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STEEL

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Contents

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PRODUCTION • PROCESSING • DISTRIBUTION • USE

HIGHLIGHTING THIS ISSUE OF STEEL

■ THE word "capacity" as applied in the steel industry has related almost solely to its size and ability to produce steel. And yet there is another meaning of the word, of greater significance in this crisis, and that is the capacity of its leaders to manage its affairs in the best interests of the nation. The record of foresight and good management **(p. 21)** was one of the inspiring features of the Steel Institute's meeting in New York. . . . The British minister to Washington **(p. 23)** spoke of the barriers between class and caste in Great Britain that are being burned away, of a lifting of the rights of citizens "to a standard of nutrition as well as of freedom." There is deep meaning in those words.

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More Rulings Made on Nickel

Tightening of restrictions on use of critical and strategic materials for nondefense production continues. Last week nickel was placed on a formal allocation basis **(p. 23)**, with indications civilian consumption will be more sharply curtailed. . . . American Iron and Steel Institute offers suggestions **(p. 23)** on possible substitutes for nickel steels. . . . A plan designed to help "off-the-counter" manufacturers of defense materials **(p. 42)** to obtain scarce materials has been evolved by OPM's priorities division. . . . Defense officials refuse government financing of a new Pacific coast steel industry **(p. 32)**. They believe that if expansion in the West is necessary, it can be handled more efficiently by the established companies.

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Zinc Still No. 1 Scarcity

Steelworks operations **(p. 29)** last week advanced ½-point to 100 per cent. . . . Rationing steel fairly among customers is an increasingly severe problem for producers **(p. 97)**. Many needs are "borderline" cases. Thus even refrigerators, which might seem a purely civilian commodity, are required for cantonments, ships and other defense purposes. The new inventory control order, which provides for reports by June 10, has already revealed unfair distribution in some items. A distributor with four months' supply of galvanized pipe was asking the past week for three times that much in addition. Zinc still appears the No. 1 scarce raw material for the steelmakers, with some finding nickel less tight because of close control. Some find carbon steel deliveries longer protracted than alloy steel.

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Ammunition For Small Arms

This week, Professor Macconochie presents **(p. 56)** an unusually complete series of drawings showing step-by-step manufacture of the British 0.303-inch cartridge case and its bullet, with tooling. . . . The work shown is typical of small-arms ammunition production methods today. . . . A line of ready-mixed cutting oils **(p. 64)** for machining gun barrels is now available. . . . A new lubricant **(p. 67)** for improved drawing of cartridge cases is announced. . . . Trends in open-hearth shops and blast furnace plants are discussed **(p. 72)** at Chicago convention. . . . Chevrolet cars are now equipped 100 per cent with at least one part **(p. 76)** made entirely by compressing and sintering steel turnings.

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Die Costs Analyzed

John P. Walsted tells **(p. 66)** how to figure die costs and shows one method of determining how expensive a steel may be warranted for any particular job. . . . A new method **(p. 68)** for joining structural sections without use of bolts, rivets, welds or other conventional connections appears to have important possibilities for cantonments and other temporary structures. . . . Assembly methods closely approaching automotive mass production have been successfully devised **(p. 81)** by one aircraft manufacturer. . . . J. J. B. Rutherford and Newell Hamilton describe **(p. 88)** a new batch-type annealing furnace recently installed by Babcock & Wilcox at Beaver Falls, Pa.

Thousands of Trained Eyes Assure Inland Quality

Keen eyes inspect Inland Cold Reduced Tin Plate

THROUGHOUT the Inland Plants there are thousands of eyes that critically watch every phase of making Inland Quality Steel. They are eyes trained by many years of close observation to know the exact requirements of Inland customers—trained to detect the slightest variation from Inland standards.

Many of these eyes are in laboratories, some checking production and processes, and others looking far into the future by means of continual intensive research. Every operating floor has its full quota of trained eyes that carefully watch each step of every steelmaking process. Not a pound of steel is shipped from an Inland Plant without first having satisfied the searching, critical eyes of Inland inspectors.

It is this keen watchfulness, combined with great steelmaking skill and modern equipment, that assures the uniform high quality of Inland Steel.

Skilled eyes take the temperature of molten steel with an optical pyrometer.

INLAND STEEL CO.

SHEETS · STRIP · TIN PLATE · BARS · PLATES · FLOOR PLATES · STRUCTURALS · PILING · RAILS · TRACK ACCESSORIES · AND REINFORCING BARS

Steel Industry on War Footing, Prepared By Two Billions Spent in Decade

Never before in better physical condition; parts balanced, thoroughly modernized, with capacity adequate for fighting and civilian needs . . . Labor a more uncertain factor . . . "Steel prices do not exist in a vacuum!"

By WALTER S. TOWER
President, American Iron and Steel Institute

■ WITHOUT fanfare you have supplied steel to every essential activity in such quantities that none so far has been unable to continue from lack of the material which you make.

In March this year the industry pushed output above 7,000,000 tons, the largest figure for any month in its long life. That output was at the annual rate of more than 85,000,000 tons. For comparison the 1940 production of steel in all the world outside of the United States was only about 92,500,000 tons.

Where has the industry found this ability to perform?

Certainly over the past ten years no incentive to develop or expand facilities was evident in either the volume of demand or earnings.

From 1930 through 1939 average annual production was less than 38,000,000 tons, or below one-half the present rate of output. In the same period the average yearly return on invested capital in the industry was less than 2 per cent. . . .

Yet in the face of these facts, the industry spent stupendous sums for modernization, improvement and expansion of equipment. Those vast expenditures, almost two billions in a decade, have given the industry its present power to produce. They were made in spite of all discouragements. They were made to keep the industry abreast of progress in the art of making better steel, at a lower cost, for the benefit of customers everywhere. . .

This war finds the country fortunate in the possession of an industry which never before was in better physical condition. Its respective parts are in approximate balance. It is thoroughly modernized, competently managed, and, with its great army of skilled workers, it can effectively match the rest of the world in meeting every demand that can be made for steel products. . .

Even before the National Defense Commission was created, alert minds in the industry had seen the coming need for electric furnace steels. Comprehensive programs of expansion of electric furnace capacity were actively under way, and numerous new furnaces already were being installed, by the time official agencies began to be concerned about the supply of special alloy steels. As a result, the industry has today, or in early prospect, close to twice the capacity for electric furnace steel which was in existence when the war began.

Walter S. Tower

It was from this industry, I believe, that the vital place of heavy steel forgings in the defense program was first suggested. Following such suggestions a great program of expansion of forging facilities was authorized by the responsible government agencies. Some of those facilities, provided for ten months ago, are inevitably still far from complete.

Further expansion of forgings capacity is now urged, but many more months must elapse before production can come from the newer facilities. One may fairly question, then, what present conditions might be, if men in this industry had not been alive to the basic importance of heavy forgings in practically every phase of the defense program.

The industry early stressed the need for conserving the supply of iron and steel scrap, essential for making steel, in the volume that the defense program would require. The soundness of that position is shown by subsequent events.

For a long time various members of the industry publicly and privately advocated the creation of stocks of strategic materials, like manganese, chromium, tungsten and tin. Some of the stocks specifically recommended months, or even years prior to the present emergency, are now in process of being created.

Almost before the defense commission was organized, the indus-

Abstract of address before American Iron and Steel Institute's fiftieth general meeting in New York, May 22.

trial relations committee of this institute undertook a searching analysis in respect to workers available for steel mills. The results of that survey, showing adequate labor supply, were published last September, as the first complete contribution from any industry to the vital question of labor in defense.

A Special Committee on Government Specifications was appointed to help government agencies bring their many specifications for steel more nearly into accord with one another and with commercial standards. That committee already has very substantial results to its credit, all in the interest of more effective operations.

The General Technical Committee and the Committee on Manufacturing Problems pushed forward their studies on a classification of standard steels, the need for which has long been evident. That classification, the first parts of which have been published recently, is a tremendous stride forward in the interest of efficiency and acceleration of production.

Steps have been taken to suggest acceptable substitutes for certain alloy steels, for which supplies of the essential alloys may be short. The facility with which those recommendations have been put together and their technical soundness are direct by-products of the many hours of diligent effort devoted to technical questions by committees of the institute during the last few years.

Defense Committee Formed

And last, in this enumeration, is the recent action by members of the industry in forming an Iron and Steel Industry Defense Committee. Its purpose is to put all the abilities of the industry into a combined effort for such co-operation as may be permissible in furthering the defense program.

