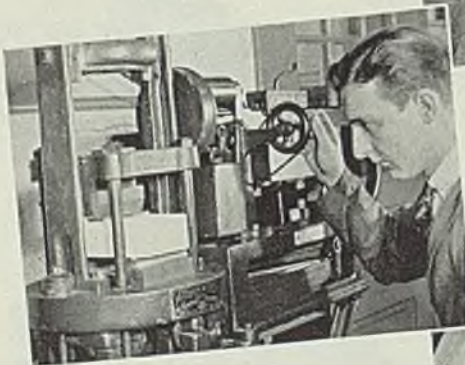
Compare this performance record with that of any other brick



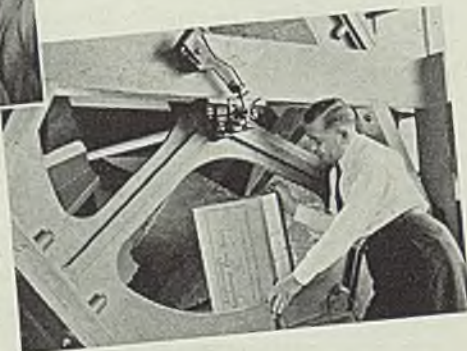
*Left—SPALLING RESISTANCE: The unusually high spalling resistance of Armstrong's Brick is proved in this test which subjects panels of brick alternately to 2000° F. and 1400 c.f.m. of air at 70° F. 10 times in 10-minute cycles following a 24-hour pre-heat at recommended top service temperature for the brick.*



*Right—COMPRESSIVE STRENGTH: Armstrong's Brick are tested in this Olsen machine, which shows they have exceptionally high crushing strength. Heavy-duty brick resist pressures up to 430 pounds per square inch—assurance that Armstrong's Brick will stand up in your furnaces.*



*Left—FLEXURAL STRENGTH: Armstrong's Insulating Fire Brick are tested in this Olsen breaking strength machine to assure uniformly high quality and dependable, lasting performance in your plant. In this test, Armstrong's Brick are subjected to pressures up to 225 pounds per square inch.*



*Right—SHIPPING STRENGTH: In the Kress tumbling barrel test, actual shipping and handling conditions are simulated by repeated dropping of a full carton of Armstrong's Insulating Fire Brick on every side, corner, and edge. Recently a shipment of 160,000 Armstrong's Brick was delivered with only 100 broken.*

FIVE types of Armstrong's Brick are available for service at from 1600° F. to 2600° F. For literature, write to Armstrong Cork Company, Building Materials Division, 985 Concord Street, Lancaster, Pa.



**Armstrong's  
HIGH TEMPERATURE  
INSULATION**



is figuring. It is understood the same interest has taken an order from Great Britain for six-inch shells requiring 10,000 tons of steel.

**Buffalo**—Brisk demand for bars from domestic and export sources is holding rolling schedules of mills as close to capacity as steel supplies permit. Some mills are working beyond the customary five-day week.

**Toronto, Ont.** — While Canadian mills are not rushed with merchant bar orders, demand is steady, with indications of early improvement. Tool and diemakers have been placing larger orders recently and third quarter commitments are expected to be ahead of those for last quarter.

## Pipe

Pipe Prices, Page 81

**Pittsburgh**—Business is increasing in all lines of pipe, except oil country goods, which are apparently stable on the level of entire first half. Production is moving up in an attempt to keep pace with new buying, both in standard pipe and in mechanical tubing.

**New York** — Allocation of 13,280 tons of 4 to 20-inch cement-lined cast pipe, has been made to four eastern foundries by the department of purchase, yard stocks for New York city, on which bids recently closed. Buying is light and in small lots with utilities placing few orders. Export demand continues substantial.

**Birmingham, Ala.** — Pipe production is heavier. Output includes municipal and utility needs and some increase in export tonnage, making prospects for the next few months comparatively good.

**Seattle**—Business is slow, inquiries as a rule less than 100 tons. Cle Elum, Wash., which awarded 350 tons of French cast iron to a Seattle house, has sanctioned a change to transite as war conditions make it impossible to ship from Europe. District 20, King county, Wash., will open bids June 25 for 5000 feet of 3-inch steel pipe and valves.

**San Francisco** — Awards of cast iron pipe aggregated only 444 tons, bringing the year's aggregate to 15,084 tons as compared with 16,374 tons for the corresponding period in 1939. Bids open this week on 8300 tons of large size centrifugal cast pipe for the metropolitan water district, Los Angeles.

## Cast Pipe Placed

1650 tons, 8 and 12-inch, Washington, to United States Cast Pipe Co., Burling-

ton, New Jersey.  
1200 tons, mainly 6 and 8-inch, Lynnfield, Mass., to United States Cast Iron Pipe Co., Burlington, N. J.  
200 tons, small sizes, Swampscott, Mass., to Donaldson Iron Works, Emaus, Pa.  
180 tons, 4 to 8-inch, Sacramento, Calif., to American Cast Iron Pipe Co., Birmingham, Ala.  
175 tons, 8-inch, Boston, to Warren Pipe & Foundry Co., Everett, Mass.

## Cast Pipe Pending

510 tons, 6-inch, San Francisco; bids June 28.  
327 tons, 4 to 12-inch, Class 250, San Bernardino, Calif.; bids opened.

## Wire

Wire Prices, Page 81

**Pittsburgh** — Mill operations increase slowly as domestic and foreign specifications improve. Increase is being felt in both merchant and manufacturers' products. Prices are firm in all products, including the secondary market, with delivery the prime consideration.

**Chicago**—Business shows further expansion but in some quarters volume still is not up to earlier expect-

**Safe Handling**

The super-stamina of Yellow Strand is common knowledge in steel mills and foundries. Now, we're braiding this invincible wire rope into slings—the last word in flexibility, kink resistance, safety, durability.

Yellow Strand Wire Rope Plaited Safety Slings\* are "soft"—handle highly finished steel rolls without damage. They hold irregular loads snugly, handle heaviest castings safely.

Many types and constructions and a wide range of fittings are available; or our engineers will design a Yellow Strand Plaited Safety Sling for your exact requirements.

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## Yellow Strand Plaited Safety Slings

\*Murray Patents: U.S. Patents 1475859, 1524671; Canadian Patents 252874, 258068.



tations. Makers of farm equipment present consistent wire needs. Rural demand is improving with betterment in weather.

**Boston**—Incoming wire orders, notably specialties and manufacturers' wire, surpass shipments, with finishing operations close to 85 per cent of capacity in some departments. Demand has made additional improvements and most tonnage is for relatively prompt delivery.

**New York**—Continued improvement in wire buying embraces a wide range of products with special-

ties and manufacturers' wire in the van. Recent gains in spring wire are maintained with no slackening in rope requirements, marine buying being notable. Backlogs are heavier despite increasing finishing operations. Most new tonnage is for prompt delivery, although some consumers are seeking forward coverage.

**Birmingham, Ala.** — Virtually all specifications in wire are in consistent demand. Releases are brisk, although some further increase is expected in the next few weeks.

## Rails, Cars

Track Material Prices, Page 81

Railroad activity is increasing, orders for 2549 cars being distributed last week, the Nickel Plate leading with 875 cars, 300 of which are light-weight welded-riveted type box cars. Union Tank Line has placed 125 tanks for underframes previously ordered. Chesapeake & Ohio issued inquiries last week for 1000 freight cars and 100 cabooses. Nickel Plate placed 3800 tons of 112-pound rails with three producers, for early delivery.

### Car Orders Placed

Baltimore & Ohio, 100 seventy-ton hoppers, to own shops.

Cambria & Indiana, 200 fifty-ton hopper cars, to Bethlehem Steel Co.'s plant at Johnstown, Pa.

Central of Georgia, fifteen 70-ton covered hopper cars, to Pullman-Standard Car Mfg. Co., Chicago.

Chief of engineers, war department, Washington, 50 tank cars, 10,000-gallon capacity each, to American Car & Foundry Co., \$132,350 total; bids June 6, inv. 183.

Gulf, Mobile & Northern, 250 hoppers, to Pullman-Standard Car Mfg. Co., Chicago; previously reported as ordered by Great Northern.

Mobile & Ohio, 1000 box cars to American Car & Foundry Co., New York, 250 hoppers to Pullman-Standard Car Mfg. Co., Chicago.

Nickel Plate, 300 fifty-ton light-weight welded-riveted box cars, to American Car & Foundry Co., for its shops at Berwick, Pa.

Nickel Plate, 575 cars; fifty 70-ton low-side drop-end gondolas, seventy-five 50-ton flat cars, to Bethlehem Steel Co., Bethlehem, Pa.; 250 fifty-ton low-side drop-end gondolas, to Pullman-Standard Car Mfg., Michigan City, Ind.; 200 fifty-ton low-side drop-end gondolas, to General American Transportation Corp., Chicago.

Phelps Dodge Corp., four dump cars, to Differential Steel Car Co., Findlay, O.

Seaboard Airline, fifty 70-ton hopper cars, to Pullman-Standard Car Mfg. Co., Chicago.

Union Tank Car Co., 125 tanks (for which underframes have been previously let), 75 going to American Car & Foundry Co., New York, 25 to Blaw Knox Co., Pittsburgh, and 25 to Struthers-Wells Co., Warren, Pa.

Wabash, five 70-ton hopper cars, to American Car & Foundry Co., New York.

