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STEEL

ESTABLISHED 1882

Contents

Volume 107—No. 18 **October 28, 1940**

PRODUCTION · PROCESSING · DISTRIBUTION · USE

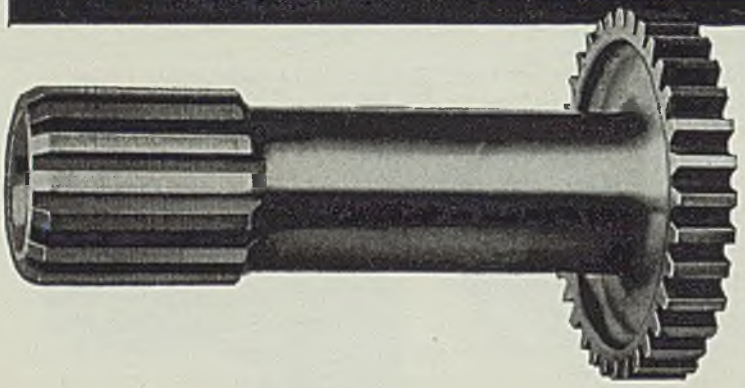
Adding NICKEL TO GEAR STEELS

1—IMPROVES *mechanical properties*
2—SIMPLIFIES *fabricating problems*

PERMISSIBLE COMPRESSIVE STRESSES ON ENGAGED GEAR TEETH

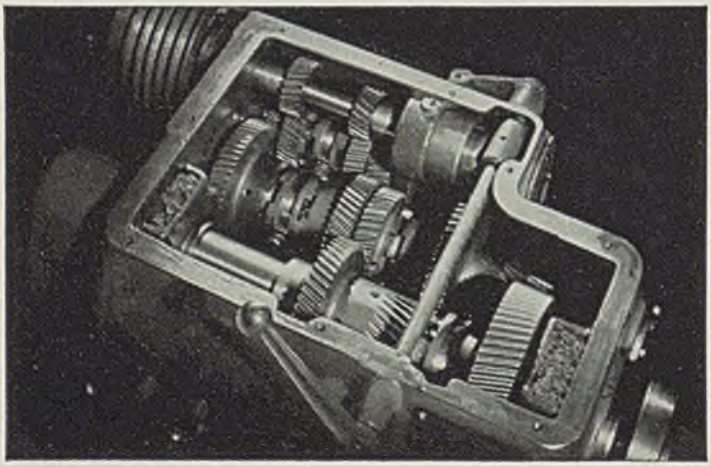
TYPE	NICKEL ALLOY STEELS S.A.E. Classification	PERMISSIBLE COMPRESSIVE STRESS*
Direct Hardening	3150, 4640, 4650, etc.	170,000 lb./sq. in.
Carburizing	3115, 3120	180,000 lb./sq. in.
Carburizing	2315, 2320, 4615, 4620	200,000 lb./sq. in.
Carburizing	3312, 4815, 4820, 2515	215,000 lb./sq. in.

**Compressive stresses calculated from Hertz formula. These values are for intermittently loaded gears and should be reduced 20/25% for constant mesh loading.*



Choosing the most suitable gear steel depends upon getting mechanical properties to safely meet service requirements. But of equal importance are fabricating properties ...uniform response to heat treatment with minimum distortion and freedom from cracking, plus *economical machining*. Today's higher speeds and heavier tooth loadings emphasize the advantages of specifying direct hardening and carburizing gear steels alloyed with Nickel...Nickel alone or in combination.

Hollow quill shaft with integral gear and splines, pictured at left, must be resilient to absorb torque of 500 HP Ranger aircraft engine. To maintain tooth contours and resist fatigue stresses this vital shaft is forged from 3½% Nickel, 1½% chromium steel, SAE 3340.



Strong, tough and wear-resistant, headstock gears in Monarch lathes are 3½% Nickel steel, SAE 2350.

JUST PUBLISHED

"Modern Trends in Nickel Steel and Cast Iron Gear Materials," a paper presented before the American Gear Manufacturers Association 22nd semi-annual meeting. For your copy of this 16-page illustrated booklet, or for personal answers to your gear problems, please address:

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK, N. Y.

STEEL
PRODUCTION • PROCESSING • DISTRIBUTION • USE

HIGHLIGHTING
THIS ISSUE

■ AS STEEL producers strained to place every idle facility into the active list, steel output last week (p. 29) rose another half-point to 95½ per cent of rated ingot capacity. Even this rate is insufficient to keep pace with the present heavy demand, and deliveries on some products continue to edge off a little farther into the future. While buying of all steel products is active, bars, shapes and plates at present are in the lead. Shell steel tonnage (p. 79) is increasing. Much present buying is for inventory or in anticipation. More orders are being placed for first quarter at prices ruling at time of shipment. Some specifying undoubtedly results from increased talk about priorities.

• • •

No Worry on Priority

There should be no cause for immediate worry about priorities. The new priorities board rules (p. 21) that voluntary preference ratings will be continued as far as practical. . . Three pages are required in this issue of STEEL (p. 41) to list government awards of last week that are of interest to the metals industries. . . . SWOC petitions the defense commission (p. 34) to withhold government contracts from labor law violators . . . Roosevelt has lost half of the support he formerly has from men who constitute the "middle class" in the metals industries. Of those participating in STEEL'S poll (p. 22), 81.16 per cent voted for Willkie; in 1936 only 60.78 per cent of these same men voted for Landon.

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Conventions and Defense

Last week marked the floodtide of the Fall convention season. At all of them the chief underlying theme was that of national defense. This was a chief factor for bringing to the 1940 National Metal Congress and Exposition (p. 23) the biggest attendance in history. Machine tool builders talked about the same subject (p. 31) and say they need to know more about design of planes, guns, tanks and other armament before they can determine what tools will be required for their production. Machine tool dealers (p. 35) do not look for collapse after defense pressure falls off; people will continue to have needs in 1950 the same as in 1940 and 1930. . . Tin smelting in the United States (p. 32) is coming closer.

• • •

Handling Strip Coils

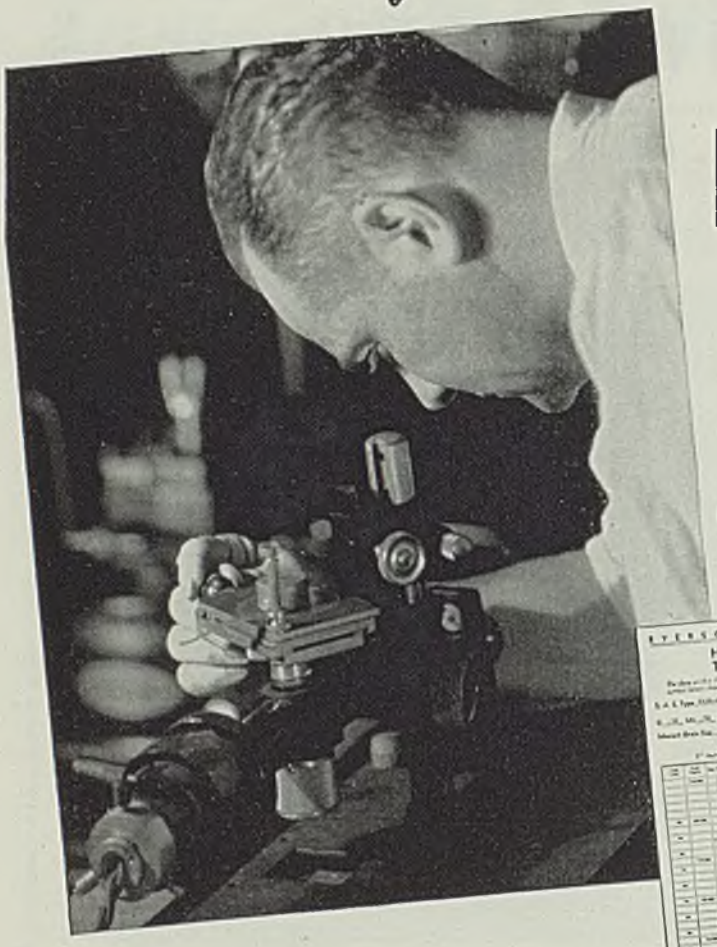
For effective use of radiant energy in drying and baking, certain basic factors must be understood. Correct application of this method makes it possible to get large output with comparatively small equipment. On the other hand, it is not applicable with equal effectiveness to all types of metal finishing work. Herewith (p. 48) is presented the first installment of a three-part article on this subject. . . . Reginald Trautschold (p. 52) describes a conveying system for handling hot strip coils in a Southern tin plate plant. . . . A queer new device (p. 56) dissipates smoke by bombarding it with high-frequency sound waves. . . . New gage (p. 71) measures width of strip moving at 2000 feet per minute.

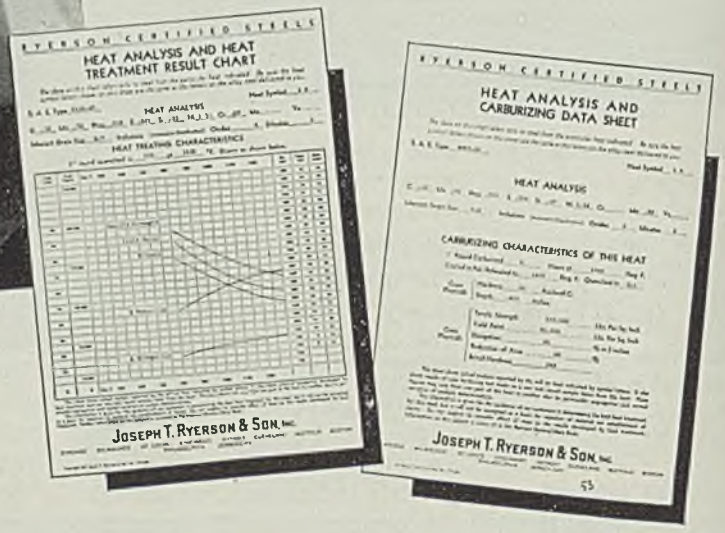
• • •

Press Brake More Useful

E. K. Spring and J. K. Desmond (p. 58) describe a new method for testing hardenability of oil-quenching tool steels. They find it more accurate than other known test methods. . . . Long employed in forming sheets for aircraft fabrication, the press brake is becoming increasingly useful in that field. STEEL (p. 64) portrays some of the shapes now used, also some of the special and suggested dies for aircraft general work. . . . Cresolsulphonic acid added to stannous chloride inhibitor retards oxidation in pickling acid (p. 70), says a British author. Addition of gelatine, he finds, affords cleaner solution and better inhibition than are obtained with flour additions.

Buy Steel with LABORATORY CERTAINTY -at Ryerson





EVERY shipment of alloy steel is accompanied by accurate data based on laboratory tests, covering exact chemical and physical properties, grain size, cleanliness rating and hardening characteristics. With the Ryerson data sheet before you, you know what steel you are getting, you secure best heat treatment results and you save time because you do not have to test.

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RYERSON CERTIFIED STEELS

RYERSON

Priorities Board

To Continue Voluntary

Preference Ratings

Three-Man Board Includes Knudsen, Stettinius, Henderson.

Donald M. Nelson Appointed Administrator of Priorities.

Rules and Regulations Now in Process of Preparation.

Price Controls, To Protect Commercial Buyers, Possible.

■ VOLUNTARY preference ratings system on national defense contracts will be continued as far as practical, the new priorities board announced last week.

The priorities board, comprised of William S. Knudsen, chairman, Edward R. Stettinius Jr. and Leon Henderson, all members of the national defense advisory commission, was established upon recommendation of the defense council and under executive order of the President. Donald M. Nelson, co-ordinator of defense purchases, was appointed administrator of priorities.

At its first meeting, the priorities board approved plans of organization, adopted a number of policies, endorsed previous activities of priorities committee of the army and navy munitions board and directed the the drafting of rules and regulations.

The board agreed that its duties will be to establish principles of policy to govern operation of the priorities system. It was pointed out that the board was established on recommendation of the defense council whose members perceived a growing demand by industry for governmental assistance in settling conflicts arising from the impact of the defense program, especially in those areas where a large portion of productive capacity is engaged in defense work.

The priorities administrator's duties will be to carry out policies adopted by the board to adjust such conflicts. He will make the necessary contacts with industry and with government agencies and will determine that activities of the government departments are consistent with the priorities board's policies.

To assist Mr. Nelson, the board has named A. C. C. Hill Jr., assistant to the co-ordinator of national defense purchases, as deputy administrator.

The priorities committee of the army and navy munitions board is charged with the placing of preference ratings on army and navy contracts and with the adjustment of any conflicts that may arise between the two services. The preference ratings will serve as indications to the manufacturers of the order in which defense contracts are to be filled.

Policies Adopted

Other policies adopted by board included: 1—Delivery dates requested by army and navy on preference-rated contracts should be geared, through proper scheduling, to deliveries of related defense items. Thus all components of tanks, such as radios and machine guns, will bear the same priority rating as the completed tank, delivery dates being so arranged that all components will flow to assembly point at proper time.

2—Preference ratings covering all supply requirements of a specific industry or companies within an industry should not be extended at present. Board felt that extension of such blanket ratings is not required and decided to continue for the present the practice of applying preference ratings to individual contracts.

3—Preference rating AA, which has not been used so far and which would take immediate precedence over all other contracts, private or government, should be reserved for cases of exceptional emergency, and before its use reference should be made to priorities board for policy decision.

4—With advice of machine tool section of defense commission, priorities committee of army and navy munitions board should continue to extend preference ratings to orders for machine tools placed by other machine tool builders. Machine tool builders frequently must purchase their own machine tools from other producers. Unless such extension of preference ratings were permitted, it would be impossible for primary machine tool builders to increase their production in order to meet the demands of the defense program.

Rules and regulations governing action by the priorities board and the administrator of priorities are in the process of preparation. They will be presented for the consideration of the board at an early meeting and thereafter will be referred to the President for his approval.

It is considered possible that priority orders may have to be issued for structural steel, tool steel and alloys. Also such construction as new or expanded munitions and aircraft plants may be granted priority orders for steel. To date, the defense commission has had only a few cases in which a conflict arose on steel shipments. All were adjusted voluntarily.

Use of price controls to protect civilian buyers, when and if rationing becomes necessary, may be a part of the priorities program. Officials emphasized that any application of price fixing will be beneficial to regular commercial buyers of products which also are needed for the defense program.

Text of the president's executive order authorizing the establishment of the priorities board and the appointment of the administrator of priorities:

"Whereas section 2(a) of the act

of June 28, 1940, public No. 671, 76th congress, provides that all naval contracts and orders and all army contracts and orders shall in the discretion of the President take priority over all deliveries for private account or for export; and

"Whereas the public interest requires that provision be made to insure the prompt delivery of materials, articles, equipment, and supplies essential to the national defense; and

"Whereas the council of national defense has established a priorities board composed of the following members of the advisory commission to the council of national defense: The advisor on industrial production, as chairman, the advisor on industrial materials, and the advisor on price stabilization; and

"Whereas the priorities board has designated Mr. Donald M. Nelson as administrator of priorities:

"Now, therefore, by virtue of the authority vested in me by section 2(a) of the said act of June 28, 1940, and as President of the United States, I hereby approve the establishment of the aforesaid board and the designation of the said administrator and authorize the said board and the said administrator, acting in the public interest and in the interest of the national defense, under rules and regulations prescribed by the board with the approval of the President, to require, in accordance with the provisions of the said section 2(a), persons with whom naval and army contracts and orders have been or are placed, to grant priority for deliveries pursuant thereto over all deliveries for private account or for export."

Nelson said: "I want to make it clear that the establishment of the new priorities administration does not mean that a system of mandatory priorities on all national defense contracts will be instituted immediately.

"It is the intention of the administrator of priorities that the system of voluntary preference ratings now applied to certain defense contracts shall be continued.

"In recommending establishment of a priorities board and an administrator of priorities, the national defense advisory commission anticipated an increasing demand for governmental assistance to assure the prompt delivery of items required for the defense program.

"The setting up, at present, of adequate machinery for handling the priority question will be an important aid in preventing industrial confusion, particularly as the program broadens. It will thus be a useful contribution to the national defense effort.

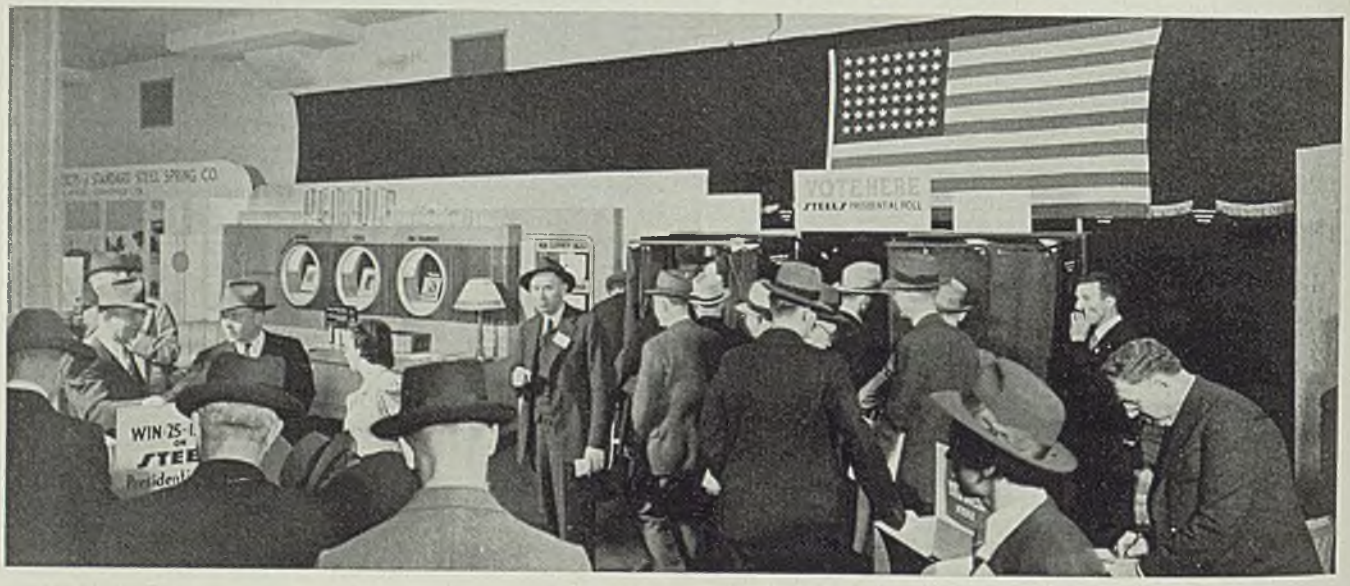
"The immediate tasks of the priorities board and the administrator of priorities will be:

"1. To establish policies governing operation of the priorities system.

"2. To adjust differences that cannot be settled by contractors themselves dealing through procurement officers of the war and navy departments and the priorities committee of the army and navy munitions board.

"3. To handle such priority problems as may arise outside the jurisdiction of the priorities committee of the army and navy munitions board."

Metal's "Middle Class" Voters Swing to Willkie



■ If President Roosevelt meets with defeat in his attempt for a third term it will be due in large measure to the votes of men who constitute the "middle class" in industry.

This fact was demonstrated conclusively in the poll conducted by STEEL at the National Metals Exposition in Cleveland last week.

During the first four days 3354 ballots were cast. Willkie drew 2722 of these votes, or 81.16 per cent. Roosevelt drew 632 votes, or 18.84 per cent.

Of these very same persons, 1776, or 60.78 per cent, said they had voted for Landon in 1936, while 1146, or 39.22 per cent, said they voted for Roosevelt four years ago.

That is, out of 1146 votes for Roosevelt in 1936, nearly half are going to Willkie in 1940.

A revealing fact is that the percentage of high executives voting in STEEL's poll was low. The great majority of the voters included men who occupy positions such as welding foremen, steel treaters, superintendents, metallurgists, engineers and production men who constitute the full range of employes.

The vote was quite consistent from day to day. Willkie's majority averaged 80.54 per cent during the first two days and 81.78 during the third and fourth days.

The results of STEEL's poll can be regarded as highly significant when the 1936 election is recalled. While Roosevelt got 27,476,673 votes, against 16,679,583 for Landon, it would have required a difference of only a few millions of votes in the right states to have swung the balance in the electoral vote.

Complete results of the 5-day poll will be published in STEEL of Nov. 4, but it seems unlikely they will reflect much change from those of the first four days' balloting. Photo, typical view at the voting machines in STEEL's booth.

"Largest Metals Show" Emphasizes New Aids to Defense Production

■ REARMAMENT requirements, with their emphasis on increased production and efficiency, resulted in the 1940 National Metal Congress and Exposition being the largest yet held.

During the first three days more than 22,000 attended the exposition. Total attendance at the show and at meetings of the participating organizations was well over the 25,000-mark reached at Chicago last year. A new record was set for exhibit space occupied, more than 103,000 square feet, by 338 exhibitors. There were 267 last year.

This year's theme was "New Aids to Production"—and the exhibits were replete with improved processes and equipment. Many featured armament items. Actually, products of at least 90 per cent of the exhibitors are being used directly or indirectly in armament manufacture.

One hundred army and navy ordnance men attended sessions of the American Society for Metals, and at least 30 more registered for American Welding society meetings. Many of the 153 papers presented at the congress discussed armament production.

This was the fourth time the congress and exposition were held in Cleveland. The first was in 1925, others in 1929 and 1936.

Four Societies Co-operate

The American Society for Metals, which sponsors the congress and exposition, received whole-hearted co-operation from the American Welding society, conducting its twenty-first annual meeting; American Institute of Mining and Metallurgical Engineers, with the fall meeting of its Institute of Metals and Iron and Steel divisions; and the Wire association, holding its annual meeting.

The American Society for Metals' program included 13 technical sections, the Edward DeMille Campbell memorial lecture, a five-period lecture course on strength of materials under combined stresses, a three-period course on the quenching of steels, the annual business meeting and the annual banquet.

Two of the technical sections constituted a symposium on surface treatment of metals during which ten papers were presented. Exceptionally large attendance was experienced at both lecture course study groups.

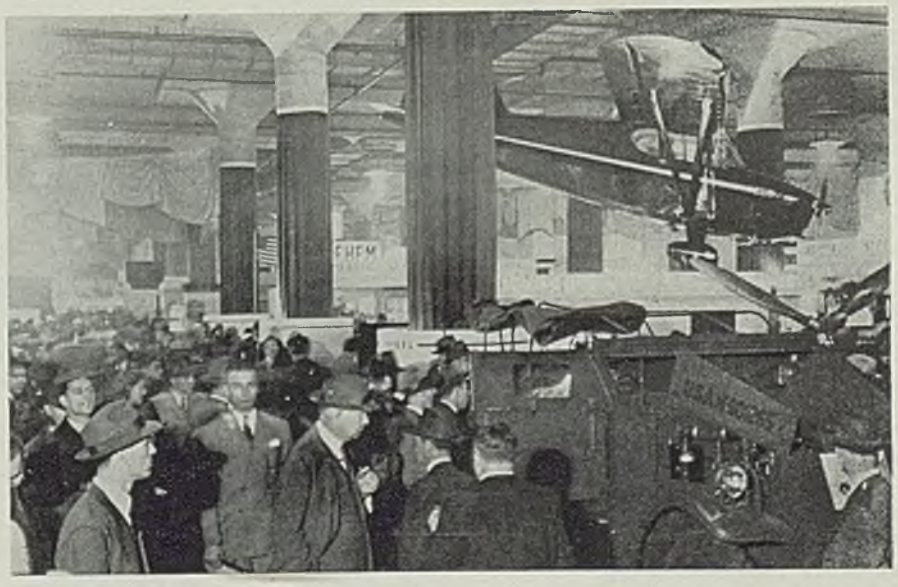
Maxwell Gensamer, associate professor in metallurgy, Carnegie Institute of Technology, Pittsburgh, conducted the five-period course held late each afternoon on strength of metals under combined stresses. This group of educational lectures was supplemented by a series on the quenching of steels by A. A. Bates, Westinghouse Electric & Mfg. Co.; W. J. Conley, University of Rochester, Rochester, N. Y., and R. G. Roshong, Lindberg Steel Treating Co., Chicago.

About 800 members attended the Society for Metals' twenty-second annual meeting, Wednesday morning. James P. Gill, president, reported on an innovation in the society's activities which has received remarkable acceptance. The Philadelphia chapter organized a course in metallurgy for government inspectors and workers on ordnance orders. It was attended by nearly 800. It has proved so successful many other chapters are planning a similar course, an important contribution to the country's rearmament program.

Mr. Gill also reported the society now includes 52 chapters, groups having been organized recently in Birmingham, Ala.; Denver, and Meadville, Pa. Membership in the society now totals 11,122—a new record—compared with 10,220 a year ago. Highspeed tool steels was announced as the subject for the 1941 symposium. The Western Metal Congress and Exposition is scheduled to be held in Los Angeles, May 19, 1941.

The 1941 National Metal Con-

Accent Is on Rearmament



■ View on one of the floors in Cleveland's exposition hall where 338 exhibitors displayed new products and processes, many related to defense

gress and Exposition will be held in Philadelphia the third week in October.

The 1940 Albert Sauveur Achievement award was made to Adolph W. Machlet, American Gas Furnace Co., Elizabeth, N. J., "for outstanding contributions over a long period of years." Technical processes contributed by Mr. Machlet include the Carbonia, or "blue steel," process now employed by government armories, arsenals and small arms manufacturers to impart a blue-black metallic surface finish. Other contributions include the nitriding process, ni-carbing and a new method of clean hardening carbon and high-speed steels. Mr. Machlet's basic work in inventing and developing a direct gas carburizing process and machine has lowered costs and improved quality of product in case-hardening.

Harder Elected President

Officers of the Society for Metals for 1940-1941 were elected as follows: Dr. Oscar E. Harder, assistant director, Battelle Memorial institute, Columbus, O., president; Dr. Bradley Stoughton, dean emeritus, Lehigh university, Bethlehem, Pa., vice president; William H. Eisenman, re-elected secretary. Newly elected trustees include C. Y. Clayton, Missouri School of Mines, Rolla, Mo.; E. L. Bartholomew, United Shoe Machinery Co., Boston.

The society awarded the president's bell, for outstanding work by any of the society chapters, to the Houston, Tex., group.

Certificates of appreciation were presented to Maxwell Gensamer, associate professor of metallurgy, Carnegie Institute of Technology, Pittsburgh; A. Allan Bates, manager, chemical and metallurgical department, research laboratories of Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.; W. J. Conley, department of engineering, University of Rochester, Rochester, N. Y.; and R. G. Roshong, metallurgist, Lindberg Steel Treating Co., Chicago, for their educational lectures conducted as a special feature of the congress this year.

A certificate of appreciation also was awarded Charles M. Strickler, General Machine Works, York, Pa., for ten years' service with the York, Pa., chapter. W. H. Wood-side, president of the society, 1938-1939, received the past-president's plaque. He is vice president in charge of research, Climax Molybdenum Co., Detroit.

A number of amendments to the society's constitution were adopted unanimously, all being revisions merely to clarify meaning.

The 1940 Edward DeMille Campbell memorial lecture was presented by Samuel L. Hoyt, technical adviser, Battelle Memorial institute. His subject, "The Scientific Method in Metallurgy," was developed by tracing the advance of metallurgy from the ancient Greeks up to the study of intermetallic compounds by the X-ray.

Oscar E. Harder

Elected president, American Society for Metals. Was vice president of the Society during the past year. Is assistant director, Battelle Memorial institute, Columbus, O.

At the annual banquet of the American Society for Metals Thursday evening, Gen. Hugh S. Johnson stated his belief that Wendell L. Willkie will be elected president. "The rising tidal wave of public sentiment that is sweeping Mr. Willkie to victory is composed of three elements, none of which has very much to do with the actual arguments of campaign speakers," he said.

"One is the growing faith in the simple homespun honesty of Mr. Willkie.

"The second is the rising disgust for the cleverness, slickness and guile of Mr. Roosevelt.

"The third is the growing popular disgust and fear of cleverness, slickness and guile of politicians as a tribe.

"This country yearns for what the whole world needs, a return to honesty, respect for the pledged word and faith in the promises by which men live."

In introducing the speaker, T. M. Girdler, chairman, Republic Steel Corp., Cleveland, said there was no more forceful exponent of democracy in America than "Gen. Hugh (Iron Pants) Johnson."

Other features at the banquet included presentation of the past president's medal to William P. Woodside, vice president in charge of research, Climax Molybdenum Co., Detroit. A certificate of appreciation was given to Mr. Hoyt for his lecture on Wednesday.

Awards Feature Meeting of American Welding Society

■ THE twenty-first annual meeting of the American Welding society held in Cleveland, Oct. 21-25, as part of the 1940 Metal Congress and Exposition included 15 technical sessions with 53 papers, annual business meeting, industrial research conference, fundamental research conference, and a session for presentation of awards. Registration totaled 1683, compared with 1240 at 1939 annual meeting, a new record.

Presentation of awards high spotted the opening session. The Samuel Wylie Miller memorial medal was awarded to William Spraragen, technical secretary of the American Welding society and editor of *The Welding Journal*, "for conspicuous contributions to the art and science of welding during 21 years in the field."

Award of the Lincoln gold medal donated by James F. Lincoln, president, Lincoln Electric Co., Cleveland, was made to H. J. French and T. N. Armstrong Jr., International Nickel Co., New York. This award, presented each year for the paper which contributed most to the year's development of welding, was made for "Weld Hardening of Carbon and of Alloy Steel."

Presented this year for the first time and scheduled for subsequent years is a new series of awards by the Resistance Welder Manufacturers' association, 505 Arch street, Philadelphia. Awards this year included: First award, $300, to A. M. Unger, H. A. Matis and W. A. Knocke of Pullman Standard Car Mfg. Co., Chicago; second award, $200, to R. S. Pelton, welding engineer, General Electric Co., Schenectady, N. Y.; third award, $100, to J. H. Cooper, welding engineer, Taylor-Winfield Corp., Warren, O.; and four other awards of $25 each to H. C. Cogan, National Electric Welding Machine Co., Bay City, Mich., jointly with R. S. Pelton, welding engineer, General Electric Co., Schenectady, N. Y.; C. F. Marschner, McDonnell Aircraft

Corp.; R. J. Wensley, ITE Circuit Breaker Co., Philadelphia; and jointly to Dr. W. B. Kouwenhoven, professor in electrical engineering, and J. Tampico, graduate student, Johns Hopkins university, Baltimore.

At the Industrial Research conference of the society held Monday, a plea was voiced by Dr. C. A. Adams, chairman of research committee and consulting engineer, Edward G. Budd Mfg. Co., Philadelphia, for the need of fundamental research in college laboratories jointly sponsored by industry to eliminate duplication of efforts by separate industrial researchers.

Investigation on dome versus flat electrodes already has indicated that actually only one type, the flat, is to be considered since the dome soon becomes flat in operation. Work on inertia of welders already has shown that a good welding machine should include provision for proper follow-up as the metal softens if a good weld is to be obtained.

Another study for which $11,000 has been appropriated covers various analyses of steels in rimmed, semikilled and coarse grained types. One of the interesting features of this study is that small experimental heats from laboratory melts are being run in conjunction with regular heats to see if it is possible to correlate the two. If this proves to be true, it opens up an entirely new means of studying laboratory steels, their weldability, best welding and heat-treatment procedures, and so on.

Glen F. Jenks

Elected president, American Welding society. Is colonel, ordnance department, Washington

Officers elected by the society for 1940-1941 were as follows: President, Col. Glen F. Jenks, United States army, Washington; first vice president, K. L. Hansen, consulting engineer, Harnischfeger Corp., Milwaukee; second vice president, David Arnott, chief surveyor and vice president, American Bureau of Shipping, New York. District vice presidents included: For New York, P. J. Horgen, General Electric Co., Lynn, Mass.; for middle-eastern section, E. T. Scott, president, Cleveland School of Welding, Cleveland; for middle-western section, D. H. Corey, welding engineer, Detroit Edison Co., Detroit; for Pacific coast section, L. W. Delhi, Western Pipe & Steel Co., San Francisco; for southern section, O. T. Barnett, metallurgist, Black Sivalls & Bryson, Oklahoma City, Okla.

Elected as new directors were: A. G. Bissell, charge of supervision of welding and casting section, bureau of ships, Washington; J. H. Deppeler, chief engineer, Metal & Thermit Corp., New York; Harold O. Hill, assistant chief engineer of fabricated steel construction, Bethlehem Steel Corp., Bethlehem, Pa.; E. L. Mathy, first vice president, Victor Equipment Co., San Francisco.

Retiring society president, George T. Horton, Chicago Bridge & Iron Co., Chicago, reported at the annual meeting a total membership for the American Welding society of 4344, which compares with 3693 a year ago, an important gain.

Lecture Courses Successful

Lecture courses conducted by sections attracted wide attention. The Washington section course had an enrollment of 1000, largely engineers in government service. Average attendance at the eight lectures was 500. The New York section course on welding metallurgy also was enthusiastically received with a paid enrollment of 256. In addition to the tri-state welding conference and two series of lectures the Cleveland section sponsored a highly successful welding conference, attended by over 450.

During 1939-40, three new sections were organized—at Manitowoc, Wis., Newark, N. J., and the Canal Zone.

Four new committees were organized to cover: Nondestructive tests for welds; codes for fusion welding high-alloy steel engineering structures; inspection of welding; electric welding apparatus. Committees reorganized include those on building codes; standard tests for welds; grouping of materials according to weldability; minimum requirements of instruction for welding operators in trade schools; AWS-ASME conference committee. The society also has appointed representatives on the ASA standardization project "Preferred Voltages—100 Volts and Under"; ASTM committee A10—subcommittee V11 on welding; American co-ordinating committee on corrosion.

The following codes were com-

Writers on Resistance Welding Receive Awards

■ Resistance Welder Manufacturers' association this year inauguarated awards for best papers published on development and application of resistance welding. The 1940 recipients shown here are, left to right: J. Tampico, graduate student, Johns Hopkins university, Baltimore; J. H. Cooper, welding engineer, Taylor-Winfield Corp., Warren, O., and winner of third award, $100; A. M. Unger, H. A. Matis and W. A. Knocke of Pullman Standard Car Mfg. Co., Chicago, joint winners of first award, $300; R. S. Pelton, welding engineer, General Electric Co., Schenectady, N. Y., winner of second award, $200; and T. C. Smith, first vice president of the society making the awards.

pleted: Tentative standard methods for mechanical testing of welds; tentative definitions of welding terms and master chart of welding processes; tentative rules for field welding of storage tanks; tentative specifications for iron and steel arc welding electrodes; welding symbols and instructions for their use; recommended procedure to be followed in preparing for welding or cutting certain types of containers which have held combustibles; AWWA-AWS tentative specifications for elevated steel water tanks, standpipes and reservoirs; standard qualification procedure — section 1 —manual arc and gas welding of ferrous materials; welding of pipe joints (chapter 4 of the ASA code for pressure piping).

Annual banquet was attended by more than 400. Toastmaster was Fred L. Plummer, chief research engineer, Hammond Iron Works, Warren, Pa., who has been elected treasurer of the society to serve out the office held by Charles A. McCune, secretary, Magnaflux Corp., New York, who died recently. Principal speaker of the evening, C. A. Adams, chairman of the research committee and consulting engineer, Edward G. Budd Mfg. Co., Philadelphia, paid a tribute to the memory of Charles A. McCune. George T. Horton, retiring president, also spoke.

Lincoln Gold Medal Presented to Armstrong and French

■ The Lincoln gold medal award, for the paper contributing most to the year's development of welding, was awarded at opening session of the American Welding society for, "Weld Hardening of Carbon and of Alloy Steel," written by H. J. French and T. N. Armstrong Jr., International Nickel Co., New York. The medal was presented by Prof. L. W. Clark, Rensselaer Polytechnic institute, Troy, N. Y., at extreme right, to Mr. French and Mr. Armstrong, extreme left, second from the right is George T. Horton, president of the society.

Progress in Bessemer Steelmaking Is Outlined at A.I.M.E. Meeting

■ AMERICA'S access to mineral supplies might have a profound influence on the final outcome of the European war, according to R. C. Allen, consultant for the industrial materials division of the national defense commission and first vice president of Oglebay, Norton & Co., Cleveland.

Mr. Allen spoke at the annual autumn dinner of the institute of metals and iron and steel divisions of the American Institute of Mining and Metallurgical Engineers, which held its fall meeting in Hotel Cleveland, Cleveland, Oct. 21-23.

Without minerals and other raw materials, our national defense program would soon crumble, Mr. Allen stated. America has a sufficient supply of manganese to meet requirements for the next two years and sufficient tin for at least a year. The manganese supply, he explained, embraces the increased production from Cuban sources, an increased yield from domestic deposits, and the substitution of low-grade domestic ores for high-grade imported manganese.

Reserves of antimony, chrome ore, tungsten and quartz crystals are beginning to accumulate and purchases of these and other minerals are being made right along. Salvage and reclamation programs are being devised by mineralogists and while it is hoped these plans may never have to be used, still they may be of importance under critical conditions.

Bessemer steel production at present is much too low for a correct balance of processes within the steel industry in the opinion of H. W. Graham, director of metallurgy and research, Jones & Laughlin Steel Corp., Pittsburgh, who spoke at one of the sessions.

Mr. Graham described how research and plant metallurgical staffs have produced a method that has helpful control features in bessemer operations, pointing out that the flame is viewed by a suitable photocell and amplifier arrangement and a continuous graphic record is obtained of the energy registered. With this system in operation, he explained, it is possible for the first time in bessemer history, to check the blower's visual estimations against an instantaneous instrumentally obtained record.

He announced that efforts now are being directed to full exploration of the exact length of afterblow that is most favorable for each grade of product and each phase thereof. Where various quality factors in a single grade call for a different periods of afterblow, he stated, the best possible compromise will be selected. In this way progress may be achieved toward a degree of uniformity never before reached in bessemer practice.

Sees Increased Bessemer Output

He explained that gradual erosion of the lining or slow building up of vessel skulls will produce gradual changes which can be compensated for by an alert blower, but he can hardly be held responsible for sudden fluctuations in power supply such as inevitably will occur if other heavy equipment is fed from electric or hydraulic lines used to rotate the converter.

Decline of the bessemer process, he stated in conclusion, probably has gone somewhat further than is justified by present economic considerations, and these considerations will tend to sustain and perhaps even increase bessemer production in coming years.

A new process of rapid dephosphorization of bessemer steel was described for the first time by G. M. Yocom, superintendent, steel works and rolling mills, Wheeling

Steel Corp., Benwood, W. Va. The process has been in operation for the past three years at the Benwood plant and approximately 250,000 tons of low phosphorus steel has been produced and applied to products where a low phosphorus content is required, the speaker pointed out.

The dephosphorizing method requires a blown metal temperature in excess of normal for the purpose of melting a dephosphorizer added in the cold state. Temperatures, he continued, affect slag fluidity and he found a silicon to manganese ratio of 2-1 coupled with young blowing was a minimum requirement for the production of a proper type of thick slag.

Has Individual Properties

Blast furnaces making bessemer iron, he explained, are usually operated on three or four ores to produce an iron of normal content at the lowest cost. In this case a manganese content of about 0.50 per cent is normal. This process is followed, he stated, but the silicon and manganese contents are adjusted to the requirements for producing the proper type of converter slag. Controlling the silicon-manganese ratio permits the use of a cross section of the available ores rather than a selected few. At the same time the proper type of thick converter slag is obtained even with the higher blowing temperatures.

Mr. Yocom asserted that the steel has rather distinct properties of its own and in certain products it is better than either open-hearth or regular bessemer steel. It has good welding and machining qualities of normal phosphorus steel and some of its stiffness and reaction to cold works but at a much lower degree of brittleness under impact stresses. On the other hand, he explained, it has properties of ductility comparable to low-carbon open-hearth steel of about 0.070 per cent phosphorus content but with a better threading and welding quality. He added that it should be applicable to various products in addition to the applications of tubular goods and flat rolled sheet products.

Inspect Cleveland Plants

■ Inspection trips sponsored by the American Society for Metals in connection with the Metal Congress and Exposition interested many visitors. Plants visited included those of Tinnerman Products Inc., White Motor Co., General Electric Co., Republic Steel Corp., Lamson & Sessions Co., Ohio Crankshaft Co., Otis Steel Co., Cleveland Tractor Co., Eaton Mfg. Co., National Acme Co., and American Gas association's laboratories, all in Cleveland.

Steelworkers To Do 100 Per Cent Job, White Tells Wire Association

■ MEN who make steels for national defense will do their job 100 per cent, C. M. White, vice president, Republic Steel Corp., Cleveland, told members of the Wire association. He said these men are "mighty good citizens," and if this country should ever be threatened by any foreign power, "you can bet they will go to work, hammer and tongs, without a single reservation, for the defense of the United States."

He spoke at a luncheon of the association which met in the Carter hotel, Cleveland, Oct. 21-25.

Today especially it is a major part of the responsibility of management to know and to follow the individual records and accomplishments of every employe in order that the people of this country may be assured that steel for national defense is being made by men of proved skill and ability, he stated.

The association's annual medal for the most meritorious paper on wire manufacture or fabrication during the year was awarded R. W. Sandelin, metallurgist, Atlantic Steel Co., Atlanta, Ga. Honorable mention was awarded H. W. Blount, development engineer, Western Electric Co., Baltimore, and J. E. Wiltrakis, in charge of engineering and wire mill operation, Western Electric Co., Kearny, N. J.

Mr. Sandelin pointed out that silicon and phosphorus are important to consider as far as the appearance of galvanizing coating is concerned. Steel with a silicon content of 0.20 to 0.30 per cent tends to impart a bright coating especially if a reasonably long immersion in the zinc is followed. If phosphorus is high enough, it will turn the steel gray. If above 0.40 per cent, it imparts a grain effect on the steel. Titanium, he stated, tends to impart a bright coat.

Reactive drawing methods are applicable to most wire mills in the opinion of H. A. Stringfellow, Worcester, Mass. If the product is of a highly competitive nature and costs are paramount, the speaker stated, then reactive drawing will lessen the cost of dies, lubricant, power and heat treatment and increase production. For airplane construction, a superior high strain airplane wire can be produced reactively at a higher rate of production and at a lower cost.

Lime tubs should be cleaned frequently to avoid deficiency of binder in the coating and poor adherence and flaking. This was the advice of D. E. Washburn, chief chemist, American Lime & Stone division, Warner Co., Bellefonte, Pa. He announced that X-ray studies are at present being made in the hope that various physical phenomena in lime and lime products may be revealed.

Readiness for Defense Work Indicated by Many Exhibits

■ ARMAMENT items and special machines for national defense material manufacture were prominent in the exposition.

Republic Steel Corp., Cleveland, exhibited a new armored scout car made by White Motor Co., Cleveland, for the United States army. Suspended from the ceiling over Republic's booth was a Stinson army training plane, all metal, chiefly aluminum and chrome-molybdenum steel. Also displayed were combat aircraft propellers of chromium, nickel and molybdenum steels, and an all-stainless steel collapsible field kitchen. Shot welding high tensile alloys was demonstrated by the company.

Revere Copper & Brass Inc., New York, featured a torpedo head, phosphor bronze, 58-inch diameter circle, ready to be loaded and put into action. Revere also showed an army field kitchen range. In glass-covered and illuminated alcoves it presented cartridge manufacture in various stages. Thus appeared 70-30 cartridge brass disks for 75-millimeter shell cases, and primer assembly, 75-millimeter shrapnel shells, complete with case, shells and shrapnel balls, and a rotating band for a 9.2-inch shell.

Pangborn Corp., Hagerstown, Md., exhibited aerial bombs and torpedoes.

Several exhibitors emphasized their readiness for defense work, such as the Surface Combustion Corp., Toledo, O., which placarded the message: "These furnaces being used for armament work." Actually the products of at least 90 per cent of the exhibitors are being used in

(*Please turn to Page* 96)

FINANCIAL

YOUNGSTOWN SHEET & TUBE PLANS REFUNDING ISSUE

■ Youngstown Sheet & Tube Co., Youngstown, O., recently reported plans for financing totaling $55,500,000 to effect further substantial reduction in the company's mortgage debt. Frank Purnell, president, declared that as an initial step in the broad refunding program the company has sold to commercial banks $10,500,000 of one to seven-year debentures at interest rates from 0.4 to 2.1 per cent.

Registration statement covering proposed issuance and sale of $45,000,000 first mortgage 3¼ per cent bonds was to be filed with the securities and exchange commission immediately. Proceeds of bonds and serial debentures will be used to refund the currently outstanding $55,500,000 of first mortgage series C, 4 per cent bonds due 1961, callable to May 1, 1945, at 104.

Kuhn, Loeb & Co. and Smith, Barney & Co. head the group which will underwrite the new first mortgage bonds.

INTERLAKE IRON CORP.

Interlake Iron Corp., Chicago, earned net profit of $269,096 in third quarter, after depreciation, interest, ordinary taxes and provision of $75,000 for amortization of its investment in Dalton Ore Co. No provision, according to the company's report, was made for federal or state income taxes or federal excess profits tax.

The quarter's profit compares with a net loss of $311,385 in the period a year ago, and $147,190 net loss in the quarter ended June 30. For nine months ended Sept. 30 indicated net profit, computed from quarterly reports, was $13,538. In the 1939 period, net loss aggregated $1,104,637.

JONES & LAUGHLIN

Jones & Laughlin Steel Corp., Pittsburgh, reports consolidated net profit in third quarter was $2,956,647 after federal income taxes at new rates, interest, depreciation, depletion and other charges. Equal to $3.35 per common share after quarterly dividend requirements on the company's 7 per cent preferred, which carries an accumulation of unpaid dividends, last quarter's net profit was highest for any quarterly period since 1930.

It compared with net income of $1,129,001 or 17 cents per common share in the period last year. Net earnings in June, 1940, quarter were $2,141,645, equal to $1.93 per common share. Increased taxes for the nine months, levied under the recently enacted excess profits revenue act, were charged against third quarter, lowering the period's net.

Aggregate net profit in first nine months was $6,232,903, equal to $5.47 per share on common. In the 1939 period, total net income was $281,189 or 48 cents per share on the 7 per cent preferred.

It has been reported Jones & Laughlin is considering means of clearing up dividend arrearages on the 7 per cent preferred, now aggregating $44.25 per share. One proposal said to be under consideration is to offer holders of the 7 per cent preferred new 5 per cent preferred in exchange. Fractional shares of the new issue would be offered to cover accumulated back dividends. Three $1 payments were made this year on account of accumulations after a lapse since latter part of 1937.

RUSTLESS IRON & STEEL CORP.

Rustless Iron & Steel Corp., Baltimore, reports net income in nine months ended Sept. 30 aggregated $824,190, after depreciation, federal income and excess profits taxes at the new rates and other charges. This was equal, after dividend requirements on the company's $2.50 preferred stock, to 82 cents per share on common. Adjusted net

50 Consumers' Third Quarter Earnings Up 54 Per Cent

■ AGGREGATE net earnings of 50 iron and steel consumers in third quarter this year was $32,937,903. This was an increase of more than 54 per cent over $21,379,914 earned by the same companies in the corresponding period in 1939. Two companies reported net loss for the quarter, against 10 last year. The same companies' aggregate net earnings in first nine months totaled $97,057,983, or 73.9 per cent more than $55,804,732 in the period last year. Two reported a deficit for the nine months, against nine in the period last year. All figures tabulated below are net earnings, except where asterisk denotes loss:

	Third Quarter		Nine Months	
	1940	1939	1940	1939
American Brake Shoe & Foundry Co., New York	$629,853	$406,954	$1,856,489†	$1,326,888†
American Radiator & Standard Sanitary Corp., New York	2,184,901	1,374,758	3,720,806	1,428,185
American Stove Co., St. Louis	309,081	351,114	817,789	1,051,755
Atlas Tack Corp., Fairhaven, Mass.	32,146	29,626	85,332	76,010
Aviation Corp., New York (c)	362,679	323,840*	72,855	1,324,047*
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.	98,187	27,694*	193,032	36,265*
Bliss & Laughlin Inc., Harvey, Ill.	165,723†	137,861†	513,941	391,376
Bridgeport Machine Co., Wichita, Kans.	45,888*†	35,405*†	106,683*	172,088*
Briggs & Stratton Corp., Milwaukee	163,009	164,024	833,595	716,402
Budd (Edward G.) Mfg. Co., Philadelphia	99,001	401,854*	1,064,353	126,920*
Budd Wheel Co., Philadelphia	223,812	33,761	577,057	310,035
Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.	23,243†	66,372†	392,476	27,404
Caterpillar Tractor Co., Peoria, Ill.	1,977,122†	1,585,775†	5,486,636	3,901,155
Chicago Railway Equipment Co., Chicago	31,652	29,829	179,389†	42,218†
City Auto Stamping Co., Toledo, O.	158,346	175,611	314,722	304,564
Continental Motors Corp., Muskegon, Mich. (b)	181,399†	18,575*†	389,138	144,809*
Cutler-Hammer Inc., Milwaukee	182,864†	167,067†	925,227	410,480
Doehler Die Casting Co., Toledo, O.	115,979†	135,571†	709,914	398,700
Eaton Mfg. Co., Cleveland	814,502†	351,339	2,722,850	1,637,030
Emsco Derrick & Equipment Co., Los Angeles	50,709*	138,496	18,716	39,708
Fairbanks Co., New York	27,476	29,524	42,220†	32,613†
Federal-Mogul Corp., Detroit	156,124	80,491†	467,968	366,496
Ferro Enamel Corp., Cleveland‡	69,848	42,384	319,042	308,850
Florence Stove Co., Gardner, Mass.	419,823†	422,068†	862,968	770,304
Fyr-Fyter Co., Dayton, O.	20,771†	13,185†	32,410	25,296
Gardner-Denver Co., Quincy, Ill.	257,202	213,940	778,715	663,463
General Electric Co., Schenectady, N. Y.	11,113,204†	8,652,439†	37,094,776	25,022,631
Hudson Motor Car Co., Detroit	530,000	670,848*	1,290,200*†	2,422,523*†
Jackson (Byron) Co., Huntington Park, Calif.	16,962	121,330	258,280	340,556
Johns-Manville Corp., New York	1,645,567	1,472,255	3,530,544	2,765,999
LeTourneau (R. G.) Inc., Peoria, Ill.	306,949†	635,262†	1,458,992	1,534,233
Marion Steam Shovel Co., Marion, O.	117,650†	12,534*	319,289	89,066*
Minneapolis-Honeywell Regulator Co., Minneapolis	964,440	779,555	1,568,361	1,134,622
Monarch Machine Tool Co., Sidney, O.	138,783†	204,046†	800,977	377,830
Mullins Mfg. Corp., Salem, O.	88,975	2,088*	255,395	115,592
National Malleable & Steel Castings Co., Cleveland	312,457	131,682	931,214	450,180
New York Air Brake Co., New York	491,659	157,329	1,324,477	373,620
Remington Rand Inc., Buffalo	499,969	201,831	2,265,967†	675,091†
Savage Arms Corp., New York	351,368	155,185	577,864†	229,378
Seagrave Corp., Columbus, O.	1,045†	26,660	19,185	6,774*
Superheater Co., New York$	310,470†	181,568†	821,108	445,741
Symington-Gould Corp., Rochester, N. Y.	45,808	6,077*	649,092	16,310
Transue & Williams Steel Forging Corp., Alliance, O.	9,388	898	44,667	373
Twin Coach Co., Kent, O.	170,352†	89,668	380,352	437,339
Underwood Elliott Fisher Co., New York	303,839	298,540	1,377,223	1,159,459
U. S. Hoffman Machinery Corp., New York	92,464	5,215*	257,706	35,354
Walworth Co., New York	302,255†	104,304†	505,670	41,322*
Westinghouse Air Brake Co., Wilmerding, Pa.	1,305,287	630,249	4,509,287†	1,490,190†
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.	4,746,315	2,731,023	14,583,327	9,069,810
Worthington Pump & Machinery Corp., Harrison, N. J.	464,551	360,470	1,543,473	265,306

†Indicated; *loss; $excluding Canadian affiliate; ‡excluding earnings of Holland company; (b) period ended July 31; (c) period ended Aug. 31.

profit for the period last year was $645,028 or 66 cents per common share after preferred dividend requirements.

Net profit for third quarter this year was $321,588 or 32 cents per share on common. In the 1939 period, reported net income was $262,045; adjusted net profit in June quarter was $254,754 or 25 cents per share on common.

OTIS STEEL CO.

Otis Steel Co., Cleveland, reported third quarter net profit, after depreciation, depletion and deduction for normal federal income tax was $464,665. Net loss in the previous quarter was $196,630; in third quarter last year net deficit totaled $184,517.