Although briefly sketched, that is a revealing record. It shows that the steel industry has been alert, farsighted, eager to do the job which lies as the foundation stone of the whole rearmament defense effort . . .

Since the creation of the Office of Production Management, successor of the defense commission, I have had the privilege of being the industry representative on the Steel Priorities Committee, in the Division of Priorities.

The work of that committee has had to do primarily with the ability of the industry to perform. Many questions have come to OPM about deliveries of material both for projects related to the defense program and for civilian purposes. But many as those questions are, they would equal less than one-tenth of 1 per cent of the millions of transactions completed during recent months, with full satisfaction to the buyers.

Yet it takes few complaints to loom large when satisfied buyers are silent. Complaints encourage consideration of need for priorities, in order to make certain that those uses which have first claim on available supplies are taken care of before others are served.

In most cases, however, general co-operation by members of the industry with the Steel Section in the Production Division of OPM has made possible some voluntary adjustment, acceptable both to the producer and to the purchasers of steel.

Capacity Raised 5,000,000 Tons

That is part of the reason why, so far, the only general preference order relating to any finished steel product is the recent one covering nickel alloy steels. As you know, that order became necessary not because of any lack of capacity to make such steels, but because of limited supply of nickel.

The record of actual accomplishments is impressive. Since the war began yearly steelmaking capacity has been raised by almost 5,000,000 tons. In that figure are included 1,400 000 tons of electric furnace capacity, representing an expansion of more than 80 per cent. Such expansion alone is equal to the present estimate of requirements for special alloy steels for direct military uses.

In production all previous performance records have been surpassed. From a rate of barely 60 per cent in May of last year operations were speeded up to pass 90 per cent in August. The average has been above that figure for each month since then. For the 12 months ending next week, output of ingots will probably exceed 76,000,000 tons. That is more than 25,000,000 tons above the level of 1918, and it is 20,000,000 above the domestic buying of steel in that speculative boom of 12 years ago.

But it is undoubtedly true that the recent figures do not reflect actual consumption. Probably more steel is now being locked up in inventories than ever before in the history of this country. When the race for accumulation ends, current production and consumption will be in better balance.

However, you all know that it is not reasonable to expect any basic industry to guarantee that there will be no tight places in the months to come. The exigencies of war are not so lightly met. In steel, the supply of ingots is adequate for defense purposes several times over, but in a few rolled products, as a result of concentrated defense and commercial demands, there are some tight places now. There probably will be others. Yet in some quarters, not wholly irresponsible, the notion prevails that the steel industry should be in a position to meet without any delay an emergency peak demand for every one of its products, irrespective of the urgency of their use . . .

The cry of "shortage," or "inadequate capacity," or "give me a priority" comes largely from the buyer who refuses to admit that a reasonable period is needed for production and shipment . . .

I must disagree with self-appointed mentors of the industry who insist that the industry should be required to assume a staggering task of forced expansion, when it is not clear that any such expansion is needed or could be attained in time to be helpful.

That you may view the subject in its proper setting, let me remind you of some of the events of barely more than a year ago.

The whole industry had then been under a thick cloud of adverse criticism in hearings before the Temporary National Economic Committee. Many days had been spent by prominent executives from steel companies in trying to describe to that committee the complex character of this great industry. With amazing patience they set forth in simple terms an explanation of the problems with which it has to deal and the methods by which it must be conducted. Then came the pseudo experts. Into a warp of misunderstanding they wove a weft of unsound theory.

"Experts" Reverse Attitudes

Among the charges or insinuations directed at the industry, much prominence was given to the idea that steelmaking facilities had been greatly over-expanded; that resulting excess capacity presented a fundamental weakness in the economic position of the industry. Steel companies were accused of failing to write off alleged obsolete equipment, which was held to be a detriment to progress and a burden on the public. Steel men were looked upon as suffering from economic astigmatism. Yet prompt action to shrink capacities on lines then implied by such critics would now find the industry crippled, and wholly inadequate, with aid to Britain of less value than a fervent hope.

Now, barely more than a year later, every energy and facility of the industry is bent to the task of trying to satisfy actual demands of the moment and to keep ahead of possible needs of the future. Like a giant long inert, it is suddenly stirred by the call to perform prodigious feats. Still, the storm of criticism against the steel industry rages. Again there is a surplus of theories and a deficit of thinking. Today the complaint is not of excess

(*Please turn to Page* 114)

Olds Questions Theory of Gearing Capacity to Income in War Time

Warns against irrational expansion, in address to Steel institute . . . Cautions about regimentation after war . . . Keynote one of confidence . . . British envoy says "Barriers of caste and class are being burned away" . . . Churchill sends greetings

■ THE EXCELLENT record of achievement by the steel industry in the present emergency was cited by speakers at the fiftieth general meeting, American Iron and Steel Institute, Waldorf-Astoria hotel, New York, May 22. Approximately 1050 attended.

Especial tribute was paid to the courage of steelmakers in improving facilities during the profitless depression years. Sometimes openly opposed by government "experts," these betterments have made possible the production of the quantities and qualities of steel now essential to this country's preparedness program.

Warning against expensive and unnecessary over-expansion, invited by certain administration economists, was voiced by Irving S. Olds, chairman, United States Steel Corp., and Walter S. Tower, institute president. (For Mr. Towers' address, see page 21.) Confidence that American industry can, with proper conditions, outproduce the Axis powers was expressed.

Said Mr. Olds: "It is unbelievable that the United States, given a well prepared program, the necessary time, and the proper support by our people, cannot outdo anything of which Germany is capable in the way of production of the essential instruments of modern warfare . . .

"I must confess great difficulty in following the argument recently advanced that because the national income is expected to soar next year to one hundred billion dollars or more, this country's steel production in 1942 will have to be in the neighborhood of 110,000,000 tons of ingots to meet the estimated demand.

"I can understand that the steel industry must provide all of the steel required for the nation's defense needs, even though that be a constantly growing amount corresponding with the enlargement of our national program to keep pace with changing conditions in the world. There has been no failure to date in supplying the steel needed for defense projects and I do not anticipate that contrary will be true in the future.

"If established economic laws were functioning normally today,

Irving S. Olds

without arbitrary fetters, perhaps some direct relationship between national income and steel demand could properly be assumed. But that is not the case. If the national income rises to one hundred billion dollars in 1942, the increase cannot rightfully be described or considered as a normal growth. The country has not truly developed to any such extent since the middle of 1940. Rather, any such increase must be analyzed as the financial evidence of the artificial stimulus to business activity growing out of our vast national defense and lend-lease policies, which are in turn financed by large-scale taxation and debt-creating programs.

Mr. Olds declared that everything of a reasonable character should be done to prevent excess capacity becoming a serious problem at the conclusion of the present emergency.

The United States Steel chairman, who was introduced by Mr. Tower as the "latest addition to an already brilliant constellation of steel executives," warned against the possibility of government regimentation continuing after the present emergency is past.

"If the abnormal demands of today call for the building of steelmaking and finishing facilities vastly in excess of peacetime requirements, the return of peace may bring with it that most difficult of all our recent depression experiences—idle plants and idle men—a productive capacity substantially beyond that needed to meet the then current demand for steel.

"It seems to me that great care should be exercised in the location and character of any new facilities of this kind so as to reduce to a minimum the scope and seriousness of such a problem. Research should assiduously be carried on to find new uses for steel and to produce new or improved forms of steel for present uses. In short, we must all do everything in our power to create a permanent and

an enlarged demand for the products of our plants . . .

"Industry has the opportunity and the responsibility of acquainting the general public with the importance of our democratic industrial order and of its part in the upbuilding of America and in the establishment of our present high standard of living. Our effort of today will not have been a success, if free private enterprise largely disappears from our land."

Churchill Sends Greetings

President Tower read several messages at the evening banquet, including one from Winston Churchill, British Prime Minister. Mr. Churchill wrote:

"Hearty greetings to the American Iron and Steel Institute.

"I well remember my harmonious relations with the United States steelmakers and the valuable contributions which they made to the successful outcome of the war in 1914-18.

"I recognize with gratitude the still greater effort which they are now making in the case of world wide liberty."

Sir Gerald Campbell, British minister to Washington, expressed the appreciation of his country for the material aid granted by the United States.

Expressing confidence in ultimate victory by the democracies, Sir Gerald outlined in general British plans for the post-war world.