### Car Orders Pending

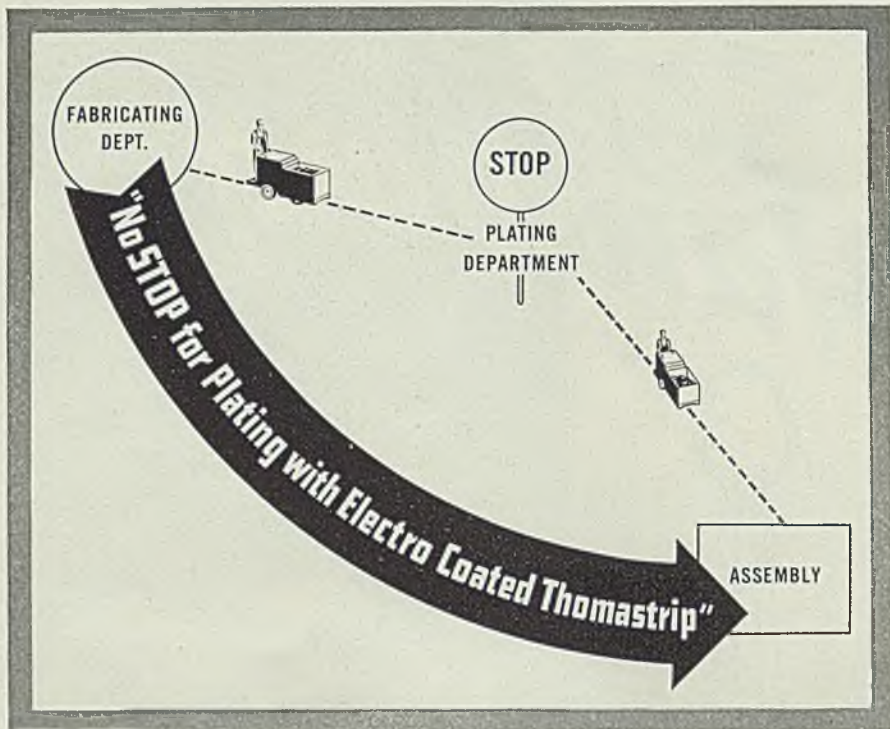
Chesapeake & Ohio, 900 fifty-ton, 40-foot box cars; 100 fifty-ton, 50-foot box cars; 100 cabooses.

Eastern Gas & Fuel Associates, Boston, fifty 50-ton hopper cars; bids asked. Detroit, Toledo & Ironton, fifty 70-ton covered hopper cars, bids asked.

### Locomotives Placed

The E. de F. de Goyaz, Brazil, one 4-0-0 type locomotive, to Baldwin Locomotive Works, Eddystone, Pa.

Guayaquil & Quito, Ecuador, two 2-8-0



Less Handling of Parts With

**ELECTRO COATED** **Thomas Strip**  
COLD ROLLED STRIP STEEL

Bright Finish Uncoated and Electro Coated With Nickel, Brass, Copper, Bronze, Zinc, and Tin.



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When you use electro coated Thomastrip, plating operations in your plant may be entirely eliminated. After the parts are formed they move directly to the assembly department, uninterrupted by costly handling and delays for plating. One or more of the many Thomastrip electro coated finishes may prove profitable to you. They will not flake nor peel.

**THE THOMAS STEEL CO.**  
SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL  
WARREN, OHIO



type steam locomotives, to Baldwin Locomotive Works, Eddystone, Pa.

## Locomotives Pending

Alaska railroad, one Pacific type locomotive; bids June 25, purchasing agent, department of interior, Washington.

## Rail Orders Placed

Nickel Plate, 3800 tons, 112-pound rail; 2470 tons to Carnegie-Illinois Steel Corp., Chicago; 646 tons, to Inland Steel Co., Chicago; 684 tons, to Bethlehem Steel Co., Bethlehem, Pa.

## Shapes

Structural Shape Prices, Page 80

**Pittsburgh** — Construction projects, both private and public, continue to come out in good volume. Current tonnages pending are as heavy as in any week in recent years. Expanding industry as a result of orders from abroad and defense needs accounts for a large part of the new industrial construction.

**Cleveland**—Small industrial jobs are numerous, and shape mill backlogs are growing. Deliveries range up to five weeks for special sections, less for standard shapes. The Cuyahoga county road program, bond issue for which was recently approved, will get under way shortly and will take an estimated 35,000 tons of steel.

**Chicago** — Structural demand is considerably improved, with fabricators showing more activity. Identified projects are more numerous and needs of heavy equipment and machinery makers are increasing.

**Boston**—Structural steel inquiry is featured by approximately 5000 tons for five air corps hangars, Northeast air base, Chicopee, Mass., closing July 9, the largest estimate in weeks. Small-lot tonnage is in better volume, although bridge needs are limited to numerous small stringer spans.

**New York** — More 300 to 500-ton structural projects are being estimated, but most active pending ton-

nage, which is considerably heavier, is made up of a comparatively few large jobs, including 18,000 tons for grade crossings and bridge. Close to 5000 tons also pends for school buildings in New York.

**Buffalo** — Except for a scattering of small jobs calling for less than 100 tons there is little interest in the structural steel market. While many industrial plants are undertaking alteration in preparation for armament manufacturing, such jobs are generally confined to interior changes with no steel required.

**San Francisco**—Pending struc-

tural business is of fair proportions and calls for more than 17,500 tons. Awards aggregated 2164 tons, bringing the total to date to 98,828 tons, compared with 67,103 tons for the corresponding period in 1939.

**Toronto, Ont.** — While there has been some slackening in structural steel buying for private concerns, demand for war building programs has been gaining steadily. During the past week upwards of 8000 tons was placed in connection with various government projects, while additional tonnage running upwards of 10 000 tons is said to be pending.

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TRADE MARK REG. U.S. PAT. OFF.



- create refreshing recirculation of air without chilling drafts.

- help to maintain production schedules in the hottest places.

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## PERKINS Man Coolers

are made in Oscillating and Stationary types, both, Portable.

**B.F. PERKINS & SON, Inc.**  
Engineers and Manufacturers  
HOLYOKE • MASSACHUSETTS

## Shape Awards Compared

	Tons
Week ended June 22 .....	13,835
Week ended June 15 .....	22,430
Week ended June 8 .....	16,137
This week, 1939 .....	17,494
Weekly average, year, 1940	18,092
Weekly average, 1939 .....	22,411
Weekly average, May .....	22,717
Total to date, 1939 .....	567,729
Total to date, 1940 .....	452,305

Includes awards of 100 tons or more.



## Shape Contracts Placed

1950 tons, boilerhouse, shop, office building, Curtiss-Wright Corp., Caldwell, N. J., to Harris Structural Steel Co., New York.  
 1100 tons, bulkhead and penstock gates, Grand Coulee dam, Odair, Wash., to unstated interest.  
 850 tons, sheet piling, East River drive section, New York, to Igoe Bros., New York, through J. Rich Steers, New York.  
 750 tons, addition to factory, General Motors Corp., diesel engine division, Detroit, to R. C. Mahon Co., Detroit.  
 600 tons, mill building, Brockway Glass Co., Brockway, Pa., to Gulbert Steel Co., Pittsburgh.

575 tons, state bridge X-4 of 82-22-4, Detroit, to Bethlehem Steel Co., Bethlehem, Pa.  
 565 tons, Westchester avenue bridge, New York, to American Bridge Co., Pittsburgh, through Lieb Construction Co., New York.  
 500 tons, two-story office building, Heald Machine Co., Worcester, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; E. J. Cross & Co., Worcester, general contractor.  
 500 tons, shape building, Westinghouse Electric & Mfg. Co., Mansfield, O., to Ingalls Iron Works, Birmingham, Ala.  
 380 tons, extension to power house, for Atlantic City Electric Co., Atlantic City, N. J., to Concrete Steel & Supply Co.  
 368 tons, structural and miscellaneous

steel, spillway operating bridge, Watts Bar dam, Tennessee Valley authority, Knoxville, to Milwaukee Bridge Co., Milwaukee, bids May 29; Reliance Steel Products Co., McKeesport, Pa., awarded item 4.

360 tons, state highway bridge, FAS-Rc-4036, Chemung county, New York, to Lackawanna Steel Construction Co., Buffalo.

360 tons, Parker dam, Earp, Calif., to American Bridge Co., Pittsburgh; bureau of reclamation, spec. 1354-D, Denver.

355 tons, four bridges, route 29, sections 1B and 1C, Hillside-Union, N. J., to Bethlehem Steel Co., Bethlehem, Pa.; New Jersey Asphalt & Paving Co., Jersey City, contractor, \$118,959.98, bids June 7, Trenton.

345 tons, bridge 32.0 Coffey county, Kansas, to Kansas City Structural Steel Co., Kansas City, Mo.

300 tons, Perry memorial industrial school, Yakima, Wash., to Isaacson Iron Works, Seattle; Howard S. Wright, Seattle, general contractor.

270 tons, state bridge RC-40-39, St. Lawrence county, New York, to American Bridge Co., Pittsburgh, through Law Bros. Contracting Corp., Herkimer, N. Y.

260 tons, novelty building, for Goodyear Tire & Rubber Co., St. Marys, O., to Burger Iron Co., Akron, O.

250 tons, power plant addition, Vienna, Md., to Bethlehem Steel Co., Bethlehem, Pa., through Utility Management Corp.

235 tons, bridge FAP-479-E(1) Heard county, Georgia, to Vincennes Steel Corp., Vincennes, Ind.

215 tons, bridge FAP-322E(1) Ord, Nebr., to American Bridge Co., Pittsburgh.

200 tons, crane rails, specification 1365, Grand Coulee dam, Odair Wash., to Carnegie-Illinois Steel Corp., Chicago.

200 tons, 15-ton gantry crane, specification 9741, Pearl Harbor, T. H., to R. W. Kaltenbach Corp., Bedford, Ohio.

200 tons, shop building, Piper Aircraft Corp., Lock Haven, Pa., to Pittsburgh Bridge & Iron Co., Pittsburgh.