Net profit earned in first nine months this year was $102,523 and compared with an aggregate net deficit of $435,958 in the period last year.

COPPERWELD STEEL CO.

Copperweld Steel Co., Glassport, Pa., reports net income earned in nine months ended Sept. 30 aggregated $798,736 after federal income taxes at the increased rates. This was equal to $1.38 per share on common after provision for dividends on the company's $50 par 5 per cent preferred and compared with $610,549 net income earned in the period last year.

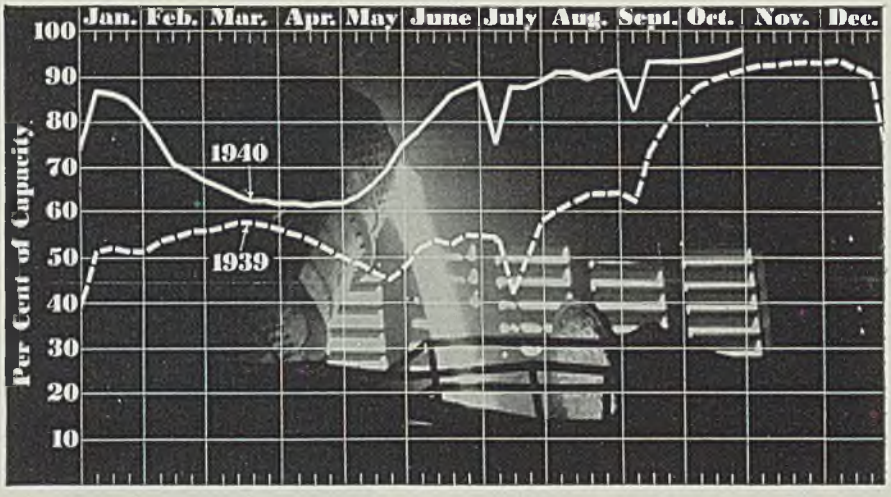
WICKWIRE SPENCER STEEL CO.

Wickwire Spencer Steel Co., New York, reports third quarter consolidated net income, before provision for income taxes, was $125,861. This compared with $177,471 net deficit incurred in this year's second quarter and with net loss of $52,661 in third period, 1939.

Aggregate net deficit in first nine months, computed from quarterly reports, was $314,310, compared with $360,514 net loss in the period last year. In first nine months of 1938, net loss was $587,481. Net profit aggregating $1,077,786 was earned in first three quarters of 1937.

ACME STEEL CO.

Acme Steel Co., Chicago, steel fabricator, reports net income earned in September quarter was $602,688 after depreciation, interest, federal income and excess profits taxes and other charges. This was equal to $1.84 per share on the company's par $25 capital stock and compared with net profit of $443,184 or $1.35 per capital share in the period a year ago. Acme reported net profit of $661,149 or $2.02 per share in the June 1940 quarter.



PRODUCTION... Up

■ STEELWORKS operations last week advanced ½-point to 95½ per cent. Six districts gained, two declined slightly and four held at unchanged rates. Last year the rate was 92 per cent; two years ago it was 54½ per cent.

Birmingham, Ala.—Continued at 97 per cent. Addition of one open hearth scheduled for next week will raise rate to 100 per cent.

Cincinnati—Rose 4 points to 94 per cent with all open hearths at two mills in production. Ingot stocks have been depleted.

Detroit—With only one open hearth idle the rate is estimated at 97 per cent, a gain of 1 point.

St. Louis—Unchanged at 82½ per cent, with 21 open hearths in production.

Youngstown, O.—Gained 1 point to 91 per cent, which will be held this week.

New England—Advanced 5 points to 90 per cent, two producers having all open hearths on.

Chicago—Dropped 1 point to 98 per cent, four producers making small reductions.

Pittsburgh—Up 2 points to 92 per cent, with rate next week scheduled at 95 per cent, all-time high.

Wheeling—Declined 4½ points to 93½ per cent. Indications are for resumption of 98 per cent rate this week.

Central eastern seaboard—Held at 93 per cent for the third consecutive week.

Buffalo—Steady at 90½ per cent for the week, although a peak of 93 per cent was reached for two days at midweek.

Cleveland—Addition of one open hearth each by two producers raised the rate 4½ points to 90 per cent, with a slight recession for repairs expected this week.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Oct. 26	Change	Same week 1939	Same week 1938
Pittsburgh	92	+ 2	91	42
Chicago	98	− 1	90	46.5
Eastern Pa.	93	None	72	34
Youngstown	91	+ 1	92	61
Wheeling	93.5	− 4.5	93	59
Cleveland	90	+ 4.5	90	74
Buffalo	90.5	None	93	49
Birmingham	97	None	94	57
New England	90	+ 5	90	55
Cincinnati	94	+ 4	88	70
St. Louis	82.5	None	80	43
Detroit	97	+ 1	95	82
Average	95.5	+ 0.5	92	54.5

Scrap, Pig Iron Exports Decline in September

■ September exports of steel and iron scrap dropped to 215,116 gross tons, valued at $4,318,837, compared with 346,087 tons, valued at $5,741,660 in August.

Shipments to Japan increased to 148,332 tons, compared with 137,429 tons in August. Exports of scrap to Great Britain fell to 75,049 tons from 136,604 tons in August. Canada took 22,298 tons in September, compared with 55,111 tons in August. Scrap exports also included 3866 tons to Mexico in September.

Pig iron exports also were lower at 84,677 tons valued at $1,985,443. Great Britain took 82,744 tons valued at $1,937,812.

Exports of ingots and blooms were heavier, 353,448 tons of non-alloy material in this classification valued at $13,236,502. Great Britain was leading buyer with 312,949 tons at $11,570,756; Japan, 10,709 tons at $460,891. Alloy ingots and blooms, including stainless, totaled 38,576 tons valued at $1,903,213. Great Britain bought 36,323 tons valued at $1,813,001.

MEN of INDUSTRY

■ W. M. BLACK has been appointed president, American Manganese Steel division, American Brake Shoe & Foundry Co., Chicago. Mr. Black became general sales manager of the division in 1934 and a vice president in 1935. He has been with the organization since 1912, except for a period during the World war when he served as a lieutenant in the United States ordnance department. W. E. Crocombe, formerly head of the American Manganese steel division, continues as president of the American Forge division of the company.

♦

R. S. Clingan, the past ten years associated with Republic Steel Corp., Cleveland, has been named Chicago district manager, Copperweld Steel Co., Warren, O.

♦

W. E. Bruere is manager of sales, electrical wire division, John A. Roebling's Sons Co., Trenton, N. J., succeeding E. E. Eagon, retired.

♦

Hugh Krampe has been appointed Chicago district sales manager, Shaw-Box Crane & Hoist division, Manning, Maxwell & Moore Inc., Muskegon, Mich., with headquarters in the Field building.

♦

D. C. Peterson, formerly vice president in charge of manufacture, Buda Co., Harvey, Ill., has been appointed works manager, Superior Engine division, National Supply Co., Toledo, O.

♦

Harold B. Thomas, one of the founders of Elastic Stop Nut Corp., Union, N. J., and vice president in charge of sales, has resigned to enter consulting work in industrial product analysis and market research. He remains active as a director and member of the executive committee of the corporation.

W. M. Black

♦

Wilbur R. Varney, the past two years associated with Bethlehem Steel Co., Bethlehem, Pa., has been named metallurgist, Taylor-Wharton Iron & Steel Co., High Bridge, N. J. He succeeds Roy A. Gezelius.

♦

H. F. Harper was re-elected president and general manager, Motor Wheel Corp., Lansing, Mich., at the corporation's annual meeting, Oct. 22. All other officers and members of the board of directors also were re-elected.

♦

W. T. Roundy has been transferred to the Atlanta, Ga., office of Cutler-Hammer Inc., Milwaukee. He will cover Florida and will make his headquarters at Orlando, Fla. A graduate electrical engineer of Marquette university, Mr. Roundy began his career with Cutler-Hammer in the manufacturing division at Milwaukee. He later served in the merchandising and resale sales departments, and also as sales engineer in the company's Cincinnati and Indianapolis offices.

♦

S. J. Horrell has been appointed vice president, and Harry Gay, chief engineer, power piping division, Blaw-Knox Co., Pittsburgh. Mr. Horrell joined the company in May, 1939, and has been serving in the power piping division as sales manager. His duties have been increased to include charge of engineering and sales.

Mr. Gay has had extensive technological experience in paper and pulp processing, power plant engineering and hydraulics. He was formerly associated with Stone & Webster, Sargent & Lundy, Greeley & Hansen, Day & Zimmerman, and Henry C. Ulen, engineering organizations.

S. J. Horrell

♦

C. E. Wooliever, assistant personnel director, Buick Motor division, Flint, Mich., was elected secretary, automotive and machine shop section, National Safety council, at its annual meeting in Chicago. Mr. Wooliever directs safety work for Buick.

♦

Colin L. Campbell, for 20 years president and general manager of Cadillac Machinery Co., Detroit, dealer in machinery and tools, is now operating as Campbell's Cadillac Machinery Co., 110 East Hancock avenue, Detroit.

♦

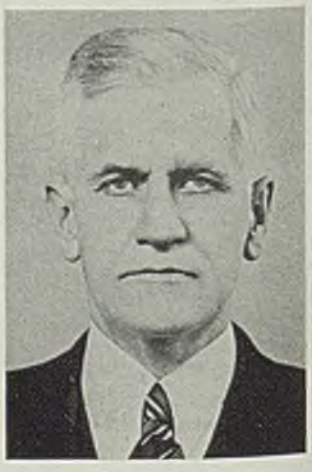
Herbert M. Wertz has been placed in charge of advertising of Toledo Steel Products Co., Toledo, O. Mr. Wertz is well known in the automotive industry, having been associated a number of years with the industrial division of De Vilbiss Co., Toledo.

♦

Harry C. Brainard, the past six years associated with the polishing-grain cement department, Park Chemical Co., Detroit, has joined the sales and service department of Industrial Lubricants Co. Inc., Detroit, maker of polishing wheels, cement and drawing compounds.

♦

George W. Curtis has been appointed Milwaukee division manager, Timken Roller Bearing Co. Industrial and automotive bearing sales as well as alloy steel sales activities of this division will be



Harry Gay

George W. Curtis

under his supervision. Since graduation in 1920 from Carnegie Institute of Technology he has served in important engineering sales capacities at Canton, O., and Pittsburgh, and upon his transfer from Pittsburgh to Milwaukee in 1930, was made district manager of the industrial division.

♦

L. M. Nesselbush recently was made a director and vice president, Falcon Bronze Co., Youngstown, O., succeeding the late R. H. Doeright. D. A. Endres was elected a director, to succeed the late C. H. Kennedy.

F. V. Geier Machine Tool Builders' President

■ Frederick V. Geier, president, Cincinnati Milling Machine Co., Cincinnati, was elected president of the National Machine Tool Builders' association at the annual meeting at the Edgewater Beach hotel, Chicago, last week.

Other officers elected: First vice president, Clifford S. Stilwell, executive vice president, Warner & Swasey Co., Cleveland; second vice president, George H. Johnson, president, Gisholt Machine Co., Madison, Wis.; treasurer, E. C. Bullard, vice president, Bullard Co., Bridgeport, Conn.

Three new directors were elected for three-year terms to serve on the board of nine. They are: L. W. Scott Alter, president, American Tool Works Co., Cincinnati; David Ayr, president, Hendley Machine Co., Torrington, Conn.; and George H. Johnson. Mrs. Frida F. Selbert continues as secretary, and Tell Berna as general manager.

Engineering problems of the national defense program are not yet fully recognized, John E. Lovely, vice president, Jones & Lamson Machine Co., Springfield, Vt., and retiring president of the association, stated.

"The biggest need of our industry is to know what our full task is to be, and when it should be done," said Mr. Lovely.

The machine tool industry is far ahead of most American industries in expansion of facilities and capacity for national defense, Mr. Lovely pointed out. Because of foreign orders, chiefly from Britain, plus an early realization upon the part of the machine tool industry of the vital need of machine tools for national defense, the industry has during the past year enormously expanded its plants and equipment and has already increased its output to a point more than double the rate of a year ago and over 2½ times the output of the peak year of 1929.

Lovely stressed the fact that the design of planes, guns, tanks, and other equipment, and the quantities in which such equipment would be needed are just now beginning to be indicated to the industries which are expected to produce this equipment, and explained that until these facts are definitely determined it is impossible for the machine tool industry to know just what machine tools will be needed for national defense production by the various factories of the country, or in just what quantities.

Republic To Expand Chicago Warehouse

■ Expansion of Republic Steel Corp.'s warehouse facilities at its South Chicago wire mill will be undertaken immediately, the company announced last week.

The new building will be of single-story construction, 250 x 160 feet, and will provide additional space for handling fencing and other wire products.

Michaels Honored

■ Celebrating his fiftieth anniversary in the scrap iron and steel business, Joseph Michaels, president of Hyman-Michaels Co., Chicago, was tendered a dinner by company directors in the Congress hotel, Chicago, Oct. 21, attended by 200 friends and business associates. He was presented with a testimonial book and traveling cases. W. A. Newman, Hyman-Michaels Co., was master of ceremonies. Among the speakers were Edwin C. Barringer, executive secretary, Institute of Scrap Iron and Steel Inc.; C. H. Lipsett, editor of *Waste Trade Journal*, New York; Walter Erman, Erman-Howell & Co. Inc., Chicago; Louis J. Borinstein, A. Borinstein & Co., Indianapolis; Harry J. Kiener, Hickman, Williams & Co., St. Louis, and William Pohn, Pohn Iron & Metal Co., Chicago.

Died:

■ J. PHILIP JAYME, 75, associated with Crucible Steel Co. of America, New York, many years, Oct. 18, at his home in Bronxville, N. Y. Mr. Jayme joined LaBelle steelworks, which became part of Crucible, in Pittsburgh in 1881 as clerk and was appointed manager of LaBelle in 1901. In 1921 he went to New York, and was active in business until recently.

♦

Emanuel Bauer, 70, head of Hilb & Bauer Metals Co., Cincinnati, iron and steel scrap broker, Oct. 17.

♦

Noble J. Ross, 86, one of the founders, Beloit Iron Works, Beloit, Wis., at his home in that city, Oct. 10.

♦

Robert S. McMannus, 57, president, R. S. McMannus Steel Construction Co. Inc., Buffalo, in that city, Oct. 19.

♦

Harry F. Hildreth, office manager and treasurer, Wright Steel & Wire Co., Worcester, Mass., in Worcester, Oct. 22.

♦

LeRoy N. Sweet, 51, vice president and manager, Chicago office, Surpless Dunn & Co., hardware manufacturers' representative, at his home in Chicago, Oct. 4.

♦

Samuel J. Ghilain, 56, superintendent, mason department, South works, Carnegie-Illinois Steel Corp., Chicago, Oct. 20. He had been employed continuously at South works since 1908.

♦

James A. Roberts, president, Athey Truss Wheel Co., manufacturer of earth moving machinery, Chicago, and formerly a partner in Roberts Bros., railroad construction contractors, in Cheyenne, Wyo., Oct. 12.

♦

Robert H. Good, 63, superintendent, Moore Bros. Co., Elizabeth, N. J., Oct. 13. Associated with the company 48 years, he had long been active in the New Jersey Foundrymen's association and was a member, American Society of Mechanical Engineers.

♦

A. G. J. Rapp, 69, of the A. G. J. Rapp Co., foundry equipment sales and engineering, Chicago, at his home in Evanston, Ill., recently. He was associated with Link-Belt Co. 30 years as foundry engineer, and from 1926 to 1932 was in charge of engineering, National Engineering Co., Chicago.

Windows of WASHINGTON

By L. M. LAMM
Washington Editor, STEEL

Knudsen Finds Defense Production at Available Capacity.

Sees Need for Expansion of Manufacturing Facilities.

Metals Reserve Co. To Purchase Bolivian Tin.

Financial Report on Zinc, Lead Companies Published.

WASHINGTON

■ NATIONAL defense commission is obtaining production now to the extent of the tools available, William S. Knudsen said last week. However, "the quantities required of the important items are so great that all facilities for the manufacturing of heavy combat equipment must be expanded to several times their present size."

Some progress has been made as a result of the past month's work, Mr. Knudsen said. "Congress has supplied us with the necessary appropriations to vigorously proceed with the immediate object of arming 1,200,000 men with all equipment and securing important items such as planes, guns, tanks and ammunition for 800,000 more.

"The contracts for this program, plus the original 1941 program which called for a much smaller force, have been placed to the extent of over eight billion dollars for the army and navy, and we have in round figures, four billion dollars more to place, which we hope to handle by the end of November. You should remember, however, that placing the work with manufacturing firms is only the first step, after which follows the 'make ready' period when machine tools, shop drawings and fixtures, plus the necessary raw materials must be provided—after which production can proceed."

Mr. Knudsen stated that everything has been done to use factories that have equipment which can be used in order that employment could increase and reduce the number of idle men looking for work. This has been accomplished, he said, to the extent that at least 400,000 men are employed over those employed on July first. This will increase still more within the next few months, Mr. Knudsen stated, and he expects employment will reach its peak in July of next year.

"Dealing with what we are doing now with the facilities we have," Mr. Knudsen said, "I can report that I went in an airplane with General Arnold and Admiral Towers to every airplane factory in the country which has contracts with the government and to every engine plant but two, making training engines. What I saw reassured me a great deal. We are making planes and motors right now, not more than half what we will be making next year perhaps, but still a fair quantity of about 950 planes per month and 1600 combat engines. You know we require more engines than planes because bombing planes have two to four engines.

"I have also inspected some shipyards and aircraft depots in the country. I have seen 100 planes in the air at one time and have seen bombs drop on targets from 12,000 feet in the air—all of which is reassuring and encouraging. We shall need a lot of tools but we can get them if we work hard, and the machine tool manufacturers are giving us all the co-operation we can ask for.

"We are going to need a lot of other materials but the raw materials division, under Mr. Stettinius, is working right now creating stock piles so that we will have a good supply when the tools are ready. I don't expect any specific difficulties to interfere with our program. It is big, to be sure, but we have the resources and the men."

♦

Jesse Jones, federal loan administrator, last week announced Metals Reserve Co., Reconstruction Finance Corp. subsidiary, had agreed with certain producers of tin concentrates in Bolivia, with the approval and guaranty of the Bolivian government, to purchase tin concentrates sufficient to smelt approximately 18,000 tons of fine tin a year. The contract will run for five years.

Price for the tin concentrates will be, after allowing for freight and the normal charges for treatment and smelting established by the English smelters, about 48½ cents per pound of fine tin. It is expected that it will cost more to smelt the tin in this country than in England, which added cost, together with refining the tin to a premium standard, will probably bring the price of fine tin to something over 50 cents per pound.

It is expected that Metals Reserve Co. will either build a smelter, or contract with some one of the smelting companies to build and operate a plant in the United States.

$10,736,792 EXPANSIONS FOR BOEING AUTHORIZED

War department has announced the award of contracts to the Boeing Airplane Co., Seattle, calling for plant expansion to cost $7,368,849.13, and also to the Boeing Aircraft Co., Stearman Aircraft division, Wichita, Kans., calling for plant expansion to cost $3,367,943.22.

The new facilities will be constructed under the terms of the emergency plant facility contract developed jointly by the national defense advisory commission, the war department, the navy depart-

ment and the treasury department. The company in each case will furnish the funds for construction. Under the contract, the government will repay the cost of the plant expansion over a period of five years.

At the end of five years the contractor will have the option to purchase the property at cost less some prearranged rate of depreciation or, alternatively, at some negotiated sum. In the event he does not choose to retain the property, title will be transferred to the government.

SWOC FILES COMPLAINT WITH HILLMAN

Steel Workers Organizing committee has filed a petition with Sidney Hillman, labor member of the national defense advisory committee, charging the Bethlehem Steel Corp. with disobeying labor statutes. Petition requests the government to withhold defense contracts from companies which do not observe the labor laws.

The advisory group's standing committee will study the petition and make a report.

The demand made by the union has placed Mr. Hillman "on the spot" with labor and especially the CIO, which has been pressing for drastic action by the government against violators of labor statutes.

Mr. Hillman said meetings already have been held by members of his staff with Bethlehem personnel and that these meetings would continue in the hope of settling the controversy.

Mr. Hillman is now expected by the SWOC to impress on the defense commission the justice of its cause and to demand action. If he succeeds in settling the Bethlehem case he will still be expected by the unions to insist that all contractors be barred from government contracts if they violate orders of federal agencies. Apparently all the members of Mr. Hillman's labor committee, whether AFL, CIO or railroad unions, are united in this demand.

W. C. TAYLOR NOMINATED AS COMMERCE UNDERSECRETARY

Wayne C. Taylor has been nominated by President Roosevelt as undersecretary of commerce, succeeding Edward J. Noble, a Republican, who resigned last August. Mr. Taylor was at one time assistant secretary of the treasury and is a Chicago banker. He has been associated with Secretary of Commerce Jones.

Mr. Taylor has represented the Red Cross in Europe since the beginning of the war. As assistant secretary of the treasury he was in charge of fiscal affairs and foreign contacts.

Mr. Taylor is 46 and a graduate of Yale university. He served as a first lieutenant in the army during the World war, and was associated with several financial firms in Chicago before coming to Washington in 1933.

His first government position was executive assistant to George Peek, then administrator of the agricultural adjustment administration. When Mr. Peek became president of the Export-Import Bank, Mr. Taylor went with him as vice president. He joined the treasury in 1936 and resigned in 1939.

$83,000,000 WPA FUNDS SPENT FOR DEFENSE PROJECTS

National defense projects approved since July 1 call for more than $83,000,000 in WPA funds, according to Howard O. Hunter, acting work projects commissioner.

At the same time Mr. Hunter released a detailed report on 123 new defense projects approved during the 30-day period ending Oct. 15, amounting to $21,465,737. During the same period a new training project for aviation ground servicemen was approved, calling for $1,429,690. Between July 1 and Sept. 15, projects for national defense facilities as approved by the President totaled $50,964,683 and $9,781,340 had been set aside for vocational training of workers for defense industries.

The largest share of the new funds approved is for the construction and improvements of airports, $6,622,947 being designated for this purpose. Projects sponsored by the army account for $6,298,759; by the national guard, $4,323,637; by the navy, $1,452,893, and by the coast guard, $42,380. Projects of a miscellaneous character but all related to the defense program total $2,725,121.

TRADE COMMISSION REPORTS ON ZINC, LEAD COMPANIES

A report on lead and zinc producing and manufacturing corporations, the fourth of the federal trade commission's reports in connection with the project for the collection of annual financial reports from a large number of industrial corporations operating in many of the principal industries of the United States, was made public last week.

The six producers and manufacturers of lead and zinc and lead and zinc products, whose financial reports are combined, represent six of the most important concerns in this industry, from the standpoint of investment, value of goods sold and workers employed. The six corporations included in the survey reported consolidated sales for the year 1939 aggregating $190,985,924, or slightly under 52 per cent of the total value of products reported by the bureau of the census for 1937. The report reflects the operations only of corporations that specialize in the "lead and zinc" business, and does not reflect the operations of the general smelters and refiners of nonferrous metals, including lead and zinc.

Data are shown in combined form in a manner which does not identify the results of any individual corporation.

Total net sales during 1939 of the corporations amounted to $190,985,924. Of the total sales, $188,233,742, or 98.6 per cent, was sold in the domestic market, and $2,752,182, or 1.4 per cent, was sold for export or in foreign markets. Costs and expenses applying to the goods sold in 1939, or the total operating outgo (including cost of materials, wages, taxes, depletion, and so forth) amounted to $170,690,943.

Combined net profit from operations, plus other income and less other charges, before deduction of interest on long term borrowing and income taxes, on the total capital of $231,945,886, was $24,544,342, or a rate of return of 10.6 per cent on the average of such total employed capital for the year.

Paid $14,731,883 Dividends

Average rate of return for the corporations represented individual rates ranging from 4.9 per cent to 20.4 per cent. The net income on the corporate net worth investment, or stockholders' equity, was $20,731,538, a rate of return of 9.1 per cent of the average stockholders' investment. The rates for individual corporations ranged from 4.2 per cent to 18.0 per cent. The rate of return for individual corporations, before deduction of interest on long term borrowings and income taxes, ranged from 5.1 per cent to 22.8 per cent. Cash dividends paid during 1939 by the six corporations amounted to $14,731,883.

The operating ratios for their 1939 operations show that the cost of goods (exclusive of all general taxes, social security and pension fund payments, selling expenses, administrative and general expenses, research and development expenses, etc.) represented 79.2 per cent of every dollar of sales. The gross margin was 20.8 per cent of sales on each dollar of sales revenue. After deduction of the items listed as expenses, together with provision for uncollectible accounts from the total gross revenue, there remained a net profit from manufacturing and trading of 12.1 cents from every dollar of sales.

Machine Tool Dealers Hear Plea For "Preparedness for Peace"

■ DESPITE the pressure for engineering services and for deliveries, due to the national defense program, Associated Machine Tool Dealers of America turned out in surprising numbers for their annual convention at the Dayton Biltmore hotel, Dayton, O., Oct. 21 and 22. More than 100 attended.

At the general sessions, which were presided over by John Sauer Jr., Peninsula Machinery Co., Detroit, retiring president of the association, particular attention was paid to problems involved in the defense program.

Among the speakers was A. B. Einig, machine tool division, advisory commission to the council of national defense. Mr. Einig, well known to the members because of his many years of association with Motch & Merryweather Machinery Co., Cleveland, dealt with the subject of machine tools and the national defense program.

He contrasted conditions now with those of 1917, emphasizing the fact that the immeasurably faster and more accurate machine tools of 1940, and various new types of machines developed since the first World war, had revolutionized the making of munitions. This applies not only to machining but also to primary operations such as forging. He cited the accurate press forming of rifle parts and the finish forging of shell cavities as examples of 1940 technique. Mr. Einig sees $450,000,000 as the machine tool output figure for 1940. He predicted no "bottle-neck" ascribable to this industry, whose co-operation is keenly appreciated by informed people in Washington.

Speaking of the possibility of the government commandeering machine tools now on order, Albert M. Stedfast, Stedfast & Roulston Inc., Boston, pointed out that while it could be done, there is no immediate likelihood that it will be necessary. Voluntary action on the part of builders in deferring deliveries to those who do not have vital needs, so that quick delivery can be made to important defense projects, are now taking care of the situation and probably will continue to do so.

$500,000,000 Output in 1941

Tell Berna, general manager, National Machine Tool Builders' association, spoke on priorities under the defense program. Because the amount of munitions manufactured in peacetime is so small as to be almost negligible, it is not strange, said Mr. Berna, that some confusion now should exist when this minor industry almost overnight is expanded into a major one. The machine tool industry's contribution to this national effort is in the nature of doubling of capacity, with an output of $500,000,000 being probable in 1941.

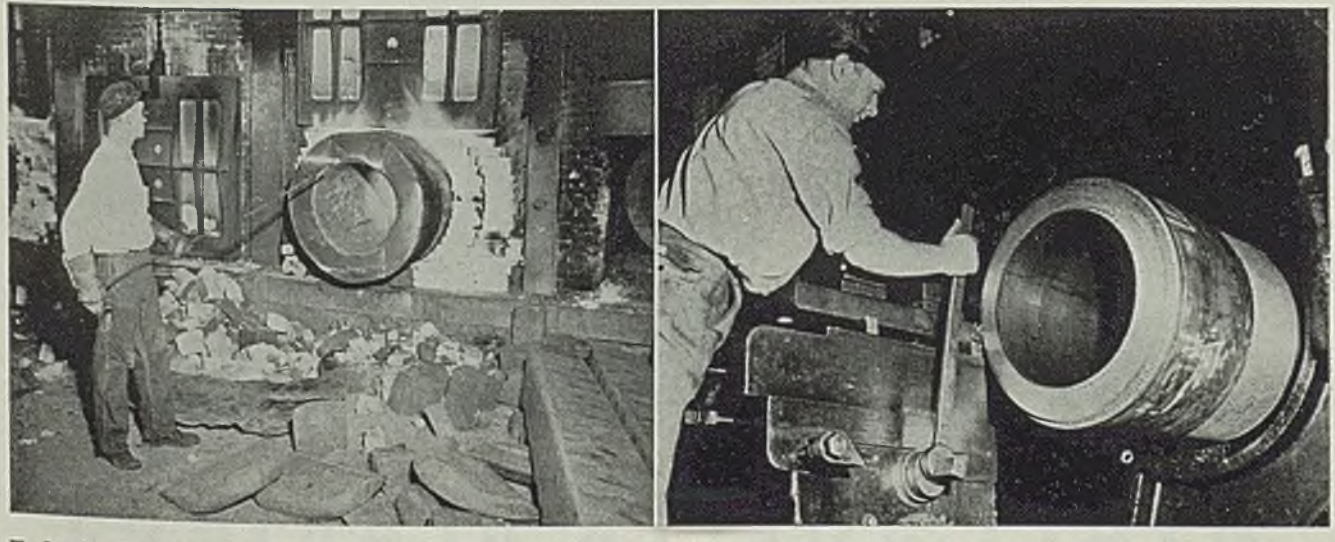
As an example of how his industry is anticipating possible emergencies, Mr. Berna mentioned the association-sponsored shell lathes. Not only have the designs of these special purpose machine tools been completed, but actual machines are being built so that they can be perfected through operating tests to insure that all will be in readiness if and when they are needed in large numbers.

Another phase of the machine tool problem is training workmen to build them. This was discussed by D. H. McKellar, who has charge of training activities at Monarch Machine Tool Co., Sidney, O. Under the system employed at Monarch, various skills involved in machine building are "broken down" into their component parts and are taught in logical sequence. In this way skill is built up something like a brick wall is built up—one unit at a time. Measurement, calculation, blueprint reading, etc. are worked in as their need logically becomes evident. The whole course, incidentally, is based upon a functional analysis of metal cutting and what happens when metal is cut. Thus the students get an insight at the very beginning into what the real function of a machine tool is. "Visual," rather than "book" methods are employed in teaching.

Other speakers included Capt. R. O. Brownfield of Wright Field, Dayton, who dealt with the place of the army air corps in national defense and who described the activities of Wright Field as the place where military planes and *materiel* related thereto are "dreamed up" and subsequently tested; E. B. Newill, assistant general manager, Frigi-

(*Please turn to Page* 72)

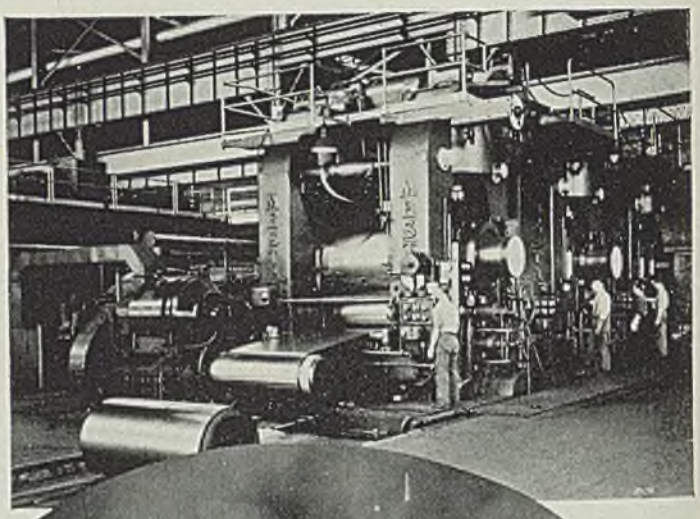
Manufacturing Guns for United States Navy



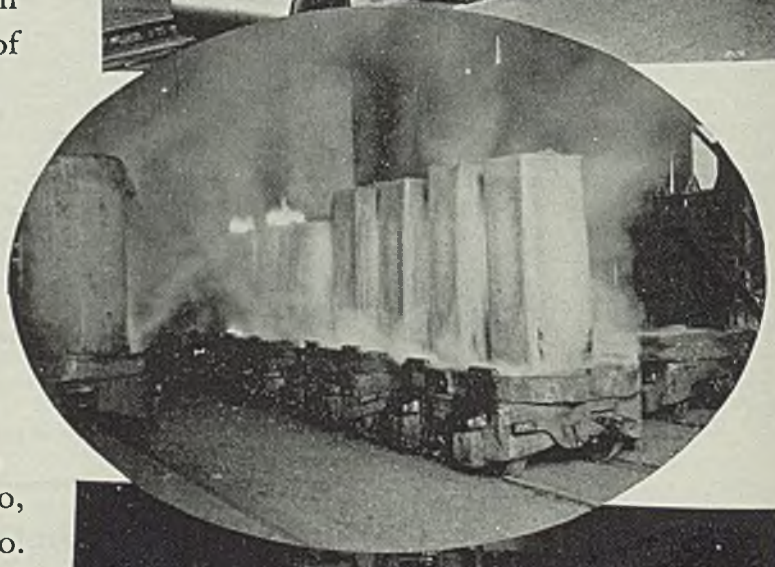
■ At the Washington navy yard and ten other arsenals throughout the country production is under way on guns for our expanding fleet. Left, heating a cylinder preparatory to forging it. Right, machining breech end of gun. National defense advisory commission photos, from Acme

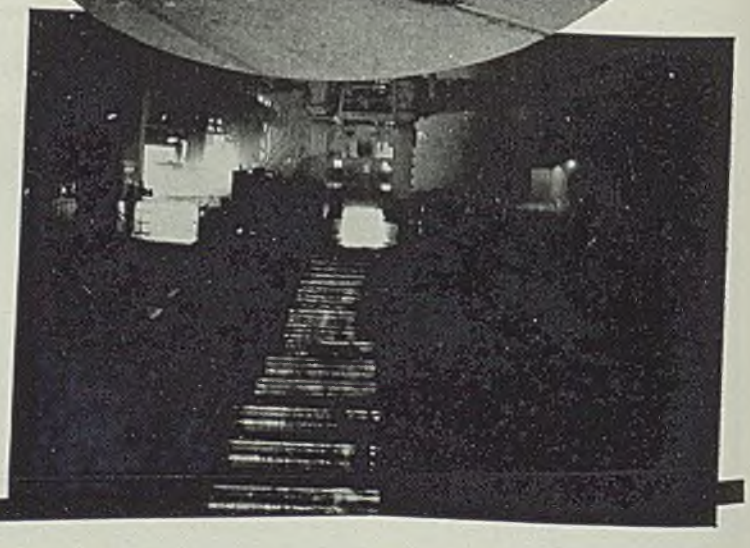
WITH ACCENT ON SAVINGS—

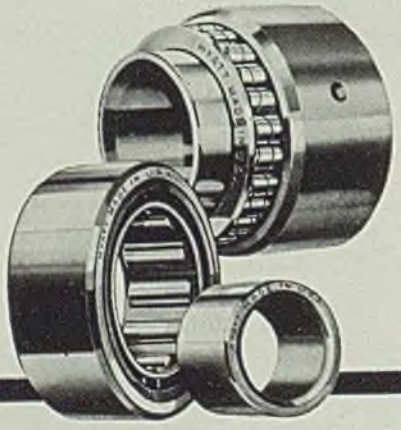
Hyatts Are Serving All Along The Line



In cranes, cars, motors, tables and miscellaneous mill equipment their widespread use today is due to their dependable performance in the past. Year after year, in mill after mill, Hyatts have served long and well... avoiding wasteful friction... prolonging equipment life ... cutting maintenance costs. Even under the tough shocks and heat of steel mill jobs, Hyatts keep your machinery young and full of life because they are built for such work. For your new equipment or changeovers let Hyatts serve and save for you. Say when and where. Hyatt Bearings Division, General Motors Sales Corporation, Harrison, New Jersey; Chicago, Pittsburgh, Detroit, San Francisco.







HYATT ROLLER BEARINGS

Mirrors of MOTORDOM

By A. H. ALLEN
Detroit Editor, STEEL

Aircraft Program To Preclude 1942 Automobile Models?

Tool and Die Shops Unfamiliar with Airplane Work.

Automobile Production Under Heavy Pressure.

Steel Buying Steady; Sheet, Strip Deliveries Normal.

DETROIT

■ WHETHER there are going to be any 1942 models in the automobile industry seemed to be the chief topic of conversation here last week, as arrangements were being made for the meeting of automobile, auto body, airplane and tool and die bigwigs with Defense Commissioner W. S. Knudsen on Friday at the New Center building. The meeting was a closed affair and results of deliberations came too late for STEEL's press schedule, but a few pertinent conclusions were being drawn even in advance of the meeting.

In the first place, the tool and die shops operating in the Detroit area are probably the best equipped for rapid and accurate work in the entire country. Despite a high labor rate, they can still run rings around similar shops operating in the east and on the west coast—a fact which has created no little jealousy in different sections of the country and which in some cases has even stymied efforts of local operators to obtain key equipment.

At the moment, these shops have just concluded what they consider the greatest tool and die year in history and are now getting their second wind for resumption of work. Many men employed in these shops have had to be laid off temporarily because of lack of work, one estimate indicating that 5600 idle tool and die men are now available in the Detroit area.

Describing current conditions, the operator of a local tool and die shop said that you could "shoot a cannon through the main bays of two or three of the larger die shops here and never hit a thing."

So, by and large, these shops are ready and eager to go, whether it be on jigs and fixtures for aircraft parts or tools and die for 1942 car models. They frankly confess car builders as yet have made known no plans for the 1942 jobs and it seems doubtful whether this program could be whipped into shape for release much before the usual time shortly after the first of next year.

As far as aircraft work is concerned, only a few local die shops have any familiarity with what is required. In private discussions, shop operators are wondering whether they may not be required to assimilate entirely new manufacturing concepts should they be called upon to turn their facilities over to aircraft work. They foresee the possibility of even pooling the facilities of a number of shops, and allocating certain parts of the program to shops best equipped for various phases.

Many Tools Not Adaptable

Tools and dies used in automobile manufacture do not appear in the main adaptable to aircraft assembly. However, an aircraft program will require a large number of jigs and fixtures, and there is no better place to get jigs and fixtures than right here in Detroit. Aircraft stamping dies for the most part are of lead-zinc alloy or copper alloy such as the familiar Cerromatrix material, cast to shape from wood or plaster patterns. Several shops here have been doing work on copper dies for aircraft stampings and have had good success.

One of the big difficulties in an aircraft program is the fact that no one around here seems to know just what is required in the way of manufacturing facilities. Even Murray Corp. of America, after setting up an aircraft stamping division and receiving some small orders for horizontal stabilizers, sent C. W. Avery, president of the company, and Richard Gazely, head of the aircraft division, to the west coast for inspection of aircraft plants there, so that more detailed knowledge of manufacturing technique could be obtained.

It was hoped that the meeting with Mr. Knudsen Friday would result in a better understanding of just where and how local plants will fit into an aircraft program. He was expected to bring complete blueprints and specifications for a list of body parts required for two models of military planes understood to have been standardized for Detroit manufacturing plants.

Engines for these planes will be the Pratt & Whitney Wasps which Ford Motor Co. next year will begin to turn out on a volume basis.

That the auto industry is entirely willing to subjugate model changes for the time being is evident from the text of the resolution adopted at the New York auto show. It reads in part as follows: "Automobile and truck producers, as well as the producers of tools and dies and bodies for the automotive industry, have certain facilities that *may* be adaptable to producing airplane body parts in quantity for assembly *by the aviation industry* (italics are ours) . . . The individual manufacturers . . . hereby resolve that in this period the manufacturers of motor vehicles, the tool and diemakers and the automotive body producers

should subordinate work on automotive model changes to the necessities of the defense program and specifically to aviation procurement."

Considered opinion is that the industry can absorb a major airplane model program and still be able to effect a reasonable model change for 1942 automobiles. After the extensive changes made in 1941 models, the '42 program normally would be on a lesser scale, with attention devoted primarily to refinements of minor details; so there would seem to be no reason why a new program would have to be suspended.

As a matter of fact, the auto industry is of such size and extent that it conceivably could absorb a manufacturing program for, say, 50,000 units of airplanes, locomotives, pianos or whatnot, without seriously disturbing its established methods of operation. Stack up a program for 50,000 airplane bodies alongside a program for 1,000,000 automobile bodies, engines, wheels, frames, transmissions and the other accessories, and it is hard to see why the former is going to cause much dislocation once the industry knows definitely just what the government wants and when it is wanted.

However, if there is going to be some minor design revision after every 150 units are produced, then there will be headaches aplenty.

■ EVERY ounce of pressure is being applied to automobile production, so much so in fact that it appears the industry may be fearful lest needs of the defense program interrupt car production later on in the model year. General Motors divisions are turning out about 50,000 cars weekly, Chrysler 30,000, Ford 27,000, Hudson 3000, Nash 2000, Packard 2000, Studebaker 3500 and Willys 1000, to give a weekly industry total close to 120,000 cars and trucks.

■ STEEL buying for automotive consumption is steady, with normal deliveries possible on sheet and strip material. In other grades of steel, however, a critical situation is developing because of the terrific needs of plant expansion for the defense program. Structural shapes are one example, deliveries of 12-16 weeks being quoted on some special light sections. A number of small plant building programs in this area are being held up waiting structural steel.

Mills here are pushing steel production to the limit. Ford Motor Co. is averaging nine of its ten furnaces in continuous operation, weekly production being in excess of 14,000 tons. Great Lakes Steel Corp. is keeping all its 16 furnaces in steady production, with only occasional shutdowns of a single unit for repairs which are rushed through in two or three days.

Ford material and parts schedules for the period Nov. 15 to Jan. 15 call for 160,000 units, an increase from the previous budget.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1938	1939	1940
Jan.	226,952	356,692	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	412,492
June	189,402	324,253	362,566
July	150,450	218,494	246,171
Aug.	96,946	103,343	89,866
Sept.	89,623	192,678	284,583
9 mos.	1,642,520	2,570,370	3,160,060
Oct.	215,286	324,688	.....
Nov.	390,405	368,541	.....
Dec.	406,960	469,120	.....
Year	2,655,171	3,732,608	.....

Estimated by Ward's Reports

Week ended:	1940	1939†
Sept. 28	95,990	64,365
Oct. 5	105,153	76,095
Oct. 12	107,957	75,860
Oct. 19	114,672	70,114
Oct. 26	117,080	78,210

†Comparable week.

■ TWO cars of startlingly different body design were exhibited by Chrysler Corp. at the recent New York automobile show. One is a convertible roadster called the Thunderbolt, the other a phaeton known as the Newport.

In these cars—not production models of course—Chrysler engineers see a forecast of future motor car styling and a new milepost in the history of aerodynamics and "fashioned-by-function" design. Both cars are the result of a collaboration between Ralph Roberts and Chrysler engineers.

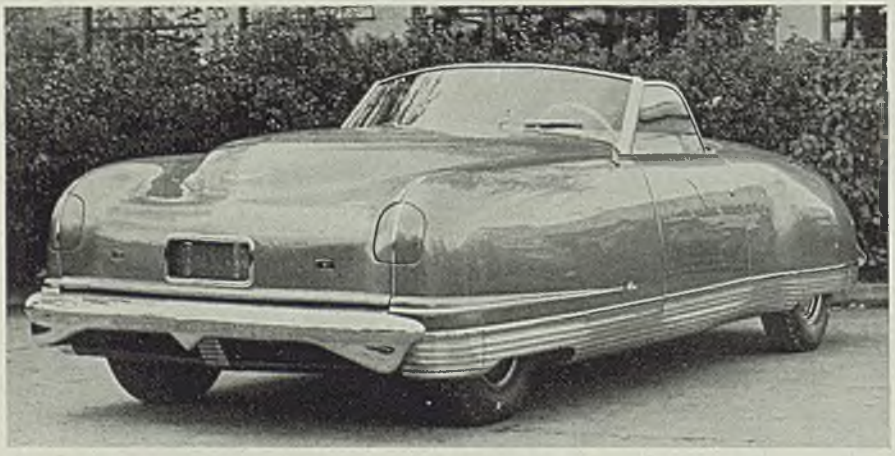
Development of racing cars had a large influence on the design of this latest example of aerodynamics. In the new cars, it is pointed out, efficiency and beauty go hand in hand. The full-width, sleek-sided body is a radical departure in pleasure car design. The low broad hood cuts down frontal resistance and the smooth-swept surfaces of front and rear, the flush glass and windshield and the absence of running boards reduce turbulence.

Chromium plate and stainless are used only to give emphasis to functional lines and there is an entire absence of "gimcracks" and gingerbread work. There is a notable lack of bulges, ribs, corrugations and other devices that have no part in functional design. Broadness of beam in these cars means great interior roominess.

A feature of the Thunderbolt is that it has a steel top which completely disappears at the touch of a button. A single button controls the raising and lowering of the top. Automatic pushbuttons also control the raising and lowering of the window glasses.

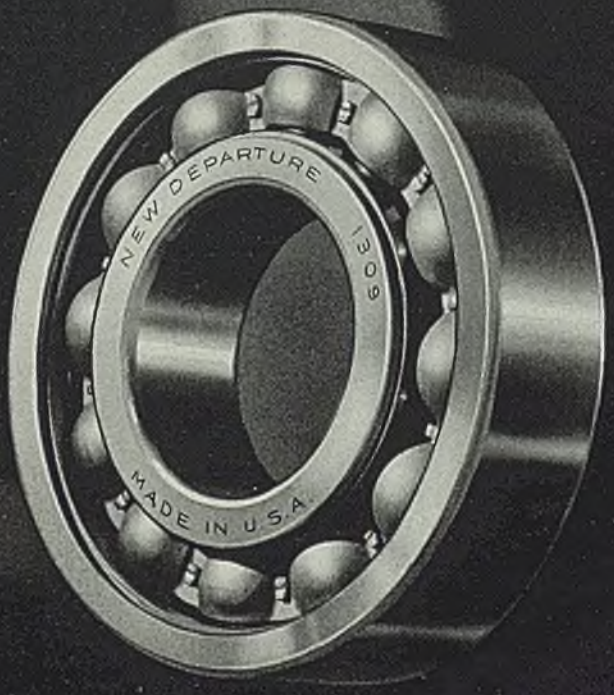
Front headlamps have retractable lids and a perfectly fixed mounting. The lamp is the regular "sealed-beam" unit but the lamps are mounted inside the front fenders. Further streamlining is evidenced by the fact that every accessory on the body is in-built. License plates are mounted under glass and door handles are of the button type.

Approaches Ultimate in Streamlining



■ Chrysler's "Car of Tomorrow", a convertible roadster called the Thunderbolt, marks a new high in functional design. Notably lacking are bulges, ribs and corrugations. A feature is push button control for the steel top, which completely disappears, raising and lowering windows, and opening doors

RESOURCES *for* RESEARCH



Improvements in the Forged Steel Ball Bearing result from expensive and painstaking research in laboratories, on proving grounds and in the field. No wonder New Departure has pioneered so many new departures in ball bearings! New Departure, Division of General Motors, Bristol, Connecticut.

NEW DEPARTURE
THE FORGED STEEL BEARING

Nothing Rolls Like a Ball

High-Speed X-Rays May Enable Radiographs of Moving Machinery

■ BEAM transmission of power, ultra high-speed X-ray radiography, and fluorescent lighting were among the latest developments in illumination and electronics discussed and demonstrated before a meeting of more than 100 eastern educators Oct. 18 at the lamp division of Westinghouse Electric & Mfg. Co., Bloomfield, N. J

This was the first public demonstration of the "Klystron," an electronic tube capable of generating for the first time high-power radio waves as short as about a third of an inch These waves can be aimed in a narrow beam in any given direction. The tube generates radio waves 40 centimeters long at a power output of about 150 watts—sufficient to light ordinary flashlight bulbs 50 to 100 feet away. Westinghouse engineers believe the "Klystron" may assume an important role in communication and in television.

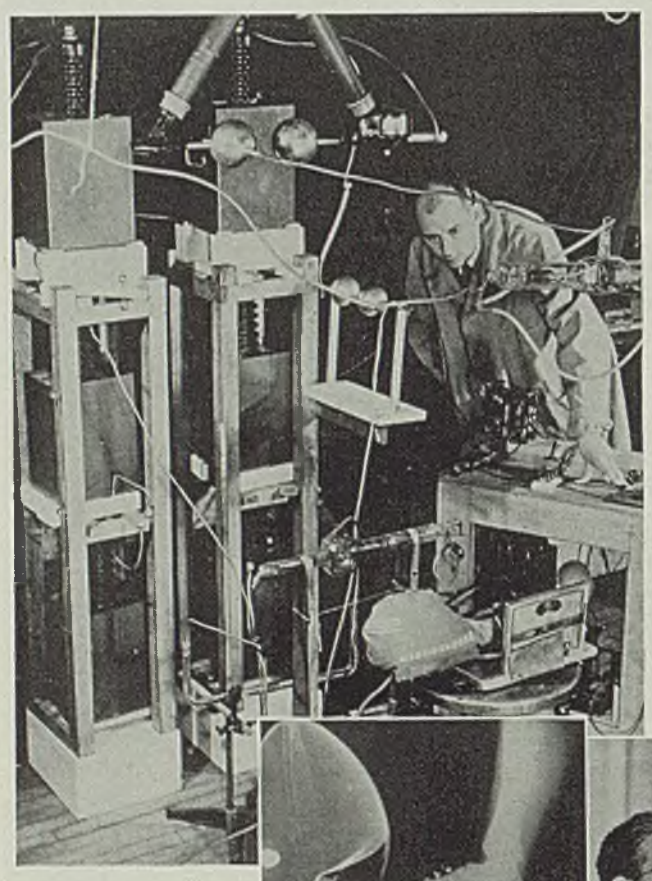
Also demonstrated were recently devised ultra high-speed X-ray tubes, developed by Drs. Charles M. Slack and L. F. Ehrke of the Westinghouse lamp division research laboratories. These tubes make it possible to take X-ray pictures in one millionth of a second. Pictures may be taken at the proper angle for stereoscopic vision, a development of importance in studying interior structures. Engineers are working to obtain higher voltages which will make penetration of heavily opaque materials feasible, thus allowing them to study the internal workings of large machines, such as automobile engines, actually in operation.

Dr. Harvey C. Rentschler, director of research of the lamp laboratories, presented to the conference newest discoveries in bactericidal ultraviolet. This included a demonstration of the killing power of these rays on bacteria and the showing of a motion picture of the "Sterilamp" in action killing typhoid germs.

Dr. J. W. Marden, assistant director of research in the Westinghouse lamp laboratories, discussed fluorescent lighting. The fluorescent lamp, most efficient of all practical present-day light sources, is finding wide acceptance for numerous commercial, industrial and certain home illumination uses. Essentially, the fluorescent lamp is a tube containing a small amount of low-pressure mercury vapor and an easily ionized gas. Electrodes coated with special electron-emitting material are mounted at opposite ends of the tube. The inner surface of the tube is coated with fluorescent materials known as "phosphors."

When an electric arc is established between the electrodes, bombard-

(*Please turn to Page* 72)



■ Radiographs of moving machinery may be possible with newly developed ultra high-speed X-ray tube. Left, an engineer makes a one-millionth of a second X-ray picture of dirt particles passing through a small vacuum cleaner. Inset shows what happens to the foot and football at impact, another one-millionth of a second X-ray

■ Right, an experimental 10,000-watt mercury vapor lamp kindles wrapping paper several inches away. One-fifth as bright as the sun's surface, the lamp is surrounded by cooling jacket carrying running water, but strong infra-red radiations penetrate the water jacket to fire the paper

Army, Navy Place $46,713,551 Defense Contracts in Week

■ CONTRACTS for defense supplies announced last week by the war and navy departments showed further sharp decline. Aggregating $46,713,551.29, the total compared with $124,650,286 announced the week before and totals exceeding $500,000,000 in some prior weeks. Most awards announced last week were small, with ordnance department purchases numerically heavy. War department announced the following awards:

Aqua Systems Inc., New York, air corps gasoline fueling systems, Orlando airport, Orlando, Fla., $58,134.

Brockman, E. W., Corona, Calif., gravel wall well, Muroc lake, California, $2645.

Chine, W. S., Honolulu, T. H., steam plant, including steam distribution system, Hickam field, Hawaii, $52,423.

Comb, Fred R., Co., Minneapolis, photographic laboratory building, Godman field, Ft. Knox, Kentucky, $42,234.

Coupe, A. L., Construction Co. Inc., Louisville, Ky., paint, oil and dope house, Godman field, Ft. Knox, Kentucky, $5750.

Eckert-Fair Construction Co., Dallas, Tex., air corps garage, Barksdale field, Louisiana, $52,185.

Ehret-Day, Asbury Park, N. J., construction of quartermaster's office, $5777.

Electric Underground Construction Co., New York, electric distribution and street lighting system, Westover field, Massachusetts, $89,220.

Hayashi, B. M., Honolulu, T. H., depot equipment maintenance building, Hickam field, Hawaii, $67,315.