"The new world comity of nations—the detailed form of which must necessarily await discussion in free council by those concerned—must achieve three ends if it is to have any chance of success: First, a system of security which will insure international stability; secondly, a system of economic collaboration which will render impossible the economic conflict between the democracies and will avoid the creation of autarchic totalitarian states; thirdly, a system of ordered change in the relationship between states, which will restore confidence in the integrity of the world of nations . . .

"The new order in international relations will be vitally dependent on the new order which will inevitably be established within the nations themselves, and nowhere will this be more apparent than in Britain, where stupendous changes are already taking form.

"Perhaps the greatest error of the last war in national politics was the hope and expectation of the vast majority, in Britain and elsewhere, to 'get back to pre-war' when it was all over. This time that cannot happen. In the first place the era preceding this war was nothing to hark back to, not comparable with the golden days of pre-1914, but there are deeper reasons than that . . .

"The man-in-the-street in Britain realizes that this is *his* war, and the condition of Britain after the war is going to be his too. A new order is on the march in my country . . . It is born of common danger, common suffering and common friendliness . . . The flame of our common effort has burned away the barriers of class and caste which has so complicated the pattern of our social life, and has left us a people united as never before.

Earle C. Smith

"It is impossible to go backward now. There is a mood of self-examination and self-criticism abroad in Britain today which has no parallel in modern times. Clearly and sincerely we are perceiving the truth of that which Rudyard Kipling wrote 40 years ago:

'Let us admit fairly, as business people should,
'We've had no end of a lesson;
'It will do us no end of good.'

"By this I do not mean that in our zeal for social reform we shall adopt the doctrines of Karl Marx nor will Britain go 'socialist' in the old-fashioned European sense of the term which connotes barricades and red flags, yet economic and social equality will inevitably be the aim of post-war Britain. For example, the principle is already being accepted in practice that a citizen of the British democracy is entitled to certain fundamental rights in the economic as well as the political sphere, to a standard of nutrition as well as of freedom, to good housing as well as the habeas corpus, to the right to work as well as the right to vote."

Earle C. Smith, chief metallurgist, Republic Steel Corp., Cleveland, was awarded the institute's medal in recognition of his paper, "The Control of Steel Composition and the Problems It Presents," delivered at the 1940 meeting.

Quincy Bent, vice president, Bethlehem Steel Co., and chairman of the institute's technical committee, and L. H. Burnett of the industrial relations committee, were introduced at the banquet. Mr. Burnett recently retired as vice president, Carnegie-Illinois Steel Corp., after 40 years' active service.

All institute officers and directors were re-elected.

Technical Problems Discussed in Question-and-Answer Session

Many subjects, chiefly of technical interest, were discussed in the question-and-answer period of the American Iron and Steel Institute's meeting last Thursday.

Instead of relatively few and lengthy papers such as featured technical sessions in prior years, 19 papers were presented, each stating a question, or combination of related questions, and giving a compact answer.

One of the most interesting, from a general viewpoint: "Is the Use of Steel in Home Construction Growing?" was answered by M. Male, research engineer, United States Steel Corp. of Delaware, Pittsburgh, who stated that the economics of this country's situation will "automatically" develop tonnage.

S. J. Cort, general manager, Maryland plant, Bethlehem Steel Co., in answering "What Improvements in Quality and Production of Steel Have Been Made Since World War I?" said furnace operators now have essential knowledge of thermal, chemical and physical phases of steelmaking operation and can accurately pre-determine desired results.

William A. Haven, vice president, Arthur G. McKee & Co., Cleveland, answered "What Are the Principal Factors Which Affect the Life of a Blast Furnace Lining? What Improvements Have Been Made Which Have Prolonged Furnace Lining Life?" He cited faulty distribution, coke preparation, wearing plates, improved cooling plates and development of high-grade refractories, in replying to the first question, and the production of dense, accurately sized brick, burned at higher temperatures, and free from

laminations, replying to the second.

"To What Extent Can We Use Domestic Alloying Elements, Rather Than Those That Have To Be Imported, To Meet Essential Steel Qualities?" was answered by W. G. Bischoff, metallurgical engineer, Timken Roller Bearing Co., Canton, O., who concluded that certain sacrifices in physical characteristics and serviceability of some steels must be expected, but for the majority of purposes steels alloyed with domestic metals will not cause undue hardship under normal service.

B. F. Courtright, superintendent, metallurgy and inspection, Wisconsin Steel Co., Chicago, in dealing with the question, "What Rapid Tests Are Available for Control of Open-Hearth Steelmaking Practices, and To What Extent Can Results Obtained by These Tests Be Used as an Accurate Guide to Operation?", cited the fracture test, the carbometer, the slag viscosimeter and the slag pancake method as rapid means of control.

P. F. Dolan, assistant general manager, Bethlehem Steel Co., Sparrows Point, Md., in discussing "What Benefits Are To Be Derived from High Blast Temperatures in Blast Furnace Operation? What Factors Limit Blast Temperature?", drew attention to the fact the use of high blast heat in a blast furnace enables the operator to furnish the steel department with hot metal in maximum quantity, of suitable physical temperature and chemical analysis, and at minimum cost.

Earle C. Smith, chief metallurgist, Republic Steel Corp., Cleveland, in answering "Is the General Trend Toward Richer or Leaner Alloy Steels?", stated there will be a wiser use of "strategic" materials, fewer steel compositions, and a better knowledge of adequate substitutes.

Conditions Determining Charge

C. D. King, chairman, operating committees, United States Steel Corp. of Delaware, Pittsburgh, in commenting on "What Considerations Govern the Properties of Scrap and Pig Iron in the Open-Hearth Furnace Charge?", concluded with the statement that the choice of varying percentages of these materials under changing conditions depends upon their availability, their relative cost, effect on production rates, and the type of products involved.

Other questions, and those who submitted answers:

"What Are the Characteristics of the Coals Used for Different Purposes in the Steel Industry?" Answered by H. H. Lowry, director, coal research laboratory, Carnegie Institute of Technology, Pittsburgh.

"What Is Spectroscopic Analysis? To What Extent Can a Spectroscope Be Used for Regular Testing in a Steel Plant?" Answered by L. Selmi, chief metallurgist, Great Lakes Steel Corp., Detroit.

"What Results Have Been Obtained by Conditioning the Air Used in Blast Furnaces?" Answered by E. K. Miller, assistant general superintendent, Jones & Laughlin Steel Co., Aliquippa, Pa.

"What Can Be Done To Reduce Consumption of Ferromanganese Without Seriously Affecting Steel Quality?" Answered by C. H. Herty Jr., research engineer, Bethlehem Steel Co., Bethlehem, Pa.

"What Is Meant by Age-Hardening of Steels?" Answered by J. H. Nead, chief metallurgist, Inland Steel Co., Chicago.

"What Would Be the Advantages of Standardization of Steel Specifications?" Answered by V. H. Lawrence, assistant to vice president, Alan Wood Steel Co., Conshohocken, Pa.

"What Are the Principles of Testing with Magnetic Powders? To What Extent Is the Test Used and Under What Conditions Is It Applicable?" Answered by E. T. Walton, superintendent of metallurgy and inspection, Crucible Steel Co. of America, Midland, Pa.