190 tons, high school, State College, Pa., to Weatherly Steel Co., New York.

165 tons, state bridge, Gilbertsville, Mass., to Phoenix Bridge Co., Phoenixville, Pa.

155 tons, receiving building, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., to Keystone Engineering Co., Pittsburgh.

150 tons, hospital buildings, Beverly, Mass., to Bethlehem Steel Co., Bethlehem, Pa.

150 tons, Bennett street bridge, Hornell, N. Y., to Lackawanna Steel Construction Co., Buffalo.

147 tons, Louise street bridge, Glendale, Calif., to Bethlehem Steel Co., Los Angeles.

145 tons, Mason street bridge, Green Bay, Wis., to Milwaukee Bridge Co., Milwaukee.

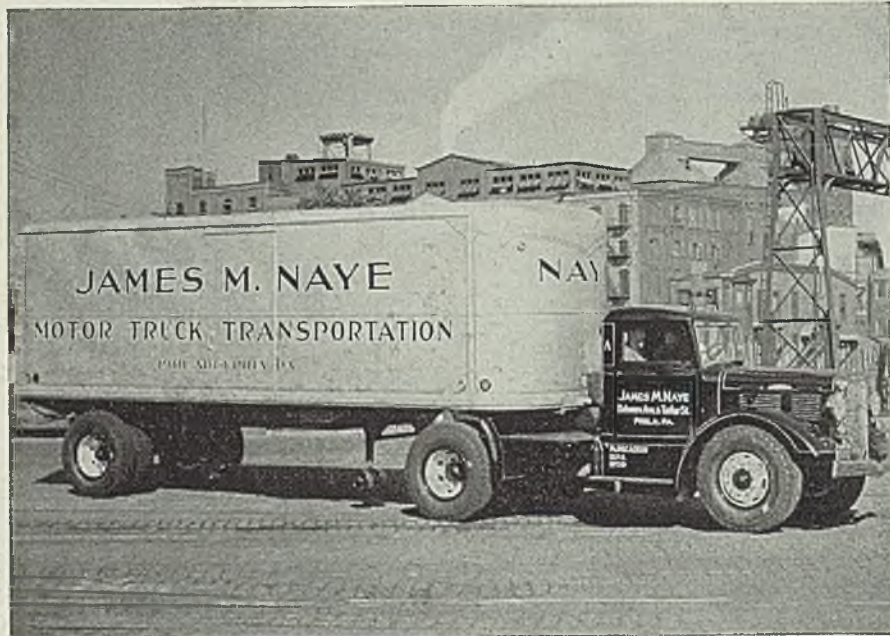
135 tons, I-beam spans, Blackhawk county, Iowa, to Pittsburgh-Des Moines Steel Co., Des Moines, Iowa.

130 tons, garage, Pittsburgh Press, Pittsburgh, to Pittsburgh Bridge & Iron Works, Pittsburgh.

125 tons, piling, state bridge, Warwick, R. I., to Carnegie-Illinois Steel Corp., Pittsburgh; General Engineering & Contracting Co., Providence, R. I., general contractor.

115 tons, Shaler Hall and Fisher Museum, Harvard University, Petersham, Mass., to Haarmann Structural Steel Co., Holyoke, Mass.

115 tons, salvage building, for Westinghouse Electric & Mfg. Co., Sharon, Pa.,



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• Here's the kind of truck-trailer that can give a fast-moving sales talk of its own—and leave a decidedly favorable impression too!

ARMCO PAINTGRIP galvanized sheets for top and body panels help take this motor transport out of the "just-another-trailer" class. That smooth, handsome body finish makes a stand-out advertisement on busy streets and highways.

You may not make or buy trucks, but it may be that you can profit in 1940 by using ARMCO PAINTGRIP in your products. This

paintable galvanized metal has a special bonderized finish that takes paint and helps preserve it. There are no zinc oxides at the surface to dry out paint and rob it of its elasticity. And you save on the finishing costs because acid etching is out.

Whatever you make of sheet metal that has to be painted, you can make better and more salable by using ARMCO PAINTGRIP. Shall we send you more information pertaining to your specific needs? Just address The American Rolling Mill Company, 480 Curtis Street, Middletown, Ohio.



# ARMCO PAINTGRIP



- to Pittsburgh Bridge & Iron Works, Pittsburgh.
- 115 tons, bridge, route 806, Allegheny county, Pennsylvania, to Fort Pitt Bridge Works, Pittsburgh.
- 110 tons, power station, Marion-Reserve Power Co., Marion, O., to Pittsburgh Bridge & Iron Works, Pittsburgh.
- 100 tons, transmission towers, Bonneville dam project, Oregon, to Bethlehem Steel Co., San Francisco.
- 100 tons or more, shapes, six radial gates and valves for Walla Walla, Wash., flood control project; Parker & Schram, Portland, general contractor.

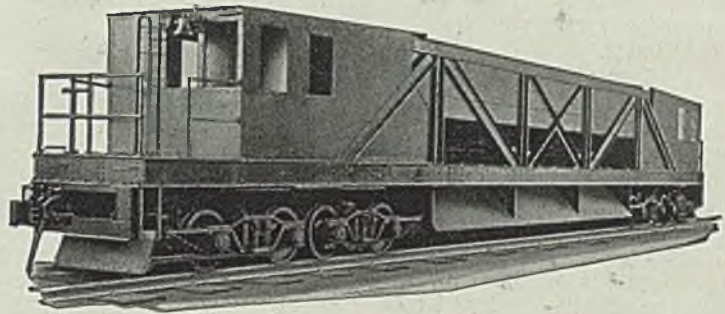
### Shape Contracts Pending

- 5800 tons, also 3500 tons plain material for shoring, sections 3 and 4, grade crossing, Atlantic avenue, Brooklyn, Tomassetti Contracting Co., New York, low.
- 5000 tons, five air corps hangars, Northeast air base, Westover field, Chicopee, Mass.; bids July 9.
- 4500 tons, depot supply building, Hill field, Ogden, Utah, for United States government.
- 3500 tons, superstructure, relocation of bridge, Great Northern railway, specification 914, Kettle Falls, Wash., for bureau of reclamation.
- 2375 tons, including 1275 tons sheet piling,ainter gates and other work, Caddoa dam on Arkansas river, Colorado; bids July 12.
- 1660 tons, sheet and H-piles, inv. 50, United States engineer, Duluth; bids June 28; also 38 tons, bolts, washers and rods and 78 tons, wales and cleats.
- 1400 tons, bottle house, for Acme Brewery Co., San Francisco.
- 1250 tons, state bridge, route 46, section 465-VF, Franklin Park, Ill.
- 1040 tons, machine shop, building 18, Philadelphia navy yard, Ralph S. Herzog, Philadelphia, low.
- 640 tons, administration building, University of California, Berkeley, Calif.; bids opened.
- 619 tons, including 144 tons H columns, bridge near Safford, Ariz.; general contract to Martin Construction Co., Tucson, Ariz., at \$109,628.
- 550 tons, additions to building, for Michigan Bell Telephone Co., Detroit.
- 540 tons, addition to warehouse, for Ohio Rubber Co., Willoughby, O.
- 450 tons, four bridges, Pennsylvania State highway commission, Harrisburg, Pa.; bids June 28.
- 440 tons, state bridge over Indian river, Cocoa, Fla.
- 428 tons, bridge under Wabash railroad tracks at St. Louis, Missouri highway project; bids June 28.
- 350 tons, buildings 58 and 60, for Aluminum Co. of America, Vancouver, Wash.
- 334 tons, steel sheet piling, also 50 tons reinforcing and miscellaneous, Portland stockyards flood control project; bids to United States engineer, Portland, June 27.
- 300 tons, shop building and ordnance school, Aberdeen proving ground, Maryland, for United States army.
- 300 tons, structural steel for conveyor flights, Kentucky dam; bids June 26, Tennessee Valley authority, Knoxville, Tenn.
- 275 tons, factory building, Oldsmobile division, General Motors Corp., Lansing, Mich.
- 227 tons, overpass, Eagle county, Colorado; bids July 2.
- 225 tons, hydrocal plant, for U. S. Gypsum Co., Southard, Okla.

- 200 tons, state bridge 1975, Columbus, Ind.
- 200 tons or more, high voltage and line towers, Tacoma, Wash.; Bethlehem Steel Co., low.
- 190 tons, school, for St. Gabriel's Roman Catholic church, Riverdale, N. Y.
- 170 tons, state bridge 1979, Cloverdale, Ind.
- 160 tons, underpass, Center street, Casper, Wyo.; bids June 25.
- 155 tons, state bridge 1972, Plainfield, Ind.
- 150 tons, two I-beam bridges, Franklin county, Pennsylvania; bids to state highway department, Harrisburg, Pa., June 28.
- 150 tons, mill buildings, Piper Aircraft Corp., Lock Haven, Pa.

- 145 tons, addition to factory, for Detroit Gasket & Mfg. Co., Marine City, Mich.
- 135 tons, repairing bridge, Wyoming county, Pennsylvania; bids to state highway department, Harrisburg, Pa., June 28.
- 130 tons, bridge 373, Rawson, Wis., for Chicago & North Western railway.
- 125 tons, reinforcing bridge 11/46, Philadelphia, for Central railroad of New Jersey.
- 115 tons, overpass, national airport, Arlington county, Virginia, for United States government.
- 110 tons, state bridge, Calamine, Wis.
- 110 tons, truss bridge, Clearfield and Centre counties, Pennsylvania; bids to

## ATLAS ORE TRANSFERS



100 ton—3 compartment Ore Transfer. Roller Bearing Journals. Double end control for car operation. Individually operated discharge gates.