Ritter Bros., Harrisburg, Pa., air corps warehouse, including utilities, Middletown air depot, $36,560.

Skilken Bros., Columbus, O., air corps operations hangar, Godman field, Ft. Knox, Kentucky, $266,421.

Stolte, F. C., Co., Pacific Grove, Calif., temporary housing, Camp McQuaide, California, $448,500.

Quartermaster Corps Awards

Aluminum Cooking Utensils Co., New Kensington, Pa., aluminum pots, $57,927.50.

American Hardware Co., Petersburg, Va., trunk lockers, $18,150.

Belber Trunk & Bag Co., Woodbury, N. J., trunk lockers, $129,000.

Chicago Bridge & Iron Co., Detroit, steel water tank, $26,970.

Diamond T Motor Car Co., Chicago, trucks, $8025.

Dunn's Marine Railway Inc., Norfolk, Va., installation of heating plant, $1997.

Fisher, Alfred P., San Francisco, barracks, including utilities, Ft. Mason, California, $10,927.

General Motors Corp., Detroit, trucks, $23,245.60.

Hunt, William, Co., Durham, N. C., plumbing, Ft. Bragg, North Carolina, $61,440.

International Silver Co., Meriden, Conn., tableware, $248,909.36.

Landers, Frary & Clark, New Britain, Conn., knives, $77,880.

Lane Construction Corp., Meriden, Conn., reinforced pavement, storm drains, inlets, Westover field, Massachusetts, $55,000.

Kay Mfg. Corp., Brooklyn, N. Y., repair parts for bedsteads, $15,937.50.

Mapel, John T., Miami Beach, Fla., night lighting system, MacDill field, Florida, $9400.

Mattatuck Mfg. Co., Waterbury, Conn., repair parts for bedsteads, $16,500.

McKee, Robert E., Los Angeles, air corps double hangar, Hickam field, Hawaii, $359,000.

Neevel Mfg. Co., Kansas City, Mo., trunk lockers, $106,250.

Nunnelly, F. A., San Antonio, Tex., emergency construction, Ft. Sam Houston, Texas, $36,524.

Reo Motor Car Co., Lansing, Mich., trucks, $1863.

Rice-Stix Dry Goods Co., St. Louis, trunk lockers, $41,850.

Schader, A. D., San Francisco, railroad, Stockton airport, California, $8739.

Simmons Co., New York, repair parts for bedsteads, $5230.

United States Trunk Co., Fall River, Mass., trunk lockers, $80,600.

Universal Trunk Co., Chicago, trunk lockers, $39,600.

Walker Moody Construction Co. Ltd., Honolulu, T. H., engine repair shop, Hickam field, Hawaii, $306,281.

Wallace, R., & Sons Mfg. Co., Wallingford, Conn., tableware, $82,408.70.

Wilkins Trunk Mfg. Co., Dallas, Tex., trunk lockers, $27,300.

Wilson Co., Charlottesville, Va., signal office, warehouse, repair shop, Langley field, Virginia, $27,777.

Zoss Construction Co., Los Angeles, ordnance magazines, March field, California, $66,000.

Corps of Engineers Awards

Alteneder, Theodore, & Son, Philadelphia, protractors, $19,200.

American Fork & Hoe Co., Cleveland, axes, $23,150.48.

Caterpillar Tractor Co, Peoria, Ill., construction equipment, $133,427.68.

Dietzgen, Eugene, & Co., New York, transits, $111,350.

Hanson Clutch & Machinery Co., Tiffin, O., power shovels, $20,946.90.

Hercules Co., Marion, O., rollers, $19,575.

Iowa Mfg. Co., Cedar Rapids, Iowa, crushing plant, $28,375.

Lord & Burnham Co., Irvington, N. J., footbridges, $407,524.

Mall Tool Co., Chicago, band saws, $211,500.

Northwest Engineering Co., Chicago, power shovels, $114,795.

Ransome Concrete Machine Co., Dunellen, N. J., concrete mixers with carts, $31,319.40.

Sullivan Machine Co., Michigan City, Ind., drills, breakers, compressors, $51,085.

Virginia Bridge Co., Roanoke, Va., bridges and spare parts, $155,453.60.

Air Corps Awards

Abrams Instrument Co., Lansing, Mich., printer assemblies, $60,490.

Aerial Machine & Tool Corp., New York, armament equipment, $79,275.

American Steel & Wire Co., Cleveland, flexible cable, $62,179.20.

Air Associates Inc., Garden City, N. Y., aircraft mooring kits, propeller test stand assemblies, $232,522.90.

Aviation Mfg. Corp., Lycoming division, Williamsport, Pa., maintenance parts for engines, $84,515.10.

Banner Die Tool and Stamping Co., Columbus, O., armament equipment, $104,550.

Barnard Aviation Equipment Co. Inc., Ashley, Pa., armament equipment, $132,560.

Bendix Aviation Corp., Bendix Products division, South Bend, Ind., wheel assemblies, $43,615.

Biederman Motors Corp., Cincinnati, truck-tractors, $62,240.

Boyle Mfg. Co., Los Angeles, galvanized steel drums, $54,088.32.

Brown & Sharpe Mfg. Co., Providence, R. I., grinders, $47,130.

Cambridge Instrument Co., New York, indicator assemblies, $194,480.

Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati, grinders, $83,342.17.

Cole Co., H., Columbus, O., armament equipment, $112,000.

Electric Storage Battery Co., Philadelphia, aircraft storage batteries, $552,224.83.

Engelhard, Charles, Inc., Newark, N. J., indicator assemblies, $180,905.70.

General Electric Co., Schenectady, N. Y., generator and regulator assemblies, $1,138,170.50.

Goodyear Tire & Rubber Co., Akron, O., wheel assemblies, $2,886,517.40.

Gosiger, C. H., Machinery Co., Dayton, O., drill presses, lathes, $77,894.

Hayes Industries Inc., Jackson, Miss., wheel assemblies, $613,629.

Iron Fireman Mfg. Co., Portland, Oreg., armament equipment, $85,645.

Jacobs Aircraft Engine Co., Pottstown, Pa., maintenance parts, $77,168.94.

Kinsey, E. A., Co., Cincinnati, grinders, lathes, shapers, $521,644.75.

Landis Tool Co., Waynesboro, Pa., grinders, $13,095.

Leece-Neville Co., Cleveland, generator and panel assemblies, $91,872.

Lite Mfg. Co., New York, tow target assemblies, $450,200.

Lloyd & Arms Inc., Philadelphia, lathes, $78,474.80.

Lockheed Aircraft Corp., Burbank, Calif., maintenance parts for airplanes, $352,508.81.

Magnaflux Corp., Chicago, magnetic inspection apparatus, $180,962.40.

Moore Eastwood & Co., Dayton, O., armament equipment, $143,550.

Motch & Merryweather Machine Co., Cleveland, grinders, $61,900.

National Enameling & Stamping Co., Milwaukee, galvanized steel drums, $88,720.

Norton Co., Worcester, Mass., grinders, $17,333.52.

Pollack Mfg. Co., Arlington, N. J., armament equipment, $237,500.

Prest-O-Lite Battery Co. Inc., Indianapolis, aircraft storage batteries, $162,380.

Ritter Dental Mfg. Co., Rochester, N. Y., lathes, $3525.60.

Ryan Aeronautical Corp., San Diego, Calif., modification of airplanes, $62,260.55.

Standard Steel Works, North Kansas City, Mo., trailers, dollies, spare parts, $173,809.

Union Twist Drill Co., Athol, Mass., drills, $65,092.64.

United Steel Barrel Co., Philadelphia, galvanized steel drums, $66,400.

Wesson Co., Detroit, drills, $58,265.14.

Wiedmann Machine Co., Philadelphia, machines, $58,256.50.

Ordnance Department Awards

Allegheny Ludlum Steel Corp., Watervliet, N. Y., small arms ammunition components, $9994.92.

American Brass Co., Waterbury, Conn., small arms ammunition components, $105,210.

American Chain & Cable Co., A. C. Campbell division, Bridgeport, Conn., small arms ammunition, $2000.

American Cutter & Engineering Co., Detroit, tools, $5400.

American Smelting & Refining Co., Federated Metal division, New York, ammunition components, $7730.

American Steel and Wire Co., Philadelphia, small arms ammunition components, $13,734.53.

Arguto Oilless Bearing Co., Philadelphia, tools, $16,085.

Armstrong Cork Co., Pittsburgh, artillery ammunition components, $355,334.

Associated Spring Corp., Wallace Barnes Co. division, Bristol, Conn., wire, $1326.

Atlantic Mfg. Co., Philadelphia, artil-

lery ammunition components, $33,504.
Barker Tool Die & Gauge Co., Detroit, gages, $5855.
Barwood & Co., Philadelphia, gages, $41,465.
Bausch and Lomb Optical Co., Rochester, N. Y., fire control equipment, microscopes, $158,477.69.
Bridgeport Brass Co., Bridgeport, Conn., artillery ammunition materiel, $1620.
Bridgeport Thermostat Co. Inc., Bridgeport, Conn., artillery ammunition materiel, $7500.
Briggs & Stratton Corp., Milwaukee, ammunition components, $50,960.
Brown & Sharpe Mfg. Co., Providence, R. I., machines, $3316.80.
Budd, Edward G., Mfg. Co., Philadelphia, ammunition components, $130,500.
Budd Wheel Co., Detroit, artillery ammunition components, brake assemblies and spare parts, $1,504,716.86.
C. & W. Tool & Engineering Co., Detroit, tools, $3921.
Cable Co., John L., Jamaica Plain, Mass., ammunition components, $12,584.25.
Canister Co., Phillipsburg, N. J., machines, $1503.
Carpenter Steel Co., Reading, Pa., small arms ammunition, $10,010.94.
Champion Container Co., Philadelphia, artillery ammunition materiel, $1187.50.
Cincinnati Ball Crank Co., Cincinnati, artillery ammunition components, $195,456.99.
Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati, machines, $32,327.
Continental Machines Inc., Minneapolis, machines, $1900.
Crafts Co. Inc., Arthur A., Boston, gages, $4880.
Crucible Steel Co. of America, New York, small arms ammunition components, $10,010.94.
Doehler Die Casting Co., Pottstown, Pa., artillery ammunition, components, materiel, $49,940.40.
Dollin Corp., Irvington, N. J., ammunition components, $15,480.
Electric Auto-Lite Co., Toledo, O., artillery ammunition components, $353,299.80.
Exact Weight Scale Co., Columbus, O., scales, $8525.
Fable & Co. Inc., Philadelphia, small arms ammunition, $2156.16.
Fulton Syphon Co., Knoxville, Tenn., artillery ammunition components, $205,500.
General Electric Co., Schenectady, N. Y., ammunition components, $92,938.
Central Machine Works Inc., Philadelphia, machinery, $4440.
General Motors Corp., Anderson, Ind., artillery ammunition components, $460,000.
Greenfield Tap & Die Corp., Greenfield, Mass., gages, $4615.65.
Gulberson Diesel Engine Co., Buda Co. plant, Harvey, Ill., diesel engine parts, $2882.30.
Heald Machine Co., Worcester, Mass., grinders, $10,779.
Herbrand Corp., Fremont, O., wrenches, $4172.35.
International Business Machines Corp., New York, recorders, $3400.
Jeffrey Mfg. Co., Columbus, O., machinery, $3245.
Leeds & Northrup Co., Philadelphia, machinery, $1027.50.
Lincoln Park Tool & Gage Co., Lincoln Park, Mich., gages, $1397.20.
Link-Belt Co., Indianapolis, artillery ammunition components, $77,350.
Machinery Builders Inc., Long Island City, N. Y., machines, $4634.40.
Magnaflux Corp., Chicago, tools, $3241.50.
Mattison Machine Works, Rockford, Ill., grinders, $8161.
Modern Tool & Die Co., Philadelphia, gages, $2025.
Morgan Machine Co., Rochester, N. Y., machines, $1141.25.
National Malleable & Steel Casting Co., Cleveland, artillery ammunition components, $294,000.
Niles-Bement-Pond Co., Pratt & Whitney division, Hartford, Conn., tools, gages, $27,414.11.
Noblitt Sparks Industries Inc., Columbus, Ind., ammunition components, $352,073.20.
Norris Plastics Co., Massillon, O., small arms materiel, $2450.
Paige, Frank E., & Co., Boston, ammunition components, $3300.
Pangborn Corp., Hagerstown, Md., machines, $12,456.
Peco Mfg. Co., Philadelphia, artillery ammunition components, $40,000.
Peters Engineering Co., Philadelphia, machinery, tools, $6400.
Poor & Co., Canton Forge & Axle Works, Canton, O., forgings, $6098.34.
Precise Tool & Mfg. Co., Fairmington, Mich., gages, $19,193.40.
Precision Mfg. Co., Philadelphia, gages, $6144.
Prophylactic Brush Co., Florence, Mass., ammunition components, $3500.

Purchases Under Walsh-Healey Act

(In week ended Oct. 12)

Iron and Steel Products

	Commodity	Amount
Albert & Davidson Pipe Corp., Brooklyn, N. Y.	Steel pipe	$13,100.00
Allis-Chalmers Mfg. Co., Milwaukee	Forgings	178,350.00
Anchor Post Fence Co., New York	Chain link fence	10,373.39
Baltimore Enamel & Novelty Co., Baltimore	Steel sheets	12,662.36
Brinton Co., H., Philadelphia	Aiming posts	23,078.00
Buell, B. B., & Co., Seattle	Ranges	16,115.00
Central Foundry Co., New York	Water pipe	14,500.00
Chapman Valve Mfg. Co., Indian Orchard, Mass.	Valves	120,272.00
Crane Co., Chicago	Valves	44,798.40
Crosby Co., Buffalo	Reels	156,485.74
Crucible Steel Co. of America, New York	Steel bars	*13,276.20
Doehler Die Casting Co., Pottstown, Pa.	Upper caps	28,900.00
Edwards Co., E. H., San Francisco	Wire rope	15,293.60
Ft. Pitt Bridge Works, Pittsburgh	Fabricated structural steel	*150,000.00
Graver Tank & Mfg. Co. Inc., East Chicago, Ind.	Gas holders	14,878.00
Heppenstall Co., Pittsburgh	Forgings	832,996.69
Hunt & Co., J. R., Baltimore	Motor maintenance equipment	31,011.12
Jackes-Evans Mfg. Co., St. Louis	Stove pipes	22,334.40
Jones & Laughlin Steel Corp., Pittsburgh	Steel bars	*120,790.80
Louisville Tin & Stove Co., Louisville, Ky.	Spark arrestors	19,639.00
Lukens Steel Co., Coatesville, Pa.	Steel plates	82,945.60
Pacific Iron & Steel Co., Los Angeles	Structural frames	11,918.00
Southwest Welding & Mfg. Co., Alhambra, Calif.	Shutter dome units	24,552.00
Steel Improvement & Forge Co., Cleveland	Steel forgings	23,660.00
Union Iron Works, Erie, Pa.	Boiler	78,831.00
Western Can Co. (M. J. B. Co., owners) San Francisco	Tin cans	19,000.00
Yale & Towne Mfg. Co., Stamford, Conn.	Padlocks	14,637.40
Yarnall-Waring Co., Philadelphia	Traps	*15,378.00

*Estimated.

Nonferrous Metals and Alloys

Aluminum Co. of America, Pittsburgh	Aluminum	$61,500.00
American Brass Co., Waterbury, Conn.	Cartridge cups, copper-nickel sheets, copper tubing	516,303.64
American Smelting & Refining Co., Federated Metals division, New York	Metal type	14,960.00
International Nickel Co. Inc., New York	Nickel, copper alloy	37,722.73
International Silver Co., New York	Forks and spoons	92,700.00
Revere Copper & Brass Inc., Baltimore	Copper tubing, cartridge cups	364,459.52
Taylor-Wharton Iron & Steel Co., Easton, Pa.	Alloy flasks	29,362.50

Machinery and other Equipment

Barrett Machine Tool Co., Meadville, Pa.	Facing machines	$12,950.00
Bullard Co., Bridgeport, Conn.	Turning machines	56,524.60
Cedar Rapids Engineering Co., Cedar Rapids, Iowa	Grinder	23,525.00
Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati	Milling machines	37,301.00
Cincinnati Shaper Co., Cincinnati	Shearing machines	16,248.00
Cleveland Automatic Machine Co., Cleveland	Lathe	12,440.60
Consolidated Machine Tool Corp., Rochester, N. Y.	Lathes	42,235.00
Curtis Mfg. Co., St. Louis	Compressors	55,894.47
Gloekler Mfg. Co., Erie, Pa.	Refrigerators	64,250.00
Gosiger, C. H., Machinery Co., Dayton, O.	Lathes	17,041.76
Goss Printing Press Co., Chicago	Plant equipment	505,490.00
Hart, Earle, Woodworking Machine Co., Chicago	Matchers	12,019.00
Heald Machine Co., Worcester, Mass.	Grinder	15,713.00
Henry & Wright Mfg. Co., Hartford, Conn.	Dieing machines	11,076.00
Ingersoll-Rand Co., New York	Pneumatic drills	10,080.00
Insinger Machine Co., Philadelphia	Dishwashing machines	32,755.00
International Postal Supply Co., Brooklyn, New York	Canceling machines	16,000.00
Lloyd & Arms Inc., Philadelphia	Lathes	28,990.00
Monarch Machine Tool Co., Sidney, O.	Lathes	245,445.03
Niles-Bement-Pond Co., Pratt & Whitney division, Hartford, Conn.	Boring machines	17,506.00
Onsrud Machine Works Inc., Chicago	Lathes	30,753.00
Prentiss, Henry, & Co. Inc., New York	Boring machines	33,298.00
Rockford Machine Tool Co., Rockford, Ill.	Slotters	69,085.50
Shipley, W. E., Machinery Co., Philadelphia	Lathes	118,415.25
Timken Roller Bearing Co., Canton, O.	Roller paths	24,554.98
Van Norman Machine Tool Co., Springfield, Mass.	Milling machines	20,612.00
Worthington Pump & Machinery Corp., Cincinnati	De-aerating equipment	28,590.00

Pullman-Standard Car Mfg. Co., Hammond, Ind., artillery ammunition materiel, $7632.74.

Republic Steel Corp., Cleveland, small arms ammunition components, $11,652.80.

Rheem Mfg. Co., Chicago, ammunition components, $122,612.50.

Rogers, John M., Gloucester City, N. J., gages, $6802.80.

Ryerson, Joseph T., & Sons Inc., Philadelphia, machines, $1706.45.

Schwitzer-Cummins Co., Indianapolis, artillery ammunition components, $300,026.30.

Scovill Mfg. Co., Waterbury, Conn., small arms ammunition components, $32,850.

Sheffield Gage Corp., Dayton, O., gages, $4310.49.

Shipley, W. E., Machinery Co., Philadelphia, grinders, $7875.

Specialty Screw Machine Products Inc., Lancaster, Pa., ammunition components, $4720.

Standard Tool & Mfg. Co., Arlington, N. J., machinery, $10,862.

Steacy-Schmidt Mfg. Co., York, Pa., machines, $1735.

Struthers-Wells-Titusville Corp., Titusville, Pa., ammunition components, $20,928.

Surface Combustion Corp., Toledo, O., furnaces, $4240.

Thorrez and Maes Mfg. Co., Jackson, Mich., artillery ammunition components, $21,250.

Timken-Detroit Axle Co., Wisconsin Axle division, Oshkosh, Wis., transmission parts, $29,806.10.

Titan Metal Mfg. Co., Bellefonte, Pa., artillery ammunition components, $12,677.89.

Titeflex Metal Hose Co., Newark, N. J., ignition assemblies, $41,250.

Universal-Cyclops Steel Corp., Bridgeville, Pa., small arms ammunition components, $8368.88.

Union Parts Mfg. Co. Inc., Brooklyn, N. Y., artillery ammunition components, $5050.90.

Union Twist Drill Co., Athol, Mass., machines, $1988.

Unique Specialties Inc., New York, artillery ammunition components, $32,115.16.

U. S. Automatic Corp., Amherst, O., artillery ammunition components, $53,388.50.

Veit and Young, Philadelphia, tools, $15,630.

Vickers Inc., Waterbury Tool division, Waterbury, Conn., gears, $126,078.

Vinco Corp., Detroit, gages, $36,234.30.

Wang Textile Co., Schenectady, N. Y., artillery ammunition materiel, $6100.

Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., machinery, $19,350.

Watson-Stillman Co., Roselle, N. J., presses, $49,400.

Weber Machine Corp., Rochester, N. Y., gages, $2167.50.

Weiss, Albert, New York, machines, $18,884.64.

Western Cartridge Co., Winchester Repeating Arms Co. division, New Haven, Conn., small arms ammunition, $9375.

Westinghouse Air Brake Co., Wilmerding, Pa., artillery ammunition components, $416,355

Worcester Stamped Metal Co., Worcester, Mass., ammunition components, $7820.

Navy department announced the following yards and docks awards:

Arctic Engineering Co. Inc., New York, renewal of water condensers of refrigerating equipment at naval hospital, Brooklyn, N. Y., $1612.

Sargent, Henry C., Brooklyn, N. Y., repairs to boiler and accessories at naval direction finder station, Fire Island, New York, $415.

Bureau of Supplies and Accounts Awards

Acme Steel Engineering Co. Inc., Baltimore, mooring buoys, $86,765.

Addressograph-Multigraph Corp., Cleveland, addressograph machines, $30,572.92.

Aluminum Cooking Utensil Co., New Kensington, Pa., aluminumware, $33,243.50.

Aluminum Products Co., LaGrange, Ill., aluminumware, $43,459.

American Steel & Wire Co., Cleveland, electric cable, $85,998.55.

American Tool Works Co., Cincinnati, lathes, $181,116.

Anaconda Wire & Cable Co., New York, electric cable, $87,964.

Axelson Mfg. Co., Los Angeles, engine lathes, $279,907.50.

Austin-Hastings Co. Inc., Cambridge, Mass., high speed shapers, $32,425.90.

Bendix Aviation Corp., Pioneer Instrument division, Bendix, N. J., aircraft equipment, $788,578.75.

Brown & Sharpe Mfg. Co., Providence, R. I., universal grinders, $31,760.60.

Carlton Machine Tool Co., Cincinnati, radial drills, $111,378.45.

Caterpillar Tractor Co., Peoria, Ill., gasoline engine driven tractors, $21,031.17.

Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati, milling machines, $17,523.

Cincinnati Shaper Co., Cincinnati, squaring shear, $14,938.

Cleveland Automatic Machine Co., Cleveland, automatic screw machines, $8214.80.

Collyer Insulated Wire Co., Pawtucket, R. I., electric cable, $93,339.85.

Continental Machines Inc., Minneapolis, combination contour metal sawing, filing and polishing machines, $19,643.74.

Dochler Metal Furniture Co. Inc., New York, mess tables, chairs, $67,428.20.

Federal Motor Truck Co., Detroit, motor trucks, $72,700.

Fibre-Metal Products Co., Chester, Pa., welders' helmets and shields, $22,462.

Fisher-Pierce Co., Neponset, Mass., soldering covers, fuse and strips, $12,818.78.

Foster Brothers Mfg. Co., Utica, N. Y., hospital beds, $31,350.

General Cable Corp., New York, electric cable, $76,506.25.

General Electric Co., Schenectady, N. Y., electric cable, $86,634.90.

General Electric Supply Corp., Schenectady, N. Y., knife switches, $29,970.

Hartzell Industries Inc., Piqua, O., propeller hubs and blades, $15,290.

Hayes Industries Inc., Jackson, Mich., cylinders, aluminum alloy wheels, $5000.50

Illinois Pure Aluminum Co., Lemont, Ill., water pitchers, $22,375.

International Harvester Co., Chicago, motor trucks, $20,478.

Jones & Lamson Machine Co., Springfield, Vt., turret lathes, $32,496.

Kidde, Walter & Co. Inc., New York, fire extinguishers, $63,225.

Knight, W. B., Machinery Co., St. Louis, milling, boring machines, $24,298.

LeBlond, R. K., Machine Tool Co., Cincinnati, hydraulic rifling machine, $11,973.

Lockheed Aircraft Corp., Burbank, Calif., airplanes, $114,180.97.

Lodge & Shipley Machine Tool Co., Cincinnati, lathes, $145,195.

Manning, Maxwell & Moore Inc., Bridgeport, Conn., manifold pressure gages, $146,500.

Marine Engine Works & Shipbuilding Co., Tarpon Springs, Fla., motor launches, $19,200.

Monarch Machine Tool Co., Sidney, O., lathe, $15,105.

National Electric Products Corp., Pittsburgh, electric cable, $92,471.45.

Okonite Co., Passaic, N. J., electric cable, $86,004.90.

Peterson Boat Works, Sturgeon Bay, Wis., motor launches, $23,670.

Phelps Dodge Copper Products Corp., Habirshaw Cable & Wire division, New York, electric cable, $86,318.37.

Rasmussen Machine Co. Inc., Racine, Wis., hack saws, $11,868.

Service Caster & Truck Co., Albion, Mich., steel platform skids, $5706.

Sidney Machine Tool Co., Sidney, O., lathes, $27,486.

Simmons Co., New York, mess tables, chairs, $6114.56.

Square D. Co., Kollsman Instrument division, Elmhurst, N. Y., manifold pressure gages, $87,473.25.

Star Machinery Co., Seattle, band scroll saws, $7379.

Steuart Motor Co., Washington, motor trucks, $17,108.54.

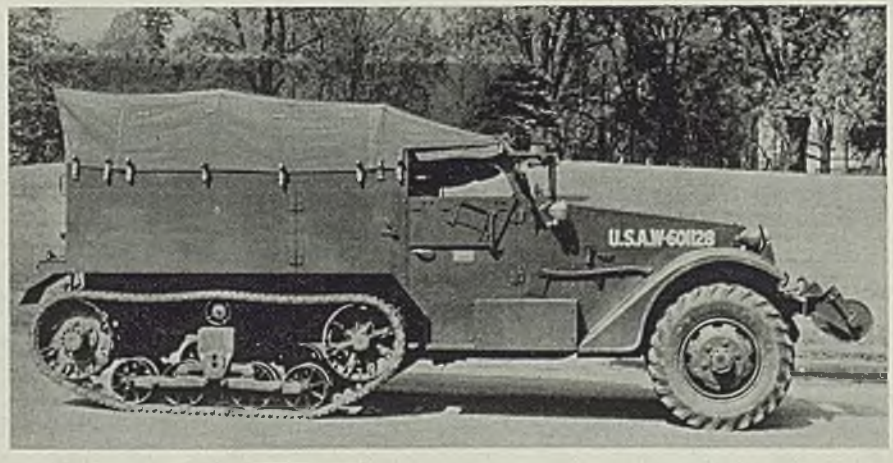
United Aircraft Corp., Hamilton Standard Propellers division, East Hartford, Conn., propeller hubs and blades, $33,021.84.

United States Gauge Co., New York, aircraft altimeters, $40,400.

Ward Leonard Electric Co., Mt. Vernon, N. Y., face plate type rheostats, $48,623.80.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., ammeters, turbogenerators, $442,089.

Army Gets New Armored Scout Cars



■ **Scout cars with bodies of quarter-inch armor plate and capable of up to 55 miles an hour are being built for the United States army by White Motor Co., Cleveland. Model shown above is equipped with "half-trac" treads in place of rear wheels. The roller projection in front is for use in crossing ditches or when the front wheels bog down. Each car carries eight men and two machine guns**

Who Did You Say Is Dumb?

■ RECENTLY the head of a small machinery manufacturing company was complaining about the attitude and ability of his employes. The workers in his shop, he said, are just dumb. They rate, he said, very little above the level of dumb animals.

This complaint brings to mind a story which Jack Dale, Dallas, Tex., mill supplies distributor, told on an occasion when he wanted to make a point about the unfailing care and patience that are required in training salesmen. It was about a conversation between two sales managers.

* * *

"How do you like your salesmen?" asked one.

"I don't like them at all," replied the second. "They are just plain dumb."

"Who trained them?" continued the first.

"I did," was the reply.

The first sales manager scratched his head a moment and asked: "Who did you say is dumb?"

* * *

When employes are "dumb" it usually is an indication of "dumbness" in the front office, for it is an old, established fact that the attitude and performance of an employe depends largely on what the employer expects of him and what the employer does to encourage intelligence, efficiency and loyalty.

Even in today's adverse psychological atmosphere employers can win such an attitude. That is because people continue to be human beings. Employes have their interests, their principles, their loyalties and their enthusiasms. They are cheering just as loudly as ever at the football games. They are just as willing as ever to accept and respond to leadership.

* * *

Many industrial managements today appreciate it as a basic fact that people continue to be human beings. All over the country employers are striving to create and encourage "family" spirit in their organizations. They hold "open-house" parties. They tender dinners to their employes and, in friendly, frank manner, talk about the business and about mutual interests. More employers go through their plants and get better acquainted with their men. They seek to develop a "feel" of the shop spirit, seeking to find out just what the average worker wants and how he feels about his job, his employer, the country and things in general.

* * *

The smart employers do these things. They know that employes are not "dumb" when they understand their jobs and are enthusiastic about them.

E C Kreutzberg

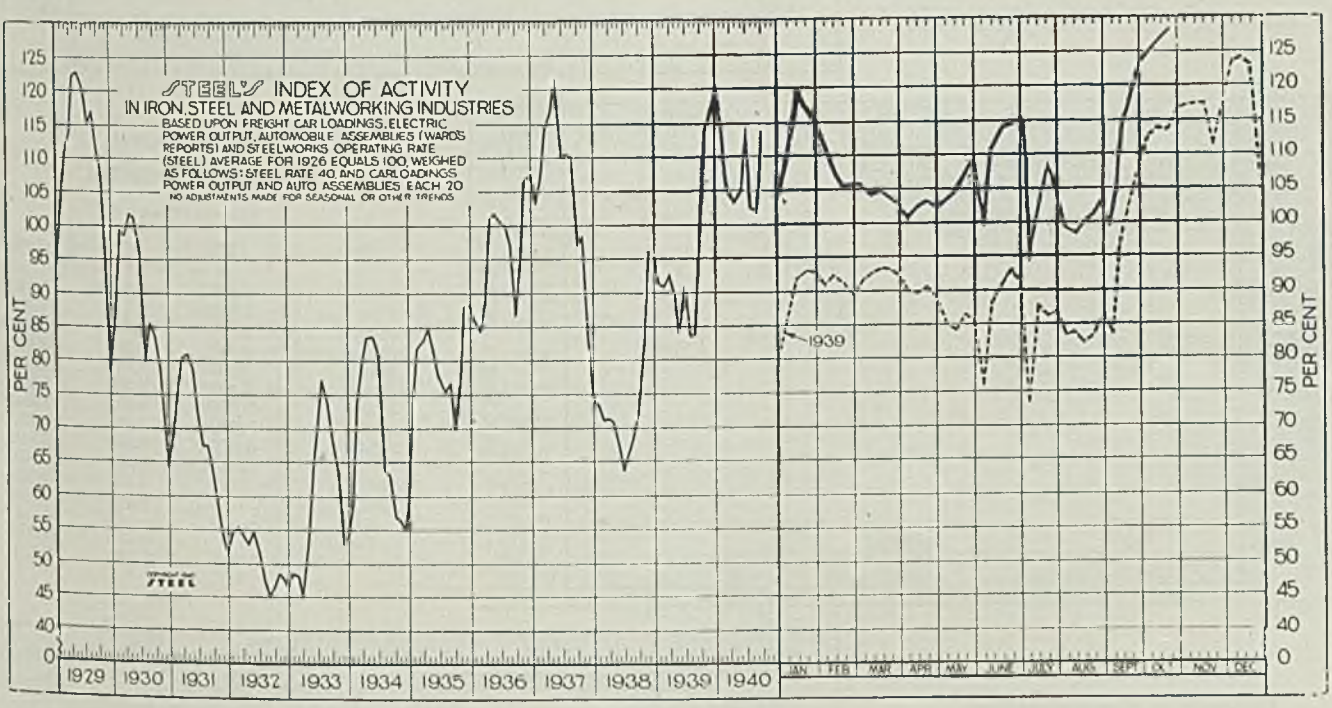
The BUSINESS TREND

Activity Index Moves To Higher Level

■ FURTHER production gains in some industrial lines awaits only the completion of expansion programs now underway. New demand continues to develop at an encouraging pace, in some instances exceeding current output. The large volume of order backlogs accumulated in recent months, indicates near capacity operations, particularly in the heavy industries, for some time to come.

For the week ended Oct. 19, STEEL'S index of activity advanced 2.3 points to the 128.3 level. Excluding Labor day week, this represents the eighth consecutive weekly increase. In the comparable week of 1939, 1937 and 1929, STEEL'S index stood at 113.6, 101.8 and 106.1 respectively.

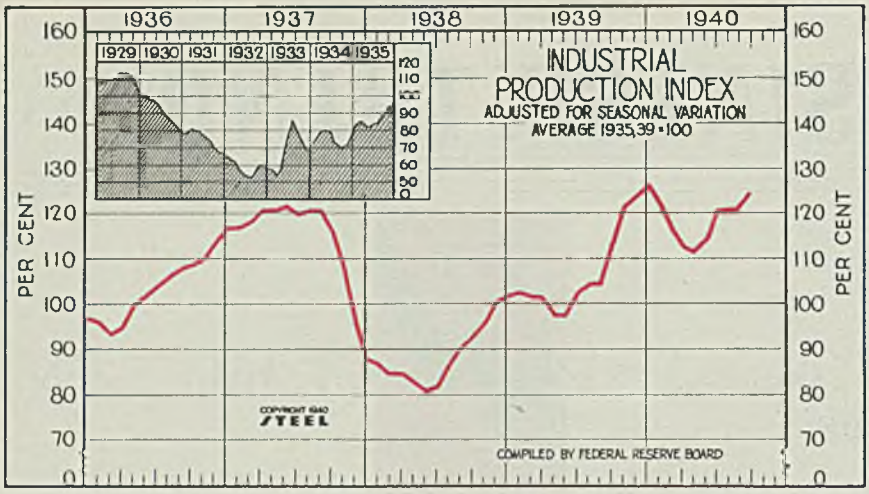
The national steel rate advanced half a point to 95 per cent during the week ended Oct. 19. On a tonnage basis this is at the greatest volume in history. Revenue freight carloadings, electric power output and automobile production also recorded encouraging gains during the latest period. Electric power consumption reached a new all time high, amounting to 2,686,799,000 kilowatts.



STEEL'S index of activity gained 2.3 points to 128.3 in the week ended Oct. 19:

Week Ended	1940	1939
Aug. 10	98.5	83.9
Aug. 17	100.8	82.2
Aug. 24	101.4	83.4
Aug. 31	103.5	86.3
Sept. 7	98.7	83.7
Sept. 14	114.9	97.5
Sept. 21	117.7	103.0
Sept. 28	122.8	107.9
Oct. 5	124.4	112.5
Oct. 12	126.0	113.9
Oct. 16	128.3	113.6

Mo. Data	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
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
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
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
April	102.7	89.5	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7	122.5
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
June	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8	120.3
July	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9	115.2
Aug.	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4	116.9
Sept.	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7	110.8
Oct.	.....	114.0	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8	107.1
Nov.	.....	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.3	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



Industrial Production
Federal Reserve Board's Index

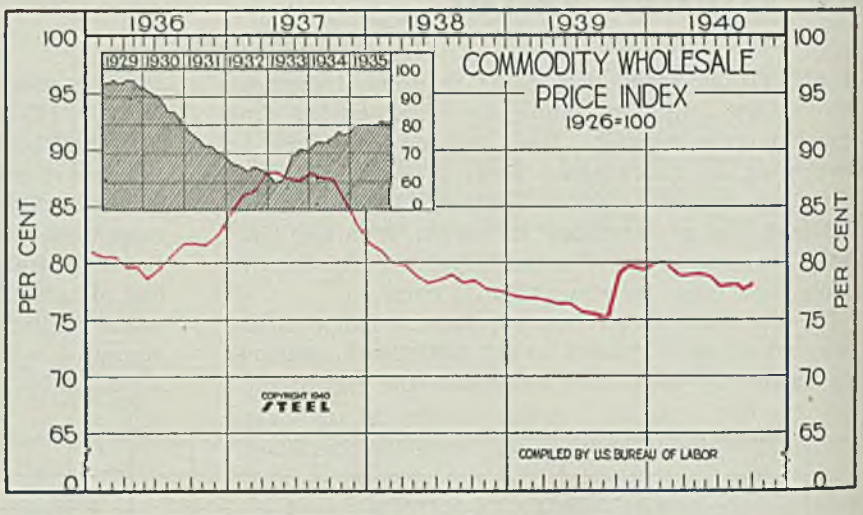
(1935-39 = 100)

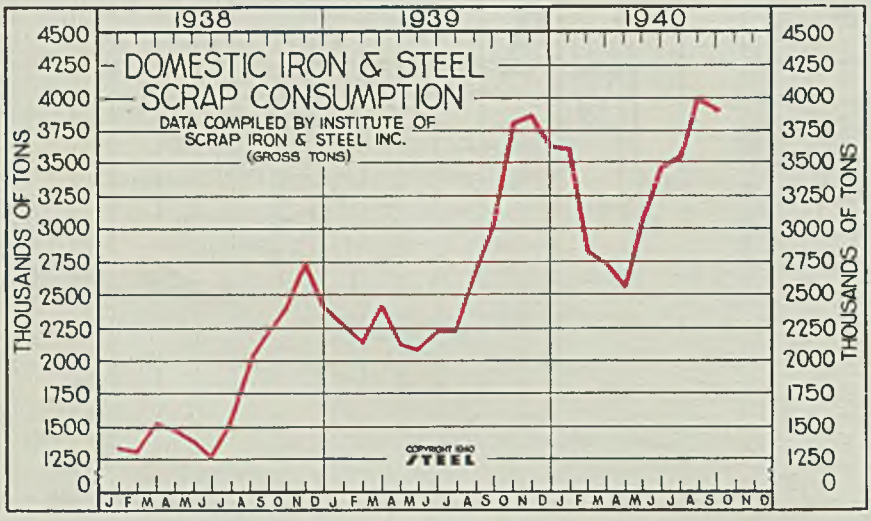
	1940	1939	1938	1937	1936
Jan.	122	102	86	116	95
Feb.	116	101	84	117	92
March	112	101	84	120	94
April	111	97	82	120	99
May	115	97	80	121	101
June	121	102	81	119	103
July	121	104	86	120	105
Aug.	121	104	90	120	107
Sept.	125	113	92	115	108
Oct.	...	121	95	107	109
Nov.	...	124	100	95	113
Dec.	...	126	101	87	116

All Commodity
Wholesale Price Index
U. S. Bureau of Labor

(1926 = 100)

	1940	1939	1938	1937	1936
Jan.	79.4	76.9	80.9	85.9	80.6
Feb.	78.7	76.9	79.8	86.3	80.6
March	78.4	76.7	79.7	87.8	79.6
April	78.6	76.2	78.7	88.0	79.7
May	78.4	76.2	78.1	87.4	78.6
June	77.5	75.6	78.3	87.2	79.2
July	77.7	75.4	78.8	87.9	80.5
Aug.	77.4	75.0	78.1	87.5	81.6
Sept.	77.8	79.1	78.3	87.4	81.6
Oct.	....	79.4	77.6	85.4	81.5
Nov.	....	79.2	77.5	83.3	82.4
Dec.	....	79.2	77.0	81.7	84.2
Ave.	....	77.1	78.6	86.3	80.8





Iron and Steel
Scrap Consumption

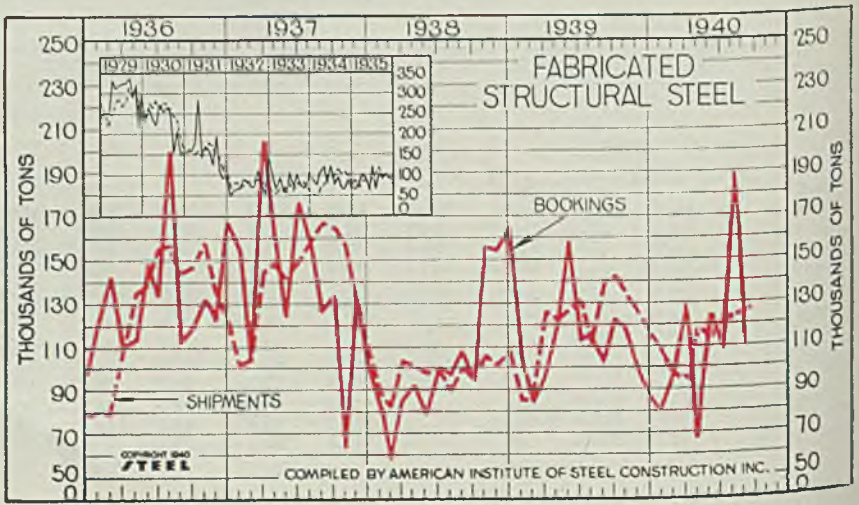
(Gross Tons)

	1940	1939 (000 omitted)	1938
Jan.	3,581	2,257	1,331
Feb.	2,812	2,124	1,306
Mar.	2,728	2,419	1,543
Apr.	2,548	2,114	1,477
May	3,061	2,079	1,387
June	3,482	2,221	1,257
July	3,526	2,247	1,520
Aug.	3,968	2,675	1,953
Sept.	3,876	3,018	2,218
Oct.	.....	3,809	2,393
Nov.	.....	3,858	2,732
Dec.	.....	3,613	2,411
Total	....	32,434	21,528
Mo. Av.	3,213	2,703	1,794

Fabricated Structural Steel

(1000 tons)

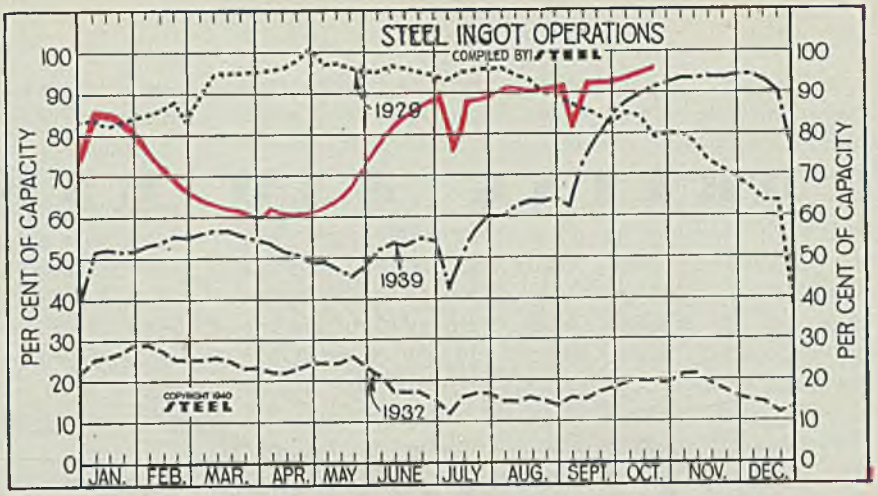
	Shipments			Bookings		
	1940	1939	1938	1940	1939	1938
Jan.	110.9	84.3	87.8	81.7	101.7	80.3
Feb.	97.2	84.4	81.2	98.9	82.7	57.1
Mar.	95.9	125.3	103.3	128.3	95.1	84.3
Apr.	116.3	120.9	100.0	73.8	118.3	91.2
May	115.6	125.9	96.4	126.8	156.9	77.3
June	119.1	130.1	98.6	109.7	111.6	99.9
July	121.3	110.5	88.0	189.9	114.1	96.0
Aug.	124.3	139.7	98.6	109.9	100.9	106.8
Sept.	.....	140.8	93.5	....	121.4	92.5
Oct.	.....	133.8	105.0	....	118.8	154.8
Nov.	.....	128.2	99.9	....	99.3	153.1
Dec.	.....	116.2	106.5	....	84.4	163.4
Total	....	1440.1	1158.8	....	1305.0	1256.6

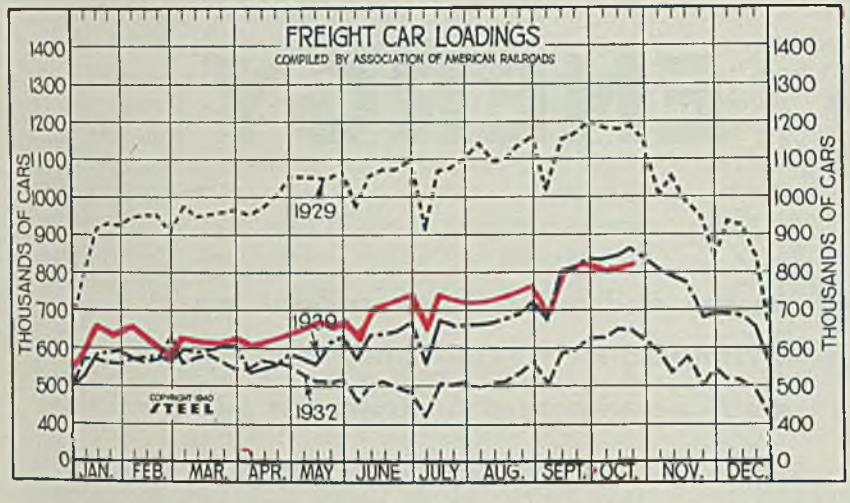


Steel Ingot Operations

(Per Cent)

Week ended	1940	1939	1938	1937
July 20....	88.0	56.5	36.0	81.0
July 27....	89.5	60.0	37.0	84.0
Aug. 3....	90.5	60.0	40.0	84.5
Aug. 10....	90.5	62.0	40.0	84.0
Aug. 17....	90.0	63.5	41.5	81.0
Aug. 24....	90.5	63.5	43.5	83.0
Aug. 31....	91.5	64.0	44.5	83.0
Sept. 7....	82.0	62.0	41.5	72.0
Sept. 14....	93.0	74.0	46.0	80.0
Sept. 21....	93.0	79.5	48.0	76.0
Sept. 28....	93.0	84.0	47.0	74.0
Oct. 5....	93.5	87.5	48.5	66.0
Oct. 12....	94.5	89.5	51.5	63.0
Oct. 19....	95.0	91.0	51.5	53.0





Freight Car Loadings

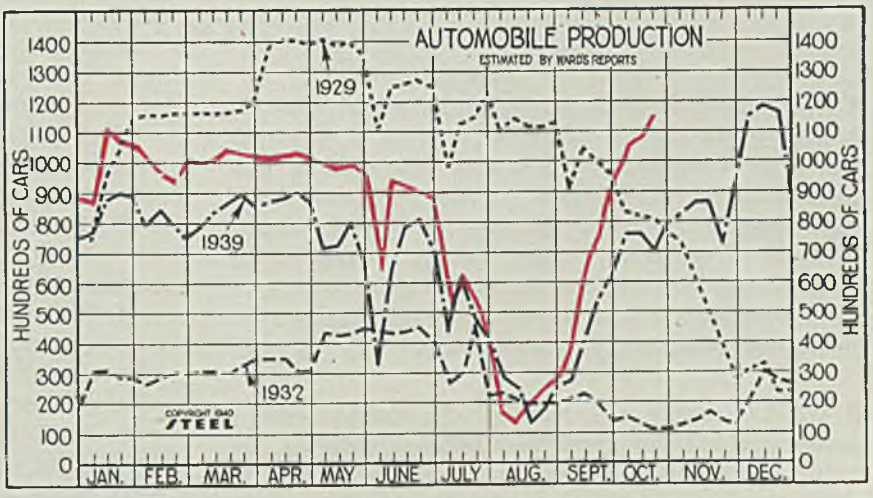
(1000 Cars)

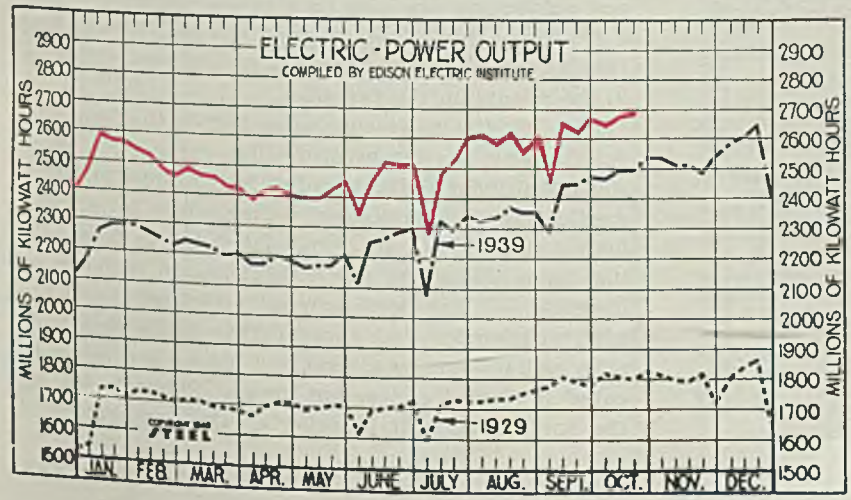
Week ended	1940	1939	1938	1937
July 20.....	730	656	581	771
July 27.....	718	660	589	783
Aug. 3.....	718	661	584	770
Aug. 10.....	727	665	590	777
Aug. 17.....	743	674	598	781
Aug. 24.....	761	688	621	787
Aug. 31.....	769	722	648	805
Sept. 7.....	695	667	569	711
Sept. 14.....	804	806	660	827
Sept. 21.....	813	815	676	840
Sept. 28.....	822	835	698	847
Oct. 5.....	806	835	703	815
Oct. 12.....	812	845	727	810
Oct. 19.....	814	861	706	773

Auto Production

(1000 Units)

Week ended	1940	1939	1938	1937
July 20....	53.0	47.4	32.1	88.1
July 27....	34.8	40.6	30.4	86.4
Aug. 3....	17.4	28.3	14.8	78.7
Aug. 10....	12.6	24.9	13.8	103.3
Aug. 17....	20.5	13.0	23.9	93.3
Aug. 24....	23.7	17.5	18.7	83.3
Aug. 31....	27.6	25.2	22.2	64.2
Sept. 7....	39.7	26.9	17.5	59.0
Sept. 14....	66.6	41.2	16.1	30.1
Sept. 21....	78.8	53.9	20.4	28.0
Sept. 28....	95.9	62.8	25.4	45.8
Oct. 5....	105.2	76.1	37.7	72.0
Oct. 12....	108.0	75.9	50.5	89.7
Oct. 19....	114.7	70.1	68.4	91.9



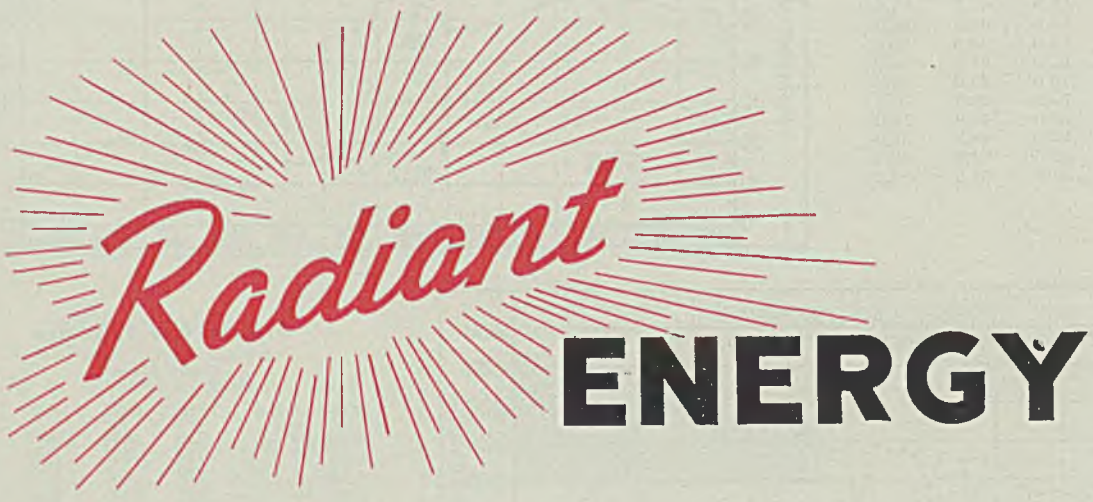


Electric Power Output

(Million KWH)

Week ended	1940	1939	1938	1937
July 20...	2,524	2,295	2,085	2,259
July 27...	2,601	2,342	2,094	2,256
Aug. 3...	2,605	2,325	2,116	2,262
Aug. 10...	2,589	2,333	2,134	2,301
Aug. 17...	2,606	2,368	2,139	2,304
Aug. 24...	2,571	2,354	2,134	2,295
Aug. 31...	2,601	2,357	2,149	2,321
Sept. 7...	2,463	2,290	2,048	2,154
Sept. 14...	2,639	2,444	2,215	2,281
Sept. 21...	2,629	2,449	2,154	2,266
Sept. 28...	2,670	2,470	2,139	2,275
Oct. 5...	2,641	2,465	2,154	2,280
Oct. 12...	2,665	2,495	2,183	2,276
Oct. 19...	2,687	2,494	2,214	2,282

DRYING AND BAKING WITH



When properly applied, drying and baking with radiant energy permit great output from comparatively small equipment, afford reduced costs and are usually accompanied by improved finishes

Part I

■ *Part I here explains basic factors which must be understood to obtain maximum benefits from either incandescent lamps or gas radiants when used in radiant energy equipment. Part II next week will detail application factors connected with use of incandescent lamps as the source of radiant energy while Part III the following week will cover use of gas radiants as the energy source. Most of the theoretical material in Part I applies equally to both sources.*

■ WHILE drying and baking with radiant energy have increased the speed and reduced costs of finishing operations in many instances, the method is not a cure-all and is not applicable to all types of metal finishing work with equal efficiency. Not so well known, either, is the fact that gas radiants as well as electric lamps may be used efficiently as the source of radiant energy.