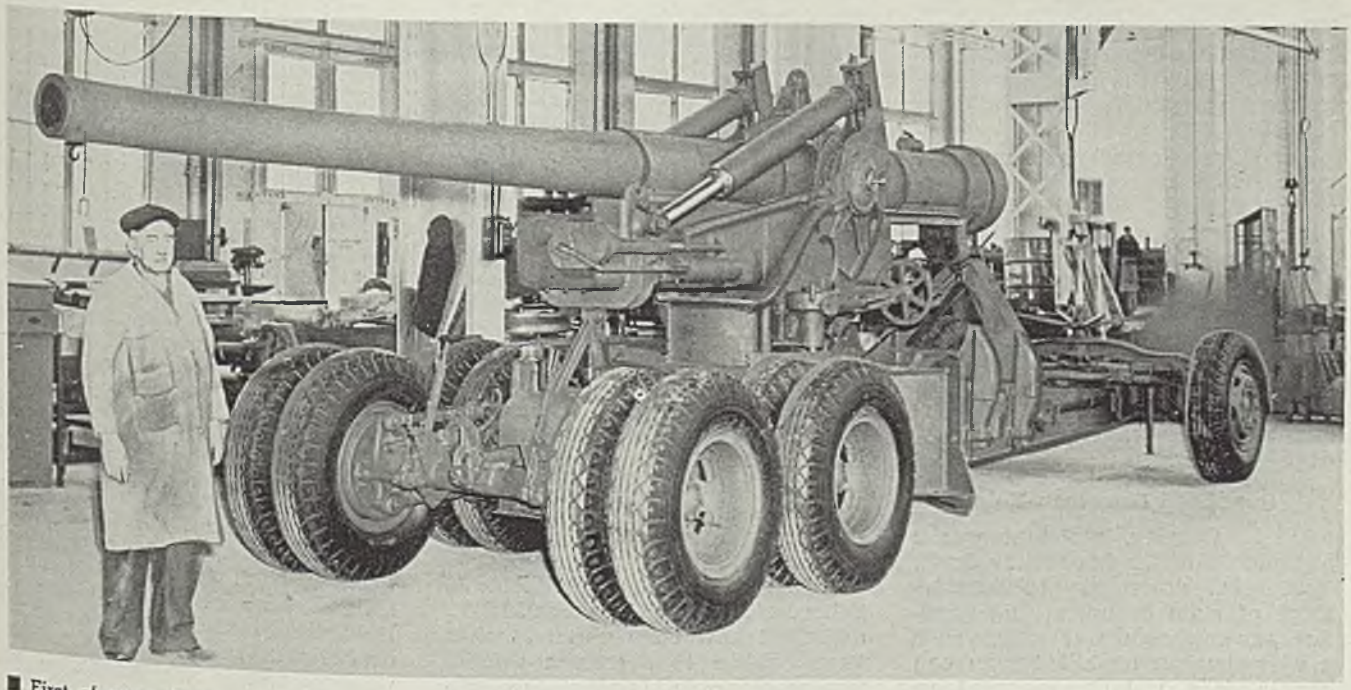
"How Important Is Grain Size in the Drawing Quality of Sheets?" Answered by J. Winlock, chief metallurgist, Edward G. Budd Mfg. Co., Philadelphia.

"What Are the Principal By-Products of the Coke Ovens? What Are Their Uses and What Part Do They Play in the Economics of Coke Oven Operations?" Answered by F. W. Werner, assistant to vice president, United States Steel Corp. of Delaware, New York.

"What Effects Are Plastics Going To Have on the Steel Industry?" Answered by L. H. Underwood, assistant to vice president, Youngstown Sheet & Tube Co., Youngstown, O. Mr. Underwood headed a subcommittee of the committee on manufacturing problems which recently submitted a report on plastics to the American Iron and Steel Institute. Details of the report were presented in the April 21 issue of STEEL, page 29.

"What Are Good Practical Tests To Determine the Quality of Coking Coal? Also the Quality of the Coke Produced?" Answered by F. F. Marquard, general

Locomotive Company Delivers First 155-Millimeter Gun



■ First of more than a hundred 155-millimeter guns for the United States Army recently was delivered by the American Locomotive Co. from its Dunkirk, N. Y., plant. The weapon is capable of hurling a 100-pound shell 26,000 yards and can be towed behind an army truck at high speeds. NEA photo

superintendent, Carnegie-Illinois Steel Corp., Clairton, Pa.

Steel's Forefront Position in Industrial Relations Traced

Steel stands in the forefront of all the basic industries in the field of industrial relations and has made great progress, it was pointed out at the American Iron and Steel institute's industrial relations session by Grover C. Brown, secretary of the institute's industrial relations committee. The committee, he declared, has pioneered in many ways in a field practically unworked by similar organizations.

Mr. Brown reviewed activities of the present committee, started in 1935, and of predecessor committees organized as early as 35 years ago. Principal objective today, as in the past, is development of sound industrial relations policies which will promote harmonious relations between employers and employes. This can best be done, he explained, by creation of better working conditions, improvement of health and physical conditions of the workers and thereby increasing efficiency, reduction of unit costs, increasing purchasing power and raising the standard of living.

Constant and rapid change with respect to labor and industrial relations has been promulgated in the period. In its lifetime, the committee has witnessed effects of a sudden flood of federal and state social legislation. Labor has been granted vacations, social security, group insurance and other benefits, and has received certain rights and prerogatives it never enjoyed before.

Approach to industrial relations problems must be with the realization employes are living men rather than inanimate objects, and requires an understanding of social laws and economic principles. Mr. Brown further declared his belief the end of rapid social changes is not yet in sight. Future effects of the national defense program, the war and the inevitable post-war adjustment are "huge question marks which make the future of industrial relations an absorbing problem to contemplate."

Open forum discussion of questions pertaining to industrial relations followed Mr. Brown's report, with committee members participating.

L. H. Burnett, chairman of the committee, presided.

Management Engineers Study Means For Increasing Industrial Output

■ METHODS by which industrial production can be increased were discussed before a meeting of about 500 production engineers who attended the two-day conference of the production division, American Management association, at New York, May 21-22.

Industry's principal problem today, it was pointed out, is to increase output without purchasing major equipment and without large-scale hiring of skilled men, since supplies of both machinery and skilled labor are not promptly available in large quantities.

Representatives of 20 manufacturers having defense orders joined in a symposium devoted to experience stories on what various plants have done to step up production.

Simplified Drawings Help

H. L. Consley, assistant works manager, York Ice Machinery Corp., York, Pa., described the development of shop drawings and specifications on sheet-metal work in such a way that an unskilled man can handle jobs usually assigned to highly skilled sheet-metal workers. As a result, the company has increased production with the same equipment and with additions only to the ranks of unskilled men.

W. C. Zinck, factory superintendent, North & Judd Mfg. Co., New Britain, Conn., said that although he had been running the blanking department of that company's plant on two shifts of eight hours each, he had difficulty in producing 40,000 gross of blanks per week. However, by promoting the best operators to apprentice die setters and changing shift schedules, he was able to increase production 25 per cent, with a reduction of 40 per cent in time plus lower tool expense and improved quality.

Nordberg Mfg. Co., Milwaukee, is employing 1700 men in three eight-hour shifts six days a week, it was stated by H. E. Rogers, works manager. He said that industry would get much greater production if it spent as much time analyzing men as it does machines and methods.

S. T. Williams, superintendent, A. Schrader's Son Co., Brooklyn, N. Y., described how compressed air has been applied to overcome production problems in his plant. Such applications included: Conversion of a kick press to an air-operated press; ejection of work and scrap from machines; conversion of a drill press to semi-automatic operation; simplification of power-press operations; work clamping and holding mechanism.

H. B. Cook, assistant director of training, Wright Aeronautical Corp., Paterson, N. J., discussed the application of high-production machines to relieve the shortage of machine tool operators. "Usually," he said, "the first cost of the high-productive machine will be less than the cost of an equivalent number of the common or garden variety of machine tools."

Henry V. Oberg, industrial engineer, Armstrong Cork Co., Lancaster, Pa., described the study of a specific plant operation designed to provide better balanced output and eliminate delays caused by equipment faults. He also discussed records which prove the extent and cause of delays and which give an indication of performance in general.

Work Increased 33 Per Cent

Setting up of standards and a bonus incentive plan for workers in such non-direct departments as stores, production stockroom, service stockroom and plating was detailed by O. C. Heffner, production manager, The Hoover Co., North Canton, O. "On the average, the work done per employe hour has been increased 33 per cent," he said.

Increasing production through analysis of breakdown and delay to equipment was discussed by J. P. Haight, chief engineer, Aluminum Co. of America, Edgewater, N. J. "Each production department should submit weekly to interested parties a copy of breakdown and delay analyses of each piece of equipment," he stated. "Recurring delays from breakdown may indicate that sufficient time is not being allowed for preventive maintenance and inspection."

John S. Shaw, director of safety, Hercules Powder Co., Wilmington, Del., warned employers to pay particular attention to the safety of workers and urged them to avoid "rush operations" as much as possible, because frequency of industrial accidents is tending to mount. He described some of the safety measures his company has devised under a so-called "contact plan."

Another session of the conference was devoted to procedures in subcontracting. Speakers included R. E. Gillmor, president, Sperry Gyroscope Co. Inc., New York; J. L. Trecker, chief subcontracting unit, defense contract service, Office of Production Management, and president, Kearney & Trecker Corp., Milwaukee; and A. R. Glancy, chief of ordnance, Office of Production Management, and formerly vice president, General Motors Corp.

Conference Board Stresses Need for Adjustment to Long Defense Effort

■ MANUFACTURERS must prepare to adjust themselves to a long period of enormous production for defense "and a consequent shortage, rationing and allocation of strategic materials." Five years, or possibly more, lie ahead of us during which prime emphasis will be placed on the production of military products and devices.