### OTHER ATLAS PRODUCTS

- Gas-Electric and Diesel-Electric Locomotives . . .
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- Stockhouse Scale Cars for Blast Furnaces . . .
- Concentrate and Calcine Cars for Copper Refineries . . .
- Automatic and Remote Controlled Electric Cars . . .
- Pushers, Levellers and Door Extractors . . .
- Coal Charging Lorries, Coke Guides and Clay Carriers . . .
- Atlas Patented Coke Quenching Cars for By-Product Coke Ovens . . .
- Atlas Patented Indicating and Recording Scales . . .
- Special Cars and Electrically Operated Cars for every conceivable Purpose.

## THE ATLAS CAR & MFG. CO.

Engineers . . . Manufacturers

CLEVELAND, OHIO



state highway department, Harrisburg, Pa., June 28.  
 10½ tons, office building, for Ohio Bell Telephone Co., Middletown, O.  
 105 tons, extension to building 159, navy yard, Washington, for bureau of yards and docks.  
 100 tons, bridge and flume over wastewater 2, specification 1374-D, Yakima, Wash., for bureau of reclamation.  
 Unstated, five traveling cranes, 5 to 125 tons; bids to Bonneville project, June 25 and 26.

# Reinforcing

Reinforcing Bar Prices, Page 81

**Pittsburgh** — The move to establish new billet steel reinforcing bars on the 1.90c level has apparently been successful. Reports of placements over the past few days show that some of this is being placed at less than the going price, but all current inquiries are receiving quotations on that basis.

**Chicago** — Demand continues chiefly small tonnages, which are numerous. Pending tonnage was slightly off in the past week, though present volume still is considered fairly substantial. Further improvement in prices is reported.

**New York** — Reinforcing steel buying is up slightly, affording some test to efforts to stabilize prices at 1.90c base. While awards are mostly for small lots, inquiry is heavier and 1400 tons for grade crossing work, Brooklyn, has been bid.

**San Francisco**—Although new inquiries are coming out at a fair rate awards last week were the smallest in over two months and totaled only 1321 tons. To date this year 74,410 tons have been placed, compared with 80,994 tons for the same period last year.

## Reinforcing Steel Awards

1350 tons, subway, section S-1-A, Chicago, to Inland Steel Co., Chicago; Paschen Bros., contractor.  
 1300 tons, substructure high level bridge, St. Georges, Del., to Bethlehem Steel Co., Bethlehem, Pa.; Penker Construction Co., contractor.  
 1000 tons, Mississippi river guide walls, locks 16, 17, 20 and 21, to Inland Steel Co., Chicago; United Construction Co., contractor.  
 600 tons, plant, Calvert Distilling Co., Relay, Md., to Bethlehem Steel Co., Bethlehem, Pa.; Consolidated Engineering Co., contractor.  
 493 tons, flood control project, Walla Walla, Wash., to unstated Portland interest; Parker & Schram, Portland, general contractors.  
 450 tons, McCook Field housing, Dayton, O., to Pollak Steel Co., Cincinnati; W. R. Goss, contractor.  
 410 tons, stadium, Pawtucket, R. I., to Bethlehem Steel Co., Bethlehem, Pa.; J. J. McHale & Sons Inc., Pawtucket, general contractor.  
 400 tons, Parkside housing, Detroit, to Republic Steel Corp., Cleveland,

through Truscon Steel Co., Youngstown, O.; Bryant & Detwiler, contractors.  
 400 tons, Cudahy Packing Co. plant, Omaha, Nebr. to Sheffield Steel Corp., Kansas City, Mo.; Phillip McArdle, contractor.  
 400 tons, plant, Duquesne Light Co., Pittsburgh, to Jones & Laughlin Steel Corp., Pittsburgh.  
 350 tons, sewage plant, Omaha, Nebr., to Sheffield Steel Corp., Kansas City, Mo.  
 335 tons, flood wall, section 1, Blinghamton, N. Y., to Bethlehem Steel Co.; Pepper Bros. and C. D. Murray Inc., contractors.  
 300 tons, Wright Aero Corp., Newark, N. J., to Republic Steel Corp., Cleveland, through Truscon Steel Co., Youngstown, O.  
 290 tons, shop addition, Pratt & Whitney division, United Aircraft Corp., East Hartford, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; Turner Construction Co., New York, general contractor.  
 240 tons, bars, doors and miscellaneous, LaGuardia Field hangar, New York, to Truscon Steel Co., Youngstown, O., through James Stewart & Co., New York.  
 232 tons, highway project FAS-329, Hickman-Fulton counties, Kentucky, to Laclede Steel Co., St. Louis; N. E. Stone, contractor.  
 230 tons, Wayne Hill housing, Portsmouth, O., to West Virginia Rail Co., Huntington, W. Va.; W. A. Sheets & Sons, contractors.  
 228 tons, shipway No. 2, Philadelphia navy yard, to Bethlehem Steel Co., Bethlehem, Pa.; Duffy Construction Co., contractor.  
 225 tons, highway mesh, project RC-40-17, Salamanca-Little Valley, N. Y. to American Steel & Wire Co., New York; Holmes & Murphy, Orchard Park, N. Y., contractors, \$264,768.25, bids May, 15, Albany, N. Y.  
 205 tons, box sewer, Milwaukee, to Youngstown Sheet & Tube Co., Youngstown, O., through Worden-Allen Co., Milwaukee.  
 200 tons, state fair building, Ames, Iowa, to Republic Steel Corp., Cleveland, through Truscon Steel Co., Youngstown, O.  
 190 tons, road work, Lackawanna county, Pennsylvania, to Bethlehem Steel Co., Bethlehem, Pa., through Sweeney Bros., Scranton, Pa.  
 180 tons, two-story office building, Heald Machine Co., Worcester, Mass., to Joseph T. Ryerson & Son, Inc., Boston; E. C. Cross & Co., Worcester, general contractor.  
 180 tons, weather bureau building, Washington, to Bethlehem Steel Co., Bethlehem, Pa.; Thorp-Rosoff Co., contractor.  
 180 tons, Brewster housing, Detroit, to

## Concrete Bars Compared

	Tons
Week ended June 22 .....	12,073
Weekly ended June 15 .....	4,014
Week ended June 8 .....	14,920
This week, 1939 .....	15,003
Weekly average, year, 1940 .....	8,316
Weekly average, 1939 .....	9,197
Weekly average, May .....	7,058
Total to date, 1939 .....	261,478
Total to date, 1940 .....	207,897
Includes awards of 100 tons or more.	

Republic Steel Corp., Cleveland, through Truscon Steel Co., Youngstown, O.; Couse & Saunders, contractor.  
 170 tons, highway project SP-94-233, Owen county, Kentucky, to Pollak Steel Co., Cincinnati; Highland Co., contractor.  
 155 tons, East River drive section, New York, Igoe Bros., Newark, N. J., through J. Rich Steers Inc., New York.  
 150 tons, apartments, Moreland boulevard, Cleveland, to Republic Steel Corp., Cleveland, through Paterson-Letch Co., Cleveland; William Dolin Construction Co., contractor.  
 135 tons, highway projects, Exeter and Barrington, R. I.; to Wickwire Spencer Steel Co. and American Steel & Wire Co., New York.  
 130 tons, plant, John Deere Co., Lansing, Mich., to Inland Steel Co., Chicago.  
 125 tons, Panama, schedule 4100, to Youngstown Sheet & Tube Co., Youngstown, O.  
 120 tons, road work, Lackawanna county, Pennsylvania, to Bethlehem Steel Co., Bethlehem, Pa., through Collins & Maxwell, Easton, Pa.  
 110 tons, manufacturing building, Charles Lennig Co., Philadelphia, to Taylor Davis Co., through F. W. Warren, both of Philadelphia.  
 110 tons, state prison cell blocks, Auburn, N. Y., to Joseph T. Ryerson & Son Inc., Chicago; C. F. Haglin & Sons, contractors.  
 100 tons, factory 22, Bayer Co., Rensselaer, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.  
 100 tons, unit 7, Commonwealth Edison Co., Chicago, to Bethlehem Steel Co., Bethlehem, Pa.  
 100 tons, flood control work, Birch Hill, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; B. Perini & Sons, contractor.  
 100 tons, Leslie Salt Co. addition, Center-ville, Calif., to Bethlehem Steel Co., San Francisco.  
 100 tons, bars and miscellaneous steel, Jones Ferry pumping station, Connecticut river, Chicopee, Mass., U. S. engineer, Providence, R. I., project, to Bethlehem Steel Co., Bethlehem, Pa.; Ley Construction Co., Springfield, Mass., contractor, \$88,697.12.

## Reinforcing Steel Pending

2375 tons, Caddoa dam, Arkansas river, Colorado; bids July 12.  
 1400 tons, grade crossing, sections 3 and 4, Long Island railroad, Atlantic avenue, Brooklyn; Tomasetti Contracting Co., New York, low, bids June 20.  
 1368 tons, viaduct at San Rafael, Marin county, Calif., for state; general contract to Heafey-Moore Co. and Fredrickson & Watson Construction Co., Oakland, Calif., at \$380,999.  
 1300 tons, grade crossing elimination, Long Island railroad, Rockaway, New York; bids June 27.  
 1000 tons, Brea dam, Orange county, Calif.; general contract to Winston Bros., 411 West Fifth street, Los Angeles, at \$664,401.  
 650 tons, building for E. R. Squibb & Sons Co., Brooklyn, N. Y.; Turner Construction Co., New York, contractor.  
 550 tons, Cottage Grove dam, Lane county, Ore.; general contract to T. E. Connolly, 461 Market street, San Francisco, at \$769,930.  
 500 tons, procurement invitation, treasury department, Albia, Iowa.