As will be shown, the shape and thickness of the work, color and type of coating, finish of the metal surface upon which the coating is cured, distance of work from the source of the radiant energy, necessity of keeping ray sources permanently clean, and adequate means of preventing "shadows" from being cast by conveyors or the work itself—all are factors of extreme importance in determining whether or not a particular operation can be changed over to radiant-energy drying or baking to advantage.

It was originally supposed that the greatly reduced baking time obtained with radiant-energy heat sources was due to some marked catalytic or accelerating effect exerted by the radiation itself. However, tests indicate this is not the case. For instance, one of the simplest and most decisive of such tests consists of painting both sides of a metal panel and subjecting one side only to the radiation. With a relatively thin panel, 22 gage, the heat is conducted rapidly through it and there is no apparent difference in the results on the two sides.

Possibly the most conclusive test is that made by determining the temperature-time curve for a given specimen under radiant-energy heat sources and then duplicating this temperature-time curve in an ordinary convected-hot-air oven. When this is done, baking times under the two conditions are found to be identical. It has been demonstrated that any of the high efficiencies and short curing times obtainable with radiant-energy drying and baking can be duplicated in forced convection ovens. Similarly, curing the surface without bringing up the temperature of

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A correlated abstract prepared largely from material in papers by Howard Haynes, Nela Park Engineering department, General Electric Co., Cleveland; H. J. Bennett, Glidden Co., Cleveland; D. J. Stedtefeld, chief chemist, Clinton Co., Chicago; D. A. Jacobson, field engineer, Burdett Mfg. Co., Chicago; Hale A. Clark, Michigan Consolidated Gas Co., Detroit; F. O. Hess, president, Selas Co., Philadelphia; Infra-Red-Ray Heating Clinic of American Gas association's Toledo, O. industrial gas conference.

the body of the piece can be accomplished with recirculated air at high temperatures and high rates of circulation as well as with radiant energy heating. Further, if high percentages of recirculation are used, such convection heating at high temperatures and rates of circulation can be remarkably efficient.

Likewise, the broad claim that radiant heating permits shorter ovens does not stand up when the incompact loadings necessary for satisfactory work with radiant-energy heat sources are compared to the extremely compact loadings permissible with high-velocity uniform-temperature interstice-penetrating convected air.

The type of work is particularly important. With radiant energy drying, only that part of the energy intercepted and absorbed by the work can be useful in raising the temperature of the work. Thus those objects which present a relatively large area to the radiant energy in proportion to their mass offer the most promising applications. Typical of these are metal cabinets, automobile bodies, lithographs on metal and other coated flat stock. On the other hand, parts such as bicycle frames, mattress springs, steel window frames are not particularly well suited because of the larger mass and smaller surface area involved.

Air in a radiant-drying oven is not heated appreciably so the work must be carried through it in such a manner that each piece receives radiant energy directly upon as large a part of the total surface as possible. Areas which are "in shadow" or obliquely disposed with respect to the radiant heat will not be properly heated. Wherever configurated parts such as flanges exist, it will not be possible to handle these satisfactorily if the flanges are large. If small, they may receive enough heat by conduction to bake them satisfactorily.

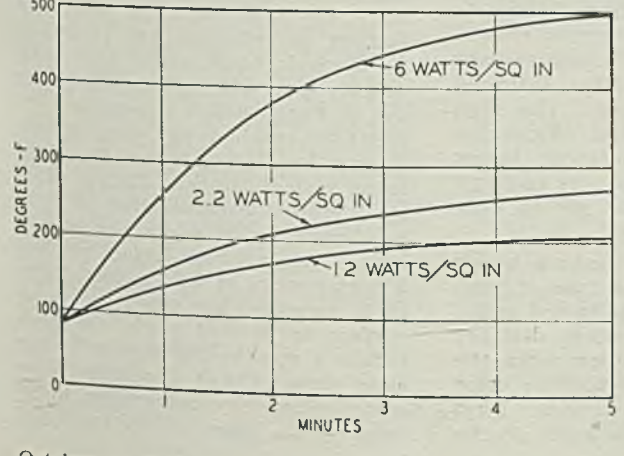
Since radiant-energy heat applications depend entirely upon use of infra-red and near infra-red rays, some discussion is warranted to obtain a clearer understanding of their characteristics. According to their wavelength, the waves in the electromagnetic spectrum can be divided into several groups including cosmic rays, received from interstellar space and of unknown origin; gamma rays, emitted by certain radioactive substances such as radium; ultraviolet rays or "beyond the violet," rays produced by the movement of electrons in atoms; light rays visible to the eye and varying from the violet to the red; infra-red rays or "beyond the red," rays produced by the atomic movement of hot bodies; and radio waves. All these are electromagnetic waves and obey the familiar laws of light including refraction, reflection, polarization, etc. All travel through space at 186,000 miles per second. Length of these waves varies from several miles for certain radio waves to a few million millionth of a centimeter for cosmic rays. All these rays are made up of bundles of energy called protons. The term "infra-red" means vibrations near the red end of the light spectrum but at a frequency invisible to the eye. The electromagnetic infra-red rays in themselves contain no heat and develop heat only when they are absorbed by some object.

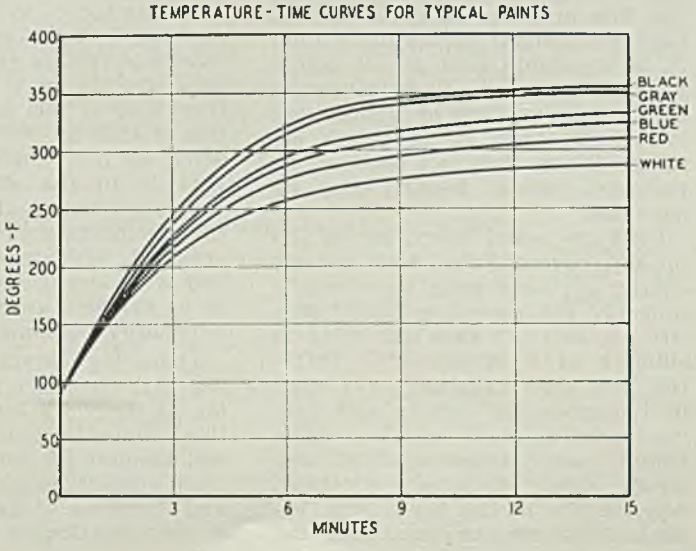
Of the three general methods of heat transfer, conduction is the simplest. Here heat is transferred directly to the work from the source without any intervening medium. Convection, the second method, means that heat is transferred to the work from the source by movements of some medium as against direct transfer from source to work point in conduction.

The third and, scientifically speaking, the most efficient method of heat transfer is by radiation, provided all the radiant energy developed is directed at surfaces where heat is desired. Heating of any object tremendously increases the molecular activity of that object whether it be a liquid, gas or solid. At elevated temperatures, the activity of the molecules sets up waves of energy which travel interminably without diminishing their total energy unless they come in contact and are absorbed by some substance. It is the temperature and mass of the radiating substance which determines the wavelengths and amount of energy radiated—irrespective

Fig. 1. (Left)—Time-temperature curves for black paint on 20-gage sheet steel, showing the effect of different energy concentration values on the temperature attained. Charts courtesy Nela Park Engineering department, General Electric Co., Cleveland

Fig. 2. (Right)—Temperature reached by the work during drying time varies with the color of the paint as is shown here where results are given for typical paints on 22-gage sheet steel under concentration of 2 watts per square inch





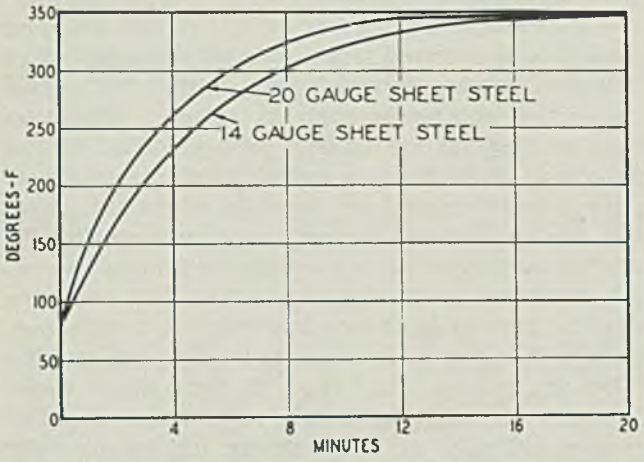


Fig. 3. (Left)—The temperature also is affected by the thickness of the panel on which the paint is applied. Note the more rapid rise with the lighter material. These curves are for black paint under 2 watts per square inch

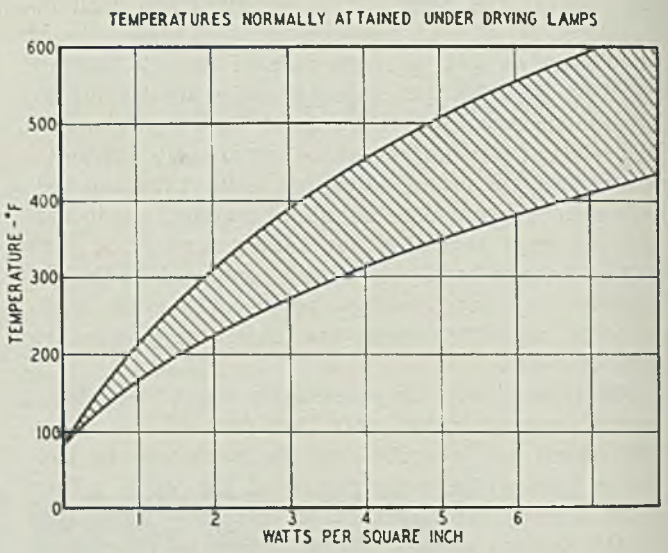


Fig. 4. (Right)—Shaded area in this chart shows range in temperature ordinarily attained with various paints. Higher values are for blacks and dark colors on light-gage stock, the lower figures for light colors and heavier material

of whether the radiating substance is a carbon or tungsten filament on the ceramic body of a gas radiant. When radiated waves meet an object of sufficient density, their energy is converted into heat.

Radiant rays therefore are an efficient medium for transferring heat from one place to another, and it is for this reason that the use of radiant-energy drying and baking has advanced tremendously.

From the above, it is apparent that radiant rays are more efficient as a means of heat transfer (provided they are not wasted on objects or spaces other than the work itself) than convection gases which naturally enough lose considerable heat in handling and transfer. However, while transfer of heat by convection gases is scientifically less efficient, it may in industrial practice be equally or more efficient, and has in many cases an advantage over radiant energy in its ability to distribute heat to all points where it is needed. Radiant heating involves the problem of aiming heat in straight lines to all points desired. Where this can be done effectively, radiant heating may be desirable.

Ordinary ovens operating at 250 to 350 degrees Fahr. emit radiant energy of fairly long wave-lengths probably not exceeding 50,000 angstrom units (each such unit being 10 billionth of a centimeter). Infra-red and near infra-red rays used in radiant-energy drying and baking have a much shorter wave-length, usually less than 20,000 angstrom units. Generally speaking, wavelengths in the band from 14,000 to 6500 units are penetrating and as such provide most effective radiant energy transfer.

To provide a preponderance of energy of a wavelength of 20,000 angstrom units or less, the incandescent body must have a temperature of at least 5000 degrees Fahr. The ordinary tungsten lamp has a temperature around 5200 degrees Fahr. In Kelvin units, the infra-red radiation should have a temperature of 1500 degrees Kelvin or higher. The sun with a temperature of 6000 degrees Kelvin is the best known source of energy of the shorter wavelengths. Filaments of ordinary Mazda lamps have temperatures ranging from 2600 to 3200 degrees Kelvin. Carbon lamps operate near 2000 degrees Kelvin. Resistance type heating elements now are manufactured to operate between 1200 and 1500 degrees Kelvin. Not enclosed in a bulb, however, such units are cooled by the surrounding air and thus are less efficient producers of radiant energy. Gas radiants operate in a range upwards from 2300 to 3000 degrees Fahr. As this is 1535 to 1925 degrees Kelvin, about 99 per cent of their radiant heat is in the effective infra-red range mentioned above. The high color temperatures and efficiencies obtained with incandescent lamps and with incandescent gas radiants point to their general use in radiant-energy equipment.

There are several factors which significantly affect the rate of heating of the work by infra-red radiation—concentration, time, distance and amount of reflection from the work surface as influenced by color and character of the surface. First is concentration of radiation on the work. This is tied in closely with the period of time the work is exposed to this concentration. See Fig. 1. Table I might be considered typical of present-day concentrations of radiant energy when using electric lamps placed 12 inches from the work in gold-plated reflectors with edges of reflectors touching. Here the arrangement and efficiency of the reflectors as well as the distance from the work are of great importance. In any case, intensity of radiant energy is readily measured with a thermopile conveniently calibrated to read in terms of watts per square inch of absorbing surface.

Time-temperature curves for black paint on 20-gage sheet steel are given in Fig. 1. Here are shown the effect of different energy concentration values on the temperatures obtained in a typical application of lamps. It will be noted 1.2 watts per square inch on the work gives a temperature of 200 degrees Fahr. in 5 minutes, whereas concentration of 6 watts per square inch produces a 500-degree temperature in the same time.

Second significant factor affecting rate of heating is rate at which the work absorbs the energy. Since the infra-red and near infra-red rays obey the laws of light, they are subject to reflection and radiation. As a result, black paints heat more quickly than white. This is brought out in Fig. 2 which shows the temperature reached by work during drying time for various paint colors using typical paints on 22-gage sheet steel with a concentration of radiant energy of 2 watts per square inch. Thus a white surface reaches a temperature of 280 degrees Fahr. in 15 minutes, but when the same surface is painted black, the temperature goes to 360 degrees in the same time. Fig. 4 also shows how color influences concentration to be employed. Mass of the material

being heated also exerts a marked effect on the temperature attained.

This is clearly demonstrated in Fig. 3 which shows how temperature is affected by thickness of the panel to which the paint is applied. Note the more rapid rise with the lighter material. The curve is for black paint using a concentration of radiant energy of 2 watts per square inch. These results indicate the weight of the panel has more effect on the heating-up time than on the ultimate temperature reached. In fact on light sheet metal work, if baking process lasts 20 minutes or longer, the mass of the material seems to have little effect on the final result. Most practical schedules call for 10 to 15-minute baking period, however, so the weight of the panel *does* have a marked effect on the result as most of the first 10 minutes or so is required to obtain working temperature. See Fig. 3.

Baffles Conserve Heat

Specific heat and conductivity of the work are other factors, as is also the heat loss from the work. This latter factor includes low-temperature radiation from the back of the work, conduction to backing and supporting members, convection currents, drafts, etc. Drafts can chill work appreciably and so, although a certain amount of ventilation is required to keep the concentration of volatile material low, most electric radiant-energy drying and baking ovens use baffles or space the heating elements close to the work to minimize heat losses. With gas radiants, of course, the hot products of combustion preclude cool drafts in the work chamber.

The heat-absorption factor mentioned above often makes it advisable to dry a sheet painted white on one side by exposing the unpainted side to the radiant energy. Or if one side is painted black and the other white, best results are obtained by exposing the black side to the energy source. This may be an extremely important factor in determining the overall efficiency of an installation.

Distance of object from the source of radiant energy affects the rate of heating only as it may affect the energy concentration on the work. Other than to keep down losses, there appears to be no theoretical limit as to distance from the ray source to the work. However, practical limitations, both of construction and of limiting wasted radiation, generally confine this distance to a maximum of possibly 24 inches with a minimum of say, 6 inches. Of course this may vary widely according to the conditions.

Type of coating to be dried or baked is one of the most important factors in determining whether radiant-energy drying or baking will prove satisfactory and economical. Metal coatings can be divided into three primary classifications—lacquers, synthetics and oleoresins.

Lacquers dry by evaporation of the thinner and are primarily a nitrocellulose material with butyl acetate thinner. They will dry in air in about 10 minutes and this is reduced to about 2 minutes if work is held at 110 degrees Fahr. If the coating is made up of nitrocellulose lacquer and resin in about equal parts, the coating will dry in air in about 45 minutes. This is reduced to about 15 minutes if baked at 150 degrees Fahr. and to 6 minutes at 200 degrees Fahr.

Synthetics may sometimes come mixed with lacquer. Such coatings dry by evaporation of the thinner and by polymerization, a chemical reaction which depends largely upon proper application of heat. Synthetics with an oil content of from 20 to 35 per cent will dry in air in from 30 to 45 minutes. If baked at 200 degrees Fahr., they dry in about 15 minutes. Synthetics with 50-per-cent oil content dry in air in from 2 to 3 hours, but this can be reduced to about 90 minutes if baked at 225 degrees Fahr., 60 minutes at 250 degrees Fahr. and only 30 minutes at 300 degrees Fahr. These 50-per-cent oil synthetics will dry in a still much shorter time if small percentages of lead or cobalt driers are added. In fact, such additions may reduce the baking time to 30 minutes at 150 degrees Fahr. Furthermore, these synthetics can be dried in about half the time mentioned if an additional 5 to 20 per cent of urea formaldehyde or resin is included. Synthetics with oil contents in excess of 50 per cent will dry in air in a short space of time.

Oleoresins dry by evaporation of the thinner, by polymerization and, which is most important, by oxidation. This class includes japans, clear varnishes and the like. Drying time is considerably longer than with either lacquers or synthetics. Clear varnishes baked at 325 degrees Fahr. require 2 hours. If raised to 400 degrees Fahr., this time is reduced to about 1 hour and only about 30 minutes at 500 degrees Fahr. Black japans require about 1½ hours at 400 degrees Fahr., 1 hour at 500 degrees Fahr.

As far as radiant-energy baking with short-time cycles is concerned, it is most important to remember that the time of baking oleoresins cannot be shortened much because of the necessity of oxidation of the oil. This oxidation takes time and indicates clearly that best results will be obtained in radiant drying by use of lacquers and synthetics. Any finish which dries by oxidation is either difficult or impossible to bake under practical conditions with infra-red radiant heat.

Shortening finishing time by changing from a material which requires a long time to bake to a material which requires less time involves certain elements of considerable significance. Often such an attempt to shorten baking time may considerably increase the cost of the coating material itself. Then also, the finish may prove much less durable. Coatings which must withstand weather generally require a longer bake. It is extremely important to investigate the quality of the coating applied in the shorter time. This should be done under conditions similar to those experienced in actual service if an effective measure of value is to be obtained.

It is important to note that, one of the chief objections to radiant drying as over and against convection is the fact that finish producers will be forced to supply many more varieties of special (and often costly) finishes than heretofore. With respect to the type of coating, radiant drying is definitely more "touchy" than convection drying.

In changing over to radiant-energy drying and baking, be sure the finish you want to use can be handled by radiant heat, and that the type of finishes suitable for radiant baking will be satisfactory for your particular application. Often increased efficiency and shorter baking times are possible merely by changing the coating material using present equipment. On the other hand, a combination of different coating material and radiant drying or baking may prove most effective.

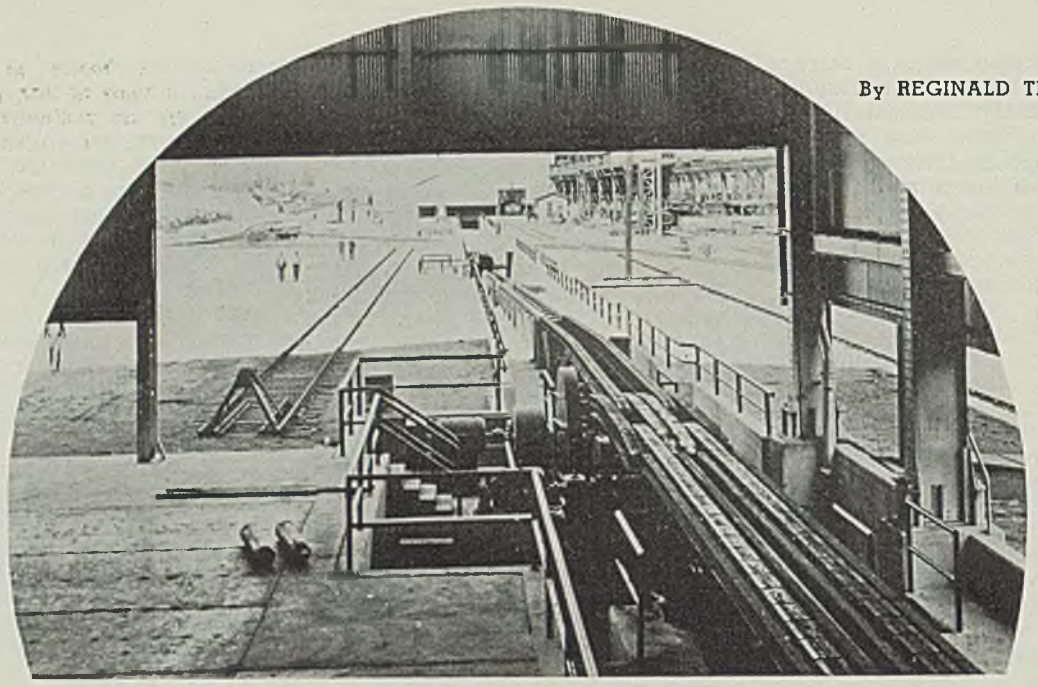
(Continued Next Week)

TABLE I—Typical Concentrations of Radiant Energy

	Average Watts Per Square Inch on Work
250-watt drying lamps in 12-inch reflectors	1.2
250-watt drying lamps in 9-inch reflectors	1.8
250-watt drying lamps in 8-inch reflectors	2.2
1000-watt floodlight lamps operated at 750 watts in 12-inch reflectors	3.6
Summer sunlight, noon at sea level	0.7

All lamps 12 inches from work, in gold plated reflectors with edges touching. The surface with the highest reflection factor for infra-red energy is gold plating. Although copper and silver plating are close to gold, these metals tarnish quickly.

By REGINALD TRAUTSCHOLD



Conveyor system for handling strip steel in coils. Note construction of "moving platform" and transfer conveyors

INTERMITTENT CONVEYOR

■ GREAT slabs of steel, weighing 6000 to 12,600 pounds each, issue from large continuous heating furnaces at a temperature around 2000 degrees Fahr. and are rolled directly into some 800 feet of 14-gage strip, 30 inches in width, at one of the newer tin-plate mills in a prominent southern steel plant. Coming off the mills, the strip is coiled while still at a temperature near 1200 degrees Fahr. These coils are mechanically transferred and gently placed on their ends upon the first of a series of double-strand steel-bar-link antifriction roller-chain carriers. This conveying system carries the coils of strip about 1000 feet to temporary storage in the plant's cold reduction department, here to await passage through the tin mill's pickling lines or other disposal.

During this journey of close to a fifth of a mile between the continuous strip mill and the continuous pickling lines, the coils cool off and the exact weight of each is posted accurately by a recording scale—all with no manual handling whatever. This essential transportation link is of interest for a number of individual processing steps are involved that call for accurate machine timing and automatic control, as well as for special and exacting conveyor construction.

Multiple double-strand steel-bar-link roller-conveyors take hot coiled strip to tin-plate mill building by steps. System operates intermittently to move all coils a fixed distance each time a hot coil is placed on loading section, so accommodates widely varying production rates. Weight of each coil is recorded automatically as it passes a certain section of the conveyor system

Construction: To provide the essential flat moving platform upon which to carry the coils of strip, heavy steel plates about 8 inches in width are welded to individual chain bars of the double-strand conveyor sections. These plates form a continuous divided platform between the end sprockets that carry the conveyor chains. At the points of transfer between successive sections of conveyor, 4-strand short-length transfer conveyors are employed, the inner strands of which run in the space between the parallel strands of the main conveyor units.

The outer strands of the transfer unit flank the strands of the main conveyor sections. See accompanying illustrations. This interlaced construction is largely responsible for the successful operation of the conveyor system as it permits the coils riding on end to be passed smoothly and without jolt or disturbance from one conveyor section to the next and from one conveyor grade to another.

Coiler transfers first deposit the hot coils of strip upon the first conveyor section end up and then function alternately at a maximum speed of one coil handled per minute. However, coil delivery from the strip mill may be somewhat irregular, being dependent upon the activity of the continuous heating furnaces, upon production conditions or requirements. For this reason the conveyor system is arranged to operate intermittently, moving forward only as and when a coil is transferred from one or the other of the coiler mandrels to the first or loading section of the conveyor.

The landing of a coil upon this conveyor section depresses a limit switch and starts the whole series of conveyor sections with their connecting transfer conveyors so they move forward as a unit for a distance of exactly 7 feet 3 inches and then stop. This starting and stopping of the coil carrier system occurs each time a coil is placed on the loading section of the conveyor. It not only synchronizes the speed of the coil carrier system with that of the productive output of the heating furnaces and strip mills but it

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For every kind of flooring condition: "A.W." Super Diamond, Standard Diamond, Diamondette, Sunken Diamond and Ribbed Patterns. Any pattern furnished in ferrous or non-ferrous analysis.

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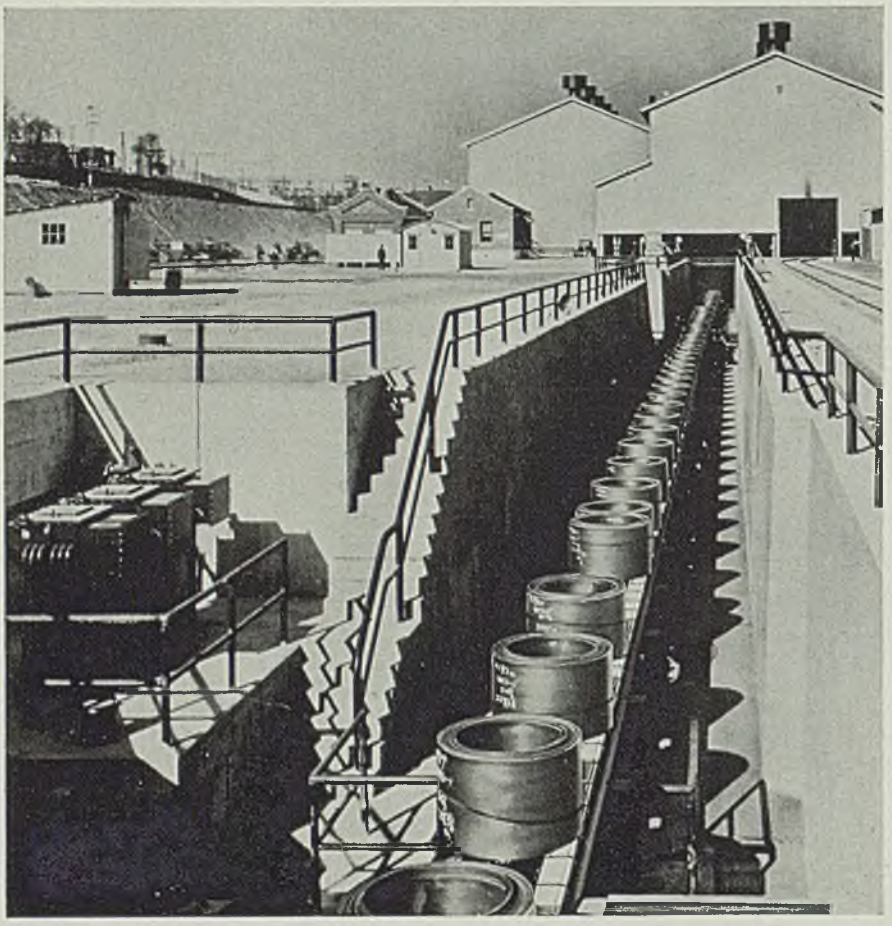
ALAN WOOD STEEL COMPANY

MAIN OFFICE AND MILLS, CONSHOHOCKEN, PENNA. :: SINCE 1826 :: DISTRICT OFFICES AND REPRESENTATIVES—Philadelphia, New York, Boston, Atlanta, Buffalo, Chicago, Cincinnati, Cleveland, Denver, Detroit, Houston, New Orleans, St. Paul, Pittsburgh, Roanoke, Sanford, N. C., St. Louis, Los Angeles, San Francisco, Seattle, Montreal—A. C. Leslie & Co. PRODUCTS INCLUDE—Steel Products in Carbon, Copper or Alloy Analyses :: Sheared Steel Plates :: Hot Rolled Sheets and Strip :: "A.W." Rolled Steel Floor Plates :: Billets, Blooms and Slabs :: "Swede" Pig Iron :: Reading Cut Nails.



Equally spaced coils of steel strip follow one another to be cooled and weighed as they advance from strip mill to tin-plate mill storage. Photos courtesy Link Belt Co., 307 North Michigan, Chicago

spaces the coils uniformly on the carrier and also utilizes platform space to the best advantage for satisfactory and uniform coil cooling.

Cooling, Weighing: As the coils advance toward the tin mill in 7-foot 3-inch steps, they are gradually air cooled so they reach the cold reduction department at normal temperature as their journey usually requires 6 to 8 hours. During this slow, intermittent and accurately timed passage from the strip mills to the storage shed, the individual coils of strip are weighed at an intermediate point on a recording beam scale.

As each coil arrives and stops momentarily at the scales, scale beams rise automatically from between and outside the parallel conveyor strands to lift the coil clear of the conveyor. As the scale comes to balance, the exact weight of the coil is posted upon a recording dial. The scale beams then descend automatically to replace the weighed coil gently in its former location on the resting coil carrier. As each subsequent coil reaches the scale section, its weight is likewise recorded.

Coil Discharge: Upon arriving at the discharge end of the coil carrier in the tin mill, the leading coil trips a limit switch that stops the movement of the final conveyor section and starts the "downtilter." This mechanism carefully turns the coil over 90 degrees—upon its side—and the coil moves along upon gravity rollers some 50 feet, where an overhead traveling crane picks up the cooled and weight-recorded coil by means of a C-hook, and places it in storage until needed in the tin mill.

This carrier system employs closely timed and synchronized cycles for efficient handling at minimum expense. It was engineered and built by the Link-Belt Co., 307 North Michigan avenue, Chicago, working in collaboration with engineers of the steel plant. It well exemplifies advanced production methods as it effects substantial economies through the elimination of much relatively expensive rehandling of work in process.

♦

Rule Calculates Hobbing Time

■ A slide rule to simplify the calculation of hobbing time is announced by Barber-Colman Co., Rockford, Ill. It is a refinement over the former calculator. One side permits calculation of the "hob approach" for spur gears, spline shafts, and other straight forms. To get this dimension it is necessary to set the diametral pitch under the arrow and read the hob approach in inches directly above the diameter of the hob used. This amount, when added to the length of the spline, or width of the gear face, gives the total length of hob travel which is used in calculating the hobbing time.

The hobbing time is calculated by setting the two slides on the reverse side in the order indicated on the rule. The rule contains all standard hob speeds found on Barber-Colman machines. In addition, an 8-inch scale is incorporated on one edge. By a slight amount of interpolation on the hob speeds, this calculator can be of equal value for determining hobbing times on other makes of hobbing machines.

The calculator is available, gratis, to all time estimators, production managers, superintendents, foremen, etc. requesting it.

Flexrock Improves Acid-Proof Finish

■ Glasflex, a transparent finish manufactured by Flexrock Co., Dept. S, 2300 Manning street, Philadelphia, has been improved so that it now is totally alkali and acid resistant. In a recent test this product was coated on tin, totally dried in a high temperature electric oven, removed and submerged in concentrated sulphuric acid. Next it was submerged in 50 per cent solution of sulphuric acid and water. Then it was placed in a carbolic acid solution and later submerged in sodium-hydroxide. Upon examination it was found that the glass coating had undergone no deterioration.

This finish is suitable for use on wood and concrete floors, table tops and counters.

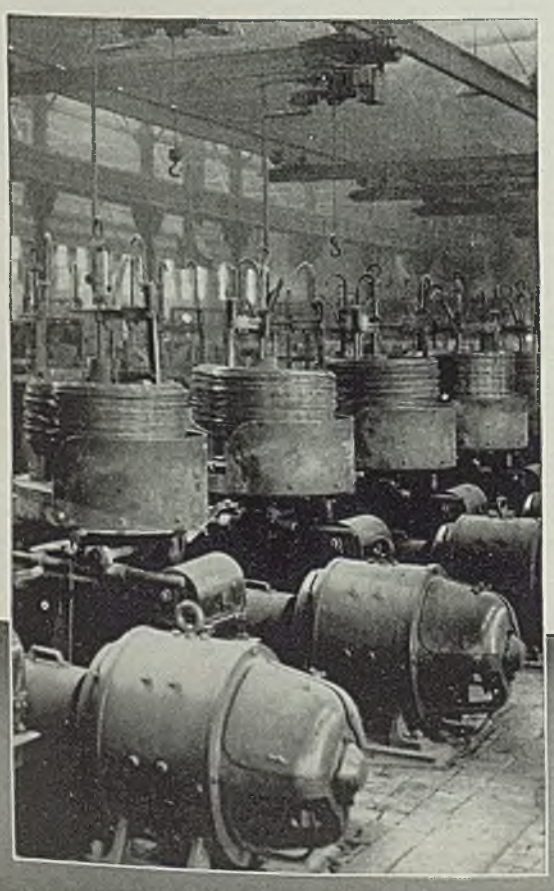
Improved Spatter Nox Reduces Cleaning Time

■ A new and improved Spatter Nox for weld spatter prevention is announced by Universal Power Corp., 4300 Euclid avenue, Cleveland. It so thoroughly prevents adhesion of weld rod spatter to the work being welded that the cleaning time is reduced as much as 50 to 75 per cent. It does not interfere with arc performance, instead it improves it by promoting arc stability.

Spatter Nox may be brushed or sprayed on the work. It covers at least 750 square feet to the gallon and serves as a rust inhibitor. It also provides an excellent base coat for subsequently applied paints or lacquers.

YOLOY ELECTRODES ...PRODUCE WELDS OF GREAT STRENGTH

A lighter, stronger P & H shovel -- welded with the Yoloy Harten combination.



HARNISCHFEGER Corporation developed welding electrodes using Yoloy wire as base metal to weld their P & H Pacemaker line of excavators. This equipment requires welds of great strength and toughness.

The Yoloy base metal welding electrodes provide welds of the following range of physical properties dependant upon extent of heat treat:

	As Welded	After Heat Treat
Tensile Strength lbs. per sq. in.	83,000	102,000
Yield Point per sq. in.	68,500	92,500
Elongation per cent in 2"	20.1	14.8

Charpy impact values prove these welds to be highly resistant to shock at sub-zero temperatures. Regular carbon steels may become brittle at these same temperatures.

Yoloy is a nickel-copper steel of exceptional weldability, high strength and corrosion resistance. Buses, trucks, railroad cars and all forms of transportation equipment can be made much lighter yet stronger by using Yoloy.

High Tensile Steel Yoloy is available in sheets, strips, plates, bars, shapes, manufacturer's wire, welding wire, seamless pipe, and electric weld pipe.

THE
YOUNGSTOWN
SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steels

General Offices - YOUNGSTOWN, OHIO

BETWEEN HEATS WITH *Shorty*

■ Say Fellers:

We got a nifty safety department over at our place. The boys are all on their toes with their eagle eyes watchin' everything to see that nobody gets hurt. They always feel that the day has been well spent when they know everyone leaves the plant in jus' as good condition at the end of the turn as when the startin' whistle blew.

We got a nice hospital in the plant, too, so in case we ever have need for one in a hurry, she's there. Once in awhile we see Doc thru the window givin' someone the once-over—like gettin' a blood pressure or listnin' to a guy's heart beatin', but ya don't often see 'im fixin' up a smashed bunch of toes caused by a hunk a pig iron fallin' on 'em or takin' a piece of steel outa a feller's eye. No ya don't 'cuz we got the fellers wearin' some trick shoes that sometimes get run down at the heels but refuse to be caved in at the toes; 'n we've also got the fellers wearing goggles so that when the sparks fly they can always open their peepers again.

Shag Asks a Favor

Well anyway, one of the fellers by the name of Logan, handlin' safety work, gave me a buzz a few weeks ago. We call 'im Shag 'cuz he wears mill clothes that are all spotted with grease from places where he's all the time crawlin' in or out to see if things are safe. Shag sez: "Shorty, you mind if I take a run up to Chicago to attend the Safety Congress?"

"It's all right, my boy," I sez. "Go ahead. Maybe ya can pick up some ideas."

* * *

Few days later Shag met me out in the plant 'n he tells me 'bout an incident he picked up in the meetin' from one of his friends. Thought maybe some of the Fellers would sorta like to hear it too, so here 'tis:

Seems as though the crew tendin' No. 5 blast furnace had sorta an understandin' that the night gang would make up runners when the time came. Ya see the runners get skulled up 'n when the gang gets to diggin' 'n pryin' round with crowbars—well—'bout a week or so ya jus' gotta dig out the clay linin' 'n put in a new one. Course when the night gang makes up the runners with a new linin' they gotta dry it out 'fore they let the hot iron run over it 'cuz when molten iron 'n wet clay meet—well 'tain't no use to tarry for hellsapoppin' right soon 'n ya sorta make haste to be on yer way. Makes no difference whether there's a path or not—ya jus' duck back of a colum' 'n stay there till all's well.

Brought His 'Bakes' Along

Well, one of the runnermen, Pete Pedro, on his way to work the night the principal runners had to be made up found a wooden packin' box 'n he sez: "I betcha she make good kindlin' wood to fix 'em clay so she no boom." 'N he puts the box on his shoulder 'n takes it to the furnace.

After midnight when the gang had a spell between casts, Pete tears the lid off the box, pulls out a wad of excelsior, spread 'er out on the coke breeze 'n lays down to take a nap. Jus' 'bout the time he dozed off someone slipped down to where Pete lay, dropped a hot piece of slag on the excelsior 'n then hid behind one of the furnace colum's.

Didn't take long for a blaze to start 'n it jus' so happened that 'bout that time Tim Stanton, the blower, came walkin' 'round the furnace 'n seein' what was goin' on he gave a yell 'n ran to where Pete was sleepin', grabbed 'im by the leg 'n yanked 'im free of the flame jus' as the whole mess burst into a real blaze.

Tim, the blower, tried to find out who did the trick but the only thing he got from the gang was: "I dunno, no see." The whole thing might've been fatal.

I'll tell ya there were a lotta sober faces round that furnace 'n I guess it was many a day 'fore anymore ol' country tricks were played by the gang.

Well, fellers, that's the story 'n I guess we still have need of the boys in the safety department. Sure glad we were represented at the Safety Congress.

So long, fellers, I'll be seein' ya!

"Shorty" Long

Introduces Belting for Large Conveyors

■ Now in operation in the Fifth Vein Coal Co. of Harrisburg, Ill., is what is said to be the first conveyor belt of 48-ounce duck. It is a 9-ply Matchless belt, 1530 feet long and 54 inches wide, weighing 35,000 pounds. It conveys 1000 tons per hour run-of-mine coal at a speed of 350 feet per minute from underground hopper and feeders which receive the coal from the mine cars in the coal seam and lifts it equal to the height of a 20-story building to the preparation plant up a 16.5-degree slope.

Made by United States Rubber Co., 1230 Sixth avenue, New York, the 48-ounce fabric features a soft weave with special strength characteristics, takes friction as easily as all former standard conveyor ducks, handles 60 pounds safe strain per inch per ply, makes possible the use of conveyors one-third larger and costs no more per pound than standard ducks of lesser weight.

Bombarding Device May Solve Smoke Problem

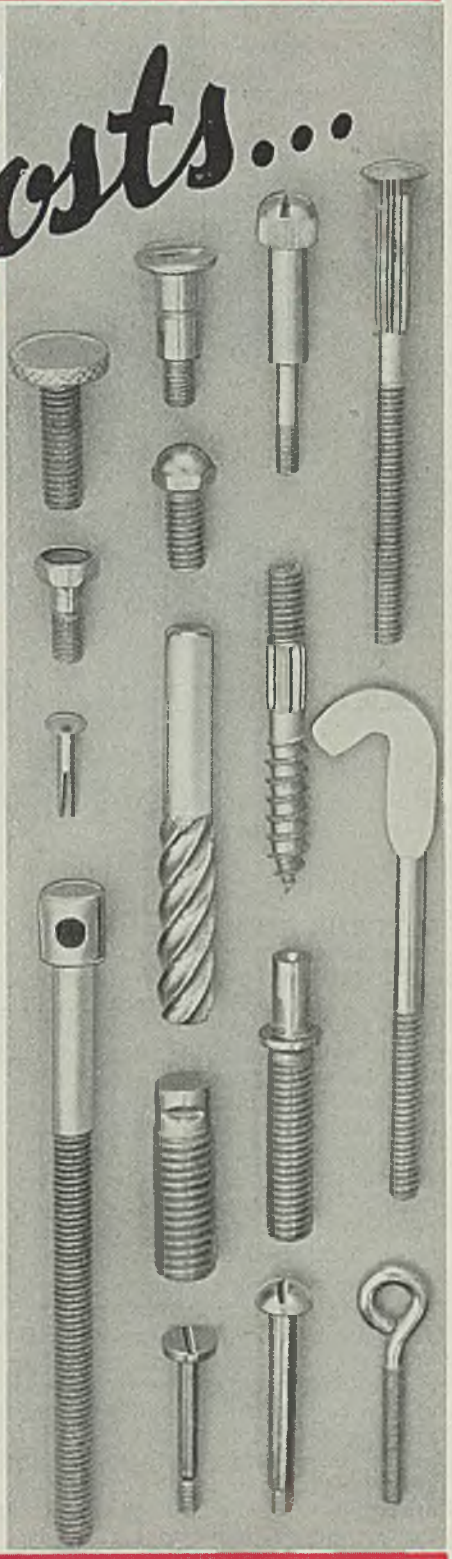
■ A queer device that bombards smoke with high-frequency sound waves, thereby causing the smoke to lie down is being developed by United States bureau of mines, according to *Aluminum News-Letter*. The idea is to attach one of these units to every chimney and stack, and prevent the smoke from getting out and spreading around the countryside.

Inside a piece of hollow pipe is a large lump of aluminum which is connected at one end to a loud speaker and special radio set. The radio sets up a magnetic field which causes the aluminum cylinder to vibrate, producing a powerful high frequency sound that, in turn, creates high frequency waves. These waves are directed at the smoke and cause the particles in the smoke to coagulate into large lumps of soot which fall out of the air stream by gravity.

Although it is still an experiment, it has possibilities of doing much to reduce air pollution by smoke, if it can be applied to large-scale service.

GAD AND JET CAN

Cut your Gadget Costs...



■ It happens hundreds of times during the course of every working day: a manufacturer requires a metal gadget, and he hesitates to face the cost of ordering screw machine products. Gad and Jet, the little men who work for TOWNSEND, specialize in hammering out queer metal parts in every conceivable design: they head them, thread them, drill, knurl, groove, shoulder and collar them; they make them out of all metals, with any plating. These gadgets approach the accuracy and finish of expensive screw machine products, but the price is down to where a customer can forget his nervous stomach. The TOWNSEND plant at New Brighton is the largest in the world devoted exclusively to the design and manufacture of the unnamable things we call gadgets. If you write for our catalog, you will see a few hundred different types of the things we make—it may give you a clue.

TOWNSEND COMPANY

NEW BRIGHTON SINCE 1848 (Pittsburgh District) PENNSYLVANIA

The Largest Rivet and the Oldest Wire Manufacturers in the World

SOLID AND TUBULAR RIVETS—SPECIAL WIRE NAILS—HEADED METAL PRODUCTS—AND WIRE SPECIALTIES—IN ALL METALS

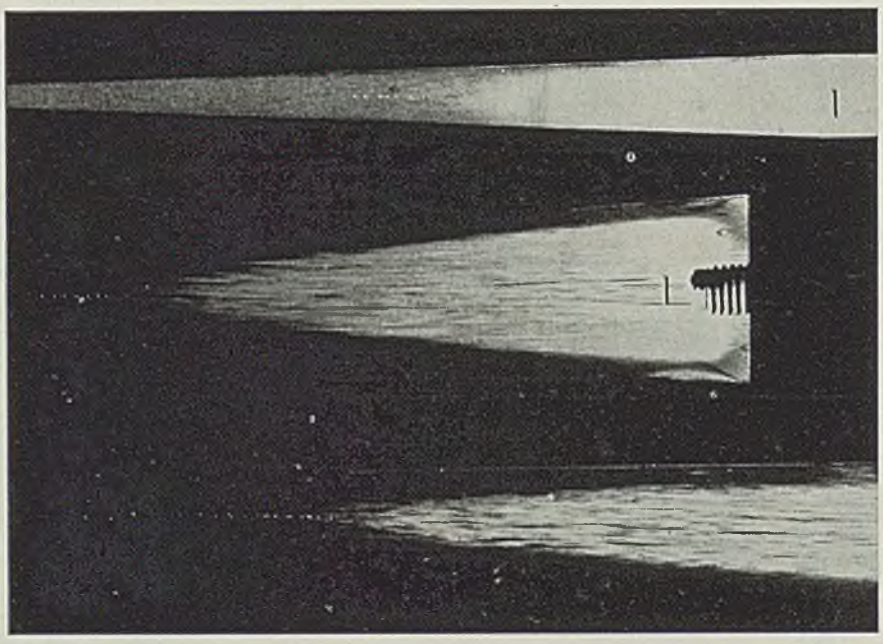


Fig. 1—These three cones from heat A were quenched from 1450 degrees Fahr. Narrow cone in oil, two wider ones in water—two-thirds actual size

Hardenability Testing Tool Steels By Oil Quenching Small Cones

Advanced hardenability test affords over 400 hardenability classifications. Preparation of small cones used as specimens is rapid, simple, involves no special equipment. Cones afford extremely accurate tests, can be heat treated rapidly. Only equipment required to make tests is a micrometer and rockwell hardness tester

■ IN THE PAST few years, many ways have been suggested to measure the hardenability of steel. Some, such as the ¾-inch round test, Jominy test, P. F. Shepherd, 1-inch square and the step down, have been accepted and are in current use. The multiplicity of practices infers that no one method is completely satisfactory. Certain present procedures have some limitations as to adaptability. Some are better for certain reasons and purposes than another.

In our own plant where we are both a tool steel manufacturer and a producer of a varied line of small products, application of most, if not all, of the different hardenability determinations fell short of meeting our full needs. For example, a great percentage of our steel is quenched in oil. To us it appeared more needful to have a test quenched in oil that could be transposed into water-quenching terms, if desired, than to use a water-quenching test and constantly transpose the data into oil-hardening work. Numerous examples of this same desirability of a hardenability test based on oil quenching of test samples are to be found in the small tool field, since many of these tools are normally quenched in oil and the transfer of data obtained on water quenching to performance on oil quenching is not entirely satisfactory.

After quite some experience with our present oil quenched cone we feel its ease of preparation, the simplicity in obtaining and interpreting results and the fine accuracy of the readings may suggest its application to others in the metal treating field and it is with that thought in mind the oil-quenched cone test is offered for general consideration.

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A cone is a surprisingly easy shape to prepare for test. The machining can be done readily either with a taper attachment for the lathe, or by merely moving the tail stock off center. The amount the tail stock must be offset is one-half the total amount of the taper for the entire length of the work.

Specimens are 8 inches long, 6 inches of which is tapered from 0.625-inch diameter to 0.200-inch. About 2 inches of round stock is usually left at one end to afford a grip for heat treating and holding for hand grinding. This small cone may be heat treated rapidly and can be ground quickly. Total time for completion of a cone test is somewhat longer than for a 1-inch square test. A 1-inch square piece requires a longer heating time, a sandblasting operation, and also, along with the cone, a small amount of grinding. The cone method compares favorably from a time and cost point of view with the other practices advanced to determine the hardenability of steels.

The included angle of the cone described is approximately 6 de-

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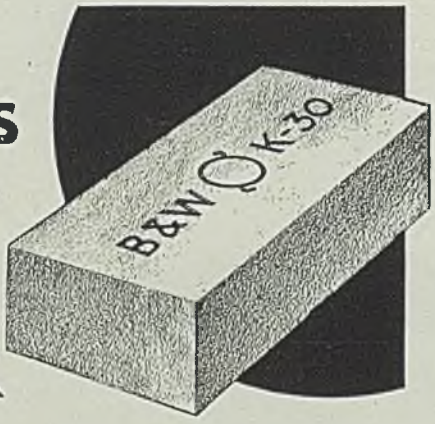

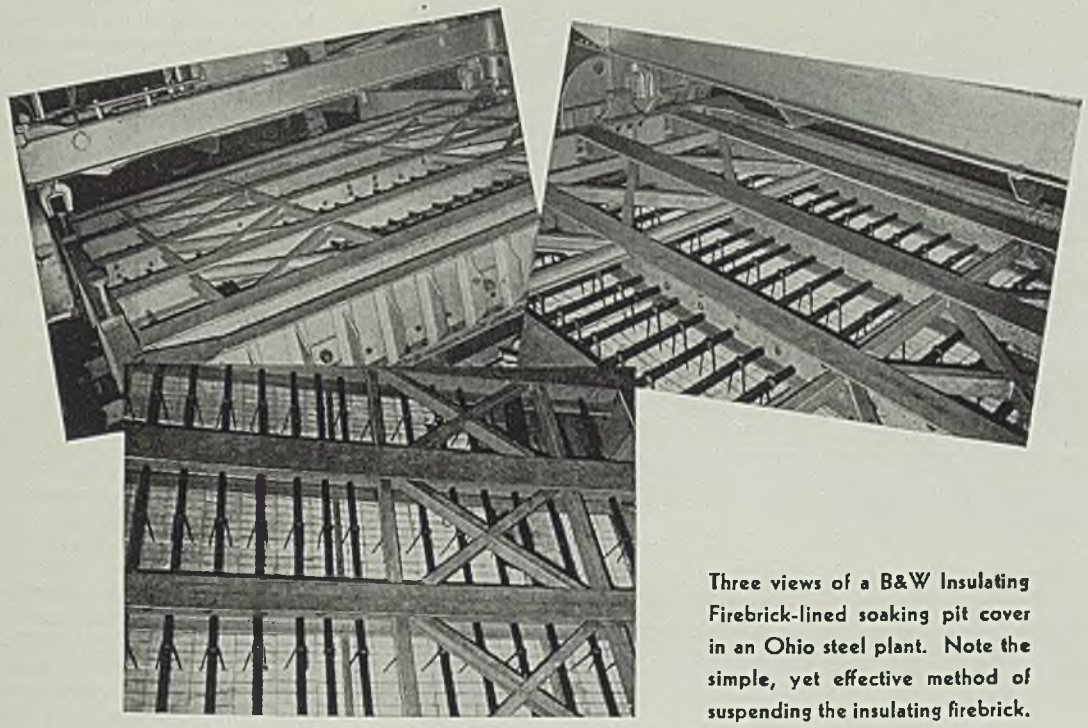

Three views of a B&W Insulating Firebrick-lined soaking pit cover in an Ohio steel plant. Note the simple, yet effective method of suspending the insulating firebrick.

With these advantages:

- ▶ Light Weight—covers can be handled with greater ease and less power.
- ▶ Fuel Savings—due to low heat-storage capacity and low thermal conductivity of B&W Insulating Firebrick.
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grees or within the permissible 7½ degrees for accurate rockwell testing. Rockwell readings can, therefore, be taken on the surface of the cone after hardening.

Starting with 0.200-inch diameter at the small end, the cone possesses an unlimited number of diameters up to 0.625-inch. For any steel, certain of these diameters will harden when the cone is quenched in oil from a particular hardening temperature and certain diameters will not harden. Exploration by the rockwell instrument on the surface of an oil-hardened cone exposes the demarcation area between the hardened and unhardened diameters.