This view was expressed by Philip D. Reed, chairman, General Electric Co., and senior consultant to the director of priorities, Office of Production Management, in speaking before the general session of the National Industrial Conference Board at its twenty-fifth annual meeting at the Waldorf-Astoria, New York, May 21.

Joseph L. Trecker, chief of the subcontracting service, OPM, declared that it is time to realize before it is too late that "business as usual is out." Placing the amount of defense expenditures contracted and contemplated at more than 40 billions of dollars and calling this figure only a beginning, he pointed out that Germany had engaged the equivalent of 60 billions of dollars in production before the war began.

A plea for co-operation between management and labor in the interest of defense was voiced by Sidney Hillman, associate director, OPM. "We can out-produce the totalitarians only if we synchronize and co-ordinate all our activities more completely than ever before," he stated. "Industry must abandon any fear of expansion. Labor must abandon any fear of training additional workers to meet the additional problems presented by our defense program."

Asks Purchases Based on Needs

Mr. Reed urged manufacturers to avail themselves of the qualified advice of the field offices of the production division of OPM in the selection of defense products suitable for manufacture in various kinds of plants and in securing information on subcontracting. "Many manufacturers now engaged in making civilian products will do well to consider their situations and explore the possibility either of redesigning them in order to avoid using strategic materials, or of converting part or all of their operations to defense manufacture," he added.

Mr. Reed also appealed to purchasing officials to limit their purchases and inventories to actual needs on the basis of current production schedules. Recognizing the natural inclination of able and conscientious purchasing departments under present conditions to place orders well beyond the amount needed to maintain normal inventories and current production, Mr. Reed pointed out that "with thousands of defense plants working directly or indirectly for the same customer and a great many of them requiring the same raw materials, the simultaneous action of most of these companies, plus a great many others seeking a reserve supply of the same materials for civilian needs, has pushed the demand clear off the scale and forced mandatory priority action to be taken months in advance of any real need for governmental intervention.

Anticipates Economic Integration

Referring to post-war conditions and problems, Mr. Reed said that he anticipated a speeding up of the twentieth century trend toward economic integration and industry-wide planning under government supervision; collective bargaining between nation-wide labor organizations and industry-wide associations of employers; greater centralized control of money and credit; government spending for previously planned public works, and a determination to take whatever steps are necessary to avoid a recurrence of mass unemployment. Subject to these reservations, he said he believed that "a sincere attempt will be made to preserve the elements and incentives of the enterprise system."

Mr. Hillman advanced five recommendations for a sound national defense labor policy.

"First of all," he said, "is a wholehearted acceptance by employers of labor's right to bargain collectively through representatives of its own choosing. In this very process the worker acquires a sense of greater responsibility and a more definite and more intimate participation in the work to be done. What this attitude of mind means to the success of our defense program cannot be overestimated. In this way we broaden and deepen the base of democracy at the very time that we are seeking to defend and preserve it.

"Second, we must have wage scales that bear a just relationship to the earning power of industry and assure a fair standard of living.

"Third, we must have a work week that will enlarge the opportunity for employment to those who are still without jobs. This will also serve to prevent the many industrial accidents, delays and decreases of output that characterize overtired workers.

"Fourth, proper physical working conditions must be maintained within the plant itself.

"Fifth, discrimination against any workers because of race, creed or color must be eliminated. Any such practice would be specially unfortunate at the present time when we are seeking both to extend and energize the practical working of democracy as a means to quicken our all-out defense effort."

Speaking of worker training, Mr. Hillman said that we are about to graduate our millionth person from our vocational school system since the defense program began.

Dr. Virgil Jordan, president of the conference, in addressing the meeting demanded for the American people the right to hear from their governmental leaders where the country is being led and how. He said Americans can face a foreign foe with confidence and find leadership for the struggle if they do not feel "that even in victory they still must face for an indefinite future the same enemy among and within themselves." To many people of this country, he added, the governments of the Axis powers and of Russia seem to be merely a "magnified image of their own," and millions of Americans today "already feel like refugees in their own land, much more than those who have fled to it from others."

Fears Price Inflation Imminent

Speaking at a round-table conference on "financing defense," Col. Allan M. Pope, president, First Boston Corp., expressed the fear that the United States is headed toward price inflation. He said his fear of inflation was due to an impression that leadership necessary to prevent it is not forthcoming and warned that no political administration could live through extreme inflation.

F. W. Lovejoy, chairman, Eastman Kodak Co., Rochester, N. Y., was elected chairman of the National Industrial Conference Board for 1941-42. He succeeds David M. Goodrich, chairman, B. F. Goodrich Co., Akron, O. Vice chairmen of the board elected for one year are: Neal Dow Becker, president, Intertype Corp.; W. Gibson Carey Jr., president, Yale & Towne Mfg. Co.; Irenee du Pont, E. I. du Pont de Nemours & Co.; John W. Mettler, president, Interwoven Stocking Co.; and Langbourne M. Williams Jr., president, Freeport Sulphur Co.

Dr. Jordan was reappointed president and chief executive officer of the board. Fred I. Kent, Bankers Trust Co., New York, was re-elected treasurer.

Fifty Thousand Attend Western Metal Congress; See 175 Exhibits

LOS ANGELES

■ FOURTH Western Metal Congress and Exposition held during the week of May 19 in the Pan-Pacific Auditorium here was by far the best of the congresses that have been held on the West coast.

It was sponsored by the American Society for Metals in co-operation with American Ceramic Society, American Chemical Society, American Foundrymen's Association, American Institute of Electrical Engineers, American Institute of Mining and Metallurgical Engineers (Institute of Metals), American Petroleum Institute (California Division), American Society of Civil Engineers, American Society for Testing Materials, American Society of Tool Engineers, American Welding Society, California Oil and Gas Association, Institute of Aeronautical Sciences, Liquefied Petroleum Gas Association (Pacific Coast Division), Mining Association of the Southwest, National Purchasing Agents' Association, Pacific Coast Electrical Association, Pacific Coast Gas Association, Society of Automotive Engineers and Wire Association.

Defense Machinery Featured

The exhibits of industrial concerns featured the application of their products or equipment to the speeding of production of war materials. More than 175 companies were represented in the exhibit area, an increase of about 20 per cent over the number that participated in the last congress three years ago.

Total attendance was over 50,000. Average attendance at the technical sessions was 500.

A. W. Winston, metallurgist, Dow Chemical Co., Bay City, Mich., in a series of morning lectures talked on "Magnesium Alloys" and their increasing importance in the aircraft production program. First, he told of the history, United States production volume, available sources, production methods, characteristics and application of magnesium alloys. Second lecture was devoted to machining practice, fabrication practice, corrosion protection and painting, and designing for magnesium alloys. Many engineers and shop men who attended became acquainted with these relatively new materials for the first time.

James P. Gill, past president, American Society for Metals, chief metallurgist, Vanadium Alloys Steel Co., presented a series of afternoon lectures on "Tool Steels and Machinability." Chip formation and its effect on finished machined materials were discussed. The physical characteristics of wrought steels and cast ferrous materials and effect of metallographic structures on machining were reported in detail. Different types of tool steels were detailed as to application, hardening behavior and general properties.

E. E. Thum, editor, *Metal Progress*, delivered a series of lectures on "Inspection of Steel," of importance to national defense industries. Alloy steels and their identification, with emphasis on proper inspection so that substitution will not occur in production, was another important subject.

"Alloy Constructional Steels" was subject of four morning lectures by H. J. French, International Nickel Co. Dr. Marcus A. Grossmann, chief metallurgist, Chicago district, Carnegie-Illinois Steel Corp., presented a series of lectures on "Heat Treatment of Metals."

T. A. Triplett, president, and V. P. Danford, research chemist, Triplett & Barton Inc., jointly presented two papers on "Recent Developments in X-ray Inspection of Aircraft Materials." Described were latest production X-ray equipment and methods for inspection of materials by X-ray.

Dr. Kent R. Van Horn, research metallurgist, Aluminum Co. of America, Cleveland, delivered a series of three lectures on various aspects of aluminum. One paper specifically discussed "The Internal Stresses of Aluminum Alloy Forgings and Castings." The lectures covered the range of aluminum alloys, including wrought, cast and heat treatable alloys.

Railroad Car Builders May Receive Steel Priority

WASHINGTON

■ Pressure on steel requirements by railroad car builders will be relieved soon when the OPM steps in to assure the builders of needed supplies.

The OPM's action is expected to be in the form of a priorities certificate which will be issued to several car companies. In cases of special urgency in connection with a particular defense project, the Priorities Division is empowered to give the contractors limited blanket ratings valid for a specified period. The ratings cover specific items necessary for completion of the contracted goods that were inaugurated last March for nine builders of electric power cranes.