- 500 tons, for flood wall protection, Kansas City, Kans.; bids June 26 to United States engineers, Kansas City.
- 465 tons, subway, section S-9-B, Chicago.
- 400 tons, bridge, Los Angeles forest highway over Big Tujunga Wash for Los Angeles county; Person & Hollingsworth, 507 South Lorena avenue, Los Angeles, low at \$113,390 on general contract.
- 400 tons, bureau of sewers, Chicago; bids June 24.
- 400 tons, building for Sprague Warner & Co., Chicago.
- 400 tons, bridge Chicago, Milwaukee, St. Paul & Pacific railroad, Franklin Park, Cook county, Ill.
- 400 tons, Grace hospital buildings, Detroit.
- 300 tons, state highway project, Blackhawk City, Iowa.
- 296 tons, six bridges in Solano and Yolo counties, California, for the state; bids July 3.
- 250 tons, buildings for Byron Jackson Co., Huntington Park, Calif.; general contract to C. L. Peck, H. W. Hellman building, Los Angeles.
- 250 tons, plant, Indiana Water Co., Indianapolis, Ind.
- 250 tons, Fox river bridge, Elgin Ill.; bids June 28.
- 250 tons, housing project, New Britain, Conn.; bids June 28.
- 240 tons, Pillsbury Flour Mills Co., Minneapolis.
- 225 tons, plant Consumer's Power Co., Comstock, Mich.
- 200 tons, Matthew Hensing housing project, Phoenix, Ariz.; general contract to Del E. Webb Construction Co., 1633 West Jefferson street, Phoenix, at \$232,251.
- 200 tons, elevator spacing, Bunge Grain Co., Minneapolis.
- 200 tons, plant Minneapolis-Honeywell Regulator Co., Minneapolis.
- 200 tons, Mount Pleasant housing, New Britain, Conn.
- 200 tons, Great Lakes Carbon Co. elevator, Lockport, Ill.
- 200 tons, water reservoir, Billings, Mont.
- 180 tons, Swift Packing Co. Seattle plant; H. S. Wright, Seattle, low.
- 148 tons, highway work, Imperial county, California, for state; bids July 5.
- 110 tons, state highway project, Luzerne county, Pennsylvania; bids to state highway department, Harrisburg, Pa., June 28.

## Pig Iron

Pig Iron Prices, Page 82

**Pittsburgh** — While production is increasing somewhat, no new furnaces have been blown in over the past week. Producers are increasing tonnage and repair work is going ahead on some additional stacks which may be blown in soon. Prices are steady at published levels.

**Cleveland** — June pig iron shipments tentatively are placed at least 25 per cent ahead of May. Some iron is being stocked, although foundry operations have ex-

panded and most consumers are optimistic regarding future schedules. A decline in automotive demand partially offsets increased iron consumption elsewhere. Most users are covered several months ahead, but a fair amount of buying still is being done. Prices are firm.

**Chicago** — Nonintegrated steel mills have accounted almost entirely for the increase in shipments this month. June will end with total well above May, though foundries have not increased operations sufficiently to require additional supply. Buying has quieted down be-

cause practically all users have covered third quarter needs. A little purchasing still continues, however, and may keep up for some time yet.

**Boston**—Pig iron buying has subsided slightly with specifications steady, notably by foundries supplying machine tool and other shops likely to share in the defense program. Most consumers have covered through third quarter at estimated minimum requirements. Larger consumers continue to draw substantially on stocks and buying is mostly for small lots.

**New York**—While buying is less

# Naylor steel mill pinion

## FLAME HARDENED TEETH AND WABBLERS



This unretouched photograph shows clearly the discoloration characteristic of flame-hardening on the teeth, wabblers, and flanges of this pinion.

**SPECIAL** Steel for special requirements is daily routine at the National-Erie Corporation. For instance, this large flame-hardened herringbone mill pinion with 16 cast teeth, 6.283" circular pitch, 25" face, 32" pitch diameter, 35.144" outside diameter shaft 6' 1½" over all. Weight unmachined 12,620 lbs. . . Machined, 11,200 lbs. . . Put YOUR problem up to National-Erie. . . take advantage of National-Erie's prompt efficient service and the cost savings that go with One Responsibility. . . One Control.

### NATIONAL-ERIE

CORPORATION

ERIE, PA., U.S.A.



## White Orchids

Congratulations and grateful thanks continue to pile in. Penton's Almanac is definitely a hit. H. P. Bigler, director, Rail Steel Bar association, says: *This is the best prepared selection of annual statistics for an industry I have ever seen.* F. B. Milhoan, American Rolling Mill Co. goes even farther: *It is so highly informative, you have something that is nothing short of a masterpiece!* Ivan L. Johnson, president, Pacific Steel Casting Co writes: *The Almanac is fine. We recognize STEEL as an authority and it has served us so well in the past we shall never want to be without it.*

## St. Louis Blues

■ First sour note to date comes anonymously from St. Louis where the citizens are highly insulted and highly indignant over having their five great bridges across the Mississippi slighted in Penton's Almanac. A movement is on foot, so our heckler says, to boycott STEEL as an inept, prejudiced and entirely untrustworthy publication. What's more, the Mayor of St. Louis has called an indignation meeting of the aroused citizenry at which inflammatory speeches will be made, denunciatory resolutions will be proposed and adopted, and a copy of STEEL will be duly burned in effigy. It sounds real exciting.

## Include The Tip

■ The height of real nerve is the guy who takes a taxi to the bankruptcy court and then invites the driver in to meet his fellow creditors.

## Uncensored Slang

■ An American chap, caught short in Germany, had to stay on trying to attend to his business since last fall. A letter from him was received over here recently and he went on at great length

describing the prosperity of the Nazi empire, the marvelous food he was enjoying and the good neighborliness he found everywhere. Then past the censors he slipped this postscript: *Incidentally, will you please tell this to Mr. Sweeney?*

## On The Job

■ Readers and advertisers put their finger on it when they told us that above all else, STEEL is Modern. And part of being modern is being flexible. The industrial picture has been changing so rapidly in recent months the average business man is ready to expect most anything tomorrow. STEEL's editors have been doing a marvelous job of slicing through all the rumors and conflicting reports and giving a clear but complete review of the situation every week—both on current news analysis and technical developments. Most timely this week is the story by A. G. Cordy, Superintendent, Heat Treating Dept., Curtiss-Wright Corp. on developing maximum physicals in aircraft parts.

## Choice of the Week

■ We like the ring of that Arthur G. McKee headline on page 66. *Don't Let Construction Slow Up Production*

## Repocrats

■ With half-opened eyes at the breakfast table this morning, the little woman was trying to get us to explain the present political picture. "Why is it," she says, "that Mr. Willkie, who is a Democrat, can try to get nominated by the Republicans? And why does Mr. Roosevelt still think that Mr. Knox and Mr. Stimson are Republicans when the Republicans decided they were Democrats? And why . . ." Briefly that's why we happened to be down at the office so early this morning.

SHRDLU

than last month, pig iron specifications may surpass last month's volume, which was the best since early in the year. Machine tool builders are specifying actively. Soil pipe makers are experiencing seasonal improvement. Most consumers have endeavored to cover requirements for 90 days and some for the entire last half. However, action has been on the conservative side, it is believed, with a result it would not prove surprising to many sellers if there would be another active buying wave in the latter part of the summer. This, they hold, would certainly prove true should a price advance be announced around that time, as some observers believe likely.

**Philadelphia** — Rumors are still circulating relative to a possible \$2 advance in prices for fourth quarter but sellers express the view no such move is likely. Buying continues fairly brisk with some consumers planning to lay down stocks for future use. Some furnaces are not yet sold out for third quarter.

**Buffalo**—Sustained diversified demand for pig iron is holding pig iron production at 84½ per cent of capacity. Foundries continue to buy on a hand-to-mouth basis. Second quarter tonnage is almost certain to exceed first quarter by a decided margin.

**Cincinnati**—Foundries are specifying more freely for pig iron. Shipments for June may show an increase of 20 to 30 per cent compared with May. Some buying is being done against third quarter needs. The effects on foundries of possible cancellation of French orders have not been defined.

**St. Louis**—While melters are largely covered for third quarter, there has been an active buying movement during the past week or ten days.

**Toronto, Ont.**—Merchant pig iron sales have started a definite uptrend, both for spot and future delivery. Melters are entering the market at more frequent intervals and most orders call for larger tonnages. The improvement is credited to increase in daily melt to meet war needs. Producers have opened books for third quarter and although melters are not rushing to cover, a number have placed contracts to the end of September.

## Tin Plate

Tin Plate Prices, Page 80

**Pittsburgh** — Operations in the district remain unchanged, with active mills at virtual capacity. Specifications are heavy and producers see possibility of starting addition-



al mills if increase continues. Demand from domestic packers and canmakers is good, as well as from the export market, and specifications on general line cans also indicate fair increases.

## Scrap

Scrap Prices, Page 84

**Pittsburgh** — The long position held by most yard dealers has made them extremely sensitive to the international situation, and as a result the apparent capitulation of France and the possibility that heavy export orders may not be consummated drove considerable tonnage out of hiding in this district.

**Cleveland**—Plentiful supplies of scrap and lack of consumer interest has caused a dip of about \$1 per ton on steelmaking grades, from the level of the preceding week. Shipments to Youngstown mills continue but Warren, O., deliveries are embargoed.

**Chicago** — Prices were mostly unchanged last week except for heavy melting steels, which advanced 50 cents on the basis of higher dealer-broker trading. Foreign developments early in the week brought confusion, with many prices now nominal pending clarification of the situation both locally and abroad.

**Boston** — Scrap prices continue to advance, notably most cast grades, but at a slower rate. Domestic buying is slightly more active with textile cast coming out in limited volume. Buying for export is almost entirely for British account with higher prices of last week maintained.