Steels of different hardenability will develop say 60 rockwell C minimum at individually characteristic places on an oil-quenched cone so this will classify them for hardenability.

One steel will be capable of developing at least 60 rockwell C up to perhaps 0.475-inch diameter. Another steel can barely reach 0.375-inch diameter with an arbitrary 60 rockwell C. Up and down this cone there are over 400 diameters that will furnish a record of the hardenability for a steel and classify it in relation to others. No other test method grants so many divisions to classify a steel.

There are several other clear measurements that may be taken precisely from an oil-quenched cone after grinding and which will be discussed later as important ways to classify steels for hardenability.

Cones quenched in water, unless of extreme size, harden over their entire outside surface and cannot be explored in the same manner as a cone quenched in oil, which has a diameter at which it will not harden. Both the water-quenched and oil-quenched cones may be ground in half, however, and the point or diameter at which they have hardened through determined by the rockwell test. The diameter at which 60 rockwell C is found along the central axis of the cone may be used for comparison and classifying steels for hardenability.

Using two electric furnace heats of the following analysis:

	C	Mn	P	S	Si	Ni	Cr
"A"	0.97	0.33	0.020	0.015	0.23	0.11	0.13
"B"	1.01	0.21	0.020	0.015	0.14	0.04	0.02

Both water and oil-quenching cones were made to record the hardenability of these heats. Two lengths of water cones were made to note the possible end-quenching effect. The lengths were 12 and 6 inches, both cones tapering from 1½ to ½-inch. The regular size oil cone was used, 0.625 to 0.200-inch taper, and appears as the smallest cone in all the illustrations. Three cones appear in the pictures—a long and short water quenched specimen and a small oil hardened cone.

The heat treating was done from a lead pot and two quenching temperatures, 1450 and 1550 degrees Fahr. were employed. The cones had previously been quenched in oil from 1600 degrees Fahr. as a means of inducing the same condition in all samples before treating. The larger water-quenched cones were in the lead pot 45 minutes, the oil-hardened cone 20 minutes. After hardening, the cones were ground in half by machine. The small oil cone can be ground readily by hand on a wet wheel in 20 to 30 minutes.

Ground cones were etched 2 minutes in 50 per cent hydrochloric acid at 180 degrees Fahr. Rockwell readings were taken along the center axis and the last 60 rockwell C from the small end of the cone determined. The diameters at which these readings occurred were measured with micrometers and recorded. See Table I.

In Fig. 1, the two wider cones have been water quenched. On the short one, this last 60 rockwell C point appears at 0.662 to 0.668 diameter. For the oil-quenched cone, the narrow one, the last 60

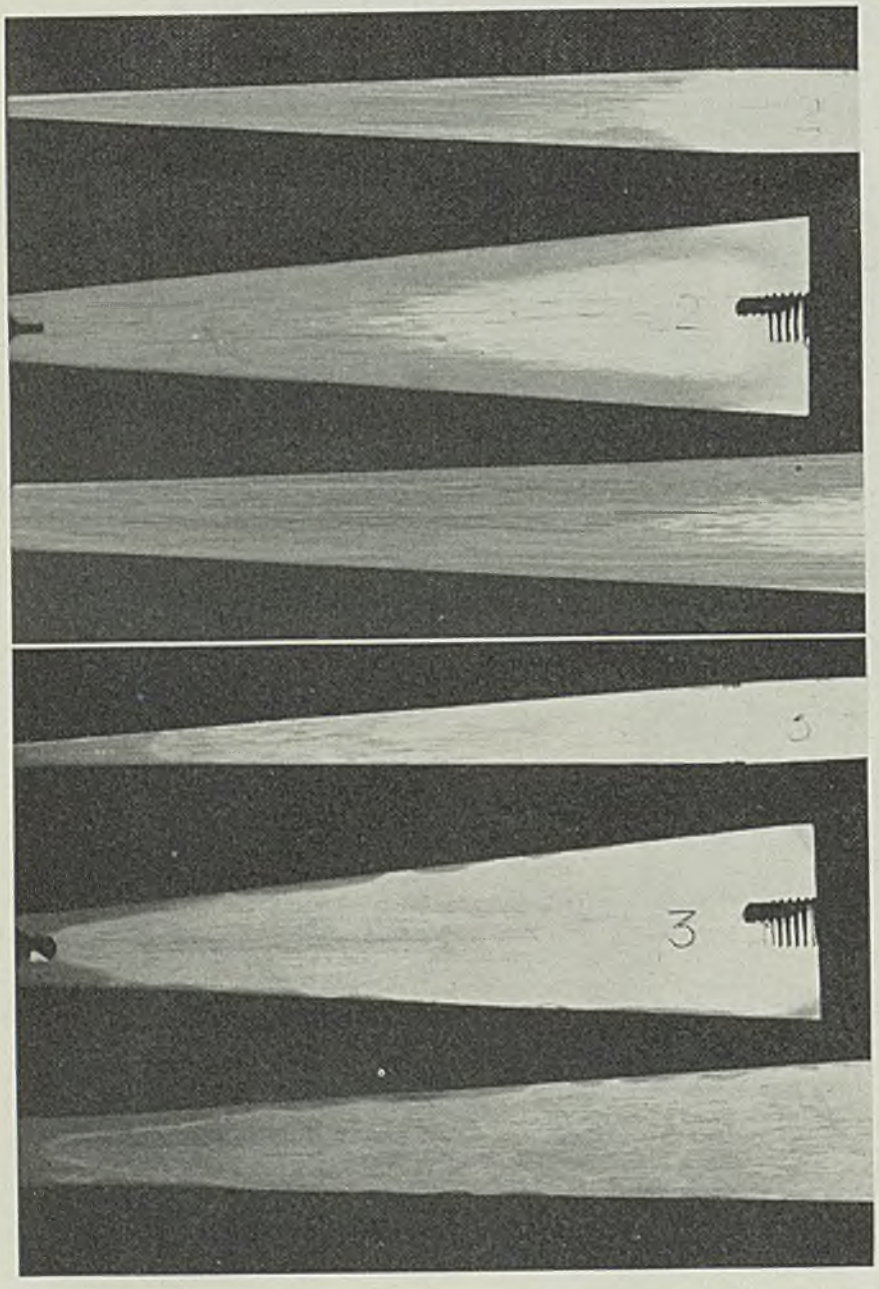


Fig. 2. (Upper)—Cones also from heat A, quenched from 1550 degrees Fahr. Fig. 3. (Lower)—These three cones from heat B were quenched from 1450 degrees Fahr.—narrow one in oil, other two in water. All two-thirds actual size

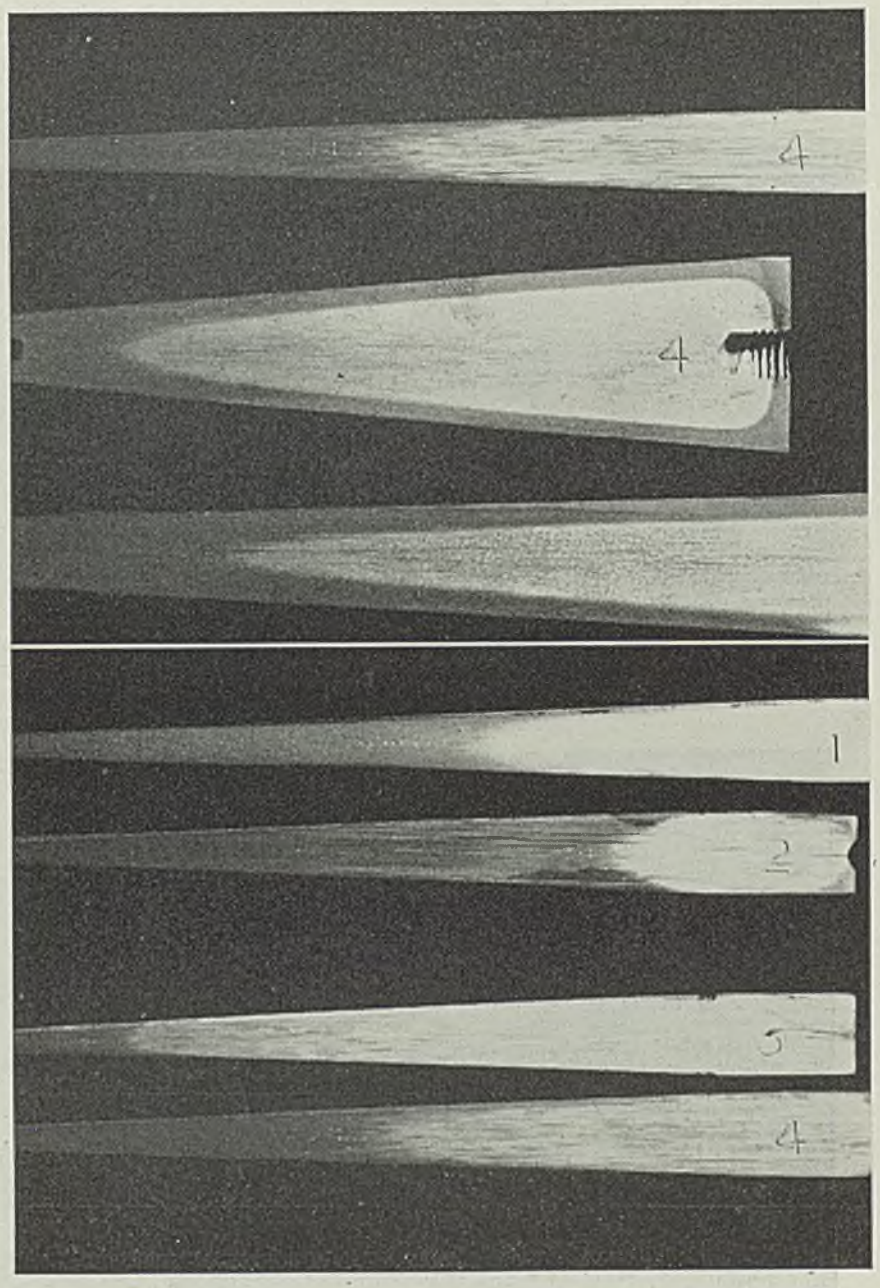


Fig. 4. (Upper)—Cones from heat B quenched from 1550 degrees Fahr. Fig. 5. (Lower)—Cones 1 and 2 from heat A, cones 3 and 4 from heat B. Cones 2 and 4 quenched into oil from 1550 degrees Fahr. Cones 1 and 3 also in oil but at 1450 degrees Fahr. All two-thirds actual size

rockwell C point occurs at 0.437 diameter. All three cones were hardened from 1450 degrees Fahr. Fig. 2 shows cones also from heat "A," but quenched from 1550 degrees Fahr. The long and short water-quenched cones have the last 60 rockwell C at 0.913 diameter and the oil-quenched cone at 0.600 diameter.

A comparison of Figs. 1 and 2 displays the change in hardenability by varying the hardening temperature from 1450 to 1550 degrees Fahr. The water-quenched cones show a change of hardenability from 0.662-0.668 to 0.913. The oil-quenched cones show a difference between 0.437 and 0.600 diameter.

Comparison Shows Difference

Likewise a comparison of Fig. 1 with Fig. 3 shows the difference in hardenability of the two heats, A and B, when hardened from the same temperature, 1450 degrees Fahr. As measured on the oil-quenched cone, this difference is 0.437-inch diameter compared with 0.257-inch diameter.

Fig. 4 is heat B quenched from 1550 degrees Fahr. and again shows the increase in hardenability as the temperature is raised, in comparison with Fig. 3.

The end effect in hardening short and long cones is not very apparent. Table I does show that short cones harden at slightly greater diameters, 0.668 compared with 0.662-inch, but since these diameters are where 60 rockwell C is found on the axis and, that point is not absolute, the difference can be ignored. The degree of taper between the long and the short cone is considerable and the significant finding is that there is little variation in the point of hardening with the two different tapers. Steels will harden at certain diameters so the cone does not have to be machined within extraordinarily close limits.

The great differences of hardenability on the cones and the possibility of using micrometers to measure the difference to thousandths of an inch makes the cone method very attractive, not only to the steel maker to classify heats but also to the consumer as a guide in his production.

Following are locations of last 60 rockwell C readings taken on the surface and center axis of the oil quenched cones shown in Fig. 5.

	1450° F.		1550° F.	
HEAT	Axis	Surface	Axis	Surface
"A" ...	0.437	0.470	0.600	0.635
"B" ...	0.257	0.315	0.432	0.475

TABLE I

HEAT	TYPE CONE	60 Rockwell Axis 1450° F.	1550° F.
A	Oil	0.437 dia.	0.600 dia.
B	Oil	0.257 dia.	0.432 dia.
A	Short	0.668 dia.	0.913 dia.
A	Long	0.662 dia.	0.913 dia.
B	Short	0.550 dia.	0.667 dia.
B	Long	0.535 dia.	0.660 dia.

In rockwelling the outside surface from the small end toward the larger, the hardness does not drop continuously. After 60 is reached, lower readings may be observed but then another 60 or 62 will be obtained. There is an area on the outside that contains both hard and soft spots. It is not until this uneven area is passed that the hardness does drop continuously. It has been suggested there is a connection between the normality of the steel and the extent of this area. To determine accurately "the last 60 rockwell" or place to measure, rockwell journeys should be taken along paths spaced 90 degrees around the surface. At the maximum diameter where the readings are 60 C around the cone, that dimension may be recorded as the hardenability.

With the ground or sectioned cone, a definite rockwell can be

taken on the axis. The diameter of the cone at this point might also well be used to register the hardenability of the steel.

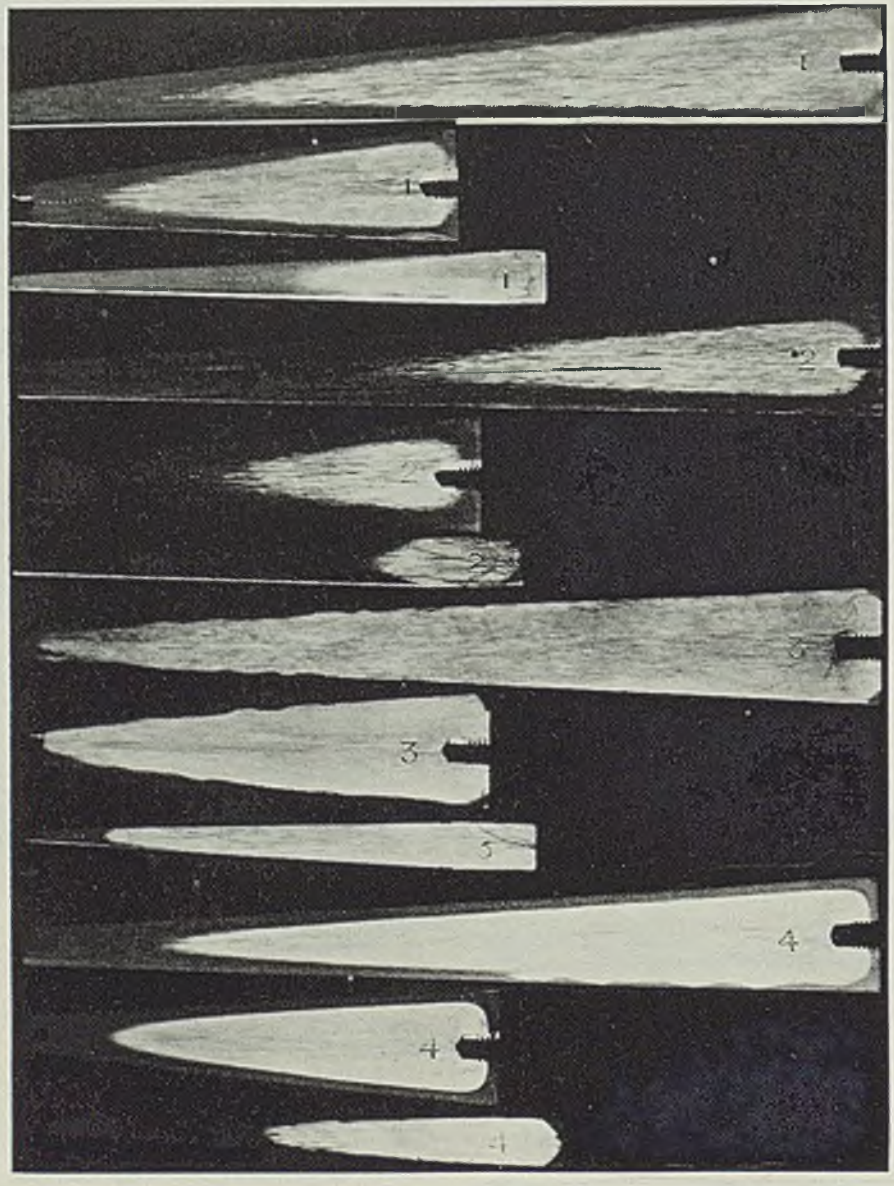
There is still another chance of obtaining a measurement from an oil-quenched cone that may be used as a yardstick for recording hardenability. The striking difference between the water-quenched and oil-quenched cones is that the oil-quenched cone does not have an entirely hard outside shell. At some point on the oil-quenched cone, the hardness depth diminishes until finally the steel does not harden even on the surface.

On an etched sectioned cone such as shown on the macrographs, this decrease in hardness takes on the appearance of a parabola. The vertex of the parabola is located at different points along the axis for steels of different hardenability and moves as the quenching temperature is changed. Reading from the top down in Fig. 5, cone No. 2 and cone No. 4 are from two different heats, A and B, and were hardened from 1450 degrees Fahr. With cone No. 1, the vertex is 3¼ inches from the end of the cone. With cone No. 3, the vertex is 1⅛ inches from the end of the cone—a difference of 2⅜ inches with plenty of space in that length to place steels of intermediate hardenability.

Originally, these heats were separated by the 1-inch square test method at 0.10 and 0.08-inch depth of hardening on water quenching from 1450 degrees Fahr.—a close and narrow range with a great likelihood of error in placing other heats inside or outside this range. The diameter at which the vertex occurs can be measured with "mikes."

Fig. 6 shows all the cones discussed in this article grouped to show movement of the parabola vertex with different heats of steel and different hardening temperatures. Cones Nos. 1 and 2 represent heat A. Cones Nos. 3 and 4 represent heat B. Except for the shallow hardening heat B when 1450 degrees Fahr. was used for a hardening temperature, the water-hardened cones harden with a hard shell on the surface which precludes the use of surface for distinguishing hardenability. The difference of hardenability within a heat as shown by the small oil cones Nos. 3 and 4 is valuable information to the consumer of tool steel and can be capitalized upon by regulation of hardening temperatures. The difference, of course, would have been slightly greater if the range of temperatures had been up to 1600 instead of 1450 to 1550 degrees Fahr.

Fig. 6—Cones of identical numbers have been quenched from same temperature. This gives overall comparison between the cones discussed in this paper



After the desired measurements have been taken from the oil-quenched cone, a fracture examination can be made readily. The smallness of the cone permits the breaking to be done in a bench vise. The Shepherd grain size will usually be wanted for four temperatures—1450, 1500, 1550 and 1600 degrees Fahr. If oil cones are prepared for these four quenching temperatures, the way a steel varies its hardenability as the temperature is changed can be observed as well as the Shepherd grain size development.

In conclusion, we feel warranted in claiming: A cone is an easy specimen to prepare and handle for testing because: It conveniently machines; hardens from lead pot; can be broken for grain size easily; can be measured readily with micrometers and for hardness by rockwell testing.

Results are more accurate than with other known test methods because: The quantities measured are of larger dimensions; (hardness on an oil-quenched cone can be measured over a 6-inch length compared with ½-inch length for the square specimen) rockwell instruments and micrometers yield precise data; machined surface free of decarburization before and after hardening is used; an oil-quench cone displays the hardenability of a steel in several ways—outside surface as well as axis and location of vertex of the parabola. This permits a check on results.

Steels can be classified as to hardening characteristics to much finer shades than by any other known process because: An etched sectional cone presents a visual demonstration of the different hardenability of steels and theoretically there is an unlimited number of places between the 0.200 and 0.675 diameters that can have the vertex of the parabola and therefore permit infinite number of graduated steps of hardenability.

ON REPAIRS

Don't let worn or broken molds, dies, forging hammers, and similar tools sabotage your production. Recondition them quickly by *atomic-hydrogen* arc welding and save practically all the time and expense otherwise required to make new ones. This process is not "patch work"—it restores original contour and wear-resisting qualities of worn tools so well that repairs defy detection.

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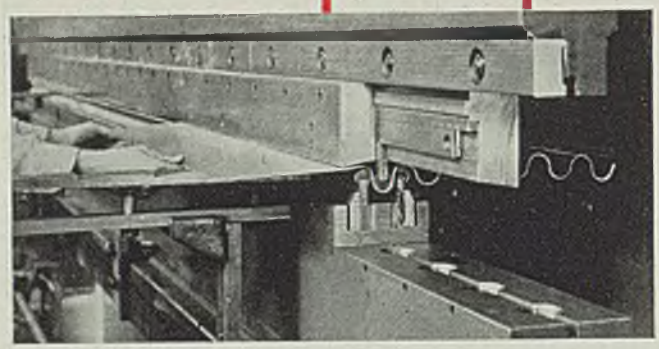


Fig. 1. (Above)—Closeup of press brake dies for aircraft corrugating work. The simple front gages permit rapid and accurate feeding of the aluminum sheet

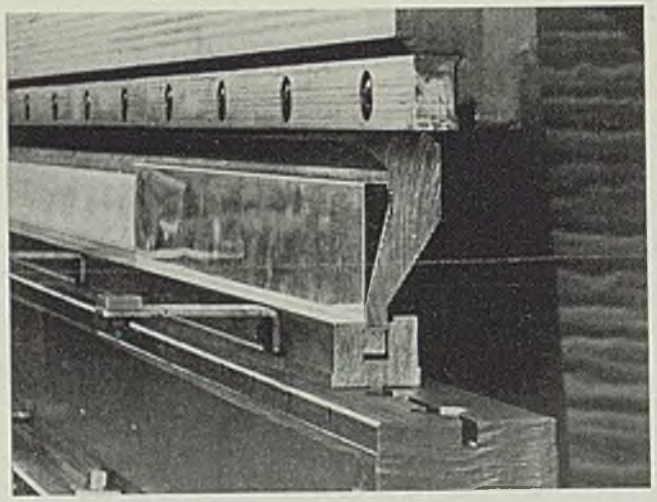


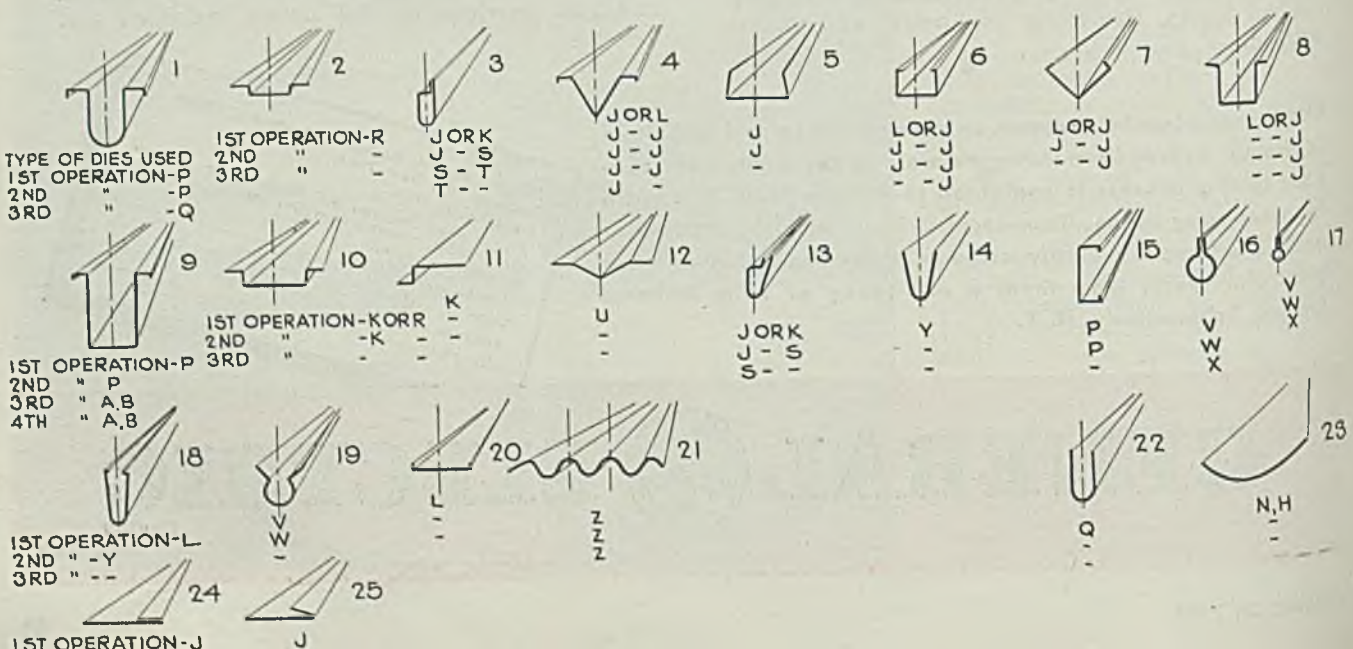
Fig. 2. (Above) Closeup of aircraft channel bend and the press brake dies used to form it. The two bends on top edge of the piece were formed with one stroke and the two bends on bottom edge in another single stroke

■ PRESS brakes are used today by practically every airplane manufacturer, large or small, because these machines are important production tools in aircraft sheet metal fabrication. They are used for corrugating wing stiffeners and for forming channel sections and many other shapes of aluminum alloy and stainless steel.

Press brakes are especially suitable for quantity production work on many bending and forming operations on standard sheet metal parts as well as for small lot production of special shapes. The relatively inexpensive dies for these machines provide a wide range of applications at low tooling cost. Fig. 3 shows typical aircraft shapes adapted to press brake dies and also indicates which dies in Figs. 4 and 5 are used to make each shape and the sequence of the forming operations.

The use of the press brake in aircraft sheet metal fabrication is not the result of an overnight adoption caused by the increased activity in the aircraft industry during the past few months. Cincinnati Shaper Co., Cincinnati, has been supplying these machines to airplane builders for more than 10 years. In fact, the press brake has been a valuable tool in airplane sheet metal shops ever since airplanes were first built of metal. When the airplane industry found itself on the threshold of mass production, the press brake had long been a tried and proved tool in the aircraft sheet metal fabricating field.

Fig. 3. (Below)—Some typical shapes for airplane construction which are adapted to forming by press brake dies. This chart also contains reference to the dies employed and the sequence of operations required



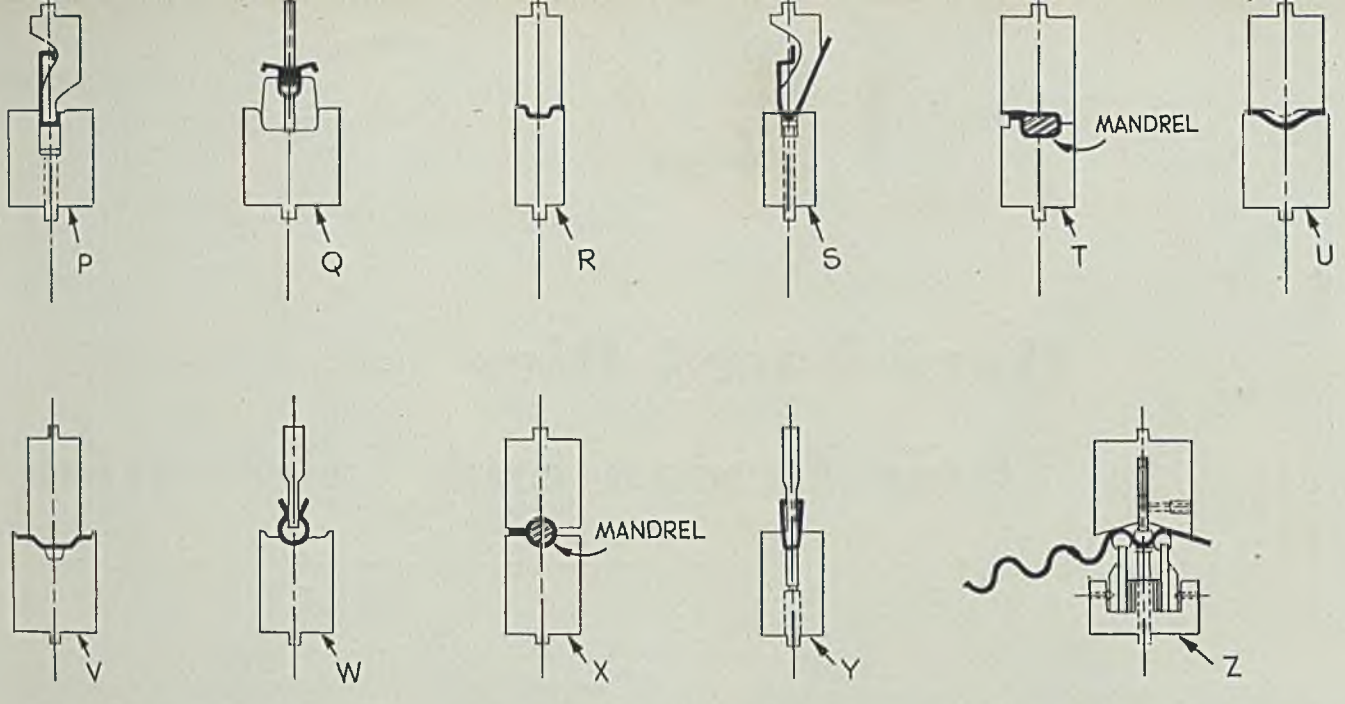


Fig. 4—Types of special dies for airplane sections. Not to scale

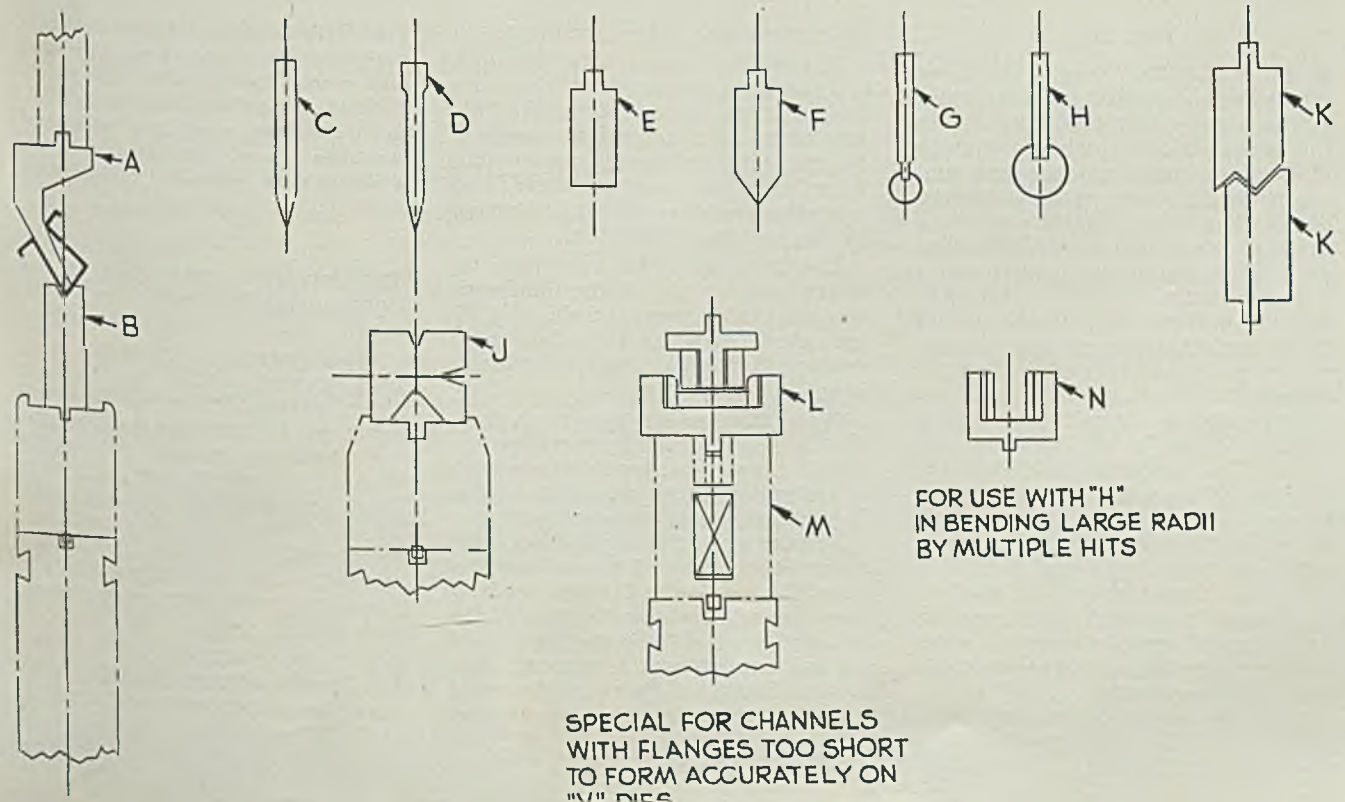
Most metal airplanes require wing stiffeners, corrugated from long wide sheets of aluminum alloy. It is in the corrugating of these wing stiffeners that the press brake plays a vital role in mass production of aircraft because it is the only machine that can corrugate aluminum alloy sheets of various lengths and widths on a practical production basis.

A great many of these corrugations are formed on specially designed U-bend dies with simple adjustments, Fig. 1, which permit forming different thicknesses of material to different pitches on the same dies.

Typical of other types of aircraft sheet metal channel sections formed on press brakes is that shown in Fig. 2. A variety of other shapes used in airplane construction and the press brake dies for forming them are shown in the sketches, Figs. 3, 4 and 5. Each airplane manufacturer has many shapes peculiar to his own design, so in actual practice many shapes other than those illustrated are produced on press brakes.

The long die surface of the press brake makes it possible to handle various lengths of material with ease. The rolled steel plate construction and machine tool refinements of the modern press brake assure bends that are accurate and uniform throughout their full length. Fast and simple assembly of formed parts follows.

Fig. 5—Suggested types of dies for aircraft general purpose work. Not to scale



By A. R. BUTLER
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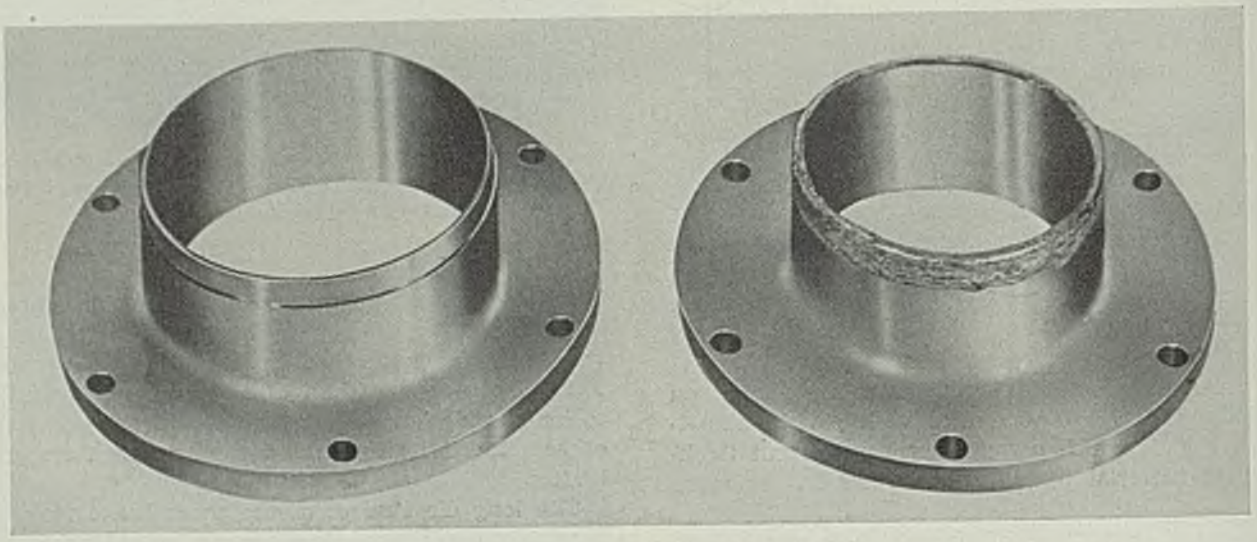
Detroit

JOINING WELDING

Hard-Faced Dies . . . Their Design and Fabrication



Parts I and II have shown results of hardness and microstructure studies. Here in Part III are included procedure details for depositing and hardening welds of oil, water or air-hardening steel

Part III

IN WELDING deeply damaged cutting edges or draw surfaces, start at the bottom and gradually fill up the damaged area, using a slightly higher amperage on the first and second beads than on the finishing beads. Sometimes a mild steel or a typical high-carbon steel can be used as a filler, facing the actual working edge with tool steel. The fill-in deposits will admix with the parent metal and still remain soft enough to act as a pad to resist shock or impact.

In repairing a small cavity on a cutting edge, a cut-back motion should be used to build up the amount of deposited metal required to give a sharp corner. This manipulation will eliminate slag pockets after the finish grinding.

A slow travel should be used in depositing the bead to secure an even deposit and to assure a more uniform admixture of the electrode with the base metal.

Hold the electrode at least at a 30-degree angle to the line of travel.

If possible, *reheat* after welding to a temperature just below the draw range of the deposited metal. This will serve as a tempering medium for the deposited metal, toughening it, refining the grain structure, and relieving any stress or strain set up in the welding operation.

Electrode size is governed by width and depth of the damaged section. As a general rule, a 3/32-inch electrode will repair a damaged section 3/32-inch wide, 3/32-inch deep.

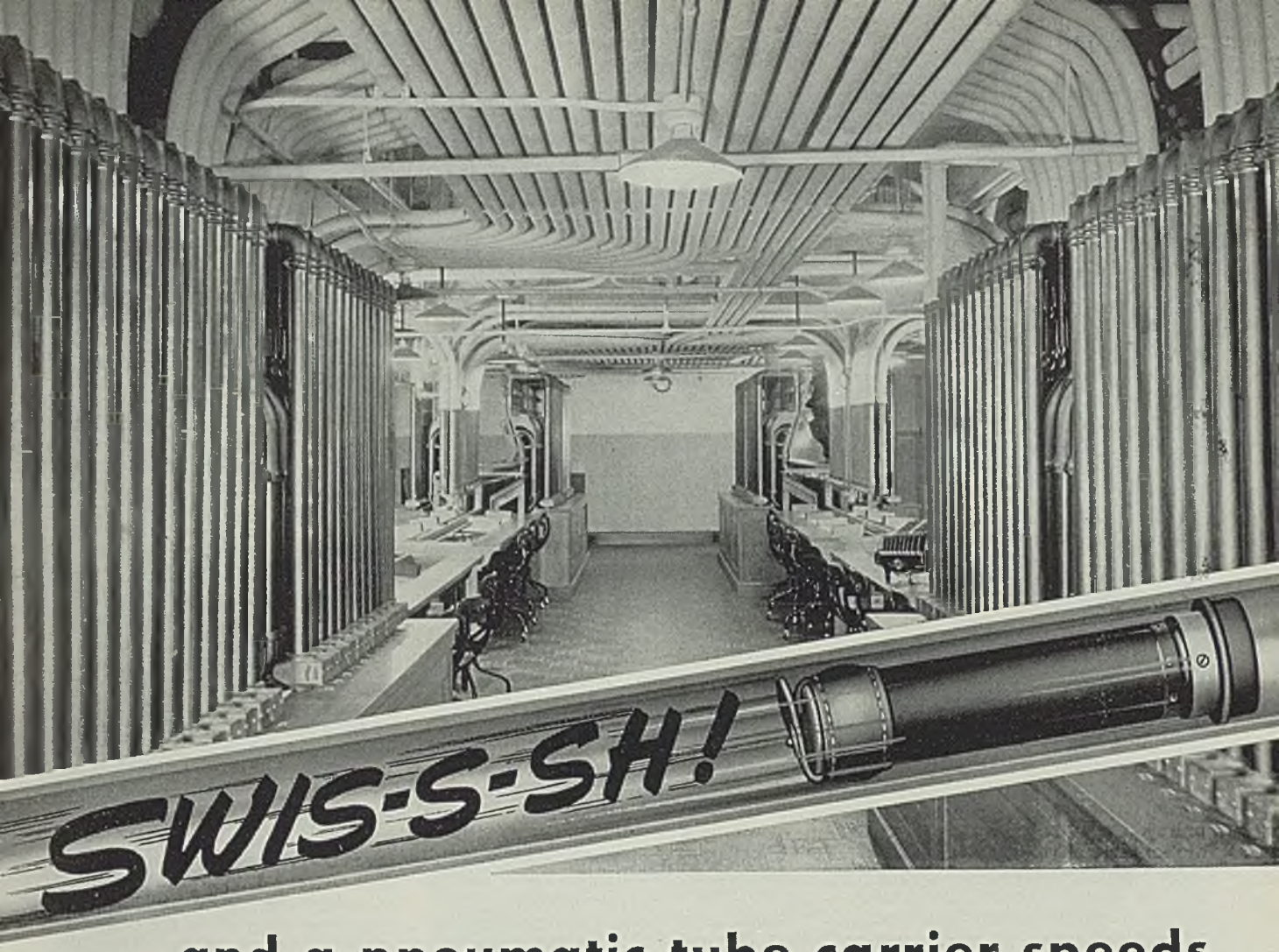
Water-Hardening Type: Following is recommended procedure for welding water-hardening steels with a water-hardening electrode: Slowly preheat the part to be welded to approximately 200 or 300 degrees Fahr., being careful not to heat beyond the maximum draw range temperature of parent metal. Where the finished part will be rendered hard by subsequent heat treatment, it is not so necessary to exert the same care in preheating the base metal.

Fig. 7—Automobile stainless-steel-hub-cap punch—as prepared and as welded with special drawing alloy. This punch, finished and polished, now forms 0.023-inch stainless steel and eliminates scratches formerly produced at points where it was impossible to buff them out

The deposited metal will take a typical water-hardening heat treatment.

Where parent metal is not to be heat treated, a 200 to 300-degree Fahr. preheat after welding will serve as a tempering medium for the deposited metal. In welding biscuit-type cutters, female forming rings or similarly shaped parts where a large weld area will tend to distort their shape, preheating the entire part will aid materially in preventing undue strains or stresses in welding.

Use the electrode positive with the lowest current possible to assure the proper fusion of electrode



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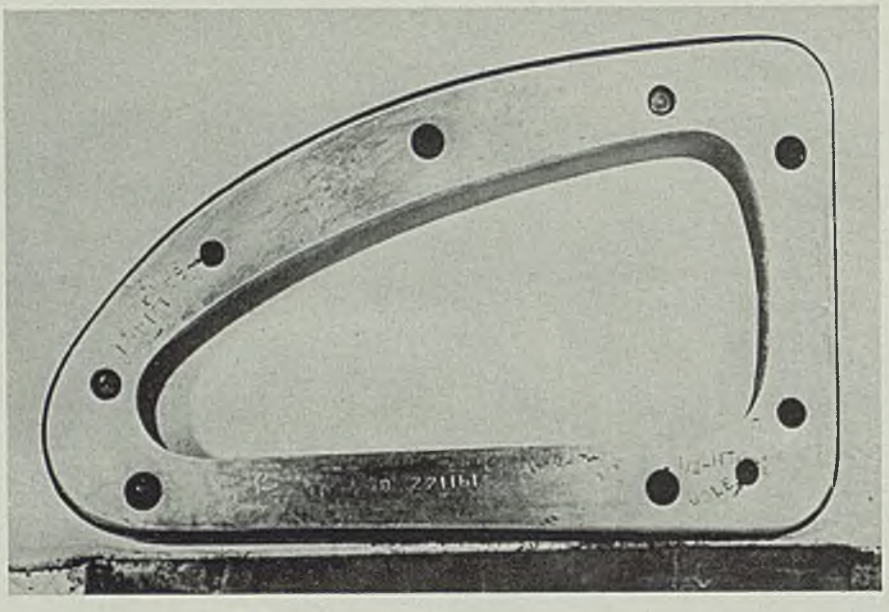


Fig. 8—This medium-carbon-steel window-opening trimming and forming punch is an excellent example of inexpensive die construction. Tool steel electrodes deposited the hard inside trimming edge and the outside forming edge of this die

with parent metal. Peen lightly and thoroughly, and brush to keep the area adjacent to the weld clean. Do not weld too large an area before peening. The self-hardening nature of the deposited metal gives an ultimate hardness of 60 rockwell C. It is not necessary to heat treat repairs or new die construction if the die lends itself to grinding.

Air-Hardening Type: Following is recommended procedure for application of air-hardening electrodes to an air-hardening steel such as high-carbon high-chromium high-speed and similar tool steels. Preheat the part slowly to between 700 and 800 degrees Fahr., being careful not to heat beyond the maximum draw range temperature of the parent metal. Where it is not possible to preheat the entire part, preheat slowly a larger area than the actual weld area, to a blue color, approximately 600 degrees Fahr. Keep part uniformly heated during welding. Use the electrode positive and lowest amperage possible to assure proper fusion.

A slow straight line travel of the arc is not recommended as this aggravates the boiling action of the high chromium content of the parent metal and the electrode. A weaving motion of the arc will dissipate this action. At first indication of boiling, weave the arc. If a straight line travel is mandatory, use a reciprocating motion of the arc. Peen lightly and thoroughly. Brush the weld seam to keep the part adjacent to the weld area clean.

If piece has been entirely preheated, reheat after welding to between 700 and 800 degrees Fahr. If the localized preheating method has been used, reheat the area of deposit to approximately 600 degrees Fahr. Such a reheat serves as a tempering medium for deposited metal. Let cool in still air—avoid rapid chilling.

In welding draw rings, female extrusion dies and punches or similarly shaped parts, the skip weld method should be used to distribute evenly the heat in the part being welded.

Hot-Work Type: Following is the recommended procedure for application of a hot-work electrode to a hot-work die. Slowly preheat the part to be welded, being careful not to heat beyond the draw range temperature, which in most cases is between 900 and 1100 degrees Fahr. Where possible, preheat to 800 or 900 degrees Fahr. before welding. Where not possible to preheat the entire part, slowly preheat a larger area than the actual weld area, to a deep purple—approximately 700 degrees Fahr. Piece to be welded should be prepared by grinding ⅛-inch below desired finish size allowing sufficient room for the deposit and to allow for grinding to finish size.

Keep the part uniformly heated. Use the electrode positive with lowest current that will assure proper fusion. Peen lightly and thoroughly. Brush weld and adjoining areas to keep clean. Let cool in still air and avoid rapid chilling.

Draw rings, female extrusion dies and punches or similarly shaped parts should employ the skip weld method to distribute the heat.

Following is the recommended procedure for application of an oil-hardening electrode to an oil-hardening steel:

Oil-Hardening Type: Slowly preheat the part to be welded, being careful not to heat beyond the maximum draw-range temperature, usually between 300 and 400 degrees Fahr. Use electrode positive, with lowest current that will assure proper fusion. Peen lightly and thoroughly. Brush the weld area to keep the part adjacent to the weld clean. Do not weld too large an area before peening.

If possible, reheat after welding to 300 or 400 degrees Fahr. to temper the deposited metal.

A versatile nonshrink oil-hardening electrode may be used for manufacturing dies using a mild or medium carbon steel for the base metal. On dies fabricating metals 18-gage and lighter, a mild steel can be used for the base material. On dies fabricating metals heavier than 18-gage up to and including ⅛-inch thickness, 0.40 to 0.60 per cent carbon steel should be used as the base metal.

A shelf type, 90-degree angle chamfer of approximately 3/16-inch depth by ¼-inch width should be prepared so the deposited metal will have a backing as well as a flat foundation. Where this is not possible, a chamfer at about 45-degree angle 3/16-inch to ¼-inch may be substituted.

Suitable for Minor Fractures

A slight preheat of 200 or 300 degrees Fahr. on all sections will produce better results as this will tend to *stretch* the low or medium carbon base, and take away the danger of checking the weld deposit. In the circular type of die, the alternate process of welding will tend to preheat the low or medium carbon base, automatically resulting in a more even expansion and contraction of the weld deposit.

Two or more beads should be applied to secure the ultimate hardness. A 200 or 300-degree Fahr. reheat after welding will serve as a tempering medium for the deposited metal.

This same versatile nonshrink oil-hardening electrode may advantageously be used to repair minor fractures or worn or damaged edges on dies of air-hardening steel *providing* no more than two depositions are required.

Both of these two deposited layers will be impregnated with alloying elements from the parent metal and thus retain most of the characteristics of the parent metal.

To do this, first slowly preheat the part to be welded to 600 or 700 degrees Fahr., being careful not to heat beyond the maximum draw-range temperature of parent metal. Where not possible to preheat the entire part, preheat to about 600 degrees Fahr. an area larger than the actual weld. Keep part uniformly heated. Use the electrode positive and lowest current that will assure proper fusion. Peen lightly and thoroughly. Brush the weld seam to

keep the part adjacent to the weld area clean.

Reheat to 600 or 700 degrees Fahr. after welding to temper the deposited metal. Cool in still air and avoid rapid chilling. Draw rings, female extrusion dies and punches or similarly shaped parts should employ skip welding to distribute the heat.

To use this same versatile nonshrink oil-hardening electrode in welding of water-hardening steel, slowly preheat the part to 200 or 300 degrees Fahr., being careful not to heat beyond the maximum draw-range temperature of parent metal. Use electrode positive and lowest current that will assure proper fusion. Peen lightly and thoroughly. Brush weld area to keep the part adjacent to the weld clean. Do not weld too large an area before peening.

Preheating Prevents Strains

A 200 or 300-degree Fahr. reheat after welding will temper the deposit. Biscuit-type cutters, female forming rings or similarly shaped parts where a large weld area will tend to distort the shape will require preheating the entire part if undue strains are to be prevented.

To use the special alloy electrode mentioned previously for drawing and forming dies, always prepare the entire weld area as uniformly as possible about ⅛-inch deep for the inlay deposit either by chipping or grinding. Have electrode positive. *A close arc should be maintained, approximately* 1/16-*inch away from the base metal,* using low current. Deep penetration is not necessary with this electrode. Approximate arc current will be 80 to 100 amperes for ⅛-inch rod, 100 to 120 amperes for 5/32-inch rod, 120 to 140 amperes for 3/16-inch rod. On multiple beads, use a slightly higher amperage on the first bead than on the finishing beads.

On narrow edge work on cast iron base metals, weld 3 inches, then skip a 3/16-inch gap for tie up between depositions, and so on. Tie in the deposits as a final operation. On extremely long deposits for forming edges on cast iron base metal, staggering of studs every 1½ inches is advisable. Peen each weld bead and brush often to keep weld area clean. In some cases on cast iron where weld deposition is excessively high or of a large area which would tend to pull to a large degree, first depositing a monel-type electrode will tend to give the best bond with the cast iron and so simplify the operation.

Economy is the prime motive in the welding of dies. Maximum benefits cannot be obtained, however, under the following conditions:

First, where no preheat is possible, welding air-hardening or oil-hardening type steels should not be attempted unless parent metal is in an annealed state.

Second, where overall cost of welding and machining is greater than cost of a new section or die, welding is not practical except in cases where the material applied by the electrode is of much better wearing quality than the original parent metal. This may offset additional cost of application.

Third, avoid extremely intricate shaped sections where even slightest shrinkage or warpage would be over or under slight tolerances allowed. Under certain conditions these can be welded but only under expert supervision.

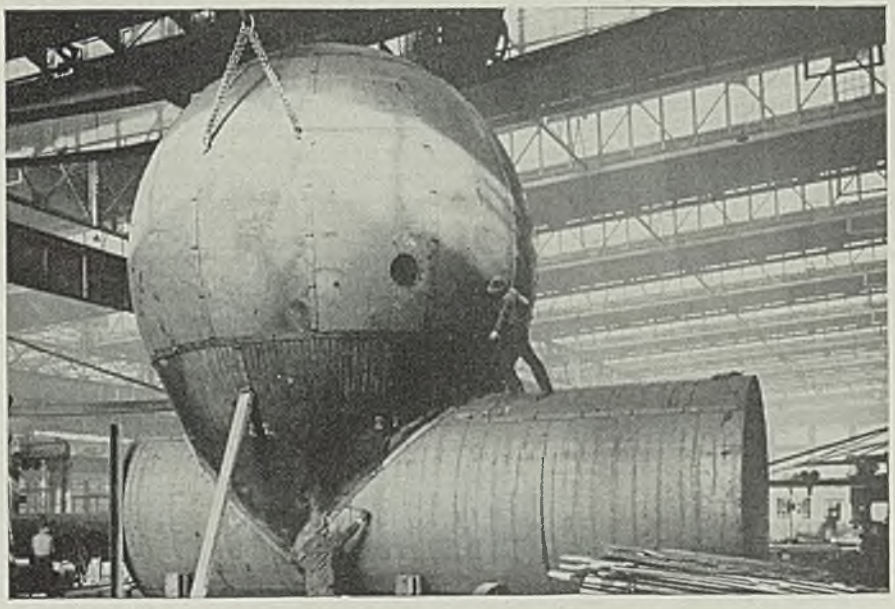
Fourth, the welding of cast iron dies with any electrode except those specifically recommended for this type of base metal will give poor results.