The Office of Price Administration last week was reported ready to issue further interpretations on the application of the iron and steel scrap price schedule, following a meeting with representatives of steel mills and the Institute of Scrap Iron and Steel.

No official statement was issued at the conclusion of the conference, at which OPACS was represented by Charles A. Bishop, metals aide to Leon Henderson. It was learned, however, that the meeting took up several points involving the interpretations on which OPACS seeks industry assent.

Reynolds Metals Buys 6,000,000 Tons Bauxite

■ Provision for 6,000,000 tons of high grade bauxite for Reynolds Metals Co., Richmond, Va., was assured last week when the company signed contracts with N. V. Billiton Maatschappij, owner of large tracts of the aluminum-bearing ore in Surinam. Contracts will run for 12 years and provide for sizable deliveries at Mobile, Ala., by Jan. 1.

The Dutch company is installing modern bauxite mining machinery in its South American fields, which are less than 2500 miles by water from Gulf ports.

The Reynolds company operates an alumina plant at Lister, Ala., which is producing aluminum six months after ground for the factory was broken.

Koppers Co. To Build 21 Coke Oven Battery

■ Contract for a battery of 21 coke ovens, to be built at the Chester, Pa., by-product coke plant of Philadelphia Electric Co., last week was reported awarded to the Engineering & Construction Division of Koppers Co., Pittsburgh.

Total coal carbonizing capacity of the battery will be 142,000 tons per year, according to Joseph Becker, vice president of the Koppers Co. Ovens will be of the Koppers-Becker underjet type.

Work is to start immediately, and the ovens are scheduled for completion in April, 1942. Amount of the contract was not divulged.

■ Tennessee Valley Authority has ordered a third turbine generator from General Electric Co., Schenectady, N. Y., for the new Watts Bar steam power plant near Chattanooga, Tenn. The new unit will be similar to the two units ordered last year, will be rated 60,000 kilowatts.

LABOR

SWOC Theatens Strike in National's Michigan Plants

■ SOFT spot in this country's defense effort continues to be the administration's attitude toward work stoppages and workers' demands for abrupt wage increases in the face of government-fixed price ceilings and an ever-increasing demand for greater production.

Notice of intention to strike was filed by Steel Workers Organizing Committee for three National Steel Corp. plants in Michigan, Great Lakes Steel Corp., Michigan Steel Co. and Hanna Furnace Corp. SWOC demanded an additional raise of 7 cents an hour and exclusive bargaining rights. Union officials said a strike vote, affecting 7500 workers, would be taken after the five-day waiting period required by Michigan law. National Steel took the initiative in granting 10-cents-an-hour increases in the steel industry several weeks ago. This increase has been followed generally by the industry and has added between $125,000,000 and $150,000,000 annually to the industry's wage costs.

At the Ravenna, O., Army Ordnance plant, common laborers were on strike demanding a 25-cent-an-hour wage increase to 90 cents. Contractors on the project late last week canceled identification badges of 10,000 workers and work on the plant was suspended.

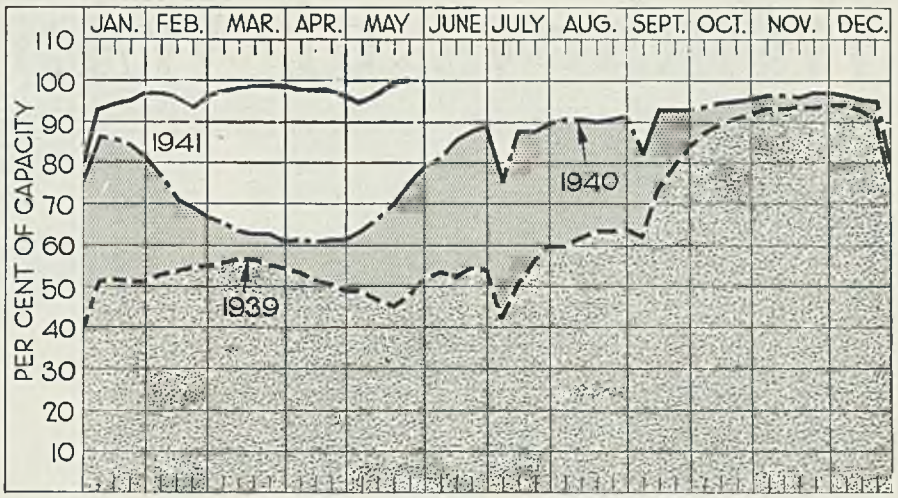
CIO To Ask Ford for Contract

United Automobile Workers-CIO won collective bargaining rights in the Ford Motor Co.'s River Rouge and Lincoln plants by a margin of 2½ to 1 in a National Labor Relations Board election. Union announced it will open negotiations for a contract with the company immediately. Labor board ordered Ford to reinstate 975 workers with back pay discharged from its Kansas City, Mo., plant.

On the West coast, shipbuilding continued to be blocked by the machinists' strike for an additional wage increase. The strike, described as "outlaw" by union officials, at week's end was receiving the critical attention of the Navy which mobilized vessels to carry workers to the yards affected.

Laporte, Ind., plant of Allis-Chalmers Mfg. Co. was closed when nearly 1000 workers engaged in production of antiaircraft guns walked out.

This was the second work stoppage at the plant in 15 days and was a sympathy strike caused, the strikers said, by the company's action in laying off three employes.



PRODUCTION . . . . Up

■ STEELWORKS operations last week advanced ½-point to 100 per cent of theoretical capacity, two largest districts being over 100 per cent. Six districts showed higher rates, two declined and four were unchanged. A year ago the rate was 75 per cent; two years ago it was 48 per cent.

Birmingham, Ala. — Steady at 95 per cent. Republic Steel Corp. has resumed coke production in 150 ovens idle since 1920 and Warrior River Coke Co. in 60 ovens not operated for ten years.

Cincinnati — Decline of 3½ points to 89 per cent resulted from necessity for open-hearth repair.

St. Louis — Unchanged at 98 per cent, with indications of the same rate holding this week.

Detroit — Up 1 point to 89 per cent, three open hearths being out for repairs. The increase resulted from furnaces of larger capacity being in production.

Chicago — Held at the all-time high, 102½ per cent. Two producers made slight curtailments but others increased output. Carnegie-Illinois Steel Corp. reached a new high at its Chicago district mills May 17 with lighting of its only idle Gary furnace, the twelfth. The company now has 22 of 23 blast furnace stacks in operation at its South Chicago and Gary plants. Never before have more than 21 been active at the same time, two usually being out for relining. The company has also lighted the last two of its coke oven batteries, making a total of 1200 ovens producing at theoretical capacity of 17,500 tons of coke per day.

Central eastern seaboard — Advanced 1 point to 96 per cent. Open hearths of Phoenix Iron Co. are still idle as a result of a strike.

Buffalo — Continued at 93 per cent, with 40 of 43 open hearths in production.

Cleveland — Addition of one open hearth increased the rate 1½ points to 96½ per cent, with further increase probable this week.

New England — Furnace repairs forced a decline of 10 points to 90 per cent, which will be recovered this week.

Pittsburgh — Rose 1½ points to 100½ per cent, with further increase expected this week.

Wheeling — Up 1 point to 89 per cent.

Youngstown, O.—Production up 2 points to 97 per cent, with 74 open hearths, three bessemers in service. Outlook for this week is for the same rate. Carnegie-Illinois Steel Corp. Monday relighted a relined blast furnace. Low water in Mahoning river and Lake Milton has caused cut in water supply of 15 per cent, threatening plant operation.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended May 24	Change	Same week 1940	Same week 1939
Pittsburgh	100.5	+ 1.5	73.5	36
Chicago	102.5	None	75	49
Eastern Pa. ...	96	+ 1	67	37
Youngstown ..	97	+ 2	57	45
Wheeling	89	+ 1	85	59
Cleveland	96.5	+ 1.5	78	54
Buffalo	93	None	65	42
Birmingham ...	95	None	83	57
New England..	90	—10	56	45
Cincinnati	89	— 3.5	61	52
St. Louis.....	98	None	55	39
Detroit	89	+ 1	79	57
Average	100	+ .5	75	48

Windows of WASHINGTON

By L. M. LAMM
Washington Editor, STEEL

Early adoption of allocation system for steel, copper foreseen. Eventual mandatory priorities expected . . . Lack of shipping facilities to hamper accumulation of strategic raw materials . . . West coast steel plant proposal reported rejected. Expansion of existing facilities considered more feasible . . . 200,000 houses required for defense workers

WASHINGTON

■ SCOPE of the defense program is expanding so rapidly defense officials are revising their previous belief that priorities on steel will not be necessary.