**New York**—Buying by domestic consumers is slightly more active with most eastern Pennsylvania smelters taking shipments, resulting in more tonnage moving from this district. Prices are unchanged, the only advance being in machine turnings, brokers offering \$8.50. Two ships are loading for export but supplies have accumulated on barges, sufficient to meet requirements. Great Britain is the only European consumer in position to carry scrap from Atlantic ports and activity has subsided.

**Buffalo** — While some of the recent activity in scrap has subsided, approximately 75,000 tons was contracted during the recent sales flurry at the advanced range of \$19.50 to \$20 for No. 1 steel. The sale was split as follows: 15,000 tons with local dealers; 40,000 tons with New York sources, which is arriving via the barge canal, scrap earmarked for Italy before the country entered the war and 10,000 tons with Duluth

dealers. One of the leading mills of the area took the entire tonnage.

**Detroit** — Some bearish sentiment is appearing among dealers, but it is believed tonnage offered for sale will be absorbed quickly and the market will hold at its present level. There is no oversupply of scrap and with steelmaking operations at a high rate, little likelihood of a decline in scrap levels can be seen.

**Cincinnati**—In a strong market scrap prices were advanced 50 cents as a reflection, in part, of bids on

recent railroad lists. Shipments to the Valley were checked when congestion of tonnage brought an embargo.

**St. Louis** — Scrap continues strong, with advances in dealer prices ranging from 25 cents to \$3 per ton. All grades were affected by the upturn, with specialties and cast scrap especially strong. Heavy melting steel was marked up 25 cents to \$1 per ton, according to grade and destination.

**San Francisco**—While some open-hearth producers are reported to be



**SETTING THE PACE**  
**FOR LOW COST**  
**WASTE DISPOSAL SERVICE**

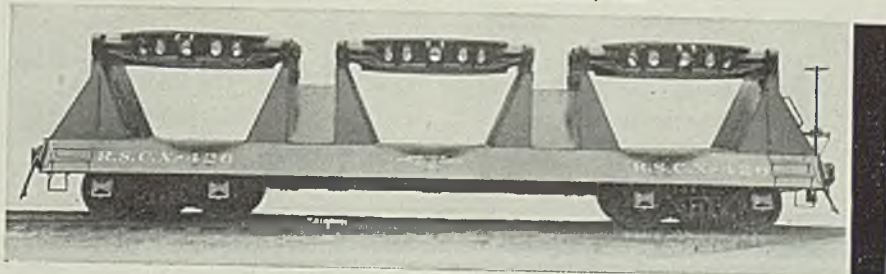
For years Koppel engineers have been studying and analyzing the waste disposal problems of steel mills and have successfully furnished many units for this type of service. Outstanding today are two types of Koppel Cars that ideally provide the required speed, capacity, ease of operation,—at lower cost.

**KOPPEL**

- (1) **Fifty (50) Yard Air Dump Cars**—designed for general waste disposal, providing almost twice the capacity of previous cars,—now being used most successfully in several of the leading mills.
- (2) **Triple Cinder Ladle Cars**—for handling waste from open hearths. Designed to utilize available ladle equipment,—so constructed that large chunks of very hot material can be handled easily and without damage.

May we submit some interesting cost figures for your consideration?

**PRESSED STEEL CAR COMPANY, INC.**  
(KOPPEL DIVISION)—PITTSBURGH, PA.





paying \$11.00 to \$11.50 a net ton, metropolitan districts of Los Angeles and San Francisco, No. 1 heavy melting steel continues unchanged

**Toronto, Ont.** — Interest continues high in iron and steel scrap. Steel mills are placing third quarter contracts at the maximum dealers can provide. The large mills, however, have not raised bid prices, with the result that some dealers are wary in closing for long terms ahead.

## Warehouse

Warehouse Prices, Page 83

**Chicago** — Uptrend is becoming more apparent. Volume of orders last week continued on an improved level established the week before. Increased activity is widely diversified. Hot-rolled annealed and cold-finished sheets are in demand, though all finishes are moving well.

**Boston**—Number of orders booked by warehouses has increased slightly during the last 10 days, after a period of moderately level volume. The improvement is well diversified as to products and prices are unchanged.

**New York**—While volume is well diversified, aggregate tonnage be-

ing moved by warehouses holds about to the recent rate.

**Philadelphia** — June business is about even with the May rate. Prices appear steadier.

**Buffalo** — Aggregate warehouse business is better than in May despite some spottiness in mid-June demand as compared with the flurry of two weeks ago. As a result of competitive conditions No. 24 galvanized sheets has been cut from 4.45 to 4.00 cents per pound.

**Cincinnati**—Warehouse buying is active. The broad, sustained demand gives no evidence of seasonal tapering. Prices are steady.

**St. Louis**—Business continues the upturn which started in early June, with additional improvement noted in pipe, merchant bars and small structural shapes. Warehouses are more active in adding to stocks.

## Iron Ore

Iron Ore Prices, Page 84

**Cleveland** — Practically all of the Great Lakes fleet of 297 bulk freighters are engaged in transporting iron ore. The monthly survey by C. C. Lindeman, statistician for the M. A. Hanna Co., shows 291 boats, or 98.44 per cent of total trip

capacity, are in commission and all are carrying ore. A month ago 90.52 per cent of the capacity was in commission and a year ago 66.96 per cent was engaged. The current percentage is the highest since 1929, with the exception of 1937, when 100 per cent was reached.

May consumption of Lake Superior iron ore totaled 4,566,200 gross tons, against 3,934,853 tons in April and 2,245,513 tons a year ago, according to the Lake Superior Iron Ore association. Consumption of 22,119,967 tons the first five months compares with 14,141,219 tons in the 1939 period. Stocks increased about 1,500,000 tons last month but were nearly 3,500,000 tons smaller than a year ago. Comparisons follow:

	Gross Tons Iron Ore on Hand		
	At Lake Erie Furnaces	On Lake Erie Docks	Total
June 1, '40	16,717,185	2,886,165	19,603,350
Month ago	15,155,399	2,950,752	18,106,151
Year ago	18,835,151	4,236,063	23,071,214

**New York** — Despite disrupted traffic in the Mediterranean area, Caucasian manganese ore shipments are still coming through, it appears. Some shipments have only recently passed through Gibraltar and still others are enroute between Poti and that point. Expressing confidence that they may continue to get shipments through to this country certain leading importers are again quoting around 55 cents per unit, without duty, Atlantic seaboard, for 50 to 52 per cent material. Some Indian manganese, 48-50 per cent, is also being offered at around that figure. No offerings of iron ore from around the Mediterranean area, however, are known.

## Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 81

Bolt and nut specifications continue more active although a more noticeable letdown in automotive releases is in evidence. Stimulating general demand at the moment are better seasonal requirements of the building trades, continued good demand from Great Britain and several South American countries, and heavier releases from the shipbuilding industry.

## Semifinished Steel

Semifinished Prices, Page 81

**Pittsburgh** — Operations by semifinished mills, which have been exceedingly heavy, will get some respite as a result of work stoppage on orders for France. Thus far no disposition of French tonnage has been made, but it is possible Britain will take it over later.

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## HILLSIDE FLUOR SPAR MINES

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CHICAGO, ILL.



## Metallurgical Coke

Coke Prices, Page 81

**Pittsburgh**—There is no immediate fear of a coke shortage. There is increasing activity in the beehive field, and while there may be a temporary squeeze due to the time required to tie in production and distribution facilities, there is ample capacity in the Connellsville and adjacent districts to provide beehive coke for all needs. Producers are getting their plants into production as rapidly as possible in most cases. Prices are firm, but not moving upward.

## Nonferrous Metals

**New York**—Fate of France and her fleet exerted more influence on nonferrous metal markets last week than any other single factor. C. Donald Dallas, president of Revere Copper & Brass Inc., reassured the trade, however, by stating that any softening in domestic copper prices in the face of fears of a general dumping of French imported copper here were entirely without foundation.

**Copper**—Following a period of

pronounced strength, outside copper eased with electrolytic offered down to 11.12½c, f.a.s. New York, by exporters; to 11.20c, Valley, by resellers; and 11.25c by custom smelters. Mine producers held at 11.50c. Sales for the month are expected to exceed 100,000 tons.

**Lead**—Demand was not as heavy as during the previous week but leading sellers exceeded intakes on several days, stimulated to some extent by a large purchase by a cable maker. Prices held firm at 4.85c, East St. Louis.

**Zinc**—Fresh inquiry was light but actual bookings continued heavy, due to a large carryover from the preceding week. Available supplies for prompt shipment continued tight with prices strong at 6.25c, East St. Louis.

**Tin**—Prices broke very sharply in all leading markets on Tuesday but subsequently recovered. The market was unsettled due to the threatened breakup of the British empire. Straits spot prices ranged from 52.00c to 55.12½c, closing at the latter level.

**Antimony**—Moderate and routine sales were reported at the unchanged price level of 14.00c, New York, for American spot.

## Nonferrous Metal Prices

June	Copper			Straits Tin, New York		Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99% Spot, N. Y.	Antimony Amer. Spot, N. Y.	Nickel Cathodes
	Electro, del. Conn.	Lake, del. Midwest	Casting, refinery	Spot	Futures						
15	11.50	11.50	11.30	57.25	55.37½	5.00	4.85	6.25	19.00	14.00	35.00
17	11.50	11.50	11.30	56.25	54.50	5.00	4.85	6.25	19.00	14.00	35.00
18	11.50	11.50	11.30	52.00	50.00	5.00	4.85	6.25	19.00	14.00	35.00
19	*11.25	11.50	11.30	53.00	50.75	5.00	4.85	6.25	19.00	14.00	35.00
20	*11.25	11.50	11.00	54.50	52.50	5.00	4.85	6.25	19.00	14.00	35.00
21	*11.25	11.50	11.00	55.12½	53.50	5.00	4.85	6.25	19.00	14.00	35.00

\*Based on sales by custom smelters; mine producers unchanged at 11.50c.