Relative to heat treating, it has been shown that although in a great many cases it is not necessary to heat treat dies after being welded, it is recommended that the dies be reheated after welding to just below the draw range of the particular type of steel welded. This tends to relieve any stress set up by the welding operation and greatly refines the grain structure of the deposited metal. In heat treating all types of tool steel, it is best to remember that the lowest temperature which gives satisfactory results should be employed.

It is also recommended that welds be normalized before reheat treating. However, in most cases normalizing is not recommended for high-carbon high-chromium steels and high-tungsten steels. However, if the work is reheated to about 800 degrees Fahr. before it cools entirely from welding, followed by cooling in air, most welding strains will be relieved in this type of tool steel.

Considerable welding experience and data, particularly on certain difficult tools, has been acquired by men working in the die-welding field. From these diversified experiences valuable information is secured and this information naturally is passed on from time to time to those plants doing similar work.

Elasticity of Weld Design



■ This pump chamber, pump shaft and sump illustrates how far designers are able to go in arc welded fabrications which involve complex assemblies of curved shapes. Here the pump chamber is 21 feet in diameter and is connected to a 10-foot diameter cylinder (pump shaft) so that the center of the sphere is 12 feet distant from the center line of the cylinder.

Eighteen pieces—two dished pieces for the crown section, twelve orange peel parts for the main section and four pieces of the connecting section were required for the sphere. The cylinder, 31½ feet long, is a single ring of four plates. Three plates are split at the intersection of the sphere and the cylinder, making a total of seven parts. One end of the cylinder is prepared for field welding and the other end is closed with ⅜-inch plate.

The sump consists of a 4-foot by 1½-inch diameter tube with a tangent portion. Its center line is 6½ feet from the center line of the cylinder. It also projects 2½ feet beyond the end of the cylinder and at that point becomes a full cylinder itself. The ends here also are enclosed with ⅜-inch plate. Photo courtesy Wilson Welder & Metals Co. Inc., Lincoln building, Forty-second street, New York.

Pickling Inhibitor

Cresolsulphonic acid added to stannous chloride inhibitor retards oxidation of pickling acid. Addition of gelatine affords cleaner solution and much better inhibition than baths containing flour

■ INFLUENCE of small amounts of stannous chloride, in conjunction with flour, in reducing hydrogen uptake in steel during pickling has been found beneficial. The stannous chloride/flour addition also greatly reduces metal loss and acid wastage during pickling. Tests show that inhibiting additions based on stannous chloride give results equaling those given by the several commercial inhibitors; the latter are however, somewhat less expensive. The most satisfactory stannous chloride inhibited bath found contained 0.05 per cent stannous chloride ($SnCl_2 2H_2O$), 0.025 per cent gelatine, and 0.05 per cent cresolsulphonic acid; the gelatine gives a cleaner solution and better inhibition than the flour originally proposed, and the cresolsulphonic acid prevents oxidation.

Experiments were made to determine: (*a*) The inhibitory power of stannous chloride, etc., as compared with other inhibitors; (*b*) the comparative rate of deterioration of the bath when in use and while standing idle; (*c*) the possibility of regeneration of the spent bath; (*d*) the possible use of materials other than flour, which is somewhat difficult to mix in and gives a cloudy solution. The following technique was adopted:—

500 milliliter of initially 7 per cent (by weight) sulphuric acid (pure), kept at 80 degrees Cent., was used as the basic solution. For the estimation of metal loss during pickling specimens of mild steel 3 x 3-inch were cut from one lot of black plate and were prepared by pickling for 10 minutes in a standard bath, washing, drying and weighing. Two such specimens were immersed vertically in the pickling bath (unstirred) under test for 10

From a paper presented in *Sheet Metal Industries, Sept.*, 1940.

TABLE I—Comparison of Pickling Baths at Various Stages of Use¶

Bath Inhibitor etc.	Original State of Bath			State of Bath after Pickling Each Set of 35 Specimens								
				After 1st Set			After 2nd Set			After 3rd Set		
	Metal loss mg.	H_2SO_4 conc. %	$SnCl_2.2H_2O$ conc. %	Metal loss mg.	H_2SO_4 conc. %	$SnCl_2.2H_2O$ conc. %	Metal loss mg.	H_2SO_4 conc. %	$SnCl_2.2H_2O$ conc. %	Metal loss mg.	H_2SO_4 conc. %	$SnCl_2.2H_2O$ conc. %
A—None	43.0	6.9	.....	38.6	2.3	.....	....	...	.....	....	...	.....
B—0.1% Flour	10.1	...	.....	11.1	5.1	.....	....	...	.....	....	...	.....
C—0.1% $SnCl_2.2H_2O$	8.3	...	.....	16.8	5.5	0.047	....	...	.....	....	...	.....
D—0.1% $SnCl_2.2H_2O$ + 0.1% Flour	3.9	...	0.064*	5.5	6.2	0.049	6.6	4.9	0.024	14.0	3.5	0.011
E—0.025% Commercial (I)†	3.6	6.9	.....	5.1	5.8	.....	9.8	4.0	.....	18.1	2.2	.....
H‡—0.1% $SnCl_2.2H_2O$ + 0.1% Flour	3.1	...	.....	11.2	...	.....	11.1	4.1	0.019	....	...	.....
I‡—0.0125% Commercial (II)†	2.9	...	.....	8.1	...	.....	24.9	2.6	.....	....	...	.....
J‡—0.025% Commercial (III)†	3.2	...	.....	6.6	...	.....	22.8	3.5	.....	....	...	.....
O—0.1% Gelatine	5.9	...	.....	....	...	.....	....	...	.....	....	...	.....
P—0.05% Gelatine	6.9	...	.....	....	...	.....	....	...	.....	....	...	.....
Q—0.1% $SnCl_2.2H_2O$ + 0.05% Gelatine	2.3	...	.....	....	...	.....	....	...	.....	....	...	.....
V—0.05% $SnCl_2.2H_2O$ + 0.025% Gelatine + 0.05% cresolsulphonic acid	3.2	7.0	.....	5.5	...	.....	5.5	5.2	.....	5.4	4.5	.....
W—0.05% Commercial (I)	1.8	7.0	.....	1.8	...	.....	1.8	5.4	.....	2.8	4.7	.....
X—0.025% Commercial (I)†	3.6	7.0	.....	4.5	5.6	.....	...	...	.....	....	...	.....
Y—0.025% Commercial (I) + 0.0125% $SnCl_2.2H_2O$.	2.1	7.0	.....	3.8	5.4	.....	....	...	.....	....	...	.....

¶Basic solution 7 per cent (by weight) sulphuric acid at 80 degrees Cent. Material pickled was black plate. Metal loss is given as milligrams per 3 x 3-inch specimen in 10 minutes.
*Stood overnight after making before use. †Recommended amount.
‡Material used for "wearing-out" was rusty, hence more rapid acid loss than other baths.

TABLE II—Influence of Cresolsulphonic Acid on Oxidation of Tin in Pickling Solution*

Cresolsulphonic Acid	Stannous Chloride Initial	Stannous Chloride After 18 hours
%	%	%
0.0	0.1	0.007
0.1	0.1	0.029
0.3	0.1	0.035

*7 per cent (by weight) sulphuric acid at 80 degrees Cent. in open beaker.

minutes, and then washed, dried and reweighed. After the initial behavior of the bath had been thus estimated it was worn out by being used to pickle a considerable amount of similar black plate. For this purpose specimens 3 x 2¾ inches were used; five of these were threaded on a steel bolt, being interspaced by nuts, and the whole batch was pickled for 20 minutes. After seven such batches (35 specimens) had been pickled continuously, the metal loss of two 3 x 3-inch specimens was again determined; in some cases the pickling solution was analyzed for free acid (using methyl violet indicator and matching with a control) and for stannous chloride where this was used (using 0.01 N iodine). A further seven batches were then put through, and so on until the bath was exhausted. In some cases, the behavior of the spent bath after regeneration with strong acid and more inhibitor was investigated. Throughout the whole procedure liquid loss by evaporation and drag-out was made up with distilled water.

Results for the more interesting of the 25 baths tested are given in Table I. The salient points follow:

1. All the inhibited baths give much less metal loss than the uninhibited, and also last much longer owing to their much slower loss of acid through metal dissolution; compare bath A with, especially, baths D, E, V, and W.

2. Stannous chloride baths are not so effectively inhibited, *weight for weight of inhibitor*, as those using the commercial inhibitors.

3. As acid becomes used up in the inhibited baths, so does the inhibitor, for the rate of metal loss increases although the acid has become less concentrated. Every bath, however, remains sufficiently inhibited until it is spent on account of loss of acidity, provided that it is worked continuously (see below).

4. The last experiments on baths H—J show that regeneration by the addition of strong acid and a fresh amount of inhibitor renews the satisfactory pickling with small metal loss.

5. The 0.1 per cent flour, recommended for use in conjunction with stannous chloride, may be advantageously replaced by 0.05 per cent gelatine, which has better solubility to a cleaner liquor, and superior inhibiting powers; compare bath B with baths O and P, and bath D with bath V.

6. Gelatine without stannous chloride gives less good inhibition and a much dirtier pickling action; compare bath P with bath Q.

7. Cresolsulphonic acid, used in bath V to diminish oxidation has no inhibiting influence; it is harmless to the quality of the pickling bath.

8. Stannous chloride may be used in conjunction with commercial inhibitor I, further reducing metal loss; compare baths X and Y.

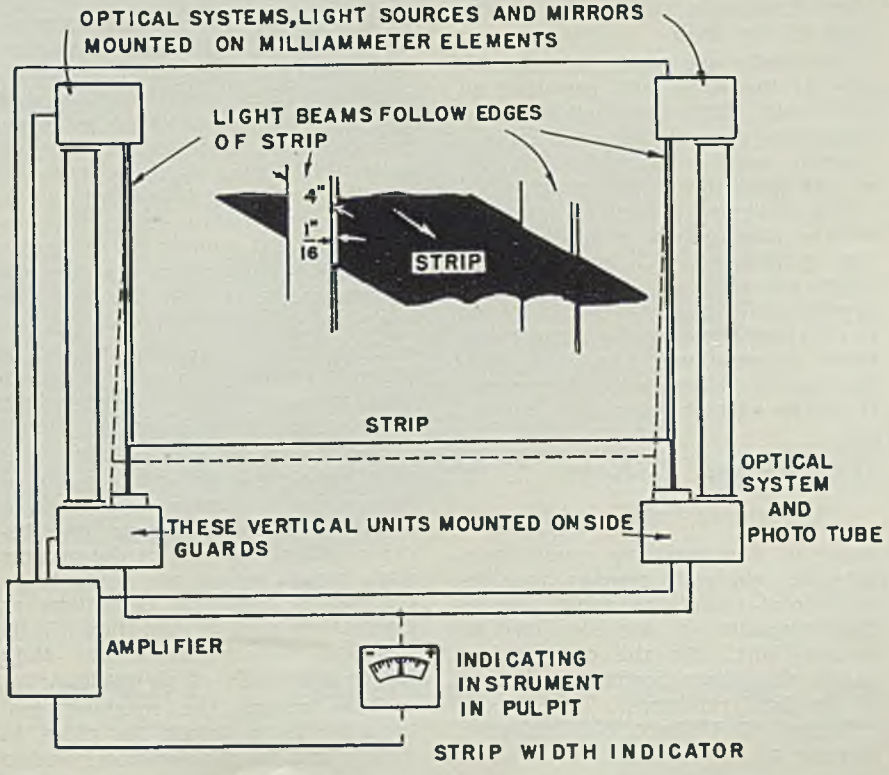
In the earlier stannous chloride baths, oxidation of the tin to the stannic state, with consequent precipitation as oxide or basic sulphate, occurred. Thus bath D, originally containing 0.084 per cent stannous chloride ($SnCl_2 2H_2O$), showed only 0.064 per cent after standing overnight at room temperature, and at 80 degrees Cent. the oxidation was much more rapid. This removal of tin as an insoluble body naturally impairs the bath. Cresolsulphonic acid is used in the acid stannous sulphate tin-plating bath to prevent oxidation, and it was thought possible that its presence in small amounts might also diminish the rate of oxidation of stannous ions in pickling baths, so prolonging the life of a bath, especially one standing idle. This proved to be the case, as the results of Table II show. Cresolsulphonic acid also retards the oxidation of stock stannous chloride solutions; it was therefore adopted as a useful adjunct to stannous chloride.

The best stannous chloride inhibited pickling bath so far found is bath V, containing 0.05 per cent stannous chloride ($SnCl_2 2H_2O$), 0.025 per cent gelatine, and 0.05 per cent cresolsulphonic acid. This has excellent inhibiting properties, though not equal to those of the equivalent (weight for weight) commercial-inhibitor bath W; it is easier to make up and cleaner to work with than baths containing flour. The appearance of the pickled material is excellent. A stock solution for direct addition to the pickling acid may be prepared by dissolving the stannous chloride in a strong solution of the cresolsulphonic acid, and adding the gelatine, previously dissolved in hot water; this keeps fairly well. It could readily be arranged for continuous addition to the pickling bath if desired.

Width Gage for Hot Strip Mills

A width gage developed primarily for use on hot strip mills is announced by General Electric Co., Schenectady, N. Y. It measures the width of strip moving at speeds as high as 2000 feet per minute or faster with an accuracy of ⅛-inch.

The gage is designed so that it does not contact the strip in any way. The strip passes between two light beams which follow the edges as the strip widens, narrows or



shifts from side to side. The instrument reads 0 for proper width and is graduated in fractions of an inch plus or minus up to the two limits. Shifting alone does not change the reading since both beams move right or left equal amounts. If the beams have to move apart or toward each other, the instrument indicates the amount too wide or too narrow.

Its outstanding advantage is that operators can observe the accuracy to which they hold the strip width and are permitted to correct immediately any deviation from the required value.

In the past it has not been possible to measure the strip until it was delivered from the coilers, and at that time there are approximately four slabs in the mill in the process of rolling. As the width is adjusted by the edgers at the roughing stands, it is obvious that if the width were incorrect several slabs would be rolled before a correction could be made.

The gage can be located at the roughing stand so that an immediate adjustment of the edgers can be made. Another can be located following the finishing train so that in case the wrong tension is used between stands, an adjustment of tension can be made immediately so the correct width is rolled.

The principle of the hot strip gage is relatively simple. A narrow beam of light is projected upon a galvanometer mounted mirror and from this mirror to a phototube below the strip. The electric circuit is arranged so that the phototube controls the input to the galvanometer and causes the mirror to rotate so that the beam of light is always partially interrupted by the edge of the strip.

Two units are used, one on each side of the strip, and arranged so that their difference indicates the departure plus or minus from the correct value. This development also is applicable to cold mills.

The detector units are mounted on the side guides and when the side guides are set correctly the units are also set to indicate the proper width of strip. An indicator is provided showing the correct distance between units and the gage instrument indicates the divergence from the correct value.

High-Speed X-Rays

(*Concluded from Page* 40)

ment of the mercury vapor particles by electrons creates invisible ultraviolet radiations, which excite the phosphors and are converted to visible light. On the composition of the phosphors depends the color of the light produced.

Samuel G. Hibben, Westinghouse director of applied lighting, pointed to new horizons in the future utilization of light. Daylight will be brought artificially into the home; light of various colors and produced by many means will enable man to "mood condition" his environment; the wonders of television will bring beautiful sunsets into the parlor. He demonstrated many forms of illumination, including "black light" from special ultraviolet lamps, which causes carpets, curtains, wall paper and other materials dyed with fluorescent dyes to glow in colors and patterns otherwise invisible. He also showed a 10,000-watt water-cooled mercury-vapor lamp which has a light-emitting heart the size of a pencil. This lamp is one-fifth as bright as the surface of the sun.

An inspection of the manufacturing, engineering and research divisions of the plant also was part of the day's program.

Machine Tool Dealers

(*Concluded from Page* 35)

daire division, General Motors Corp., Dayton, who, with the help of demonstration apparatus and refrigerants, including liquid oxygen, dealt with phenomena of heat and cold; and Col. H. A. Toulmin Jr., Dayton, who was the dinner speaker on "Organizing for War."

"Selling for Delivery in 1950" was the topic of a paper by A. G. Bryant, president, Bryant Machinery & Engineering Co., Chicago. "Production of machine tools for purposes of defense must cease after a time when civilization has again asserted a dominance over forces of brute strength," he declared. "When that time occurs, what machines will we be selling and for what purpose?"

Mr. Bryant challenged the philosophy held in some quarters that the war will be followed by utter collapse and cessation of normal activities. Crises in the past, he reminded, have been followed by progress, higher living standards, significant social developments, invention and increased production for human needs.

"Certainly there is no room in our outlook for despair, and our present attitude should be one of preparedness, preparedness in this sense, for peace, when there is peace. . . .

"In 1950, as in 1940 and 1930 and 1920, people are going to want new things and will strive to get them. It is ridiculous to assume that because of the reactions of the present war, human beings are going to be content to revert to conditions of generations past or that they will be satisfied with anything less than better standards of living. . . .

"This means the machine tool industry to maintain its place in society and for its own preservation must create new machines to manufacture new necessities. . . . By that time we must stop selling machines that make the covered wagons of today and start selling the machines that will produce the super streamliners of transportation, of household facilities, and of business equipment of tomorrow.

"New machine tools must be created and produced and some who are engaged only in the selling branch of our industry may feel that this does not concern them, that this is solely the job of the manufacturers. To such let us say that this job must be done by the co-operation of all. Our engineers and our production departments can design and produce new models as they have repeatedly demonstrated. To know what is required, however, and to interpret this to the manufacturing division is a primary job of the selling organizations.

"They must be alert to new conditions; they must keep the factories advised; they must suggest new possibilities in machine applications and in types."

Fred B. Scott Jr., Syracuse Supply Co., Syracuse, N. Y., was elected president of the association; Albert M. Stedfast, Stedfast & Roulston Inc., Boston, vice president; and F. W. Schiefer, F. W. Schiefer Machinery Co., Rochester, N. Y., secretary-treasurer.

Named to the executive committee for three-year terms were: Edward A. Lynch, Edward A. Lynch Machinery Co., Philadelphia; T. C. Stephens, Robert R. Stephens Machinery Co., St. Louis; A. C. Wigglesworth, Wigglesworth Machinery Co., Cambridge, Mass.

DEALERS ARE GUESTS OF MONARCH COMPANY

Following the annual convention of the Associated Machine Tool Dealers of America in Dayton, O., the majority of those who attended proceeded by busses to Sidney, O., where they were guests of Wendell E. Whipp, president, Monarch Machine Tool Co. A reception was held at Hotel Wagner in Sidney, after which dinner was served at the Monarch plant.

The visitors were conducted through the plant, and the air-conditioned office and engineering department. High-production metal cutting was demonstrated.

■ New aircraft assembly plant being constructed at Niagara Falls, N. Y., airport for Bell Aircraft Corp., Buffalo, is scheduled for completion in 115 days. Providing more than 300,000 square feet of floor space, the new building will cost $1,050,000. Austin Co., Cleveland, designed the plant, is also erecting it.

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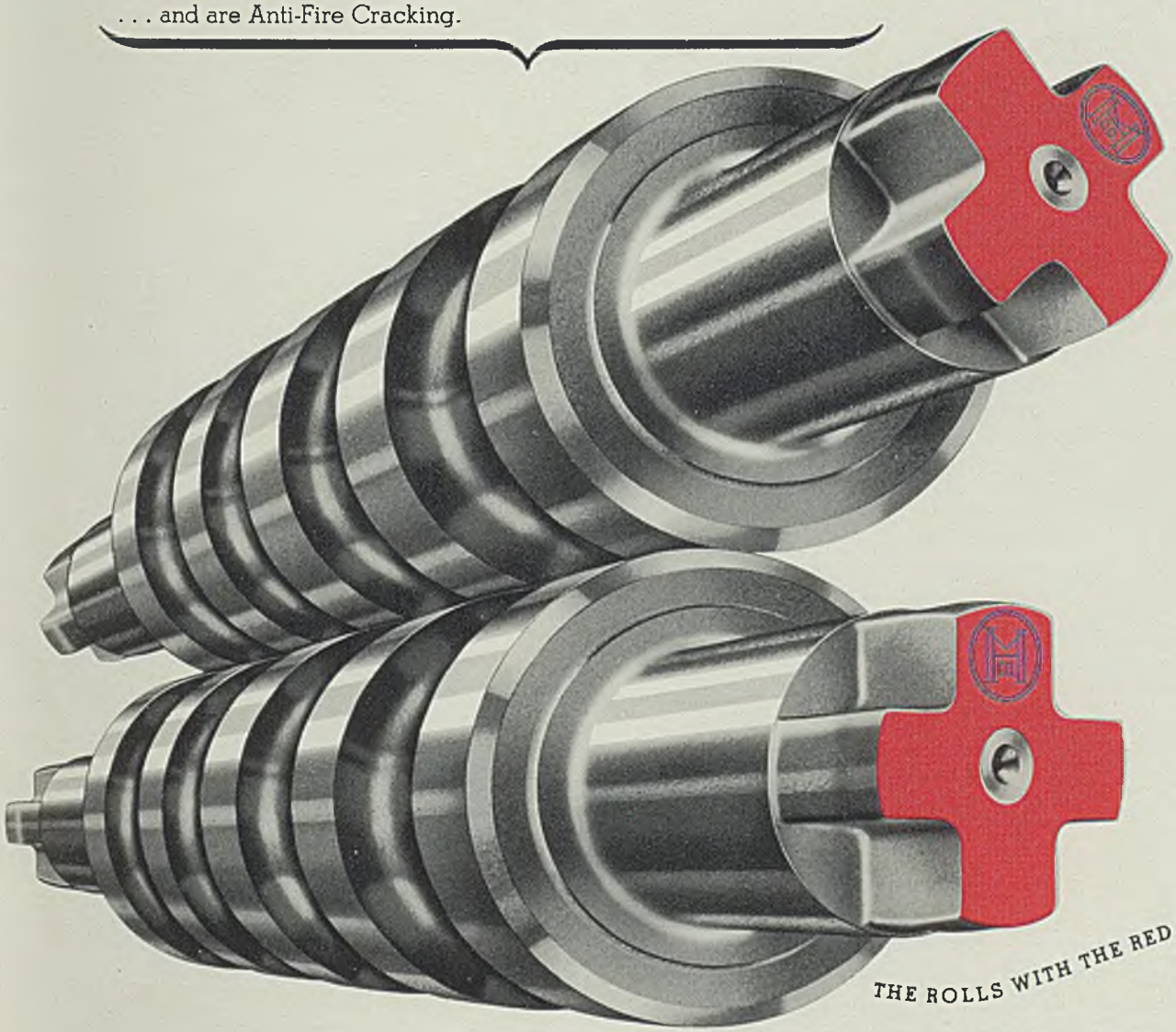
"Techni" Process Alloy Steel Rolls have Great Strength, Excellent Finish, Unusual Wearing Quality, Resistance to Slippage, . . . and are Anti-Fire Cracking.



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REPLACES TWO METAL CLEANING PRODUCTS FOR REVERE COPPER & BRASS INC.

When the Rome Mfg. Co. Division of Revere Copper & Brass Inc., Rome, N. Y., adopted a Pennsalt Cleaner for cleaning their small copper and brass products prior to copper dipping, chromium or bright nickel plating—this single metal cleaner immediately took over the job that had formerly required the handling of two ingredients.

The Pennsalt Cleaner meets the exacting requirements of this prominent manufacturer, and helps to provide the uniformity of finish so essential in finely finished products such as these. The operators are enthusiastic over the handling ease of this cleaner, and over the fact that it replaces a two-product operation formerly necessary.

This is a typical experience. The Pennsalt Cleaners are serving throughout the country, doing a better metal cleaning job and cutting cleaning costs for firms in nearly every industry. For heavy-duty cleaning, there is Orthosil, the original Pennsalt Cleaner. For varied and extreme requirements, there are other Pennsalt Cleaners that meet every need with laboratory precision.

Why not check their advantages in your plant? Write Dept. E for details. Pennsalt Cleaner Division, Pennsylvania Salt Mfg. Co., Widener Bldg., Phila., Pa.

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PENNSALT

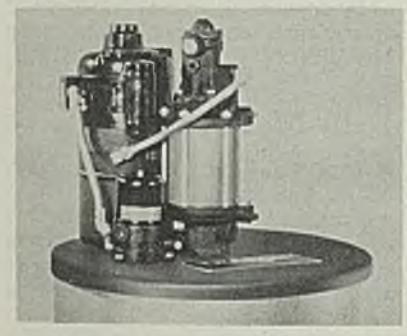
CLEANERS FOR INDUSTRY

PENNSYLVANIA SALT MANUFACTURING COMPANY

Chemicals

Barrel Pumps

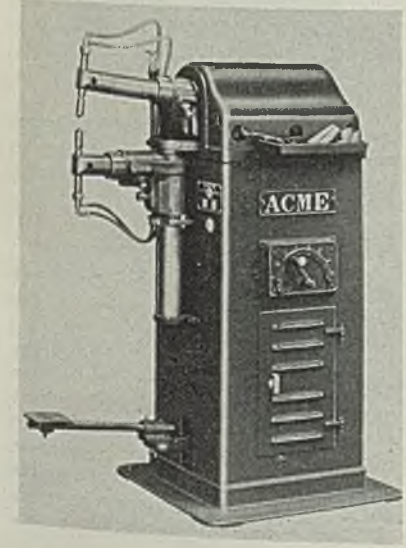
■ Trabon Engineering Corp., 1814 East Fortieth street, Cleveland, has placed on the market a hydraulically operated barrel pump capable of handling tacky and heavy greases. It is sturdy and compact in construction and has a capacity for hard and constant service. It is powered by a ½-horsepower, alternating or direct current motor—all moving parts are completely en-



closed and mounted on a drum cover which fits over all standard 400-pound drums. The lubricant cylinder rests at the bottom of the drum, making it possible to dispense the entire contents from the original container directly into the bearings or the parts requiring lubrication. The pump is built in six models, medium and high pressures ranging from 1500 to 5000 pounds.

Spot Welders

■ Acme Electric Welder Co., Huntington Park, Calif., has introduced foot-operated rocker arm type 2 and 3 spot welders in 20, 30, 40, and 50 kilovolt ampere transformer capacities. Their horns are double-end reversible, one end machined to hold electrodes at a 90 degree angle and opposite end 22½ degree angle. The arrangement of the swivel



lower horn holder on a long column facilitates welding in hard-to-get-at places and deep pans or boxes. Built for 24 hour continuous service, the units have clamping block devices which retain the horns in the horn holders with good electrical contact. Extra heavy rocker arm is of malleable iron. Steel rocker arm brackets are bronze bushed.

Lift Truck

■ Towmotor Co., 1226 East 152nd street, Cleveland, has introduced a new lift truck, the LT-40, for handling 1000 to 3000-pound loads. Built on a 40-inch wheelbase, with a turning radius of 68 inches, the new unit weighs only 3 to 4 thousand pounds, has an overall width of 35 inches and an overall length (without forks) of 70 inches. Interchangeable attachments include forks, rams, scoops, flat plates and special loading devices. Powered by a 22-horsepower 4-cylinder gas engine, equipped with degasser and governor, the truck travels at

speeds from 1 to 10 miles an hour —with two speeds forward and two in reverse. This is achieved by a transmission having only 4 gear elements. The truck's entire motor assembly and battery are accessible by lifting the driver's seat. Design of transmission case also permits removal of air-ventilated clutch plate, without disturbing the transmission. The front axle housing is designed as an integral part of the frame. In addition, the LT-40 has a full-width, upholstered seat, positioned in the center of the machine. Controls are placed well forward, simplifying operation and providing increased leg room.

Current Regulator

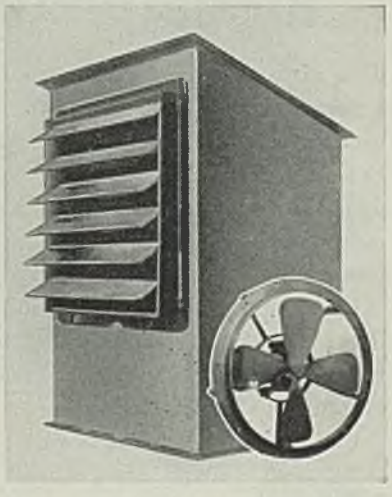
■ Wagner Electric Corp., 6400 Plymouth avenue, St. Louis, has placed on the market a Y-H constant-cur-

rent regulator for series street lighting systems, boundary and signal lighting for airports, flasher signs for advertising and similar applications requiring constant current at all loads. It has a supply current of unity power-factor when the load also has unity power-factor—and when the load has a lagging power-factor, the input current has a power-factor of approximately the same numerical value but leading.

The unit has no moving coils but operates from no load to full load, immediately adjusting its output voltage to varying load conditions without surges on the line or lamp circuit. Due to the low current-draw, the supply line drop is very small.

Pent-House Fans

■ Truflo Fan Co., Harmony, Pa., announces a complete line of pent-house fans for venting obnoxious gases, fumes and dusts. These units are of steel construction and are available in a complete range of



sizes for housing standard wall fans of 12 to 48-inch diameters. Sheet steel walls and shutters are mounted on heavy angle iron frame. The pent-house is placed directly

over the opening through the roof of the building. The fan exhausts the air up through the opening, or from several floors below by means of a duct connected to fan housing.

Contactor

■ Westinghouse Electric & Mfg. Co., East Pittsburgh, announces an enclosed Dn multi-pole contactor for complicated control systems. It is available in ratings up to 10 amperes, 600 volts alternating current and may contain as many as eight poles in any combination of normally open and normally closed contacts. The enclosure is made of black enamel sheet steel and has a deep drawn snap cover. The general shape of the enclosure conforms to that used on the standard line of line-starters manufactured by this company.

Screw and Screw Driver

■ Maxwell A. West, 1250 Broadway, New York, announces a new standard screw and screw driver. Advantage of this combination is that in operation the driver bit serves as a universal joint between the screw head and shank of the driver. The bit is self-aligning and self-centering in operation. Replacement bits can be used for recessed screws or common slotted types. The universal action is in the shank instead of on the end of the bit and recess.

This new combination is said to make power driving much faster, eliminates danger of driver slipping from the screw head and will not ream or destroy the recess of the screw head while in operation. A special driver also has been designed to drive this new screw at a radius of 90 degrees. A special "thief-proof" screw also has been developed by Mr. West.

Drill Mounting

■ Ingersoll-Rand Co., Phillipsburg, N. J., has introduced a new Jackleg air-feed rock drill mounting for use with Jackhamers. It helps to support the drill, absorb the recoil and feed it forward as the hole is drilled into the rock. This development enables the use of the larger and faster drilling hammers on horizontal holes. Instead of the operator holding up the drill by hand and pushing it forward as it drills into the rock, he uses the Jackleg and has to exert only a slight downward pull on the handle of the Jackhamer to balance the lifting force that is exerted by the pneumatic feed of the Jackleg. The latter weighs only 35 pounds and can be regulated by a pressure throttle.

Vibrating Conveyor

■ Ajax Flexible Coupling Co., Westfield, N. Y., has introduced an improved vibrating conveyor featuring totally-enclosed design, minimum headroom and rubber shackled pan mounting with self-contained reciprocating drive. It is equipped with two intakes and a single discharge. Flanges are provided for flexible boots on intake and discharge openings for dustproof connection to hop-

pers and chutes. These conveyors are available in standard and special lengths up to 50 feet or more, and widths up to 4 feet. For long distances, they can be installed in series.

The driving mechanism is self-balancing and applies the reciprocating motion directly to the conveyor pan. Rubber-bushed shackles connect the supporting springs to pan. They require no lubrication.

Safety Transformer

■ Newark Transformer Co., Newark, N. J., has placed on the market a transformer for reducing accidents that occur in handling electric extension cords in wet and camp places. It is a light, small cylindrical device, the outer shell of which is made of a noncorrosive, nonconductor and tough compound

shell enclosing a water proof transformer element. A hook is provided on one end to carry and hang it where convenient. To use it, it is only necessary to plug one set of wires in any 110 or 115-volt receptacle. The transformer coil is attached opposite to the hook end. Its function is to reduce any 110 or 115-volt current down to the safe 6-volt.

Hydro-Dynamic Press

□ E. W. Bliss Co., Brooklyn, N. Y., has introduced a double action 800-200-ton hydro-dynamic press with universal electric control. It is equipped with an auxiliary hydraulic pressure cushion in the bed. The press is operated at high speeds by two 125-horsepower motors. The pushbutton control setup is such the inner main slide cannot contact the work until after the desired blankholder pressure is applied by the other slide.

The main drive brings the two slides simultaneously to the work, the inner slide halting for a fraction of a second while the blankholder pressure is applied, and then proceeding at the draw speed. Reversal may be controlled either by slide position or by pressure in the system. Positive inching for die setting also is accomplished by pushbutton. The press features close fitting gibs, normally open prefill valve and holding valve. The equipment is self-contained throughout.

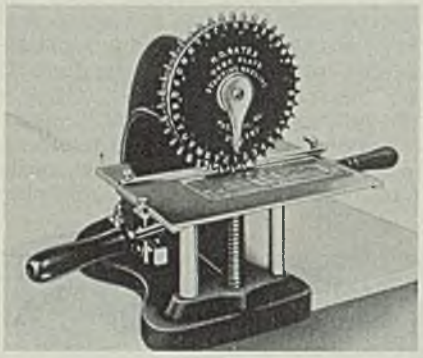
The capacity of the main slide is 800 tons; capacity of the blankholder slide 200 tons; capacity of cushion in bed 150 tons; bed area front to back, right to left 84 x 85 inches. The distance to top of bed to face of blankholder slide with slide up is 95 inches; with slide down 69 inches; maximum strokes of main slide 42 inches. The press's overall height is 340 inches.

Stamping Machine

■ H. O. Bates, Elizabeth, N. J., has placed on the market a No. 5 stamping machine which stamps nameplates, parts or pieces, from 0.005 to 3¼ inches thick and up to 9 x 7½ inches square, permitting the stamping, with letters and numbers, of assembled manufactured parts and also permitting the stamping

of name-plates after assembly. It features a double row heavy duty SKF bearing in the die wheel for easy turning and accuracy.

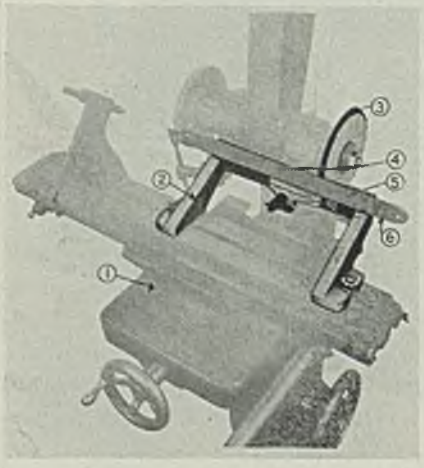
By means of its screw principle, up to nearly three tons pressure can be applied. This permits stamping letters and numbers into stain-



less steel and other alloys of metal. The depth of impressions can be controlled for stamping soft materials. The machine is furnished standard with any one size of dies from 1/32 to 3/16-inch, a complete alphabet and set of figures. Special characters may be substituted, if desired, and extra die wheels can be furnished for interchanging to stamp several sizes in the one machine.

Grinding Fixture For Hack Saw Blades

■ Industrial Engineering Co. Inc., Pence building, Minneapolis, has introduced a new Quick Way grinding fixture for use in regrinding hack saw blades. By its use the saw blades give 60 to 80 hours additional service. The fixture can be attached to any universal tool



grinder. The special grinding wheel which is furnished with the fixture will grind approximately 1000 blades and can be easily replaced.

In the illustration Fig. 1 is the grinding saddle. Fig. 2 is the frame of the fixture itself. Fig. 3 is the 6 x ¼ x ⅝-inch grinding wheel with a 30-degree face. Fig. 4 shows the index feed pawl. This is machined from hardened steel to insure against wear and to keep the unit accurate. Fig. 5 is the index feed pawl lock screw which enables the operator to locate the feed pawl in any position, or the pawl can be left free to oscillate with the feed of the blade. Fig. 6 indicates the high speed power hack saw blade in position for the grinding operation.

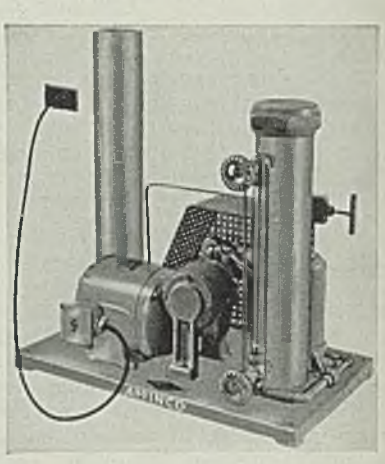
Pusher Locomotive

■ H. K. Porter Co. Inc., 4975 Harrison street, Pittsburgh, has introduced a 40-ton pusher locomotive for use on 42-inch narrow gage track laid between two standard tracks. It is fitted with two pusher arms which, in operation, swing out behind freight cars on the regular tracks, pushing them along as the pusher locomotive moves ahead. The locomotive is powered

by two 100-horsepower Westinghouse mill motors, fitted with double reduction gear drives. Current is supplied by collector shoes on a third rail. The motors are ventilated by filtered air forced over them at the rate of 2400 cubic feet per minute. This is accomplished by an electrically operated conoidal fan. Both brakes and pusher arms are operated by a 25-cubic foot electrically driven air compressor. Brake bands are placed on drive shafts between motors and transmissions. Additional features are the electrically heated cab, floored with ebony asbestos wood; and electrically heated sand boxes. Size of the locomotive is 36 feet long by 15 feet high by 51 inches wide. It weighs 80,000 pounds and has a rated tractive force of 20,000 pounds with a maximum tractive force of 30,000 pounds.

Booster Pump

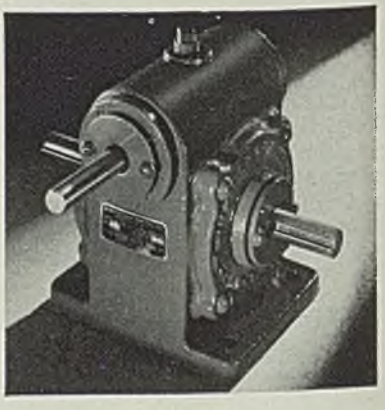
■ American Instrument Co., Silver Spring, Md., has placed on the market a new motor driven pump capable of developing pressures up to 6000 pounds per square inch. It is especially applicable for use in creating high test pressures for catalytic hydrogenation work, for determining the bursting strengths of cylinders, spheres, etc., for operating high-pressure and hydrau-



lic intensifiers, and for determining the effects of high pressures and their sudden release on various materials. It consists essentially of a geared-head motor (for operation on 115 or 230 volts alternating or direct current), reservoir and compression chamber, mounted on a cast iron base. Its theoretical reservoir, 1300 milliliters; actual volume 3000 milliliters. Working and actual volumes of the compression chamber, 1300 milliliters. It is tested to 9000 pounds per square inch.

Speed Reducer

■ Winfield H. Smith Inc., Springville, Erie county, N. Y., has placed on the market a No. 3½ BT antifriction, worm-on-top gear speed reducer for continuous duty installations. Its worm is of hardened steel with ground threads. It is located on top, keyed to the shaft



which is mounted on radial-thrust ball bearings. The gear is of a special alloy bearing bronze. The oil seals are built-in and keep oil in and dirt out. These are provided at all shaft extensions. The unit has a rating of ¼-horsepower with torque capacity of 140 to 190-inch pounds. It features ratios of 58, 36, 18 and 9 to 1. The reducer is 6½ inches high. The base measures 4⅛ x 5 inches.

Steel Operating Rate

Up Half Point at 95½

Peak since June, 1929, when 96½ was reached. October sales best of year. Pig iron prices advanced.

MARKET IN TABLOID ★

Demand
Carrying over into November briskly.

Prices
Strong.

Production
Up ½-point to 95½ but considerably under April, 1929, *at* 101.

■ STEELWORKS operations last week advanced another half point to 95½ per cent of capacity, highest since the second week of June, 1929 with 96.5 per cent. At the end of April, 1929, the rate had reached 101 per cent, a figure rarely attained. In April, 1937 it averaged 91½ per cent, while the peak of last year was 94 per cent in early December.

Apparently the continued rise in operations is due largely to stepping up the pace at the bessemer converters and electric furnaces. Many units now working had been regarded as at least semi-obsolete.

Meanwhile new orders continue heavy, it being apparent that sales in October have been the best for the year to date, though perhaps not equaling October of last year. Deliveries become further extended. On some shape descriptions February is the earliest delivery obtainable. In alloy steel frequently no delivery months can be promised.

Increasing talk of priorities and the recent formation of the priority board in Washington are bringing in specifications at a slightly higher rate than shipments. The situation parallels last fall at the outbreak of the war. The present upsurge reflects inventory buying by jobbers and consumers alike, though heavy tonnages are also being placed to meet specific contracts, especially structurals.

The Pittsburg Coke & Iron Co., Neville Island, Pa., advanced prices of principal grades of pig iron $1.50 to $2.00 per ton on Friday, quoting basic, malleable and foundry at $24.50 per ton, base, and bessemer $25.

Large orders are being placed against the 280,000 tons of 155 and 105 millimeter shells awarded by the army earlier in the month.

In current demand shapes and bars still lead, with wide plates not far behind. Steel pipe is not moving in line with the three major heavy products, nor even with wire products and sheets. However, there is a flurry in plumbing and heating pipe, a strong demand for mechanical tubing from the machinery and automotive industries, and brisk business in boiler tubing, especially for marine boilers. Line pipe and casings are rather slow.

Featuring railroad purchases were 45,000 tons of rails, 15,000 tons each, from the Chicago Northwestern, Erie and Southern Pacific railroads, the Erie also buying 1150 freight cars.

Exports of iron and steel scrap in September were 251,116 tons as against 346,087 tons in August. Shipments decreased to all principal countries except Japan where possible anticipation of an embargo stimulated the movement. Japan took 148,332 tons in September, against 137,429 tons in August, Great Britain received 75,049 tons as against 136,604 tons in August.

Perhaps the best percentage improvement in sales is in light steel. Plates from the small producers carry the promptest delivery, at three weeks, though a few weeks ago two weeks could have been done. Hot-rolled sheets, for some producers, are the only major steel product in which deliveries are not lengthening. Priority slips continue rare.

Prices keep improving though some concessions occasionally are noted in certain kinds of steel. Galvanized sheets and reinforcing bars are stronger. Usually, prompt deliveries are more important than price.

Automobile production for the week ended Oct. 26 is estimated at 117,080 units, an increase of 2408 over a week ago, comparing with 78,210 a year ago.

Steel operations rose in six districts, declined in two and were unchanged in four, a net result of 95½ per cent. Gains were at Cincinnati, up 4 points to 94 per cent; Detroit, up 1 point to 97 per cent; Youngstown, 1 point to 91; New England, 5 points to 90; Pittsburgh, 2 points to 92; Cleveland, 4½ points to 90 per cent. Wheeling dropped 4½ points to 93½ and Chicago, 1 point to 98 per cent. Remaining the same were Birmingham at 97, St. Louis at 82½, Buffalo at 90½ and eastern Pennsylvania at 93.

Tin plate production has risen 2 points to 44 per cent of capacity and is expected to advance a few more points before the end of the year. Stocks have declined to more reasonable levels.

The three groups of composite prices are unchanged: Iron and steel at $38.07, finished steel at $56.60 and steelworks scrap at $20.54.

The tight steel situation has many interesting ramifications. For instance users of strip seconds find the supply scarce and higher prices in prospect.

COMPOSITE MARKET AVERAGES

	Oct. 26	Oct. 19	Oct. 12	One Month Ago Sept., 1940	Three Months Ago July, 1940	One Year Ago Oct., 1939	Five Years Ago Oct., 1935
Iron and Steel....	$38.07	$38.07	$38.07	$37.93	$37.63	$37.62	$32.84
Finished Steel	56.60	56.60	56.60	56.60	56.60	55.90	53.70
Steelworks Scrap..	20.54	20.54	20.54	20.05	18.56	21.45	12.72

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

COMPARISON OF PRICES

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

Finished Material

	Oct. 26, 1940	Sept. 1940	July 1940	Oct. 1939
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.47	2.47	2.47
Iron bars, Chicago	2.25	2.15	2.15	2.15
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.275
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.00
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.00
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	5.00	5.00	5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.50

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to ⅜-inch, Pitts.	2.00	2.00	2.00	1.92

Pig Iron

	Oct. 26, 1940	Sept. 1940	July 1940	Oct. 1939
Bessemer, del. Pittsburgh	$24.34	$24.34	$24.34	$24.34
Basic, Valley	22.50	22.50	22.50	22.50
Basic, eastern, del. Philadelphia	24.34	24.34	24.34	24.34
No. 2 foundry, Pittsburgh	24.21	24.21	24.21	24.21
No. 2 foundry, Chicago	23.00	23.00	23.00	23.00
Southern No. 2, Birmingham	19.38	19.38	19.38	19.38
Southern No. 2 del. Cincinnati	22.89	22.89	22.89	22.89
No. 2X, del. Phila. (differ. av.)	25.215	25.215	25.215	25.215
Malleable, Valley	23.00	23.00	23.00	23.00
Malleable, Chicago	23.00	23.00	23.00	23.00
Lake Sup., charcoal, del. Chicago	30.34	30.34	30.34	30.34
Gray forge, del. Pittsburgh	23.17	23.17	23.17	23.17
Ferromanganese, del. Pittsburgh	125.33	125.33	125.33	105.33

Scrap

Heavy melt. steel, Pitts.	$21.50	$20.15	$19.55	$23.15
Heavy melt. steel, No. 2, E. Pa.	19.75	19.69	17.50	20.00
Heavy melting steel, Chicago	19.75	19.31	17.45	19.25
Rails for rolling, Chicago	24.25	21.37	21.65	21.90
Railroad steel specialties, Chicago	23.25	21.62	21.00	21.75

Coke

Connellsville, furnace, ovens	$4.75	$4.75	$4.75	$4.75
Connellsville, foundry, ovens	5.75	5.75	5.75	5.80
Chicago, by-product fdry., del.	11.75	11.25	11.25	10.50

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

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

Sheet Steel

Hot Rolled

Pittsburgh	2.10c
Chicago, Gary	2.10c
Cleveland	2.10c
Detroit, del.	2.20c
Buffalo	2.10c
Sparrows Point, Md.	2.10c
New York, del.	2.34c
Philadelphia, del.	2.27c
Granite City, Ill.	2.20c
Middletown, O.	2.10c
Youngstown, O.	2.10c
Birmingham	2.10c
Pacific Coast ports	2.65c

Cold Rolled

Pittsburgh	3.05c
Chicago, Gary	3.05c
Buffalo	3.05c
Cleveland	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.37c
New York, del.	3.39c
Granite City, Ill.	3.15c
Middletown, O.	3.05c
Youngstown, O.	3.05c
Pacific Coast ports	3.70c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast ports	4.05c

Black Plate, No. 29 and Lighter

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

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.80c
Pacific Coast	4.55c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.40c	4.00c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

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

Straight Chromes

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

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c
Philadelphia, del.	2.15c
Boston, delivered	2.46c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, Pa.	2.10c
Sparrows Point, Md.	2.10c
Claymont, Del.	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast ports	2.65c

Steel Floor Plates

Pittsburgh	3.35c
Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	4.00c

Structural Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.31c
Pacific Coast ports	2.75c

Tin and Terne Plate

Tin Plate, Coke (base box)

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

Mfg. Terne Plate (base box)

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

Bars

Soft Steel

(Base, 20 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Duluth	2.25c
Birmingham	2.15c
Cleveland	2.15c
Buffalo	2.15c
Detroit, delivered	2.25c
Philadelphia, del.	2.47c
Boston, delivered	2.52c
New York, del.	2.48c
Gulf ports	2.50c
Pacific Coast ports	2.80c

Rail Steel

(Base, 5 tons or over)

Pittsburgh	2.05c
Chicago or Gary	2.05c
Detroit, delivered	2.15c
Cleveland	2.05c

Buffalo	2.05c
Birmingham	2.05c
Gulf ports	2.40c
Pacific Coast ports	2.70c

Iron

Chicago	2.25c
Philadelphia, del.	2.37c
Pittsburgh, refined	3.50-8.00c
Terre Haute, Ind.	2.15c

Reinforcing

New Billet Bars, Base

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

Rail Steel Bars, Base

Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birm.	2.05c
Gulf ports	2.40c
Pacific Coast ports	2.50c

Wire Products

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

Standard and cement coated wire nails	$2.55

(Per Pound)

Polished fence staples	2.55c
Annealed fence wire	3.05c
Galv. fence wire	3.40c
Woven wire fencing (base C. L. column)	67
Single loop bale ties, (base C.L. column)	56
Galv. barbed wire, 80-rod spools, base column	70
Twisted barbless wire, column	70

To Manufacturing Trade

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

Cold-Finished Bars

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

*Delivered.

Alloy Bars (Hot)

(Base, 20 tons or over)

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

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.70	3300	3.80
2500	2.55	3400	3.20

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

Electric furnace up 50 cents.

Alloy Plates (Hot)

Pittsburgh, Chicago, Coatesville, Pa.	3.50c

Strip and Hoops

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

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.10c
Detroit, del.	2.20c
Philadelphia, del.	2.42c
New York, del.	2.46c
Pacific Coast ports	2.75c
Cooperage hoop, Young., Pitts.; Chicago, Birm..	2.20c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.80c
Chicago	2.90c
Detroit, del.	2.90c
Worcester, Mass.	3.00c

Carbon	Cleve.,	Pitts.
0.26—0.50		2.80c
0.51—0.75		4.30c
0.76—1.00		6.15c
Over 1.00		8.35c

Worcester, Mass. $4 higher.

Commodity Cold-Rolled Strip

Pitts.-Cleve.-Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.35c

Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00

Cents per pound

Angle bars, billet, mills.	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham.	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

½ x 6 and smaller	68 off
Do., ⅞ and ⅝ x 6-in. and shorter	66 off
Do., ¾ to 1 x 6-in. and shorter	64 off
1⅛ and larger, all lengths	62 off
All diameters, over 6-in. long	62 off
Tire bolts	52.5 off

Stove Bolts

In packages with nuts separate 72.5-10 off; with nuts attached 72.5 off; bulk 82 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts	60 off
Plow bolts	68.5 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
½-inch and less.	66	70
⅝-1-inch	63	65
1⅛-1½-inch	61	62
1⅝ and larger	60	..

Hexagon Cap Screws

Upset 1-in., smaller	70.0 off

Square Head Set Screws

Upset, 1-in., smaller	75.0 off
Headless set screws	64.0 off

Piling

Pitts., Chgo., Buffalo	2.40c
Gulf ports	2.85c
Pacific Coast ports	2.95c

Rivets, Washers

F.o.b. Pitts., Cleve., Chgo., Bham.

Structural	3.40c
⅞-inch and under	65-10 off

Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
½	63½	54
¾	66½	58
1—3	68½	60½

Iron

¾	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld	67½
2, lap weld	60
2½ to 3, lap weld	63
3½ to 6, lap weld	65
7 and 8, lap weld	64

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cutlengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½" O.D.	13	$ 9.72	$23.71
1¾" O.D.	13	11.06	22.93
2" O.D.	13	12.38	19.35
2¼" O.D.	13	13.79	21.68
2¼" O.D.	12	15.16	.....
2½" O.D.	12	16.58	26.57
2¾" O.D.	12	17.54	29.00
3" O.D.	12	18.35	31.36
3½" O.D.	11	23.15	39.81
4" O.D.	10	28.66	49.90
5" O.D.	9	44.25	73.93
5" O.D.	7	68.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O.D.	13	$ 7.82	$ 9.01
1¼" O.D.	13	9.26	10.67
1½" O.D.	13	10.23	11.79
1¾" O.D.	13	11.64	13.42
2" O.D.	13	13.04	15.03
2¼" O.D.	13	14.54	16.76
2¼" O.D.	12	16.01	18.45
2½" O.D.	12	17.54	20.21
2¾" O.D.	12	18.59	21.42
3" O.D.	12	19.50	22.48
3½" O.D.	11	24.62	28.37
4" O.D.	10	30.54	35.20
4½" O.D.	10	37.35	43.04
5" O.D.	9	46.87	54.01
6" O.D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Pet Net Ton

6-in., & over, Birm.	$45.00-46.00
4-in., Birmingham	48.00-49.00
4-in., Chicago	56.80-57.80
6-in. & over, Chicago	53.80-54.80
6-in. & over, east fdy.	49.00
Do., 4-in.	52.00

Class A Pipe $3 over Class B Stnd. fitgs., Birm., base $100.00.