Authoritative sources here believe the industry will soon be placed on a priorities basis, which will include an allocation system, if it is possible to refrain from mandatory priorities.

Eventual mandatory action is foreseen, however, as the government now conceives of our participation in the war as likely to last for three or four years.

Priorities are seen near also for copper. Lack of shipping threatens to cut down amount of foreign copper that will be brought here this year, and defense officials are stressing that available supplies must be conserved, with a possible shortage in mind.

Free trading in metals, already sharply curtailed, is likely to become a thing of the past as the armament program develops, in the view of high officials. Priorities and other controls slated for the industry will be aimed at diverting supplies from nondefense uses, and making as much as possible available for military needs.

First step that will change the priorities picture on steel, it is believed here, will be the Gano Dunn report which will be submitted to President Roosevelt about May 28. Dunn is understood to have found steel needs have undergone a large increase since his earlier report on capacity and supply.

Accumulation of strategic raw materials in stockpiles will be hampered by a lack of shipping facilities expected later in the year, and the OPM has given up hope of obtaining the amounts originally planned.

Industry can be supplied with nearly a full year's needs of chromite, graphite, manganese, mica, tin and rubber from the stockpiles. The tungsten situation is serious, with stocks depleted when imports over the Burma Road were interrupted. In zinc, the shortage has not been alleviated to any great extent by the stockpile program, and purchases from other Western Hemisphere nations are being considered.

The OPM gives this status for the principal items figuring in the stockpile buying:

CHROMITE: (Ore used in making chromium) Stockpile sufficient to supply industry for more than a year at current rate of consumption. Much more has been ordered, and domestic production is being encouraged.

COPPER: (Shells and other military) Orders of considerable quantities have been placed with Chile, and delivery of first 100,000 tons is being completed.

GRAPHITE: (Military uses principally for foundry and crucible work, paints and pigments, electrical machine brushes, electrodes and dry batteries) Stockpile adequate to supply industry nearly a year at present rate of consumption.

MANGANESE: (Used in iron and steel manufacturing) Stockpiles sufficient to meet industrial needs for 16 months. Probable domestic production, plus Cuban deliveries, could supply industry through 1943.

MERCURY: (Used in the manufacture of a compound for high explosives, drugs, and antifouling paint for ship bottoms) Domestic output has risen to record heights. Stockpile adequate to supply industry for more than half a year.

MICA: (Used in radio and electrical equipment manufacturing) Stockpile enough to supply industry for more than a year. New sources in Western Hemisphere being investigated.

NICKEL: (Used as an alloy in steel to increase toughness) Current supplies are low, but most of world supply is in Canada and defense requirements are assured.

QUARTZ CRYSTAL: (Principal use is in radio frequency control) Stockpile is sufficient for some months and growing.

TIN: (Used in the manufacture of automobiles, gun metals, etc.) Present stock will supply industry more than a year. Large tonnage ordered from China. Bolivia to deliver 18,000 tons a year for five years.

TUNGSTEN: (Used to give alloy steels high tension characteristics) Stocks are low, largely due to an interruption of imports while the Burma Road was closed. Domestic production being stepped up so that peace-time needs can be met without imports. Substitutes are being studied.

ZINC: (Used in plating storage batteries, for manufacturing brass, and galvanizing metals) Shortage being met by partial priority control and expansion of existing plants. Domestic supply could be supplemented by purchases from other nations of the Western Hemisphere.

RUBBER: Record imports have built a sufficient reserve for about a year. Exchange of U. S. cotton for British rubber helped build stock. Synthetic production increasing but still insignificant. Conservation and increased reclamation being studied

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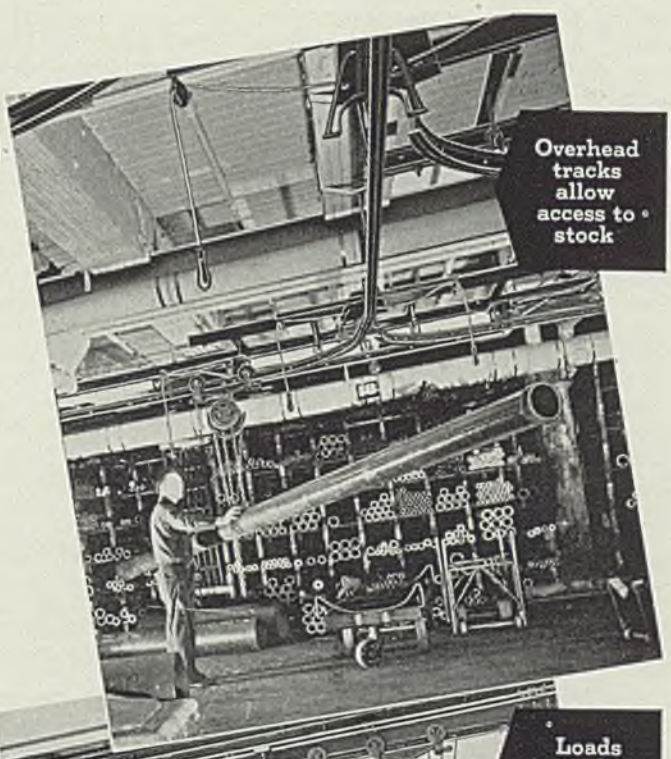
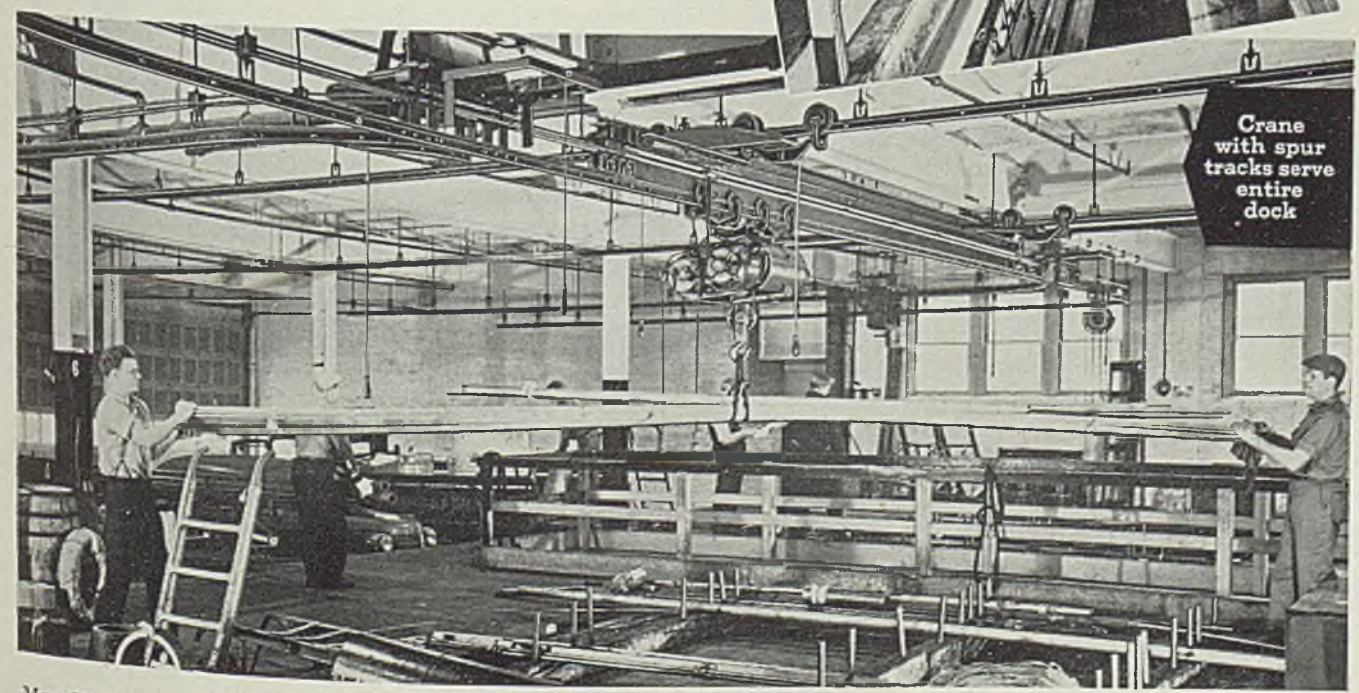


Overhead tracks allow access to stock

Loads raised to dock through hatchway



Crane with spur tracks serve entire dock

which, with moderate application, would stretch supply for about a year and a half.