### MILL PRODUCTS

F.o.b. mill base, cents per lb., except as specified. Copper brass products based on 11.50c Conn. copper

Sheets	
Yellow brass (high)	18.56
Copper, hot rolled	20.12
Lead, cut to jobbers	8.25
Zinc, 100 lb. base	11.50

Tubes	
High yellow brass	21.31
Seamless copper	20.62

Rods	
High yellow brass	13.55
Copper, hot rolled	16.62

Anodes	
Copper, untrimmed	17.37

Wire	
Yellow brass (high)	18.81

### OLD METALS

Nom. Dealers' Buying Prices

No. 1 Composition Red Brass

New York	7.00-7.25
Cleveland	8.00-8.25
Chicago	7.50-7.75
St. Louis	7.75-8.25

Heavy Copper and Wire

New York, No. 1	8.62½-8.87½
Cleveland, No. 1	9.00
Chicago, No. 1	8.75-9.00

St. Louis .....8.75-9.25

### Composition Brass Turnings

New York .....6.62½-6.87½

### Light Copper

New York .....6.62½-6.87½

Cleveland .....7.00

Chicago .....6.75-7.00

St. Louis .....6.75-7.00

### Light Brass

Cleveland .....4.25-4.50

Chicago .....4.37½-4.62½

St. Louis .....4.25-4.50

### Lead

New York .....4.50-4.60

Cleveland .....3.90-4.15

Chicago .....3.90-4.10

St. Louis .....4.00-4.25

### Zinc

New York .....3.50-3.75

Cleveland .....3.00-3.25

St. Louis .....3.25-3.50

### Aluminum

Misc., cast, Cleveland .....8.00

Borings, Cleveland .....6.50

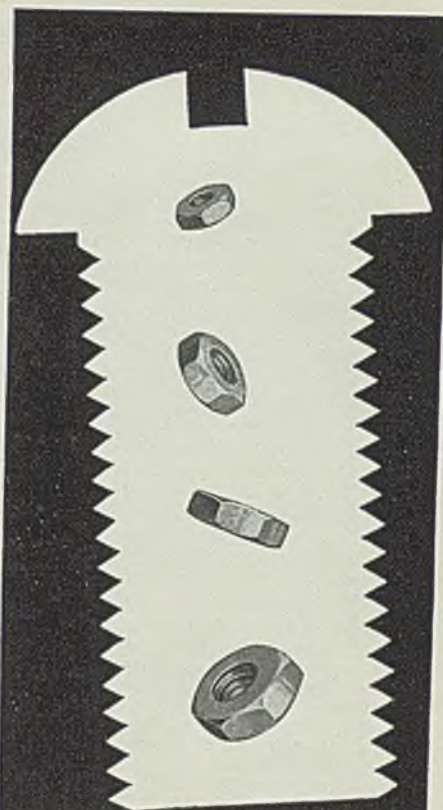
Clips, soft, Cleveland .....14.00

Misc. cast, St. Louis .....7.75-8.00

### SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads .....12.25

Standard No. 12 aluminum .....14.25-14.75



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# Construction and Enterprise

## Ohio

ALLIANCE, O.—Taylorcraft Aviation Corp. plans doubling capacity by a steel and brick addition 80 x 300 feet, to increase production to 2000 planes. New equipment will be installed. D. L. Zacharias is secretary and assistant treasurer.

CLEVELAND—Jordan Welding & Mfg. Co., 9428 Cassius avenue, is planning plant addition. Company now has 2500-square foot warehouse under construction.

CLEVELAND—Eaton Mfg. Co., 755 East 140th street, is building steel frame addition 30 x 66 feet.

CLEVELAND—National Malleable & Steel Casting Co., 10600 Quincy avenue, Charles H. McCrea, manager, is building warehouse addition of 1900 square feet at 2560 Woodland avenue.

CLEVELAND—East Ohio Gas Co., 1405 East Sixth street, will erect a liquid gas storage plant at East Sixty-second street and Lake Erie, to cost \$1,000,000. Will consist of three spherical nickel steel storage tanks 57 feet in diameter with 30-inch cork lining, pumps and compressor units. General contract to Gas Machinery Co., 16100 Waterloo road. Tanks will be supplied by Republic Steel Corp., Republic building, Cleveland.

CLEVELAND—Van Dorn Iron Works Co., 2685 East Seventy-ninth street, will reopen and equip a plant building containing 85,000 square feet floor space for government work, principally tank hulls. The building has stood idle several years.

CLEVELAND—Steel Improvement & Forge Co., 960 Addison road, is building an addition 60 x 80 feet to house a new forging hammer. This extension will cost \$12,000 and is in addition to enlargement reported in STEEL, May 20. J. L. Hunting Co., Ninth-Chester building, is general contractor.

CLEVELAND—Clark Controller Co., Primus Clark, president, 1146 East 152nd street, will build a further addition 30 x 47 feet, costing \$8000. J. L. Hunting, Ninth-Chester building, has general contract. (Noted June 10).

KENT, O.—Gougler Machine Co., 789 Stow street, is building a one-story brick addition 50 x 60 feet to enlarge general manufacturing facilities. Charles G. Kistler, 136 North Water street, is architect.

MANTUA, O.—Briggs Steam Tractor Co., recently incorporated by Carl R. Briggs and John Cunningham, Akron, O., will lease or build plant for manufacture of steam-powered tractors. Hobson L. Dyer, attorney, Akron, O., is in charge.

MINERVA, O.—Minerva Electric Products Inc., Earl W. Allen, president, has been incorporated to take over and expand Allen Electric Products Co., of which Mr. Allen has been proprietor. Company plans addition to plant and office as business expands.

YELLOW SPRINGS, O.—Antioch Foundry plans new plant in or near this town, funds being pledged by business men. Morris Bean is manager.

## Connecticut

MANCHESTER, CONN.—Oxford Soap Co., care Buck & Buck, engineers, 650 Main street, Hartford, Conn., will build a one-story warehouse 120 x 150 feet and a three-story processing building 74 x 115 feet, to cost about \$100,000.

MILFORD, CONN.—U. S. Motors Co. plans erection of a one-story plant on New Haven avenue, with provision for addition of other units.

WALLINGFORD, CONN.—American Cyanamid Co., West Main street, Stamford, Conn., will build a chemical plant to cost over \$40,000.

WATERBURY, CONN.—American

Brass Co., West Main street, has completed plans for a 90 x 195-foot addition, costing about \$400,000.

WATERBURY, CONN.—Waterbury Tool Co., 188 East Aurora street, has let general contract to the Austin Co., 19 Rector street, New York, for a one-story factory addition 150 x 150 feet.

## Massachusetts

LYNN, MASS.—General Electric Co., J. G. Trudger in charge, 920 Western avenue, will build a one-story manufacturing building 80 x 165 feet to cost over \$40,000.

WORCESTER, MASS.—Heald Machine Co., has broken ground for a two-story office building. Company recently completed a manufacturing addition containing 30,000 square feet floor space.

## New York

ELMIRA, N. Y.—R. J. Lancraft, secretary, association of commerce, Federation building, is taking bids for owner on a one-story building for manufacture of lubricants and a distribution plant, costing about \$40,000.

FALCONER, N. Y.—Swanson Machine Co., 59 Hopkins avenue, L. Swanson, general manager, will remodel a three-story factory building bought from Spicer Mfg. Co. Changes estimated to cost about \$40,000.

JAMESTOWN, N. Y.—Jamstown Metal Equipment Co., O. A. Lenna, president and general manager, 1088 Allen street, will take bids soon on a one-story plant, 240 x 700 feet, to house its Blackstone Washer division. Cost about \$250,000.

LOCKPORT, N. Y.—Harrison Radiator Corp. plans a plant addition to cost over \$40,000.

NORTH TONAWANDA, N. Y.—City is considering construction of a sewage disposal plant to cost about \$400,000. FWA aid will be asked.

## New Jersey

ATLANTIC CITY, N. J.—Atlantic City Electric Co., 30 Church street, New York, has let a general contract to M. B. Markland Co., 1325 Boardwalk, Atlantic City, for a powerhouse addition 40 x 100 feet for a steam electric plant. P. Spron, 30 Church street, New York, is engineer.

BAYONNE, N. J.—Bayonne Steel Barrel Co., Constable Hook, N. J., will take bids soon for one-story steel barrel factory.

BENDIX, N. J.—Air Associates Inc. has let contract to Austin Co., 16112 Euclid avenue, Cleveland, for plant and office building costing \$300,000. (Noted June 10.)

## Pennsylvania

ERIE, PA.—Standard Stoker Co. Inc., 1701 Gaskell avenue, will build a plant addition, company engineer taking bids for early award.

JOHNSTOWN, PA.—City council, F. I. Connor, clerk, city hall, has revised plans for a sewage disposal plant to cost over \$100,000. Will apply for PWA assistance. W. A. Goff, 220 South Sixteenth street, Philadelphia, is engineer.

MEADVILLE, PA.—Champion Tool Co., D. B. Higby in charge, has let contract for a one-story addition 50 x 140 feet to H. Shenk, Sassafrass street, Erie, Pa., to cost about \$40,000, with equipment.

PULASKI, PA.—O. Hommel Co., Carnegie, Pa., will build a plant for manufacture of colors and oxides on 50-acre site., at cost of about \$40,000.