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Youngs., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young, Buffalo, Birm.	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅝-inch incl. (per 100 lbs.)	$2.00
Do., over ⅝ to 41/64-in. incl.	2.15

Worcester up $0.10; Galveston up $0.25; Pacific Coast up $0.50.

Skelp

Pitts., Chi., Youngstown, Coatesville, Sparrows Pt.	1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$4.35- 4.60
Connellsville, fdry.	5.25- 5.50
Connell, prem. fdry.	5.75- 6.25
New River fdry.	6.25- 6.50
Wise county fdry	5.50- 6.50
Wise county fur.	5.00- 5.25

By-Product Foundry

Newark, N. J., del.	11.38-11.85
Chicago, outside del.	11.00
Chicago, delivered	11.75
Terre Haute, del.	11.25
Milwaukee, ovens	11.75
New England, del.	12.50
St. Louis, del.	11.75
Birmingham, ovens	7.50
Indianapolis, del.	11.25
Cincinnati, del.	11.00
Cleveland, del.	11.55
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 xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (less than 1000 lbs.)	14.75c
Do. (1000 lbs. or over)	13.75c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	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.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$24.00	$24.50	$23.50	$25.00
Birmingham, Ala.§	19.38	.....	18.38	24.00
Birdsboro, Pa.	24.00	24.50	23.50	25.00
Buffalo	23.00	23.50	22.00	24.00
Chicago	23.00	23.00	22.50	23.50
Cleveland	23.00	23.00	22.50	23.50
Detroit	23.00	23.00	22.50	23.50
Duluth	23.50	23.50	.....	24.00
Erie, Pa.	23.00	23.50	22.50	24.00
Everett, Mass.	24.00	24.50	23.50	25.00
Granite City, Ill.	23.00	23.00	22.50	23.50
Hamilton, O.	23.00	23.00	22.50	.....
Neville Island, Pa.	23.00	23.00	22.50	23.50
Provo, Utah	22.00	.....	.....	.....
Sharpsville, Pa.	23.00	23.00	22.50	23.50
Sparrow's Point, Md.	24.00	.....	23.50	.....
Swedeland, Pa.	24.00	24.50	23.50	25.00
Toledo, O.	23.00	23.00	22.50	23.50
Youngstown, O.	23.00	23.00	22.50	23.50

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

Delivered from Basing Points:				
Akron, O., from Cleveland	24.39	24.39	23.89	24.89
Baltimore from Birmingham	24.78	.....	23.66	.....
Boston from Birmingham	24.12	.....	.....	.....
Boston from Everett, Mass.	24.50	25.00	24.00	25.50
Boston from Buffalo	24.50	25.00	24.00	25.50
Brooklyn, N. Y., from Bethlehem	26.50	27.00	.....	.....
Canton, O., from Cleveland	24.39	24.39	23.89	24.89
Chicago from Birmingham	†23.22	.....	.....	.....
Cincinnati from Hamilton, O.	23.24	24.11	23.61	.....
Cincinnati from Birmingham	23.06	.....	22.06	.....
Cleveland from Birmingham	23.32	.....	22.82	.....
Mansfield, O., from Toledo, O.	24.94	24.94	24.44	24.44
Milwaukee from Chicago	24.10	24.10	23.60	24.60
Muskegon, Mich., from Chicago, Toledo or Detroit	26.19	26.19	25.69	26.69
Newark, N. J., from Birmingham	25.15	.....	.....	.....
Newark, N. J., from Bethlehem	25.53	26.03	.....	.....
Philadelphia from Birmingham	24.46	.....	23.96	.....
Philadelphia from Swedeland, Pa.	24.84	25.34	24.34	.....
Pittsburgh district from Neville Island	‡Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	25.31	25.31	24.81	25.81
St. Louis, northern	23.50	23.50	23.00	.....
St. Louis from Birmingham	†23.12	.....	22.62	.....
St. Paul from Duluth	25.63	25.63	.....	26.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $28.50, base; $29.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$22.50	Lake Superior fur.	$27.00
Pitts. dist. fur.	22.50	do., del. Chicago	30.34
		Lyles, Tenn.	26.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $28.50; 6.51-7—$29.00; 7-7.50—$29.50; 7.51-8—$30.00; 8-8.50—$30.50; 8.51-9—$31.00; 9-9.50—$31.50; Buffalo, $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	55.10
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	26.00

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$50.00
Chem. bonded chrome	50.00
Magnesite brick	72.00
Chem. bonded magnesite	61.00

Fluorspar

Washed gravel, duty pd., tide, net ton	$25.00-$26.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	19.00
Do. barge	19.00
No. 2 lump	20.00

Ferroalloy Prices

Ferromanganese, 78-82%, carlots, duty pd. $120.00
Ton lots 130.00
Less ton lots 133.50
Less 200 lb. lots 138.00
Do., carlots del. Pitts. 125.33

Spiegeleisen, 19-21% dom.
Palmerton, Pa., spot 36.00
Do., 26-28% 49.50

Ferrosilicon, 50%, freight allowed, c.l. 74.50
Do., ton lot 87.00
Do., 75 per cent 135.00
Do., ton lots 151.00
Spot, $5 a ton higher.

Silicomanganese, c.l., 2½ per cent carbon 118.00
2% carbon, 108.00; 1%, 133.00
Contract ton price $12.50 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.90-2.00

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electric furn., per ton, c. l., 23-26% f.o.b. Mt. Pleasant, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 11.00c
Do., ton lots 11.75c
Do., less-ton lots 12.00c

67-72% low carbon:

	Carloads	Ton lots	Less ton
2% carb.	17.50c	18.25c	18.75c
1% carb.	18.50c	19.25c	19.75c
0.10% carb.	20.50c	21.25c	21.75c
0.20% carb.	19.50c	20.25c	20.75c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do., less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls $2.25
Do., less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50
Do., spot 145.00
Do., contract, ton lots 145.00
Do., spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do., spot 160.00
Do., contract, ton lots 160.00
Do., spot, ton lots 165 00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do., ton lots 8.00c
Do., less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract, freight allowed, lb. spot carlots, bulk 7.00c
Do., ton lots 7.50c
Do., less-ton lots 7.75c
Do., less 200 lbs. 8.00c
Spot, ¼c higher.

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.50
Do., smaller lots 2.60

Vanadium Pentoxide, contract, lb. contained $1.10
Do., spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 84.00c
Do., spot 89.00c
88% chrome, contract 83.00c
Do., spot 88.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ⅛-in., lb. 14.00c
Do., 2% 12.50c
Spot ¼c higher

Silicon Briquets, contract carloads, bulk, freight allowed, ton $69.50
Ton lots 79.50
Less-ton lots, lb. 3.75c
Less 200 lb. lots, lb. 4.00c
Spot ¼-cent higher.

Manganese Briquets, contract carloads, bulk freight allowed, lb. 5.00c
Ton lots 5.50c
Less-ton lots 5.75c
Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, bulk, gross ton 102.50
Do., spot 107.50
34-40%, contract, carloads, lb., alloy 14.00c
Do., ton lots 15.00c
Do., less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60
Do., 100-200 lb. lots 2.75
Do., under 100-lb. lots 3.00

Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant 80.00c

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars: Carbon	Cold Drawn Bars: S.A.E. 2300	Cold Drawn Bars: S.A.E. 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	4.30	3.51	4.09	8.84	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	3.85	4.00	4.35	3.70	3.70	5.25	3.50	....	5.05	....	4.05	....	....
Norfolk, Va.	4.00	4.10	....	4.05	4.05	5.45	3.85	....	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	8.40	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	4.62	3.20	3.75	8.40	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	8.70	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	9.09	7.44
Milwaukee	3.63	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	5.88	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	3.65	3.75	5.75	3.70	6.50	5.00	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	4.75	....	5.75	....	....
Los Angeles	4.15	4.60	6.45	4.00	4.00	6.40	4.30	6.50	5.25	....	6.60	10.55	9.80
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

	S.A.E. Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.18	7.50	6.05	5.80	7.90
New York (Met.)	4.04	7.60	5.90	5.65	....
Philadelphia	4.10	7.31	5.86	5.61	8.56
Baltimore	4.45	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.10	5.65	5.40	7.50
Pittsburgh	3.40	7.35	5.75	5.50	7.60
Cleveland	3.30	7.55	5.85	5.85	7.70
Detroit	3.48	7.67	5.97	5.72	7.19
Cincinnati	3.65	7.69	5.99	5.74	7.84
Chicago	3.70	7.35	5.65	5.40	7.50
Twin Cities	3.95	7.70	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	9.55	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; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland, Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in Birmingham.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Kansas City and St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 300-4999 in San Francisco, Portland; any quantity in Twin Cities; 300-1999 in Los Angeles.

Galvanized Sheets: Base, 150-1499 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; 25 to 49 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 Official Rates of Exchange

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d		Continental Channel or North Sea ports gross tons:: Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	.....	.....	$33.23	3 18 0
Basic bessemer	.....	.....	.....	.....
Hematite, Phos. .03-.05	.....	.....	.....	.....
Billets	.....	.....	$31.95	3 15 0
Wire rods, No. 5 gage	.....	.....	60.71	7 2 6
Standard rails	.....	.....	$48.99	5 15 0
Merchant bars	2.66c	14 15 0	2.77c	7 6 0
Structural shapes	2.48c	13 15 0	2.83c	7 9 0
Plates, ¼ in. or 5 mm.	2.68c	14 17 6	3.53c	9 6 0
Sheets, black, 24 gage or 0.5 mm	3.40c	18 17 6	2.98c	7 17 0°
Sheets, gal., 24 ga., corr	3.98c	22 2 6	3.94c	10 7 6
Bands and strips	.....	.....	2.76c	7 5 0
Plain wire, base	.....	.....	3.15c	8 6 3
Galvanized wire, base	.....	.....	3.75c	9 17 6
Wire nails, base	.....	.....	3.56c	9 7 6
Tin plate, box 108 lbs.	$ 5 61	1 7 9	.....	.....

British ferromanganese $120 (8) delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d		French ::Francs		Belgian ::Francs		Reich ::Mar
Fdy. pig iron, Si. 2.5	$24.24	6 0 0(a)	$17.18	788	$31.44	950	$25.33	63
Basic bess. pig iron	22.83	5 13 0(a)	.....	...	29.79	900	27.94	(b) 69.50
Furnace coke	6.77	1 13 5	4.91	225	10.92	320	7.64	19
Billets	42.42	10 10 0	26.62	1.221	42.20	1.275	38.79	96
Standard rails	2.30c	12 15 6	1.69c	1.692	2.06c	1.375	2.38c	132
Merchant bars	2.78c	15 8 6††	1.53c	1.530	2.06c	1.375	1.98c	110
Structural shapes	2.46c	13 13 0††	1.49c	1.487	2.06c	1.375	1.93c	107
Plates, †¼-in. or 5 mm.	2.55c	14 3 0††	1.95c	1.951	2.42c	1.610	2.29c	127
Sheets, black	3.49c	19 17 6§	2.30c	2.295‡	2.85c	1.900‡	2.59c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	4.07c	22 12 6	3.59c	3.589	4.80c	3.200	6.66c	370
Plain wire	3.83c	21 5 0	2.34c	2.340	3.00c	2.000	3.11c	173
Bands and strips	2.91c	16 3 6††	1.71c	1.713	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. 5s rebate to approved customers. (b) hematite. °Close annealed

††Rebate of 15s on certain conditions.

**Gold pound sterling not quoted. ::No quotations.

IRON AND STEEL SCRAP PRICES

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

HEAVY MELTING STEEL

Birmingham, No. 1	18.00
Bos. dock No. 1 exp.	17.00-17.25
New Eng. del. No. 1	17.00-17.50
Buffalo, No. 1	20.00-20.50
Buffalo, No. 2	18.00-18.50
Chicago, No. 1	19.50-20.00
Chicago, auto, no alloy	18.50-19.00
Cincinnati, dealers	17.00-17.50
Cleveland, No. 1	20.50-21.00
Cleveland, No. 2	19.50-20.00
Detroit, No. 1	†16.50-17.00
Detroit, No. 2	†15.50-16.00
Eastern Pa., No. 1	20.50-21.00
Eastern Pa., No. 2	19.50-20.00
Federal, Ill., No. 2	16.25-16.75
Granite City, R. R. No. 1	17.25-17.75
Granite City, No. 2	16.00-16.50
Los Ang., No. 1 net	13.00-13.50
Los Ang., No. 2 net	12.00-12.50
N. Y. dock No. 1 exp.	†17.00
Pitts., No. 1 (R. R.)	23.00-23.50
Pittsburgh, No. 1	21.00-22.00
Pittsburgh, No. 2	19.50-20.00
St. Louis, No. 1	17.25-17.75
St. Louis, No. 2	16.25-16.75
San Fran., No. 1 net	13.00-13.50
San Fran., No. 2 net	12.00-12.50
Seattle, No. 1	15.00
Toronto, dlrs., No. 1	11.00-11.25
Valleys, No. 1	21.00-21.50

COMPRESSED SHEETS

Buffalo	18.00-18.50
Chicago, factory	19.00-19.50
Chicago, dealers	17.50-18.00
Cincinnati, dealers	16.00-16.50
Cleveland	20.00-20.50
Detroit	†18.25-18.75
E. Pa., new mat.	21.00
E. Pa., old mat.	17.50-18.00
Los Angeles, net	9.50-10.00
Pittsburgh	21.00-22.00
St. Louis	14.00-14.50
San Francisco, net	9.50-10.00
Valleys	19.50-20.00

BUNDLED SHEETS

Buffalo, No. 1	18.00-18.50
Buffalo, No. 2	16.50-17.00
Cleveland	15.00-15.50
Pittsburgh	19.50-20.00
St. Louis	13.00-13.50
Toronto, dealers	9.75

SHEET CLIPPINGS, LOOSE

Chicago	14.00-14.50
Cincinnati, dealers	11.50-12.00
Detroit	†14.75-15.25
St. Louis	12.50-13.00
Toronto, dealers	9.00

BUSHELING

Birmingham, No. 1	14.50
Buffalo, No. 1	18.00-18.50
Chicago, No. 1	18.50-19.00
Cincin., No. 1 deal.	13.00-13.50
Cincin., No. 2 deal.	7.25- 7.75
Cleveland, No. 2	14.00-14.50
Detroit, No. 1 new	†17.50-18.00
Valleys, new, No. 1	19.50-20.00
Toronto, dealers	5.50- 6.00

MACHINE TURNINGS (Long)

Birmingham	7.50
Buffalo	13.50-14.00
Chicago	13.75-14.25
Cincinnati, dealers	9.75-10.25
Cleveland, no alloy	13.50-14.00
Detroit	†10.00-10.50
Eastern Pa.	14.50-15.00
Los Angeles	4.00- 5.00
New York	†9.00- 9.50
Pittsburgh	15.50-16.00
St. Louis	10.50-11.00
San Francisco	5.00
Toronto, dealers	7.25- 7.50
Valleys	14.00-14.50

SHOVELING TURNINGS

Buffalo	14.50-15.00
Cleveland	14.00-14.50
Chicago	14.00-14.50
Chicago, spcl, anal.	15.00-15.50
Detroit	†12.25-12.50
Pitts., alloy-free	17.00-17.50

BORINGS AND TURNINGS
For Blast Furnace Use

Boston district	†7.50- 8.00
Buffalo	13.50-14.00
Cincinnati, dealers	8.00- 8.25
Cleveland	14.00-14.50
Eastern Pa.	13.00-13.50
Detroit	†12.00-12.50
New York	†8.75- 9.00
Pittsburgh	14.00-14.50
Toronto, dealers	7.00- 7.25

AXLE TURNINGS

Buffalo	16.50-17.00
Boston district	†12.00-12.50
Chicago, elec. fur.	19.00-19.50
East. Pa. elec. fur.	19.50-20.00
St. Louis	13.25-13.75
Toronto	7.25- 7.50

CAST IRON BORINGS

Birmingham	8.50
Boston dist. chem.	†9.75-10.00
Buffalo	13.50-14.00
Chicago	13.00-13.50
Cincinnati, dealers	8.00- 8.25
Cleveland	14.00-14.50
Detroit	†12.00-12.50
E. Pa. chemical	14.50-15.00
New York	†10.00-10.50
St. Louis	10.00-10.50
Toronto, dealers	7.25- 7.50

RAILROAD SPECIALTIES

Chicago	23.00-23.50

ANGLE BARS—STEEL

Chicago	22.00-22.50
St. Louis	20.50-21.00

SPRINGS

Buffalo	24.50-25.00
Chicago, coil	24.00-24.50
Chicago, leaf	23.00-23.50
Eastern Pa.	25.00-26.00
Pittsburgh	28.00-28.50
St. Louis	22.00-22.50

STEEL RAILS, SHORT

Birmingham	19.50
Buffalo	25.50-26.00
Chicago (3 ft.)	22.75-23.25
Chicago (2 ft.)	24.00-24.50
Cincinnati, dealers	23.75-24.25
Detroit	†23.00-23.50
Pitts., 2 ft. and less	27.00-27.50
St. L., 2 ft. & less	23.75-24.25

STEEL RAILS, SCRAP

Birmingham	17.00
Boston district	†14.50-15.00
Buffalo	22.00-22.50
Chicago	19.50-20.00
Cleveland	24.00-24.50
Pittsburgh	24.00-24.50
St. Louis	20.25-20.75
Seattle	18.00-18.50

PIPE AND FLUES

Chicago, net	13.00-13.50
Cincinnati, dealers	12.75-13.25

RAILROAD GRATE BARS

Buffalo	14.00-14.50
Chicago, net	14.00-14.50
Cincinnati, dealers	12.25-12.75
Eastern Pa.	18.00
New York	†12.00-12.50
St. Louis	14.00-14.50

RAILROAD WROUGHT

Birmingham	16.00
Boston district	†9.50-10.00
Eastern Pa., No. 1	20.00-20.50
St. Louis, No. 1	15.00-15.50
St. Louis, No. 2	17.00-17.50

FORGE FLASHINGS

Boston district	†12.00-12.25
Buffalo	18.00-18.50
Cleveland	19.00-19.50
Detroit	†16.50-17.00
Pittsburgh	19.50-20.00

FORGE SCRAP

Boston district	†7.00
Chicago, heavy	24.00-24.50

LOW PHOSPHORUS

Cleveland, crops	23.50-24.00
Eastern Pa., crops	25.00-25.50
Pitts., billet, bloom, slab crops	28.00-28.50

LOW PHOS. PUNCHINGS

Buffalo	24.00-24.50
Chicago	22.75-23.25
Cleveland	21.50-22.00
Eastern Pa.	25.00-25.50
Pittsburgh	26.50-27.00
Seattle	15.00
Detroit	†20.00-20.50

RAILS FOR ROLLING
5 feet and over

Birmingham	20.00
Boston	†17.50-18.00
Chicago	24.00-24.50
New York	†18.50-19.00
Eastern Pa.	25.00-26.00
St. Louis	23.50-24.00

STEEL CAR AXLES

Birmingham	18.00
Boston district	†18.50-19.00
Chicago, net	24.00-24.50
Eastern Pa.	25.00-25.50
St. Louis	23.50-24.00

LOCOMOTIVE TIRES

Chicago (cut)	22.50-23.00
St. Louis, No. 1	20.50-21.00

SHAFTING

Boston district	†19.00-19.25
New York	†19.50-20.00
Eastern Pa.	25.00-25.50
St. Louis, 1¼-3¾"	19.75-20.25

CAR WHEELS

Birmingham, iron	15.00
Boston dist., iron	†15.50-16.00
Buffalo, steel	24.50-25.00
Chicago, iron	20.50-21.00
Chicago, rolled steel	23.50-24.00
Cincin., iron deal.	20.00-20.50
Eastern Pa., iron	21.50-22.00
Eastern Pa., steel	25.50-26.00
Pittsburgh, iron	22.00-22.50
Pittsburgh, steel	28.00-28.50
St. Louis, iron	20.50-21.00
St. Louis, steel	22.00-22.50

NO. 1 CAST SCRAP

Birmingham	17.00
Boston, No. 1 mach.	†16.75-17.25
N. Eng. del. No. 2	15.50-16.00
N. Eng. del. textile	20.00-21.00
Buffalo, cupola	18.50-19.00
Buffalo, mach.	20.00-20.50
Chicago, agri. net	15.50-16.00
Chicago, auto net	18.25-18.75
Chicago, railr'd net	17.00-17.50
Chicago, mach. net	17.75-18.25
Cincin., mach. deal.	20.75-21.25
Cleveland, mach.	22.50-23.00
Detroit, cupola, net	†17.00-17.50
Eastern Pa., cupola	22.50-23.00
E. Pa., No. 2	19.50
E. Pa., yard fdry.	19.50-20.00
Los Angeles	16.50-17.00
Pittsburgh, cupola	20.50-21.00
San Francisco	14.50-15.00
Seattle	14.50-16.00
St. L., agri. mach.	19.25-19.75
St. L., No. 1 mach.	19.75-20.25
Toronto, No. 1 mach., net dealers	18.00-18.50

HEAVY CAST

Boston dist. break.	†15.50-15.75
New England, del.	16.25-16.75
Buffalo, break	17.50-18.00
Cleveland, break, net	16.50-17.00
Detroit, auto net	†17.25-17.75
Detroit, break.	†15.00-15.50
Eastern Pa.	21.50
Los Ang., auto, net	13.00-14.00
New York break	†16.00-16.50

STOVE PLATE

Birmingham	10.00-11.00
Boston district	†11.50-11.75
Buffalo	17.00-17.50
Chicago, net	13.00-13.50
Cincinnati, dealers	12.75-13.25
Detroit, net	†12.00-12.50
Eastern Pa.	18.00-18.50
New York fdry	†13.50
St. Louis	14.00-14.50
Toronto dealers, net	12.00

MALLEABLE

New England, del.	22.00-23.00
Buffalo	22.50-23.00
Chicago, R. R.	23.50-24.00
Cincin. agri., deal.	18.25-18.75
Cleveland, rail	23.50-24.00
Eastern Pa., R. R.	22.50-23.00
Los Angeles	12.50
Pittsburgh, rail	25.00-25.50
St. Louis, R. R.	20.00-20.50

Ores

Lake Superior Iron Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	10.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos	nom.
Spanish, No. African basic, 50 to 60%	nom.
Chinese wolframite, net ton, duty pd.	$23.50-24.00
Brazil iron ore, 68-69%, ord.	7.50c
Low phos. (.02 max.)	8.00c
F.O.B. Rio Janeiro.	
Scheelite, imp.	$25.00
Chrome ore, Indian, 48% gross ton, c.i.f.	$28.00-30.00

Manganese Ore

Including war risk but not duty, cents per unit cargo lots.

Caucasian, 50-52%	54.00-55.00
So. African, 50-52%	54.00
Indian, 49-50%	50.00
Brazilian, 46%	67.50
Cuban, 50-51%, duty free	

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

Sheets, Strip

Sheet & Strip Prices, Page 80, 81

Pittsburgh—Sheet production continues to move up slowly, with the current week's output slightly better than 80 per cent of capacity. Mills are moving up to keep pace with incoming orders, since bookings from various domestic sources are better now than at any period previously during the year, with the exception of periods when low-priced material was being cleaned up. Narrow strip mill operations have leveled off temporarily at about 70 per cent of capacity.

Cleveland—Hot-rolled sheets are one of the few products in which delivery periods are not being extended, capacity being sufficient to take care of October demand. On most sheets, however, deliveries are slipping. Consumers have in mind three to four months' inventories and in many cases have already attained it. In many cases where alloy sheets are wanted consumers are obliged to accept indefinite deliveries, merely awaiting their turn on the books. Prices are firm throughout most of the list. Even galvanized sheets have stiffened considerably. In strip, consumers of seconds state that even these are scarce. Some companies report for the first time orders for first quarter delivery at prices prevailing.

Chicago — Mills are well booked for sheets and strip and find orders coming in at an unprecedented rate due to high activity in practically all consuming fields. Some business is on the books which will require shipments extending into early 1941.

Boston—Orders for narrow cold strip continue in excess of heavy shipments with rerolling operations near capacity on numerous widths and finishes. Priority talk is increasing pressure for deliveries which are lengthening with backlogs mounting. Varied alloy tonnage is appearing on which voluntary mill co-operation as to shipment is requested.

New York—Sheet sellers are convinced that bookings this month will run substantially ahead of September, notwithstanding the fact that there was a heavy movement last month against contracts booked at concessions. Not only are buyers impressed with the importance of increasing their stocks in many cases, due to extending mill delivery schedules, but are in receipt of more new business than they had anticipated only a few weeks ago.

Philadelphia—Sheet requirements for defense work are growing, in-

cluding a large tonnage for housing and equipping national guard and draft units. Mills are not actively soliciting first quarter business but a steadily increasing tonnage is being entered at open prices for that period. Producers are able to work in occasional orders for certain grades for delivery in two to three weeks but four to five weeks is more generally required, with backlogs still expanding.

Buffalo—With heavy deliveries of sheets and strip to automotive manufacturers mills do not expect motor production to be seriously affected by defense priorty. Deliveries of common grades are being extended only three weeks.

Cincinnati — Specifications for sheet and strip for the last nine weeks have averaged about mill capacity, backlogs are not being unduly extended and delivery problems not aggravated. Automotive requirements are fairly steady, without heavy new orders. Galvanized sheets active. Export business is about normal.

St. Louis—Sheet and strip buying is about equal to current output, except on tin plate and certain gages of galvanized. Strip releases have expanded, and sellers report greater pressure for delivery. Enameling stock continues active, with stove manufacturers and refrigeration interests accounting for liberal tonnages.

Plates

Plate Prices, Page 80

Pittsburgh—Shipbuilding activity, and demand for armor plate, continue to keep mills filled up. Backlogs show no sign of receding. Currently defense orders are receiving little, if any, priority for the simple reason practically all tonnage on the books is directly or indirectly headed for defense work.

Cleveland — Smaller companies can make the better deliveries but where these a week ago promised two to three weeks, they now mention three to four weeks. Demand is well diversified. Armor plate buying is expanding.

Chicago — Heavy construction work, involving railroad cars, machinery, tanks and boilers, sustain demand for steel plates. Orders are in fair volume and mills find it necessary to extend deliveries.

Boston — Miscellaneous industrial demand for plates tends upward with buying and specifications by larger consumers holding. Shipyards are leading consumers with some smaller units spreading distribution of tonnage over a greater number of mills. Deliveries are increasingly more subject to mill rolling schedules and are lengthening, with tank plates delayed about three weeks with several Eastern Pennsylvania mills.

Philadelphia—Plate demand is brisk from practically all directions. Municipal tank fabrication is one exception but this is offset by heavy shipbuilding and industrial construction. Export demand is moderately active in small lots. Light plate deliveries are backed up four to five weeks with little heavy plate tonnage available for the remainder of the year.

Toronto, Ont.—Plate demand continues heavy, with production and supply unchanged. Producers are booked for their entire output for several months and most new demands are being filled in the United States. Inquiries recently were issued regarding plate for war tanks and orders also have been placed for plate for new ship construction.

Baltimore—Plate business is active, and while shipments on narrow widths, especially in universal plates, can still be had within a fortnight where pressure is particularly urgent, four weeks appears the general rule on medium widths of light gage, and six to eight weeks and in some instances longer on plates 84 inches wide and over.

Plate Contracts Placed

200 tons, including 40 tons shapes, two ammunition barges for navy, to Bethlehem and Columbia Steel Co.; Associated Shipbuilders, Seattle, general contractor.

200 tons, discharge pipe, United States engineer office, Portland, Oreg., to King Bros. Boiler Works, Portland, Oreg.

200 tons, wind tunnel scale supports, Moffett Field, California, to Consolidated Steel Corp., Los Angeles.

Unstated tonnage, one steel barge and equipment, United States engineer, St. Paul, to Treadwell Construction Co., Midland, Pa., $83,200, inv. 23; bids Oct. 10, St. Paul.

Unstated tonnage, 250,000-gallon water tank, Fort Custer, Mich., to Chicago Bridge & Iron Co., Chicago; bids Oct. 9, inv. 6113-15, to constructing quartermaster.

Unstated tonnage, four diesel electric all-welded steel tugs, Moran Towing & Transportation Co., New York, to Pennsylvania shipyards, Beaumont, Tex.; to replace four purchased by government.

Plate Contracts Pending

1600 to 6400 tons, two to eight mine sweepers for navy; bids Oct. 30.

960 tons, two mine layers for navy; bids Oct. 23.

Unstated tonnage, two 500,000-gallon elevated riveted steel tanks, Panama, schedule 4404, Darby Corp., Kansas City, Mo., low $49,774, bids Oct. 17, Washington.

Unstated tonnage, two seagoing diesel-electric hopper dredges, afloat Delaware river, Fort Mifflin, Pa.; bids Dec. 2, United States engineer, Philadelphia.

Unstated tonnage, 20,000-barrel cylindrical steel tank, all-welded construction, Panama, schedule 4459, bids Nov. 7, Washington.

Unstated tonnage, 200,000-gallon elevated steel tank, Hill field, Utah, bids Oct. 31, constructing quartermaster, that station, Inv. 6858-51.

Unstated tonnage, two welded steel terminal barges, 285 x 75 x 10 feet, six inches, Inland Waterways Corp., New Orleans, bids Dec. 2.

Unstated, plant expansion Jobbers Petroleum Sales Corp., 2701 Commodore Way, Seattle; bids soon.

Bars

Bar Prices, Page 80

Pittsburgh — Bar output is running close to 100 per cent rated capacity in most cases. Buying continues steady from miscellaneous sources. Automotive releases have increased somewhat and inquiries for large tonnages to be delivered during first quarter are in the market.

Cleveland—Bars continue an item of best demand, with deliveries further extended. Considerable tonnage has been bought for first quarter at prices then prevailing. Occasional orders are being received from the government with priority ratings. Prices are exceedingly firm. October sales have been the best for the year to date.

Chicago — Orders and inquiries for steel bars continue at high level and this coupled with heavy releases on orders is giving mills more than they can handle with ease. This applies particularly to alloy and high carbon grades. National defense with voluntary priority is complicating the delivery situation.

Boston — Heavy consumption of alloy and carbon steel bars maintains demand but more buyers are concerned as to deliveries. Shipyards are releasing bars in good volume and forging shop requirements are substantial. Miscellaneous needs for defense contracts are mounting and machine tool builders are turning more often to secondary distributors to fill gaps in inventories.

New York — Bar consumption is increasing, with producers generally reporting specifications in excess of shipments. This is resulting in a further prolongation of delivery schedules, with hot carbon bars generally quotable in six to eight weeks, alloy bars 10 to 12 weeks and special treatment bars 18 to 20 weeks. Cold-finished bars are available in four weeks and upon occasion less, where hot bars can be drawn upon from stocks, and seven to eight weeks where cold

finishers have to first obtain shipments from hot bar producers.

Philadelphia—Bar demand is widely distributed, with volume fully sustaining backlogs. Deliveries average four to six weeks but vary according to sizes and rolling schedules. Pressure for shipment is still experienced and mills are expediting defense material.

Birmingham, Ala.—Bars are active in all specifications. Output has been well maintained, and is near capacity. Tennessee Coal, Iron & Railroad Co. has been awarded a $12,000,000 contract for shell forgings, requiring 75,000 tons of bars. Machining will be done by Goslin-Birmingham Mfg. Co., Birmingham, and LeTourneau Co. of Georgia, Toccoa, Ga.

Toronto, Ont.—Sustained demand features the merchant bar market with new orders appearing from many new sources. While some local steel interests are delivering from six weeks to two months, others have heavy bookings to the end of the year. Tool steel has specially heavy call at this time with all Canadian tool builders running at capacity.

Baltimore — Bar deliveries are more extended. Although plain carbon bars can still be had in some cases within five weeks generally it is now nearer six to eight weeks; alloy bar shipments run around 12 weeks and deliveries on alloy bars requiring special treatment, around 18 to 20 weeks.

Wire

Wire Prices, Page 81

Pittsburgh—Wire mills are booking tonnage from relatively distant points at the full price, indicating local mills are not pressed so much as those in other territories. There is considerable export business in the merchant market, and domestic merchant business shows considerable improvement.

Chicago—Wire mills are pushed to the limit to meet current demand. Orders are being booked in large volume and are coming from all directions, with national defense a rapidly growing influence. Priorities on government materials are disrupting schedules, particularly where several processing operations are involved.

Birmingham, Ala. — No let-up is seen in demand for most wire products, although orders and shipments are not quite equal to sheets, plates and bars. The wire mill is operating at approximately 85 per cent.

Boston—Wire mill operations are near capacity and shipments heavy, but incoming volume of new orders

is ahead of deliveries with backlogs maintained or mounting. More tonnage for shipment next quarter at open prices is being booked with heavier inquiry for wire entering into defense contracts.

Baltimore — Manufacturers' wire, especially spring wire, is moving briskly, and nails reflect considerable light governmental and residential work. Merchant wire, in general, is less active this month, due to heavy movement in September against contracts taken at concessions.

Pipe

Pipe Prices, Page 81

Pittsburgh — Oil country business is steady. Most market support is still coming from standard pipe. Mechanical tubing releases from automotive sources and from aircraft production are active. Pressure tubing business remains static.

Cleveland—Among the various tubular products, merchant pipe is being bought most vigorously. Casing demand is slowing and line pipe is dull. Cast iron pipe prospects are good because of the many cantonments and new industrial plants being erected, which will also help merchant pipe.

Boston—Partly seasonal, but also due to defense construction requirements, merchant steel pipe buying holds recent improvement, with prices firming up in some districts because of stronger mill stand. Plumbing supply and heating houses are broadening inventories conservatively, holding to estimated needs and ordering out supplies more frequently.

Birmingham, Ala.—Pipe plants in most instances are comfortably booked. Tonnage is coming from widely scattered sources, sufficient to maintain a five-day week.

Seattle — City has opened bids and awards are pending for several local projects involving about 500 tons of various sizes of cast iron water mains. A tonnage is also pending at Fort Lewis cantonment.

San Francisco—Awards of cast iron pipe aggregated 2119 tons and brought the total for the year to 38,689 tons, compared to 34,139 tons for the corresponding period in 1939.

Steel Pipe Pending

Unstated tonnage, 2450 linear feet, 16-inch, spiral welded steel pipe, Panama schedule 4468, bids Nov. 4, Washington.

Cast Pipe Placed

1135 tons, 30-in., Long Beach, Calif., to American Cast Iron Pipe Co., Birmingham, Ala.

658 tons, 6 to 12-in., Seattle, Wash., to United States Pipe & Foundry Co., Burlington, N. J.

Rails, Cars

Track Material Prices, Page 81

Rail buying is getting under way slowly, Chicago & North Western, Southern Pacific and Erie each placing 15,000 tons last week. Numerous other carriers are outlining their needs for next year.

Car buying is scattering, led by 1150 awarded by the Erie and 500 by the Minneapolis, St. Paul & Sault Ste. Marie.

Car Orders Placed

Erie, 1150 cars; 250 hoppers each to Pullman-Standard Car Mfg. Co., Chicago, and General American Transportation Corp., Chicago; 250 mill-type drop-end gondolas to Greenville Steel Car Co., Greenville, Pa.; 200 box cars to American Car & Foundry Co., New York; 100 box cars to Magor Car Co., Passaic, N. J.; 100 furniture cars to American Car & Foundry Co., New York.

Minneapolis, St. Paul & Sault Ste. Marie,

400 box and 100 automobile cars, to Pullman-Standard Car Mfg. Co., Chicago.

National Carbide Corp., 12 welded steel flat container cars, to American Car & Foundry Co., New York.

Car Orders Pending

Bureau of supplies and accounts, navy department, 59 all-steel box cars, 50-ton capacity, delivery east and west yards, schedule 3762, bids Nov. 12.

Chief of engineers, army, Washington, seven flat-gondola construction cars, six 20-ton box cars, two 5000-gallon tank cars and one 20-ton caboose car, bids Nov. 8, Inv. 120.

Rail Orders Placed

Chicago & North Western, 11,200 tons to Carnegie-Illinois Steel Corp., Chicago, and 4800 tons to Inland Steel Co., Chicago.

Erie, 12,800 tons, 112 and 131-pound rail, to Carnegie-Illinois Steel Corp., Pittsburgh, 2200 tons of 131-pound rail, to Bethlehem Steel Co., Bethlehem, Pa.

Southern Pacific, 15,000 tons, and accessories, to Columbia Steel Co., San Francisco; to be rolled by Tennessee Coal, Iron & Railroad Co., Ensley, Ala., mill.

Locomotives Placed

Kansas City Terminal Railway association, three diesel switchers, to American Locomotive Co., New York.

Shapes

Structural Shape Prices, Page 80

Pittsburgh — Inquiries continue to flood the market, with placements running slightly behind, indicating that backlogs are moving upward. There is little indication yet of any early clarification of the structural market.

Cleveland—Structural shapes are among the products where only more distant deliveries can be promised. In some sizes and descriptions February is the earliest promised. Prices of fabricated structural steel are still being shaded by certain fabricators who do not have sufficient backlog. One award of the week was 1500 tons for a sheet mill addition, Corrigan-McKinney works, Republic Steel Corp. Several fairly large projects are pending but are slow in closing.

Chicago—Demand continues light for structural shapes, with comparatively few orders placed and relatively few jobs out for bids. Most current work is for bridges and plant construction and additions in outlying territory, particularly in the west.

Boston—While the larger-tonnage orders are going to outside shops, district fabricators have accumulated fair backlogs and most are operating at a higher rate. However, these shops are confronted with lengthening deliveries on plain material, an increasing factor in current fabrication.

New York—Structural mills are severely taxed and deliveries are lengthening. While visible tonnage of structural steel would not tax the fabricating industry over a period of several months heavy concentration of orders for prompt delivery is forcing some large units to capacity. Smaller shops are busier, volume filtering down to them.

Philadelphia—Structural bookings continue heavy, preventing improvement in deliveries, which now

Shape Awards Compared

	Tons
Week ended Oct. 26	69,875
Week ended Oct. 19	50,930
Week ended Oct. 12	36,034
This week, 1939	17,827
Weekly average, year, 1940	28,160
Weekly average, 1939	22,411
Weekly average, Sept.	66,171
Total to date, 1939	972,444
Total to date, 1940	1,210,866

Includes awards of 100 tons or more.

Behind the Scenes with STEEL

Big Week

■ As we take a few minutes off to bat this out on our asthmatic Royal, the 1940 National Metal Congress is in its last day and what a week it's been! With current steel production hugging full capacity, big plants and small shops running three shifts around the clock, and most everyone riding high on the crest of a boom wave, still the show has been literally jammed all week. The number, quality and interest of exhibits has surpassed anything before and the thousands of men who have taken time off from busy offices to be here are leaving town today with one common thought: The production genius of American industry is on its toes, hard at work and more than capable of the job to be done.

Lots To See

■ We've been padding up and down the aisles until our dogs are barking but we've seen the works, entered all the contests and learned a whale of a lot of things we never knew 'til now. Lindberg Engineering and American Cyanamid & Chemical both kept us up on the news, Baldwin Southwark weighed us to the exact ounce with a tricky new strain gage, Copperweld gave us a chance to win a hundred bucks on a pin ball game (but we didn't), our name's in at Armco for a set of stainless steel tableware, we feel sure of a case of motor oil from Tidewater, but are a little doubtful on our tensile strength guess for that swell watch at Otis Steel. For hours we hung around the American Gas Furnace booth, fascinated by the glass blowers and the gorgeous things they seemingly create from nothing. We inspected Republic's scout car and airplane parts exhibit, watched a movie at the Aluminum Co.'s little theater, tried to make a date with Allegheny-Ludlum's cute little drum majorette only to find out she was permanently attached to the exhibit, and we bummed a free pack of Pangborn's special cigarettes. That's only the beginning but it will give you an idea that we've had a lot of fun, seen a lot of people and are a bit on the weary side.

Willkie Wins

■ Into STEEL's booth during the week so far have come over 3500 interested citizens to cast their ballots in our own Presidential Poll, the results of which you may have already studied on page 22 of this issue. Through the courtesy of the Berger Mfg. Div. of Republic two of the latest model voting machines were installed and everyone seemed to get a big kick out of it. The results of the first two days, showing Mr. Willkie with a substantial majority of 80.5 per cent, were shot out over the wires and made most of the dailies around the country. Mr. Willkie himself was wired the good news although he probably would have liked it better if the poll had been of the Teamsters' Union or something. Largest Willkie badge we saw all week measured a full 12 inches across and covered all the gravy spots from lapel to belt buckle.

Swell Party

■ Wednesday evening at Hotel Statler, Jones & Laughlin threw for the publishers and their staffs one of the nicest affairs we've ever been in on. If we over-indulged in the hors d'oeuvres, raw oysters, roast turkey and prime ribs of beef blame it simply on the lunches we haven't had time to eat for four straight days.

Disappointed Readers

■ It was good to have all three regular readers stop by the booth and ask to see our corpse but we fooled 'em by snorting healthily and warning we'd be on deck regularly now. So *Viva Willkie!*

SHRDLU.

are extended well into December on some sizes. Several large lots are pending for shipyard work, with heavy shipments also in prospect for vessel construction.

Seattle — Backlogs are increasing and capacity of plants is engaged at highest level in ten years. Seattle plant of Bethlehem Steel Co. is furnishing a large tonnage of specifications that can be rolled here for ship construction and other projects at Portland, Tacoma and Seattle.

Shape Contracts Placed

10,000 tons, aircraft engine plant, Wright Aeronautical Corp., Lockland, O., to Whitehead & Kales Co., Detroit.

9500 tons, aircraft factory building, Curtiss Airplane division, Curtiss-Wright Corp., Cheektowaga district, Buffalo, to Bethlehem Steel Co., Bethlehem, Pa.

8500 tons, aircraft plant buildings, Republic Aviation Corp., Farmingdale, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

8000 tons, aircraft factory and office building, Curtiss-Wright Corp., Columbus, O., to American Bridge Co., Pittsburgh.

3650 tons, overpass and bridges, Shenandoah river, Warren county, Virginia, to Bethlehem Steel Co., Bethlehem, Pa.; George F. Haselwood Co., Cumberland, Md., contractor, $1,137,035.

3000 tons, additional plant extension Boeing Aircraft Co., Seattle, to Pacific Car & Foundry Co., Seattle; Austin Co., general contractor.

2717 tons, three hangars, invitation 6813-41-36, Elmendorf Field, Anchorage, Alaska, to Bethlehem Steel Co., San Francisco.

2600 tons, converter plants, Anaconda Copper Mining Co., Anaconda and Butte, Mont., to Minneapolis-Moline Power Implement Co., Minneapolis.

2500 tons, H piling and open contract for shapes required in several Puget Sound navy construction projects, to Bethlehem Steel Co., Seattle; Austin Co., general contractor.

2200 tons, nylon plant, E. I. duPont de Nemours & Co., Martinsville, Va., to Bethlehem Steel Co., Bethlehem, Pa.; reported in error last week to Belmont Iron Works.

2000 tons, addition to naval ammunition depot, Hawthorne, Nev., to Bethlehem Steel Co., San Francisco.

1800 tons, air corps base hangars and flight hangars No. 2 and 3, Anchorage, Alaska, to Bethlehem Steel Co., Bethlehem, Pa.; bids Sept. 24.

1500 tons, sheet mill addition, Corrigan-McKinney branch, Republic Steel Corp., to Fort Pitt Bridge Works, Pittsburgh.

1100 tons, apartment, Thirty-seventh street and Madison Ave., New York, to Harris Structural Co., New York, through John Lowry Inc., New York, contractor.

1000 tons, buildings for Vega Airplane Co., Burbank, Calif. to Consolidated Steel Corp., Los Angeles.

700 tons, addition to plant, Spencer Lens Co., Buffalo, to R. S. McMannus Steel Construction Co., Buffalo.

610 tons, coal handling unit, Consolidated Edison Co., Kips Bay station, New York, to American Bridge Co., Pittsburgh.

560 tons, building, American Type Founders Corp., Elizabeth, N. J., to Belmont Iron Works, Eddystone, Pa.

510 tons, buildings, American Car & Foundry Co., Berwick, Pa., to Anthracite Bridge Co., Scranton, Pa. (355 tons) and Pine Brook Iron Works, Pine Forge, Pa. (155 tons).

500 tons, addition, L street station No. 4, Edison Electric Illuminating Co., South Boston, Mass., to West End Iron Works, Cambridge, Mass.

500 tons, building addition, Bendix division, General Motors Corp., Baltimore, to Oltmer Iron Works, Jersey City, N. J. through Argonaut Realty Co., Detroit.

500 tons, addition to building, Cleveland Pneumatic Tool Co., Cleveland, to Burger Iron Co., Akron, O.

450 tons, naval air base Tongue Point, Oreg., to Willamette Iron & Steel Co., Portland; Austin Co., general contractor.

430 tons, viaduct, Olive street and Skinker Road, St. Louis, to American Bridge Co., Pittsburgh, through Samuel Kraus Co. and Israel Bros., St. Louis, general contractors.

425 tons, trash racks for outlet works, reclamation spec. No. 1404-D, Rutledge, Tex., to Stupp Bros. Bridge & Iron Co., St. Louis, Sept. 25.

380 tons, boiler house, tank plant, Chrysler Corp., Detroit, to Whitehead & Kales Co., Detroit.

375 tons, building No. 7, Lockheed Aircraft Corp., Burbank, Calif., to Pennsylvania Iron & Steel Co., Los Angeles.

350 tons, six powder magazines, Dover, N. J., war department, to Bethlehem Fabricators, Bethlehem, Pa.

340 tons, addition, Blue Ridge Co., Glasgow, Va., to Belmont Iron Works, Eddystone, Pa.

270 tons, crane runway, American Forge Co., Chicago, to Midland Structural Steel Co., Cicero, Ill.

250 tons, building, Ottawa Silica Co., Ottawa, Ill., to Midland Structural Steel Co., Cicero, Ill.

250 tons, work in connection with wind tunnel, Moffett Field, Calif., to Consolidated Steel Corp., Los Angeles.

240 tons, state bridge PSC-5998, Gardenville, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

240 tons, warehouse, National Container Corp., Long Island City, N. Y., to Schacht Steel Construction Co., New York.

220 tons, Seattle telephone exchange building, to Poole & McGonigle, Portland.

220 tons, A. C. hangar, Salt Lake City, Utah, for government, to Paxton-Vierling Co., Omaha, Neb.

215 tons, warehouse, Douglas Aircraft Co., El Segundo, Calif., to Bethlehem Steel Co., Los Angeles.

200 tons, bulkhead wall, contract 34, Marginal street, New York, to Bethlehem Steel Co., Bethlehem, Pa.

200 tons, diesel engine laboratory, New London, Conn., to Jones & Laughlin Steel Corp., Pittsburgh.

200 tons, water system shaft, Webster, Mass., for city, to Groisser & Schlager Iron Works, Somerville, Mass.

190 tons, building, Charles Bruning Co. Inc., Chicago, to Joseph T. Ryerson & Son, Inc., Chicago.

175 tons, bridge No. 5781, Hinckley, Minn., to Minneapolis-Moline Power Implement Co., Minneapolis.

165 tons, bridge, New York, New Haven & Hartford railroad, Baychester, N. Y., to American Bridge Co., Pittsburgh, through Mariana Construction Co., New Haven, Conn.

155 tons, retail yard coal bin, Pittsburgh Coal Co., Pittsburgh, to Pittsburgh Industrial Engineering Co., Pittsburgh.

150 tons, addition to plant, Universal Cyclops Steel Co., Titusville, Pa., to Fort Pitt Bridge Works, Pittsburgh.

150 tons, mirror plant, Cincinnati, for government, to Indiana Bridge Co., Muncie, Ind.

150 tons, storage building and addition, Stearman Aircraft Corp., Wichita, Kans., to G. C. Christopher Co., Wichita.

150 tons, Bernard elementary school, Chicago, to Wendnagel & Co., Chicago.

150 tons, Pennsylvania state bridge, Berks county, to Bethlehem Steel Co., Bethlehem, Pa.

150 tons, submarine base building, New London, Conn., for government, to Ingalls Iron Works Co., Birmingham, Ala.

145 tons, office building, Detroit Edison Co., Port Huron, Mich., to Bethlehem Steel Co., Bethlehem, Pa.

135 tons, hospital building, Concord, N. H., for state, to Lyons Iron Works, Manchester, N. H.

130 tons, building, Chesapeake & Potomac Telephone Co., Beckley, W. Va., to L. Schreiber Sons Co., Norwood, O.

120 tons, bridge, Wyandotte county, Ohio, to Burger Iron Co., Akron, O.

120 tons, unloading platform, Continental Grain Co., East St. Louis, Ill., to Mississippi Valley Structural Steel Co., Decatur, Ill.

120 tons, bridge, route 29, section 2D, Union county, New Jersey, to Bethlehem Steel Co., Bethlehem, Pa.; La-Fera-Grecco Contracting Co., Newark, contractor; bids Oct. 4, Trenton.

108 tons, steel superstructures for three through plate girder bridges, near Harriman, Tenn., to Bethlehem Steel Co., Bethlehem, Pa.; Tennessee Valley Authority project; bids Oct. 7, Knoxville, Tenn.

105 tons, addition to power house, etc., Lowe Paper Co., Ridgefield, N. J., to Oltmer Iron Works, Jersey City, N. J.

105 tons, bridge, Winchester, N. H., to American Bridge Co., Pittsburgh; Charter Oak Construction Co., Hartford, Conn., contractor.

100 tons, steel piling, Miller Bros. Iron & Metal Co., Milwaukee, to Bethlehem

Steel Co., Bethlehem, Pa.

100 tons, Greyhound Bus terminal, Buffalo, to Buffalo Structural Steel Co.; Siegfried Construction Co., Buffalo, low on general contract.

Unstated tonnage, addition, steel hardening department, Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., to Standard Structural Steel Co., Hartford, Conn.; R. G. Bent & Co., Hartford, contractor.

Shape Contracts Pending

12,000 tons, assembly and machine shop, Wright Aeronautical Corp., Lockland, O.

10,000 tons, 50 hangars for quartermasters department, United States army. Washington, plans expected out shortly; to be 60 x 150 feet, designed for dismantling and re-assembling, for moving from place to place.

6500 tons, factory and office building, Curtiss-Wright Corp., Robertson, Mo.

6000 tons, additions, Boeing Airplane Co., Seattle; bids soon.

5300 tons, TNT plant, Joliet, Ill., United States war department, to be built by Stone & Webster Engineering Corp., and operated by E. I. du Pont de Nemours & Co.; bids Oct. 25.

5000 tons, extension repair shop, aircraft store house and two hangars, naval air base, Alameda, Calif.; bids soon.

2400 tons, eleven bridges, Wisconsin highway department; bids Oct. 22.

1650 tons, ten seaplane tenders for west coast; Associated Shipbuilding Co., Seattle, low.

1500 tons, second unit, Boeing Airplane Co., Seattle; general contract to Austin Co.

1500 tons, steel sheet piling, shore protection, Long Branch, N. J.; bids Nov. 4, Department of Commerce, Washington.

900 tons, structural shop and crane runway, Coast Guard station, Curtiss Bay, Md., specifications to come out soon.

700 tons, manufacturing building, Fairchild Engine & Airplane Corp., Hagerstown, Md.

675 tons, power house, Bendix Aviation Corp., Elmira, N. Y.

647 tons, Pennsylvania state bridges; 267 tons, Clearfield county, 263 tons, Allegheny county, 117 tons, Northampton county; bids Nov. 1.

640 to 3200 tons, two to ten mine sweepers for navy; bids Oct. 30.

640 tons, two mine sweepers, for navy; bids Oct. 23.

600 tons, factory building, Bendix Radio division, General Motors Corp., Baltimore.

500 tons, foundry building, Foster-Wheeler Corp., Carteret, N. J.

500 tons, highway bridges over Rio Grande river, state of New Mexico, Espanola, N. Mex.

400 tons, factory building, Wallace Laboratories, Jersey City, N. J.

400 tons, health center, West Virginia State college, Institute, W. Va.

400 tons, department store addition, May Co., Baltimore, plans soon.

375 tons, building, High Standard Mfg. Co., New Haven, Conn.

365 tons, addition to machine shop, American Chain & Cable Co., Reading, Pa.

330 tons, north addition, administration building, Wright field, Dayton, O., for government.

280 tons, state bridge, Arcadia, Calif.

265 tons, overpass bridge, Du Bois, Pa.; bids to state highway department, Harrisburg, Pa., Nov. 1.

260 tons, divided highway, including plate girder underpass bridge, reinforced concrete ramps and extension to existing pedestrian subway, Pittsburgh; bids to state highway department, Harrisburg, Pa., Nov. 1.

250 tons, addition to store, May Co., Denver; bids Oct. 23.

250 tons, plant addition, Crown Cork & Seal Co., Baltimore; bids Oct. 29.

240 tons, addition to boiler house, San Diego Gas & Electric Co., San Diego, Calif.; bids Oct. 24.

225 tons, store, Sears, Roebuck & Co., Decatur, Ill.; bids Oct. 16.

220 tons, mess hall and bakery, Quonset Point, R. I., for navy.

170 tons, extension to abrasive grain storage building, Norton Co., Worcester, Mass.

165 tons, dispensary building, Quonset Point, R. I., for navy.

150 tons, highway bridge, Corfu, N. Y.; Mohawk Paving Co., Buffalo, low on general contract.

140 tons, bridge over Salinas river, Nacimiento, Calif., Southern Pacific Co.

130 tons, A. C. reclamation building, Hill field, Ogden, Utah, for government.

120 tons, trestle, Battle Creek, Mich., for army.

115 tons, building, Mary Immaculate convent, West Hartford, Conn.

115 tons, 1-beam bridge, Northampton county, Pennsylvania; bids to state highway department, Harrisburg, Pa., Nov. 1.

110 tons, gallery, building 1, General Electric Co., Pittsfield, Mass.

100 tons, shapes and bars, grade crossing over Bangor & Aroostook railroad, Oakfield, Me.; bids Nov. 6, state highway commission, Augusta.

Unstated, three sets of steel frames for Coulee project; bids to Denver, Oct. 29, spec. 1443-D.

Unstated, materials for six substations for Bonneville Project, Portland, Oct. 29; spec. 1464.

Reinforcing

Reinforcing Bar Prices, Page 81

Cleveland—New work in sight is not as heavy as a week ago. Consumers are still expecting the low prices of former recent days, all bids for a local project having been rejected. Producers are taking a firmer stand on prices.

Chicago—Volume of reinforcing steel business is only fair, but prices continue steady. Current jobs are small and of miscellaneous character, principally plant additions. No large awards have been made the past week, but interest is attaching to anticipated early inquiries for several thousand tons for government powder manufacturing and shell loading plants at Wilmington, Ill.

Boston—Pending housing requirements involve close to 1000 tons of reinforcing bars, with more in prospect. Concrete bar prices remain firmer with only scattered mild shading, but deliveries are lengthening, with district warehouse stocks

considered slightly below normal.

New York—Reinforcing steel inquiry has slackened and pending tonnage is lower, following placing of most large contracts in this territory. However, prospective volume is heavier than normal for this period due to a substantial number of large defense construction projects about ready for estimates. Concrete bar prices are the firmest in many months.

Philadelphia—Reinforcing orders are holding mill deliveries to four or five weeks minimum. Few large inquiries are active here but total of small jobs is substantial while backlogs and prospective work assure heavy shipments for an extended period.

Reinforcing Steel Awards

2300 tons, Dam, Caddoa, Colo., to Colorado Fuel & Iron Corp., Denver.

800 tons, bridge substructure, St. Georges, Del., to Fireproof Products Co., New York, through Corbetto Construction Co., New York, contractor.

700 tons, three bridges, Warren county, Riverton, Va., to Jones & Laughlin Steel Corp., Pittsburgh; George M. Hazlewood Co. contractor.

700 tons, bridges and overpass, Shenandoah river and paving, route 3, Warren county, Virginia, to Jones & Laughlin Steel Corp., Pittsburgh; George F. Haselwood Co., Cumberland, Md., contractor.

500 tons, grain elevators, Buffalo, for Cargill Inc., to Buffalo Steel Co., Buffalo; H. G. Onstad, contractor.

500 tons, buildings and miscellaneous work, Camp Edwards, Falmouth, Mass., divided, to Concrete Steel Co., Boston, and Joseph T. Ryerson & Son, Inc., Cambridge, Mass.

425 tons, highway project, route 6, sections 8A and 8B, Clifton, N. J., to Stultz-Sickles Co., Newark, N. J., through LaFera-Grecco Contracting Co., Newark, N. J.

372 tons, United States postoffice, Cairo, Ill., Henke Construction Co., Chicago, contractor, to Calumet Steel Co., Chicago.

330 tons, ordnance buildings, alterations and repairs, Frankford, Pa., arsenal, to Montgomery Iron & Steel Co., Philadelphia; Henry W. Holst Co., Philadelphia, contractor; bars to Truscon Steel Co., 250 tons, as previously noted.

325 tons, treasury department, invitation 10679, Los Angeles, to Columbia Steel Co., Los Angeles.

325 tons, extension, navy yard facilities, Boston to Concrete Steel Co., Boston; New England Foundation Co., Boston, contractor.

300 tons, shop adition, Aluminum Co. of America, Edgewater, N. J., to Bethlehem Steel Co., Bethlehem, Pa., through Turner Construction Co., New York, contractor.

260 tons, highway project, route, 39, sections 1B and 10A, Burlington-Mercer counties, New Jersey, to Stultz-Sickles Co., Newark, N. J., through Joseph Nesto & Co., Newark, N. J., contractors.

230 tons, C. Schmidt & Sons, brewery, Philadelphia, divided between Concrete Steel Co., and American Steel Engineering Co.; A. Raymond Raff Co., Philadelphia, contractor.

200 tons, treasury department, invitation 10746, Los Angeles, to Bethlehem Steel Co., Los Angeles.

175 tons, conveyor tunnel for coal and dried sludge, Stickney, Ill., Marsh Construction Co., Chicago, contractor, to Concrete Steel Co., Chicago.

170 tons, Northeast school, Lincoln, Nebr., to Bethlehem Steel Co., Bethlehem, Pa.

156 tons, pulp plant addition and hospital building, Everett and Tacoma, Wash., to Seattle Steel Co., Seattle.

150 tons, buildings at Burbank, Calif., for Vega Airplane Co., to Ceco Steel Products Corp., Los Angeles.

150 tons, building, Atlantic Refining Co., Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.; Lauter Construction Co., contractor.

132 tons, bars and shapes, mostly former, postoffice, Gloversville, N. Y., to Albany Steel & Iron Co., Albany, N. Y., and Utica Structural Steel Co., Utica, N. Y.; William O. Prumoma, Albany, contractor.

130 tons, Massachusetts General Hospital, Boston, to Northern Steel Co., Boston, through Concrete Steel Co., New York; Sawyer Construction Co., contractor.

108 tons, addition to office building, A. C. Nielsen Co., Chicago, Erik A. Borg Co., Chicago, contractor, to Joseph T. Ryerson & Son Inc., Chicago.

100 tons, Fort Lewis, Wash., cantonment, Bethlehem Steel Co., Seattle.

100 tons, building for water and power department, Los Angeles, to Consolidated Steel Corp., Los Angeles.

100 tons, Commonwealth Edison Co., Chicago, to Joseph T. Ryerson & Son Inc., Chicago.

100 tons, Clay and Fort Hill Homes housing project, Marietta, Ga., to Bethlehem, Pa., through Griffin Construction Co., Atlanta, Ga., contractor.

Unstated, open contract for naval air base at Tongue Point, Oreg., to Soule Steel Co., Portland; Austin Co., general contractor.

Unstated, 1,500,000 square feet wire mesh for Fort Lewis, Wash., cantonment, to Columbia Steel Co.; Sound Construction & Engineering Co., Seattle, and Peter Kiewitt & Son, Omaha, general joint contractors.

Reinforcing Steel Pending

1360 tons, housing project, Vallejo, Calif.; Columbia Steel Co., San Francisco, low.

348 tons, administration, cafeteria and heating plant, specification 9973, naval supply depot, Oakland, Calif.; James I. Barnes Construction Co., Los Angeles, low on general contract.

304 tons, Pennsylvania highway project R-59, sec. 10, Clearfield county.

300 tons, Edgewood housing, Akron, O.,

Concrete Bars Compared

	Tons
Week ended Oct. 26	9,838
Week ended Oct. 19	15,934
Week ended Oct. 12	5,705
This week, 1939	9,112
Weekly average, year, 1940	9,665
Weekly average, 1939	9,197
Weekly average, Sept.	10,611
Total to date, 1939	420,090
Total to date, 1940	415,610

Includes awards of 100 tons or more.

Lloyd Builders, Chicago, general contractor, low bidder; bids Oct. 23.

300 tons, overpass bridge, DuBois, Pa.; bids to state highway department, Harrisburg, Pa., Nov. 1.

275 tons, addition to Bancroft Hall, naval academy, Annapolis, Md., to Irwin & Leighton, Philadelphia, contractors.

250 tons, housing project, Danville, Ill., bids taken Oct. 3 rejected; plans ready for rebidding about Oct. 26.

237 tons, paving, project 302, Jackson county, Ohio, Ralph Myers, Campbellsburg, Ind., general contractor, low.

200 tons, navy barracks, Great Lakes Ill.

200 tons, Chicago subway Sec. S-10D, Chicago; bids Oct. 24.

160 tons, U. S. engineer, Providence, R. I.; bids Oct. 30, inv. 82; also 45 tons, inv. 82, Oct. 31.

140 tons, school, Lawrenceville, N. J.

115 tons, bridge, Cuyahoga county, Ohio; bids Oct. 19, all rejected.

110 tons, divided highway, including plate girder underpass bridge, reinforced concrete ramps and extension to existing pedestrian subway, Pittsburgh; bids to state highway department, Harrisburg, Pa., Nov. 1.

108 tons, Pennsylvania highway project R-228, sec. 10, Allegheny county.

102 tons, United States postoffice, Jackson Park, Chicago; bids Oct. 25.

100 tons, water softening plant, Chillicothe, O.

Pig Iron

Pig Iron Prices, Page 82

Cleveland—The emphasis is on improved consumption, some estimates placing it at 20 per cent ahead of a month ago. Foundries are speeding up with even jobbing foundries quite busy. Many foundries are now working six days a week and operations of only three days are rare. Steelmaking grades of pig iron are decidedly scarce; foundry grades are tight but not scarce yet. Releases are extremely good. Some producers are putting into effect what they call informal priorities by pruning shipments down to actual needs.

Pittsburgh—Pittsburgh Coke & Iron Co. late Friday announced new prices on all grades of pig iron, effective immediately, at Sharpsville, Pa., and Youngstown, O. Basic, malleable and foundry are increased $1.50 and $2, to $24.50, and bessemer $1.50, to $25.

Chicago—Pig iron and coke production is on a capacity basis. Orders last week were considerably ahead of the previous week and total so far this month is far above the corresponding period of September. Gray iron foundries continue to increase their melt and are buying iron and coke in proportion.

New York — With shipments well above those of last month, pig iron producers find specifications on many grades exceeding production and are cutting further into stocks. Northern sellers say that southern producers, finding plenty of business in the South at prices more profitable considering the shorter hauls, are competing less actively.

Philadelphia—Pig iron sellers are more reluctant to accept business from others than regular customers in view of the heavy tonnages already booked for shipment this year. Producers expect a tight situation this winter.

Buffalo—With a leading steel mill negotiating with the principal merchant iron producer of the area for hot metal some apprehension is felt over supplies after the turn of the year, but no extension in deliveries is thought likely for the remainder of the present year.

Cincinnati — Pig iron shipments are the best of the year, pointing to completion of contracts by Jan. 1. Furnaces are discouraging any buying which shows attempt to cover needs into next year. Prices are not under discussion, but are exceptionally firm on the more frequent small-lot purchases.

St. Louis—Buying of pig iron continues active, despite the belief that fourth quarter requirements had been well satisfied in earlier commitments. Numerous lesser melters have come into the market for spot iron, and their takings represent a large aggregate.

Scrap

Scrap Prices, Page 84

Pittsburgh — The market is quiet and no important movement in either direction is discernible. Reports of lower prices being paid at some points are frequent, although none can be verified. Sales have been made at current quotations and one sale of No. 1 steel has been made at better than current levels, although it is reported this material is above average quality.

Cleveland—Shipments to melters are steady. Foundries are seeking cast grades, which are strong, with some difficulty in obtaining sufficient tonnage. Steel scrap is more easily obtainable and some holders are releasing part of their yard stocks. Prices are unchanged.

Chicago — Iron and steel scrap is steady. Specialty grades are exceedingly firm. Supplies are coming out in good volume and are expected to do so for some time, although some dealers are playing a speculative game and withholding material in hope of a price rise.

Boston — Iron and steel scrap

prices are firm and generally unchanged for domestic consumption. For export, dock delivery, brokers' bids are slightly easier with buying off moderately. Prospective arrival of cargo space is more uncertain, practically all activity being centered against British orders.

Philadelphia — Despite continued strong tone, factors likely to push prices generally higher appear less evident than a few weeks ago. Cast grades have advanced further, but No. 1 steel holds at $20.50 to $21.

Detroit — Signs of weakness are appearing in the scrap market here, and while no price adjustments have been made it is felt that a downward movement is imminent. A leading body builder sold over 500 cars of compressed sheet bundles last week at about 25 cents below the figure received the previous month.

Cincinnati — Quotations on iron and steel scrap are unchanged. Mill purchasing has declined, possibly in reflection of Washington conferences. Some dealers, however, are inclined to hold material until practical results are clarified.

St. Louis—Iron and steel scrap is quiet, with prices mixed. Some grades, including heavy cast, country mixed scrap, and stove plate, are slightly higher, while heavy melting steel and some specialties are off 25 cents.

San Francisco—Prices in the San Francisco metropolitan area are firmer than those prevailing in the Los Angeles district, due primarily to the fact that four mills in this district are consuming more than is actually produced and that can be delivered at reasonable freight rates. It is estimated that San Francisco district mills are consuming, at present, close to 33,000 tons per month. In the Los Angeles area scrap is flowing freely with a tendency toward somewhat lower prices to go into effect soon.

Warehouse

Warehouse Prices, Page 83

Chicago—October warehouse business is at the high level established in September and with demand remaining good, it is probable that a proportionate volume can be expected for November. Beyond that, the inventory period may restrict orders.

New York — Volume booked by warehouses continues to improve with prices on most products except nails, merchant pipe and galvanized sheets, generally firm. Mill deliveries to warehouses are fairly well maintained with the exception of plain structural shapes, alloys and specialty products requiring more extended processing. Mills are taking a firmer stand on both pipe and nails with replacement stocks stronger.

Philadelphia—While October business apparently will show a gain over September, it is questionable whether the heavy volume of a year ago will be topped. Demand is unusually well diversified as to products and consumers.

Cincinnati — Industrial buying from warehouses, many sales being due to delayed mill deliveries, continues a feature. The trend in volume is steadily upward, to make October a banner month of 1940. All items are active.

Baltimore—With mill deliveries tightening and steel consumption expanding and including much rush business, jobbers report sharply increased business. Light construction work accounts for a particularly good tonnage.

Semifinished Steel

Semifinished Prices, Page 81

Pittsburgh — Shipments to local nonintegrated sheet mills have been somewhat better, releases coming in at a better pace on sheet bars. There also has been somewhat of an increase from nonintegrated tin mills. Demand still is heaviest for rods, with considerable skelp now moving. Little change is noticeable in shipments of various semifinished grades, particularly billets, to Great Britain.

Tin Plate

Tin Plate Prices, Page 80

Pittsburgh—With stocks reaching a more reasonable level, mill operations are now moving up somewhat to meet increasing demand from the export market and from general line buyers in this country. Operations last week were about 44 per cent, an increase of two points, and indications are that further small gains will be forthcoming over the balance of the year. However, mills do not expect any operating rate comparable to that of the third quarter.

Steel in Europe

Foreign Steel Prices, Page 83

London—(*By Cable*)—Iron and steel activities in Great Britain continue to expand and plants are operating near capacity. Stocks of ore

and semifinished steel continue to accumulate. All works are kept busy with government war contracts. The light castings industry is getting a fuller share than recently Export trade continues severely restricted despite inquiries from India and the Dominions. Tin plate tonnages are being released for export.

Nonferrous Metals

New York—Strong uptrend in metal prices was checked last week as buying pressure lifted. Supplies available for nearby delivery remained tight, however, and many producers were forced to draw heavily on their reserve supplies.

Copper—Prices tended toward the 12-cent producers' level with custom smelters quoting 12.37½c and brokers 12.37½c for fourth quarter and 12.25c for first quarter delivery. Consumption rose to a new all-time high in September at 92,876 tons and may rise to 100,000 in October.

Lead—Sales for the week exceeded production but demand was much lighter than it had been recently. Refined stocks dropped 2029 tons last month to only 41,292 tons compared with shipments of 53,456 and production of 51,441 tons. Prices held at 5.35c, East St. Louis.

Zinc—Consumers have absorbed all offerings but did not press for large tonnages. Prime western held at 7.25c, East St. Louis. Consumption holds at the peak for recent years with the galvanized sheet output rate at 80 per cent of capacity.

Tin—Prices were unusually steady with Straits spot having held at 51.62½c since Oct. 16 with the exception of Oct. 22 when 51.50c prevailed.

Nonferrous Metal Prices

Oct.	Copper, Electro, del. Conn.	Copper, Lake, del. Midwest	Copper, Casting, refinery	Straits Tin, New York, Spot	Straits Tin, New York, Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
19	12.00	12.00	12.50	51.62½	50.50	5.50	5.35	7.25	18.00	14.00	35.00
21	12.00	12.00	12.50	51.62½	50.50	5.50	5.35	7.25	18.00	14.00	35.00
22	12.00	12.00	12.50	51.50	50.37½	5.50	5.35	7.25	18.00	14.00	35.00
23	12.00	12.00	12.50	51.62½	50.37½	5.50	5.35	7.25	18.00	14.00	35.00
24	12.00	12.00	12.50	51.62½	50.37½	5.50	5.35	7.25	18.00	14.00	35.00
25	12.00	12.00	12.50	51.62½	50.37½	5.50	5.35	7.25	18.00	14.00	35.00

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 12.00c Conn. copper

Sheets

Yellow brass (high)	19.23
Copper, hot rolled	20.62
Lead, cut to jobbers	7.75
Zinc, 100 lb. base	12.50

Tubes

High yellow brass	21.98
Seamless copper	21.12

Rods

High yellow brass	14.76
Copper, hot rolled	17.12

Anodes

Copper, untrimmed	17.87

Wire

Yellow brass (high)	19.48

OLD METALS

Nom. Dealers' Buying Prices

No. 1 Composition Red Brass

New York	8.00-8.25
Cleveland	8.62½-9.12½
Chicago	8.00-8.50
St. Louis	8.37½

Heavy Copper and Wire

New York, No. 1	9.62½-9.87½
Cleveland, No. 1	9.37½-9.87½
Chicago, No. 1	9.62½-9.87½
St. Louis	9.37½

Composition Brass Turnings

New York	7.62½-7.87½

Light Copper

New York	7.62½-7.87½
Cleveland	7.37½-7.87½
Chicago	7.62½-7.87½
St. Louis	7.37½

Light Brass

Cleveland	4.12½-4.37½
Chicago	5.50-5.75
St. Louis	4.87½

Lead

New York	4.75-4.85
Cleveland	3.75-4.00
Chicago	4.20-4.45
St. Louis	3.50-3.75

Zinc

New York	3.87½-4.12½
Cleveland	3.25-3.50
St. Louis	3.50-3.75

Aluminum

Mls., cast, Cleveland	9.25-9.50
Borings, Cleveland	6.50
Clips, soft, Cleveland	14.25
Misc. cast, St. Louis	7.75-8.00

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads	13.25
Standard No. 12 aluminum	15.00-15.50

Wire Group Meeting

(*Concluded from Page 27*)

armament manufacture, directly or otherwise.

Where not openly expressed, the key motive for the exhibits this year is to train executives and workers in the more efficient and modern machines and methods used in defense.

Lindberg Engineering Co., Chicago, exhibited gas and electric fired Cyclone furnaces, in which gases are burned in a chamber away from the work and then mixed into a stream of rapidly circulating gases, which are driven in large volume, at high velocity, through the charge. Such furnaces are now being used to anneal cartridge cases at the Frankford and Springfield arsenals. These forced convection furnaces also are used in treating aluminum for aircraft.

American Rolling Mill Co., Middletown, O., presented a 5-gallon fuel can for combat cars, made of "zincgrip." American Magnesium Corp., Cleveland, and the Aluminum Co. of America, Pittsburgh, showed various seamless tubing and forgings for aircraft.

United States Steel Corp., Pittsburgh, presented a "machinability exhibit" designed to promote speed, accurateness and eliminate lost motion in defense work. On view was a part of the research laboratory at Gary, Ind.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., displayed balanced atmosphere heat treating equipment which is being employed in making airplane parts and shells for antitank guns.

Steel Capacity Adequate, Says Republic Chairman

■ United States' steel producing capacity is sufficient to supply this country's normal needs, the requirements of the national defense program and all the steel that may be required for exports to Great Britain, said T. M. Girdler, chairman, Republic Steel Corp., Cleveland, in a broadcast from Cleveland last week.

Some steel users who have been listening to "excited stories" of an imminent steel shortage have been buying in excess of their current needs, said Mr. Girdler. This in itself could create an "artificial" shortage.

"Should the time ever come," he said, "when the country needs more steel than can be supplied by our present capacity, you may be sure the steel industry will be ready and willing to expand its facilities to whatever extent required."

Foundry Equipment Index Off in September

■ Foundry Equipment Manufacturers' association, Cleveland, reports index of net orders closed for new equipment in September was 162, compared with 167.2 in August. Index for repairs was 158.6 in August and 160 in July. Total sales index was 161.2 in August, 165.4 in July.

Indexes are per cent of monthly average of sales to metalworking industries, 1937-39. Practical comparison on the old base, 1922-24, can be determined by multiplying new base figures by 1.328.

Armco Starts $5,000,000 Improvement Program

■ Plant improvements totaling more than $5,000,000 to enable increased production for national defense requirements will be made by American Rolling Mill Co., Middletown, O. Most important item in the program will be a 4-stand, 4-high, 54-inch cold-reduction mill at the Middletown plant, which, with buildings and auxiliary equipment, will cost $3,800,000. Other major items include 25 additional by-product coke ovens and other improvements at the Hamilton, O., plant, and a soaking pit at Middletown.

Purchasing Agents Sponsor Exhibit

■ Fifth annual Manufacturers' Products exhibit, sponsored by the Purchasing Agents' Association of Baltimore at the Lord Baltimore hotel, Oct. 22-24, comprised 73 displays.

Chase Copper & Brass Co. was awarded first prize for the most decorative booth among companies with national distribution. Second award went to Hygrade Sylvania Corp., manufacturer of lighting equipment. For local distributors, first award was to Baltimore Stationary Co., and second to Gibson & Kirk Co., nonferrous foundry and local distributor for the Johnson Bronze Co. Inc., New Castle, Pa. First prize for the most informative exhibit went to James J. Lacy Co., Baltimore, for a demonstration of molding in green sand.

Frank H. Carter, Maryland Dry Docks Co., and chairman of the exhibits committee, presented the awards to the winning exhibitors.

Exhibitors included: Abrasive Co. Inc., Air Reduction Sales Co., American Brass Co., American Pipe & Equipment Co., American Saw & Mfg. Co., Beaver Pipe Tools Inc., Black & Decker Mfg. Co., Cambridge Wire Cloth Co., Central Iron & Steel Co., Edgcomb Steel Co., Peter A. Frasse Co. Inc., Hill-Chase & Co., Maryland Bolt & Nut Co., John McKenzie Inc., Nicholson File Co., Penn Steel Castings Co., Seaboard Steel & Iron Corp., Simonds Saw & Steel Co., Standard Tool Co., Stanley Electric Tool Co., Wickwire Spencer Steel Co. and Willson Products Co.

Construction and Enterprise

Michigan

ALLEGAN, MICH.—Blood Bros. Machine Co. has let contract to Muskegon Construction Co., Muskegon, Mich., for a machine shop addition.

DETROIT—City Pattern Works, 1161 Harper avenue, at Rivard street, is building a 20,000-square foot addition. Vaughan Reid is president.

DETROIT—Superior Tool & Die Co., 6633 Rohns street, is considering erection of a new plant.

DETROIT—Davis Tool & Engineering Co., 6481 Epworth street, has let general contract to Bennage & McKinstrie, Detroit, for a plant addition costing about $85,000. Hugh T. Millar, Detroit, is architect.

DETROIT—Industrial Gas Equipment Co., 2748 Penobscot building, has been incorporated with $50,000 capital to manufacture equipment for production of gases, by Leonard P. Pool, 1010 East Grand boulevard, Detroit.

DETROIT—Metal Compounds Corp. has been incorporated with $50,000 capital to produce metals from ores and scrap, by George D. Harrison, 6209 Hamilton avenue, Detroit.

DETROIT—Pentecost Steel Erection Co., 5151 Grand Avenue, has been incorporated with $50,000 capital to erect steel fabrications, by John C. Emery, 2005 Washington Boulevard building, Detroit.

DETROIT—Jones Iron & Metal Co., 3315 Barium Tower, has been incorporated with $50,000 capital to deal in steel and metal products, by Benjamin Jones, 18027 Roselawn avenue, Detroit.

FERNDALE, MICH.—Ethyl Gasoline

■ Additional Construction and Enterprise leads may be found in the list of Shapes Pending on page 92 and Reinforcing Bars Pending on page 93 of this issue.

Corp., 7800 Eight-mile road, has plans by Albert Kahn, 345 New Center building, Detroit, for a laboratory addition, 45 x 310 feet, to cost about $75,000.

FLINT, MICH.—A-C Spark Plug division, General Motors Corp., will build a plant addition for manufacture of war materials. Plans by Argonaut Realty Co., General Motors building, Detroit.

JACKSON, MICH.—Heywood Probert Mfg. Co., R. F. D. No. 1, has been incorporated with $50,000 capital to manufacture farm equipment, by Stephen H. Heywood, 410 Van Buren avenue, Jackson, Mich.

OXFORD, MICH.—Master Machine Works has plans by Ware & Baumgartner, architects, Pontiac, Mich., for a plant addition.

SAGINAW, MICH.—Saginaw Malleable Iron division, General Motors Corp., has given general contract to Spence Bros., Saginaw, for annealing and oven building, to cost about $45,000.

Connecticut

NEW BRITAIN, CONN.—Corbin Screw Corp. division of American Hardware Co., High street, will build a brick and steel plant addition to cost about $50,000.

NEW HAVEN—High Standard Mfg. Co., 169 East avenue, will build a new unit for the manufacture of machine guns, costing about $40,000.

SKELTON, CONN. — Chromium Process Co. will build a two-story 42 x 65-foot plant addition, general contract to M. Durrschmidt, Main street, Derby, Conn. L. F. Caproni, 1221 Chapel street, New Haven, engineer.

STRATFORD, CONN.—Albert Kahn Inc., engineer, 345 New Center building, Detroit, will let contract soon for a plant addition for Vought-Sikorsky division, United Aircraft Corp., South Main street, to cost about $500,000.

Massachusetts

WORCESTER, MASS.—Leland Gifford Co. is building an addition to its machine shop at 1001 Southbridge street, costing $30,000, increasing space by 28,000 square feet. A. J. Daniels, Shrewsbury, Mass., is architect. Company manufactures drilling and tapping machinery and other equipment.

New York

DANSVILLE, N. Y.—Foster Wheeler Corp., manufacturer of power plant and oil refining equipment, plans a plant addition to cost over $40,000.

NEW YORK—National Aniline & Chemical Co., 1051 South Park avenue, plans a plant addition to cost about $40,000.

SYRACUSE, N. Y.—Rollway Bearing Co. Inc. is building addition to accommodate enlarged bearing assembly and shipping facilities. Various departments will be rearranged.

WATKINS GLEN, N. Y.—Bids will be taken in the spring for a filtration plant at the waterworks plant, to cost about $90,000. William T. Fields Engineers Inc., Flower building, Watertown, N. Y., is engineer.

New Jersey

ELIZABETH, N. J.—American Type Founders Inc., 200 Elmora avenue, has let general contract for a one-story 200 x 300-foot manufacturing building on West Grand street to H. K. Ferguson Co., Cleveland.

ELIZABETH, N. J.—Phelps-Dodge Copper Products Co., South Front street, has let general contract for 84 x 105-foot mill addition and one story warehouse building 100 x 240 feet for the manufacture of copper products, to Wigton-Abbott, 1225 South avenue, Plainfield, N. J. Savary & Glaeser, 102 North Washington avenue, Dunellen, N. J., are architects.

RAHWAH, N. J.—National Pneumatic Co., 970 New Brunswick avenue, has let general contract to Wigton-Abbott, 1225 South avenue, Plainfield, N. J., for 150 x 300-foot plant addition to cost about $55,000.

Ohio

CLEVELAND—Forest City Foundries Co., 2500 West Twenty-seventh street, is enlarging its branch plant at 9327 Maywood avenue and will install additional cranes and molding machines. Addition covers about 4700 square feet.

CLEVELAND—Grahling Bros. Co., 340 East 131st street, Walter W. Grahling, president, is expanding manufacturing space about 14,000 square feet to meet enlarged demand for its products, lighting equipment.

CLEVELAND—Hope Metals Products Inc., 1814 East Fortieth street, Neldon T. Hasenflue, secretary, will move production early in November to 1505 Rockwell avenue where 15,000 square feet will be available.

CLEVELAND—Euclid Road Machinery Co., 1361 Chardon road, is enlarging facilities in assembly department, a large crane being added and addition 40 x 85 feet to house crane runway.

Pennsylvania

CHESTER, PA.—Fibre Metal Products Co., Fifth street, has let general contract for a plant addition to William Provoost, Chester, to cost about $40,000.

FRANKLIN, PA.—Chicago Pneumatic Tool Co. will ask bids soon on a one-story 60 x 250-foot plant addition to cost about $40,000.

LOCK HAVEN, PA.—American Aniline Products Inc., Mount Vernon street, T. James, president will expand facilities by erection of several buildings, at cost of about $250,000.

MOCANAQUA, PA.—Mocanaqua Water Co., will erect a 50,000-gallon or more capacity steel standpipe, booster pump station and other improvements at cost of about $15,000.

READING, PA.—American Chain & Cable Inc., Tupehocken street, has plans for a three-story 110 x 120-foot machine shop. Plans have been drawn by Muhlenberg, Yates & Muhlenberg, Ganster building, architects and engineers.

Illinois

CHICAGO—American Forge division, American Brake Shoe & Foundry Co., 2621 South Hoyne avenue, has revised plans by B. F. Olson, 19 South LaSalle street, for one and two-story 66 x 116-foot addition on Oakley avenue near Twenty-sixth street, to cost about $50,000. Bids will be called soon.

Delaware

WILMINGTON, DEL. — International Latex Corp., care Walter Carlson, architect, Delaware Trust building, plans erection of a plant at Dover, Del., to cost about $50,000.

Maryland

CUMBERLAND, MD.—Celanese Corp. of America will build a three-story addition, 100 x 140 feet, at cost of about $125,000.

District of Columbia

WASHINGTON—Bureau of supplies and accounts, navy department, will open bids as follows: Nov. 1, schedule 3738, motor-driven universal grinding machine for South Charleston, W. Va.; schedule 3687, oil-burning furnace for forging, for Portsmouth, N. H.; schedule 3727, two electric arc welding sets for Philadelphia; schedule 3745, motor-driven universal tool and cutter grinder for South Charleston, W. Va.; schedule 3750, horizontal hydraulic press for Charleston, S. C.; schedule 3753, sixteen motor-driven engine lathes for Newport,

R. I.; Nov. 5, schedule 3720, seven motor-driven radial drills for Puget Sound, Wash.; schedule 3740, motor-driven heavy-duty precision lathe for Seattle; Nov. 8, schedule 3731, motor-driven vertical boring mill for Mare Island, Calif.; schedule 3699, two electric furnaces for vessel delivery.

Missouri

FAYETTE, MO.—Bond issue for $25,000 has been approved to finance construction of water purification plant and plans are being prepared for bids. J. W. Shikles & Co., 708 New York Life building, Kansas City, Mo., are consulting engineers.

KANSAS CITY, MO.—Dickey Clay Mfg. Co., New York Life building, is having plans drawn by Alfred Bemberg, architect, same address, for a plant at Monroe and Quinotte streets, to cost about $400,000.

ST. LOUIS—Daybrite Lighting Inc., 5401 Bulwer avenue, manufacturer of lighting equipment, adding 24,000 square feet manufacturing space and 6000 square feet office space in second-story addition. Emil H. Niemann, 3816 Shaw street, is architect.

ST. LOUIS—Continental Can Co., Inc., New York, has bought 15 acres on North Broadway and will build a plant costing over $1,000,000, plans to be ready about Nov. 1.

Oklahoma

BARTLESVILLE, OKLA.—Independent Natural Gas Co., owned by Phillips Petroleum Co., Bartlesville, plans natural gas pipe line from the Texas Panhandle to Milwaukee.

Wisconsin

MILWAUKEE—A. O. Smith Corp., 3533 North Twenty-seventh street, has let general contract to Wisconsin Bridge & Iron Co., 5023 North Thirty-fifth street, for a two-story 200 x 200-foot plant addition. Cost estimated at $107,600.

STEVENS POINT, WIS. — American Telephone & Telegraph Co., New York, has started construction of 195 miles of coaxial cable from Stevens Point to Minneapolis. Cable will be partly aerial and partly underground. Cost, with terminal and repeater equipment, is about $2,000,000.

Minnesota

FOSSTON, MINN.—Voters at special election approved construction of municipal power plant. W. B. Ruud is city clerk.

MINNEAPOLIS—Mereen-Johnson Machine Co., 4401 Lyndale avenue North, manufacturer of woodworking machinery, has given general contract to E. F. Wandesee & Son for a one-story plant addition.

MINNEAPOLIS — Flour City Ornamental Iron Co., recently awarded a war department contract for aluminum pontoons for bridges, totaling $1,169,610, has given contract to Jensen Construction Co. for one-story plant addition 50 x 143 feet. Larson & McLaren, Foshay Tower, are architects.

MINNEAPOLIS—V. A. Boker & Sons, 3104 Snelling avenue, manufacturers of metal stampings have let general contract to Russell R. Johnson, 69 Bedford street Southeast, for a one-story plant addition.

NORTH MANKATO, MINN.—City, M. R. Wigley, clerk, will vote Nov. 5 on $52,300 bond issue for sewage disposal plant.

PELICAN RAPIDS, MINN.—Lake region electric co-operative, Albert R. Knutson, superintendent, has let contract to Zontelli Bros., Ironton, Minn., for 195 miles rural transmission lines to serve 400 customers. Arnold Christopherson, Fergus Falls, Minn., is consulting engineer.

PIPESTONE, MINN. — Southwestern Minnesota electric co-operative, LeRoy C. Sabie, superintendent, has REA allottment of $192,000 for 253 miles of rural transmission lines.

ST. CLOUD, MINN.—City, A. J. Haberkorn, clerk, is taking bids on centrifugal pump and coupling for direct connection to 75-horsepower 1750-rpm motor; also centrifugal pump, motor, base coupling and electrical control equipment.

ST. PAUL—Griffin Wheel Co., 941 Johnson parkway, manufacturer of railroad car wheels, has given general contract to Wm. Baumeister Construction Co., Pioneer building, for an addition and extensive improvements to its foundry.

ST. PAUL—St. Paul Foundry Co., 500 Como avenue, structural steel fabricator, castings maker and manufacturer of special machinery, has given general contract to Lawrence Peterson Construction Co. for a foundry addition.

WHEATON, MINN.—Traverse electric co-operative, Simon Lundquist, president, has REA allottment of $192,000 for 235 miles of rural transmission lines in three counties.

Texas

HOUSTON, TEX. — Cameron Iron Works, 711 Milby street, has let general contract to Brown Construction Co., 2204 Fannin street, for factory addition to cost about $27,000.

North Dakota

BISMARCK, N. DAK.—City, Myron H. Atkinson, auditor, is taking bids on waterworks improvements, including filters, wells, pumps, addition to chemical storage rooms and equipment. Lium & Burlick, Grand Forks, N. Dak., is consulting engineer.

South Dakota

HURON, S. DAK.—City, M. F. Walt, auditor, takes bids to Nov. 12 on power unit for municipal disposal plant, including engine and generator, using sewage gas, gasoline or fuel oil.

WATERTOWN, S. DAK.—City, F. J. Hubbard, auditor, is considering improvements at municipal electric light plant, including additional generator. Ralph D. Thomas & Associates, 1200 Second avenue South, Minneapolis, are engineers.

Nebraska

OMAHA, NEBR.—Robert C. Druesdow & Associates, 860 Omaha National Bank building, are having plans prepared by Walter Steiner, engineer, Hynes, Calif., for an oil refinery at Falls City, Nebr., to cost about $200,000.

Wyoming

BASIN, WYO.—Wyoming state highway commission, Frank Kelso, superintendent, has given general contract to Green Bros., Worland, Wyo., for construction of division maintenance shop and storage building, 56 x 104 feet.

CHEYENNE, WYO. — Union Pacific railroad, general offices at Omaha, Nebr., has started improvements to shops and yards at Cheyenne, including new turntable, to cost over $55,000.

Oregon

BURNS, OREG.—William F. Hayden, St. Louis, mining engineer, has surveyed tin deposits at Juniper Ridge, 37 miles from here and is seeking to interest capital to finance a treatment plant.

Washington

SEATTLE—Tennent Steel Castings Co. has been incorporated with $50,000 capital by M. G. Tennent and M. M. Pixley, Seaboard building, to operate a steel castings foundry.

SEATTLE—Duthie Shipbuilding Corp. has been formed by J. F. Duthie, 1612 Northern Life tower, with $100,000 capital, to operate a shipyard.

SEATTLE—City council has approved an appropriation of $450,000 to finance municipal power plant service facilities.

SEATTLE—Puget Sound Sheet Metal Co., 3631 East Marginal Way, is building a one-story addition 25 x 103 feet, Austin Co., Cleveland, general contractor.

TACOMA, WASH.—Northwest Machine Works, 1953 South C street, has been incorporated with $100,000 capital and has taken over the plant of Tennent Machine Works. Will spend $25,000 for reconditioning and new equipment. Will design and manufacture equipment for plywood manufacturing. George H. Osgood is manager.

Canada

BEACHVILLE, ONT.—Gypsum Lime & Alabastine of Canada Ltd. has plans under consideration for a plant addition here to cost $100,000.

HAMILTON, ONT.—Wallace Barnes Co. Ltd. 274 Sherman avenue North, manufacturer of wire products and springs, has let general contract to W. H. Cooper Construction Co. Ltd., Medical Arts building, Toronto, Ont., for a $100,000 plant addition.

TORONTO, ONT. — Canadian Acme Screw & Gear Ltd., 207 Weston road, is building a $150,000 plant addition. J. Roy Page, 18 Toronto street, has general contract.

TORONTO, ONT.—Bradford & Hoshoe, 1170 Yonge street, have general contract for 45 x 250-foot plant addition for Hamilton Gear Co. Ltd., 75 Van Horne street, to cost $50,000.

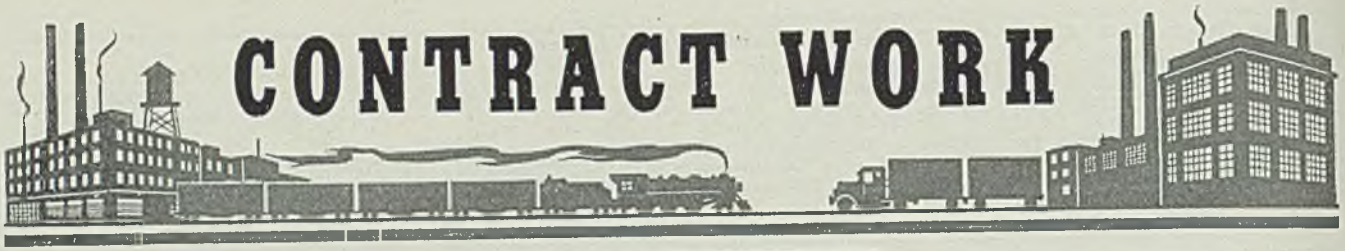
TORONTO, ONT.—Viceroy Mfg. Co. Ltd., 345 Royce avenue, rubber manufacturer, is building a machine shop costing $30,000. Bennett-Pratt Ltd., 30 Bloor street West, has general contract.

TORONTO, ONT.—Lever Bros. Ltd., soap and glycerine manufacturers, 299 Eastern avenue, are having plans prepared by Ewart & Byam, Excelsior Life building, for a $60,000 plant addition.

WOODSTOCK, ONT.—Standard Tube Co. Ltd., Givins street, is building a plant to cost $30,000. J. A. Vance & Son, 288 Light street, has general contract.

LACHINE, QUE. — Anglo - Canadian Wire Rope Co. Ltd., Aberdeen avenue, has given general contract to Foundation Co. of Canada Ltd., 1538 Sherbrooke street West, Montreal, Que., for a $45,000 plant addition.

ST. LAURENT, QUE.—Marshall Ventilated Mattress Co. is having plans prepared for a $100,000 factory on Ouimet street.



CONTRACT WORK

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We have surplus facilities to machine, assemble and/or fabricate at low labor costs. We can handle items such as light stampings, general machine products and pipe fabrication. Send blue prints and specifications for quotation. Box 360, Youngstown, O.

Send your inquiries for
SPECIAL ENGINEERING WORK
to the
A. H. NILSON MACHINE COMPANY, BRIDGEPORT, CONN.
designers and builders of wire and ribbon stock forming machines.
We also solicit your bids for cam milling

PATTERN EQUIPMENT

WOOD or METAL

Made Right and Delivered When Promised.

THE WELLMAN BRONZE & ALUMINUM COMPANY
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CLEVELAND, OHIO

WELDED STEEL FABRICATION

Specialists in duplication of castings and machinery parts with rolled steel shapes.

Send blue prints and specifications for quotation.

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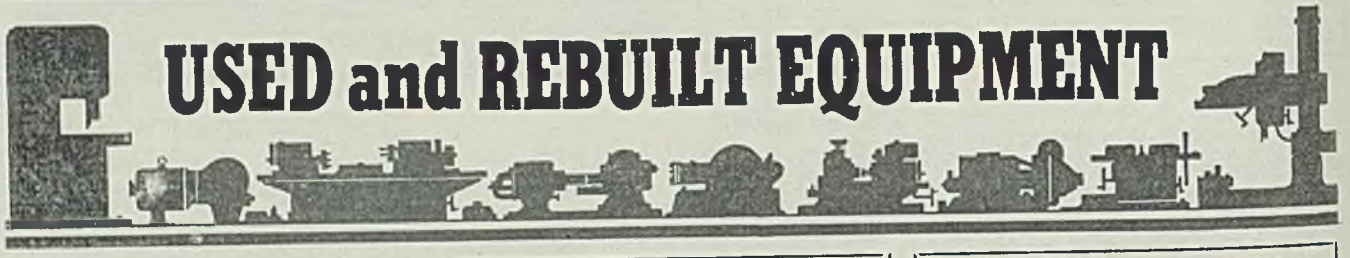
New Opportunities in contract work are rapidly developing, due to increasing government orders, and large production backlogs. Why not take advantage of this situation? The "Contract Work" columns of STEEL will carry your qualifications to concerns now letting contract work. Write today for details.



USED and REBUILT EQUIPMENT

AIR COMPRESSOR

676 CFM. Ing-Rand XRE., 2-stage, motor 125 HP. 3/60/440 V. Wt. 18,000 lbs.

BAR STRAIGHTENER

⅝" to 2½" Arno Loose with 20 HP. Motor of 3/60/220 V. Wt. 12,000 lbs.

VERTICAL MILL

60" Ingersoll, 3-spindle, single pulley, weight about 20,000 lbs.

ROLLS

8' x ½" Bertsch Bending Rolls, Initial type, Patented drop end, double friction pulleys.

SHEAR

60" blade, Bethlehem Billet Shear, 17½" shaft., For M. D. Wt. 100,000 lbs.

MARR-GALBREATH MACHINERY COMPANY
53 Water Street
Pittsburgh, Pa.

BOILER ROOM EQUIPMENT

2—300 H. P. Connely Sterling-type boilers 150 lbs., with pumps and fittings.
2—Combustion Engineering Type "E" stokers, with new spare parts.
All equipment in excellent condition and must be moved within 30 days for only $2900.
Single units in proportion.
10 Ton 38 ft. span hand crane with two Yale and Towne trolleys, only $300.
Electric Coal Hoist, structural steel, radiation, pipe, etc. at bargain prices.

HARRIS WRECKING COMPANY
1963 W. 3rd St. Cleveland, Ohio.

WANTED TO BUY

BULLDOZER
Hilles & Jones No. 2 or equal.
PUNCH
Shallow throat, 1" through 1".

THE INDUSTRIAL EQUIPMENT CORP.
P.O. Box 1647 Pittsburgh, Pa.

42" and 62" Vertical Boring Mills.
48" x 30' New Haven Lathe, 22' cc, B.D.
30" x 76" Farrel Roll Grinder, M.D.
10' Bridgeport Knife Grinder, M.D.
150 ton United St.-Hyd. Forging Press.
2"-4"-6"-8"-12" Wm. Pipe Mach., M.D.
No. 5 H&J Guill. Shear 4-1/2" rd., M.D.
10'x1/4" Bliss Sq. Shear 18" gap.
18" W-F & 36" Yoder Gang Slitters, M.D.
48" Aetna-Std. Straightener 17-3 3/4" M.D.

WEST PENN MACHINERY CO.
1208 House Bldg. Pittsburgh, Pa.

Rails—"1 Ton or 1000"

NEW RAILS—5000 tons—All Sections—All Sizes
RELAYING RAILS—25,000 tons—All Sections—All Sizes, practically as good as New.
ACCESSORIES—Every Track Accessory carried in stock—Angle and Splice Bars, Bolts, Nuts, Frogs, Switches, Tie Plates.
Buy from One Source—Save Time and Money
'Phone, Write, or Wire

L. B. FOSTER COMPANY, Inc.
PITTSBURGH NEW YORK CHICAGO

FOR RENT OR SALE

Modern 10" Rolling Mill including 16" break down rolls For Rent or Sale with all necessary equipment in New York Metropolitan District. Address Box 330, STEEL, Penton Bldg., Cleveland.

TRAVELING CRANES

OVERHEAD ELECTRIC
Various sizes.
Send us your inquiries.

INDUSTRIAL EQUIPMENT CORP.
PITTSBURGH, PA.

WANTED TO BUY

One 36" good used, second hand electric magnet. Communicate with Erie Scrap Iron Co., Box No. 904, Erie, Pa.

Positions Wanted

PLANT OR GENERAL MANAGER; 25 years experience light to medium metal industries also foundry. Capable engineer, alert and progressive manager seeks negotiations with live moderate size industry. Protestant, married, age, 45. You may have the facts, there is no obligation. Address Box 334, STEEL, Penton Bldg., Cleveland.

TWENTY YEARS EXPERIENCED STRUCtural and plate shop, superintendent. Seeking position either as superintendent, general foreman or estimating sales engineer. Moderate Salary until proven results. Address Box 335, STEEL, Penton Bldg., Cleveland.

POSITION WANTED — SALESMAN OF machine tools, accessories, or metal working equipment. Fourteen years experience this field. Willing go anywhere. Age thirty-five, married. Employed at present. Definitely not afraid to work. Box 324, STEEL, Penton Bldg., Cleveland, O.

FORMER SUCCESSFUL SALES MANager operating as manufacturer's agent in Cleveland and vicinity in position to handle another line. Twenty years' experience selling to industrial trade, also jobbers and department stores. Address Box 339, STEEL, Penton Bldg., Cleveland.

MECHANICAL ENGINEER, NOW EMployed, wants executive position as Chief or Plant Engineer with industrial concern. College graduate, 25 years experience in steel and allied industries. Address Box 285, STEEL, Penton Bldg., Cleveland.

Help Wanted

EXCEPTIONAL OPPORTUNITY FOR EXperienced man with some technical training and successful sales record, for executive sales position with seamless steel tube mill. Exclusive territory, office, personnel. State salary and full details of training and experience. Address Box 338, STEEL, Penton Bldg., Cleveland.

All classifications other than "Positions Wanted," set solid, minimum 50 words, 5.00, each additional word .10; all capitals, minimum 50 words, 6.50, each additional word .13; all capitals, leaded, minimum 50 words 7.50, each additional word .15. "Positions Wanted," set solid, minimum 25 words 1.25, each additional word .05; all capitals, minimum 25 words 1.75, each additional word .07; all capitals, leaded, minimum 25 words 2.50, each additional word .10. Keyed address takes seven words. Cash with order necessary on "Positions Wanted" advertisements. Replies forwarded without charge.

Classified pages are 3 columns, each column 2¼ inches wide.

Forms close Wednesday preceding publication date.

Employment Service

SALARIED POSITIONS
$2,500 to $25,000

This thoroughly organized advertising service of 30 years' recognized standing and reputation, carries on preliminary negotiations for positions of the caliber indicated above, through a procedure individualized to each client's personal requirements. Several weeks are required to negotiate and each individual must finance the moderate cost of his own campaign. Retaining fee protected by refund provision as stipulated in our agreement. Identity is covered and, if employed, present position protected. If your salary has been $2,500 or more, send only name and address for details. R. W. Bixby, Inc., 110 Delward Bldg., Buffalo, N. Y.

Opportunities

$500,000 PROFITABLE BUSINESS CAN be added to your metal stamping business. Finished products to sell to department stores. Sell year around and very profitable. $20,000 required for dies. Address Box 340, STEEL, Penton Bldg., Cleveland.

Castings

OHIO

THE WEST STEEL CASTING CO., Cleveland. Fully equipped for any production problem. Two 1½ ton Elec. Furnaces. Makers of high grade light steel castings, also alloy castings subject to wear or high heat.

PENNSYLVANIA

NORTH WALES MACHINE CO., INC., North Wales. Grey Iron, Nickel, Chrome, Molybdenum Alloys, Semi-steel. Superior quality machine and hand molded sand blast and tumbled.

For Sale

FOR SALE

Drop Forge Plant and business now in active operation. Completely equipped with die and blacksmith departments. Located inland Mid-Western city. Excellent shipping facilities and favorable labor conditions. Room for expansion. Address Box 319, STEEL, Penton Building, Cleveland.

Representatives Wanted

OLD ESTABLISHED CARBON BRUSH company wants further representation. Give full details in first letter. Address Box 341, STEEL, Penton Bldg., Cleveland.

MANUFACTURER OF HIGH-PRESSURE hydraulic diecasting machine wants representatives in Syracuse, Rochester, Buffalo, Pittsburgh, Cincinnati, Indianapolis, St. Paul-Minneapolis, St. Louis, Chattanooga, Birmingham, New Orleans, Houston, Seattle, Portland and Los Angeles territories. *Inquiries from these territories are being held pending appointment of representatives.* Prefer established manufacturer's agent already contacting commercial die casters or other plants making own diecastings. Please send full particulars of experience to Box 342, STEEL, Penton Building, Cleveland, Ohio.

Bids Wanted

Federal Works Agency, Public Buildings Administration, Washington, D. C., Oct. 10, 1940.—Sealed proposals in duplicate will be publicly opened in this office at 1 P. M., Standard Time, Nov. 12, 1940, for construction of the U. S. P. O. at Burgettstown, Pa. Upon application, one set of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $5 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished, in the discretion of the Commissioner, to builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any sub-contractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Commissioner of Public Buildings, Federal Works Agency.

ADVERTISING INDEX

This month Where-to-Buy Products Index carried in October 14 issue

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Centrifugally Cast . . . Certainly!
But of COPPER!
NO, FAIRBANKS-MORSE is not the only electric-motor builder who casts rotor and squirrel cage winding into one piece centrifugally.
But, only Fairbanks-Morse makes a centrifugally cast rotor with the winding of COPPER.
Of course it's more difficult. It took a great deal of time and money to learn how to perfect the means of production.
But it makes a better motor because copper makes a better winding.
Copper has better electrical conductivity. Copper has better thermal characteristics.
Hence, the Fairbanks-Morse Motor with centrifugally cast, one-piece COPPER rotor winding is more capable of withstanding constant plugging and reversing. It gives added years of trouble-free service.
If you use motors, this motor is worth your detailed investigation and, if you like—comparison.
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