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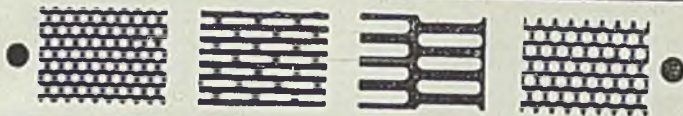
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## Michigan

CHELSEA, MICH.—Chelsea Spring Co. has let general contract to O. W. Burke Co., Detroit, for a \$75,000 addition to its plant. Christian W. Brandt, Detroit, is architect.

DETROIT—H. & H. Tube & Mfg., 261 Scotch avenue, has plans by T. C. Hughes, 120 Madison avenue, for a one-story plant addition.

DETROIT—Detroit Bevel Gear Co., 8130 Joseph Campau avenue, has let general contract to Hazelton-Clark Co., Detroit, for alterations and extensions to plant. (Noted April 22).

LANSING, MICH.—John Deere Plow Co., 735 East Michigan avenue, will build a four-story plant, general contract to Granger Bros. Construction Co., 509 Lincoln street. O. A. Eckerman, 640 Tenth avenue, Moline, Ill., is architect.

OWOSSO, MICH.—Midwest Abrasive Co., 2189 Beaufort avenue, Detroit, has given contract to J. H. Murphey, Owosso, for remodeling the former American Malleables Co. plant at Owosso, which it recently purchased.

PONTIAC, MICH.—Yellow Truck & Coach Mfg. Co. has plans by Albert Kahn Inc., New Center building, Detroit for a one-story plant addition to cost about \$200,000.

SAGINAW, MICH.—Saginaw Malleable Iron division, General Motors Corp. has given general contract to Spence Bros., Saginaw, for an addition to its annealing department.

SPARTA, MICH.—Sparta Foundry Co. has let general contract to Earl H. Beckering, Grand Rapids, Mich, for a plant addition. Weemhoff & Steckete, Grand Rapids, are architects.

## Illinois

AURORA, ILL.—Aurora Pump Co., F. S. Marn, president, has plans by H. Spler, Aurora, for a one-story 60 x 120-foot addition to cost about \$40,000 with equipment.

CHICAGO—Stiger-Hilton Mfg. Co., 5643 Race avenue, has been incorporated with 50,000 shares no par value to manufacture metal specialties. Herrick, Vette & Peregrine, 231 South LaSalle street, Chicago, are correspondents.

CHICAGO—American Phenolic Corp., 1250 West Van Buren street, will build an additional unit to its plant in Clearing Industrial district for manufacture of bakelite and synthetic molding materials at cost of about \$150,000.

GENEVA, ILL.—Burgess-Norton Mfg. Co., manufacturer of screw machine products and sheet metal stampings, has given contract to August Wilson for a plant addition.

ROCKFORD, ILL.—Barber-Colman Co., manufacturer of machine tools, has given contract to Anderson Bros. for a one-story addition 170 x 176 feet.

## Indiana

CONNERSVILLE, IND.—Board of public works, R. W. Castle, chairman, city hall, has approved \$90,000 bonds for waterworks improvements, including a diesel engine pumping unit, filtration plant and reservoir, at cost of about \$200,000. J. W. Moore & Son, 834 Indiana Pythian building, Indianapolis, are engineers.

WARSAW, IND.—Power King Tool Corp., Karl J. Heinzelman and James Collins, new owners, will build a plant 35 x 256 feet on East Center street, East Warsaw. Location for past 20 years has been at Market and Detroit streets.

## District of Columbia

WASHINGTON—Bureau of supplies and accounts, navy department, will receive bids as follows: June 25, schedule 2022, eleven motor-driven sounding machines for various east coast points; schedule 2108, twenty-one motor-driven pumps, spare parts, tools and wrenches for Philadelphia and Mare Island, Calif.; schedule 2000, six portable pneumatic drills for Philadelphia; June 21, schedule 2045, motor-driven portable hydraulic pipe, tubing conduit and structural shape bending machine for San Diego, Calif.; schedule 2050, two motor-driven drilling machines for Alameda, Calif.; June 28 schedule 2059, motor-driven toolroom type precision lathe for Baldwin, Long Island, N. Y.; July 5, schedule 2053, fifty-one gasoline engine-driven portable pumps and spare parts for Mare Island, Calif. and Norfolk, Va.

## Kentucky

LOUISVILLE, KY.—Louisville Gas & Electric Co., Louisville, will build a \$2,300,000 generating plant and \$120,000 transmission line 28 miles long to Fort Knox, Ky., to furnish added power supply to the latter. Generating plant will be of 25,000-kw capacity, a steam unit at the Canal street station.

## Tennessee

KNOXVILLE, TENN. — Tennessee Powder Co. is being organized by J. M. Burnett Jr. and Mrs. Geneva M. Richards, Knoxville, to build a powder manufacturing plant near Memphis, Tenn. British purchasing commission, Washington, is interested. Plant will be built and operated by du Pont interests, with capacity for 50,000,000 pounds of canned powder annually. Cost estimated at \$15,000,000.

## West Virginia

WINDSOR, W. VA.—West Penn Power Co., subsidiary of American Waterworks & Electric Co., and Ohio Power Co., Canton, O., subsidiary of American Gas & Electric Co., New York, joint owners, have awarded general contract to Sanderson & Porter, 52 William street, New York, for power plant extension, including new switch house, 60,000-KVA bank of transformers, dismantling five boilers and installation of new generators, boilers and accessories. To be completed in two years.

## Virginia

FREDERICKSBURG, VA.—Lyons Iron & Metal Co. Inc. has been incorporated with \$10,000 capital to deal in scrap metal, by Leah K. Lyons, president. Harry H. Sager, Fredericksburg, is attorney.

## Missouri

ST. LOUIS—Messmer Brass Co., 2700 South Seventh street, plans an addition to its plant.

ST. LOUIS—American Stove Co., 2001 South Kingshighway will build a stove manufacturing addition on Wilson avenue at cost of about \$300,000.

ST. LOUIS—Carter Carburetor Co., 2838 North Spring avenue, will build a plant addition to cost \$250,000.

## Oklahoma

OKLAHOMA CITY, OKLA.—American Compressed Steel Co. will build a one-story plant addition.

## Wisconsin

MILWAUKEE—Convertible Door Mfg. Co. has awarded contract to J. G. Jansen

Construction Co. for a one-story plant addition 90 x 129 feet. George Schley & Sons, 735 North Water street, are architects.

MILWAUKEE—Seaman Body Corp. has given contract to Permanent Construction Co., 2712 North Holton street, for a one-story plant addition 149 x 216 feet. Emil A. Abendroth is engineer.

MILWAUKEE—Falk Corp., manufacturer of gears, gear drives and castings, will build an addition to its foundry.

WAUSAU, WIS.—Marathon Rubber Products Co., 510 Sherman street, plans a one-story plant 100 x 150 feet.

## Minnesota

MINNEAPOLIS—Board of education, James F. Gould, business superintendent, 305 City Hall, will open bids June 18 for sheet metal machines and small tools for Southwest high school.

MINNEAPOLIS, MINN. — Northern Pump Co. has given contract to Geo. F. Cook Construction Co. for a one-story machine shop addition 91 x 198 feet. Considerable new machinery and equipment will be installed to increase production.

## Nebraska

OMAHA, NEBR.—Dependable Mfg. Co., 122 North Eleventh street, has been organized to manufacture metal furniture, succeeding the former Vittek Mfg. Co. It is headed by A. E. Frisell.

## Montana

MISSOULA, MONT.—Montana Power Co. plans construction of a substation and reconstruction of electric transmission lines, at total cost of about \$125,000.

SIDNEY, MONT.—Richland county, W. A. Leo, county clerk, will build a one-story county machine shop 60 x 100 feet. J. G. Link & Co., Billings, Mont., are engineers.

## California

LOS ANGELES—P. Salter is building a machine shop costing \$5000 at 8631 Melrose avenue, Los Angeles.

LOS ANGELES—Washington Ornamental Iron Works is building a plant addition 40 x 63 feet at 534 East Thirty-first street at cost of \$2000.

LOS ANGELES—Vitaloy Motor Parts Mfg. Co., 437 East Florence avenue, has been incorporated by Frank H. Vaughan and associates.

LOS ANGELES—Baker Oil Tool Co., 6000 Boyle avenue, is building a steel frame plant 38 x 80 feet, to cost \$14,000.

## Washington

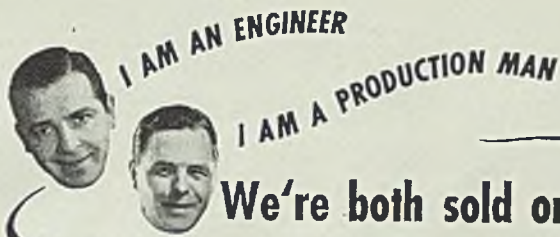
TACOMA, WASH.—Moline Malleable Iron Co. of Washington has been incorporated with \$1000 capital by R. R. Fautleroy and associates, 666 East Eleventh street.

SEATTLE—Seattle Steel Co. has given contract to the Austin Co., Cleveland, for design and construction of a steel and concrete warehouse and office building, the former to be built in September.

SEATTLE—Teal Aircraft Corp. has been incorporated with \$100,000 capital by George R. Whalley and associates, 300 Aurora avenue.

VANCOUVER, WASH.—Great Western Malting Co., William Elnzig, manager, will build a 500,000-bushel malt storage elevator. Plans by E. F. Carter, Vancouver, B. C.





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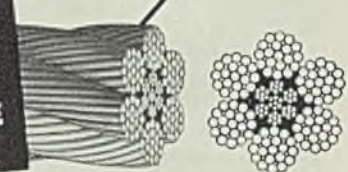
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## Bids Wanted

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