U. S. To Finance New Bendix Aviation Corp. Magnesium Plant

A $1,079,005 lease agreement providing for purchase of land, buildings and equipment for a magnesium castings factory has been authorized with Bendix Aviation Corp., Jesse Jones, Federal Loan Administrator, announced. The plant will be built at Bendix, N. J.

Mr. Jones said that at the request of the OPM, the Reconstruction Finance Corp. has made available $250,000,000 for aluminum facilities, $350,000,000 for aircraft plants, and $50,000,000 for magnesium plants.

They will be owned by the Defense Plant Corp. and leased to private operators, he said. No expansion of existing facilities is involved in the new program, which contemplates erection of new facilities.

The Metals Reserve Co. has contracted with Bolivian tungsten producers to buy their entire production for the next three years, at $21 per short ton unit. Mr. Jones said about $8,000,000 per year will be spent for the production, which will be in the form of ores and concentrates containing about 4400 tons per year of tungsten oxide.

Metal Inventory Control Order Interpretations Are Issued

E. R. Stettinius Jr., priorities director, has issued a series of interpretations and instructions relating to the metal inventory control order issued on May 1. The order provides for a form of inventory control on 16 metals and classes of metals and has as its main purpose to prevent accumulation of excessive stocks. Customers are not permitted to acquire inventories in excess of the quantity necessary to meet required deliveries efficiently.

The interpretations explain how the order applies to exports, imports, deliveries of metals to consignees, acquisition of seasonal stocks, transactions carried on between commission men, detinners, warehouse and wholesale distributors, customers of metals in "semi-processed or pre-manufacturing form," and the filing of required reports.

Report OPM Rejects West Coast Steel Plant Proposal

Office of Production Management's Raw Materials Division has rejected the proposal of Henry J. Kaiser, West coast construction engineer, to build a new steel plant in the West, it is understood.

S. R. Fuller Jr., head of the division, is reported to have written to President Roosevelt that the Kaiser proposal is not practical and would be an unsound use of government funds. The proposal involved government financing.

W. A. Hauck, steel consultant for OPM, made a field survey of the possibilities. Lack of coking coal was said to be one of the objections cited in his report.

What action the President plans is not known. He frequently has spoken favorably concerning the possibility of a Pacific coast steel industry. At press conference last week he was asked if he had received a letter from OPM dealing with the question and replied that he had received several, but that no conclusions had been reached.

OPM Chief William S. Knudsen said steel production on the Pacific coast could be increased more rapidly by expanding existing plants. He also indicated the Kaiser proposal would not be approved by the government.

Personnel Additions to Defense Organization

Four assistant deputy directors' offices have been created in OPM's priorities division by Director E. R. Stettinius Jr.

L. E. Scriven and E. C. Laird Jr. will staff one of these offices and will have charge of the division's field work.

C. H. Mathiessen Jr. will be assistant deputy director for operations.

Joseph L. Overlook will serve as assistant deputy director in charge of blanket and project preference ratings; he will be assisted by A. L. Williams.

E. A. Locke Jr. will be assistant deputy director in charge of liaison with other government agencies and with Great Britain.

Mr. Stettinius also announced the assistant director in charge of operations hereafter will be known as the deputy director and will supervise the work carried on by the four assistant deputies. John P. Gregg, formerly of the State Department, will be assistant to the deputy director.

Nelson Rockefeller, co-ordinator of commercial and cultural relations between the American republics, will be an advisory representative to the priorities board and will also serve as a special advisor to Mr. Stettinius on Latin American problems.

Donald H. Wallace has been appointed price executive for the nonferrous metals and products section of OPACS by Leon Henderson, administrator. Mr. Wallace is on leave from his position as associate professor of economics, Williams College, Williamstown, Mass.

Carl G. Holmquist has been appointed associate price executive in the nonferrous metals and products section. Mr. Holmquist formerly was associated with several engineering concerns in the copper and other industries.

Peter Stone, formerly head of the construction analysis unit, Works Project Administration, has been appointed price executive for the lumber, building materials and furniture section.

Three appointments to OPM's production division were announced by Director Robert S. McConnell. E. J. Hergenrother, formerly metallurgist with International Nickel Co., will encourage industry to effect the substitutions recommended by the National Academy of Sciences' Metals Advisory Committee. Frank Ayer, consulting engineer for Roan Antelope Copper Mines, will study replacements for essential supplies which might be cut off by a shipping shortage. James S. Earle, formerly assistant metallurgist for Federated Metals Division, American Smelting & Refining Co., will take charge of the reclamation unit.

200,000 Houses for Defense Workers Needed This Year

At least 200,000 houses for defense workers are needed now and possibly another 200,000 will be needed next year, J. C. Nichols, chief of the supply section, OPM, declared last week. Caution in expanding defense housing was urged by Mr. Nichols, however.

"In my opinion, defense housing construction must be held to the absolute minimum. I believe, where we know the demand is temporary and private industry cannot afford to build, we should make every effort to use dormitories, floating hotels, trailers, mobile houses, demountable houses, or the cheapest construction consistent with decent living standards. Otherwise, I fear the impact on other existing home values after the emergency, and the discouragement of new home building when it will be so sadly needed to give wide employment in our aftermath."

Industrial Accidents Rise as Defense Production Expands

Deaths from occupational accidents in March were 7 per cent higher than in March, 1940, according to the American Red Cross. The increase is attributed to the employment of new men on jobs where they are relatively inexperienced and not aware of the inherent hazards.

Upswings in employment usually are accompanied by increases in the accident rate.

Nickel Under Formal Allocation; May Shortage Is 5,500,000 Pounds

DISTRIBUTION of nickel last week was placed on a formal allocation basis, replacing the mandatory controls in effect since last March. E. R. Stettinius Jr., director of OPM's priorities division, stated the division will distribute available supplies month by month for defense purposes.

Simultaneously, the American Iron and Steel Institute published a pamphlet suggesting possible substitutes for nickel steels.

No schedule of preference ratings for civilian uses was included in the latest order, although Mr. Stettinius said "some allocations can and will be made for nondefense uses on a restricted basis."

While an effort will be made to avoid unemployment and labor dislocations by forcing a total stoppage to nondefense industries, Mr. Stettinius declared "it is apparent nickel flowing into civilian channels will have to be drastically curtailed."

Approximately 15,500,000 pounds of nickel, the largest amount that ever has been available to United States industry, will be distributed during May. Almost all of this is of Canadian origin.

Indicating that defense manufacturers will not be confronted with a shortage, Mr. Stettinius announced that all defense orders hereafter will have a rating of A-10 or higher.

May demand, if all defense and civilian needs could be filled, would total 21,000,000 pounds, according to OPM spokesmen. While it is impossible to estimate future needs in face of a rapidly changing situation, it appears the overall shortage for all purposes probably will exceed 45,000,000 pounds in 1941.

Producers and distributors of primary nickel were ordered by the priorities division to maintain complete records on inventories, contracts and orders, which are to be submitted to the division not later than the 25th day of each month. Order became effective May 15 and expires Sept. 30, 1941.

Institute Suggests Possible Substitutes for Nickel Steels

To conserve nickel and aid consumers in making suitable substitutes for nickel steels, the American Iron and Steel Institute has published a booklet giving technical advice on alloys steels to be used as possible substitutes.

The booklet suggests as possible substitutes a wide variety of standard steels. In some cases of high-nickel alloys, it suggests the substitution of alloys containing a lesser amount of nickel, together with such other alloying elements as molybdenum, chromium and vanadium.

In other cases, nickel would be entirely supplanted by other alloys. By such substitutions, it is believed the various nondefense industries whose supplies of nickel steels have been temporarily cut off or reduced may be enabled to continue production with a minimum of inconvenience or delay to the consumers.

The booklet, entitled *Possible Substitutes for Nickel Steels*, deals solely with constructional steels containing not more than the following percentages of the given alloying elements: Nickel, 5.25; chromium, 1.50; molybdenum, 0.75; manganese, 2.00; silicon, 2.00 and vanadium, 0.20.

Effects of various quantities of those alloying elements on the engineering properties of steel have been explored and recorded systematically, thus making it possible to put into effect quickly a widespread program of substitutions in alloy steels. In some cases, substitutions may be made which will be satisfactory in every respect, while in others, a compromise involving redesign of the product may be necessary.

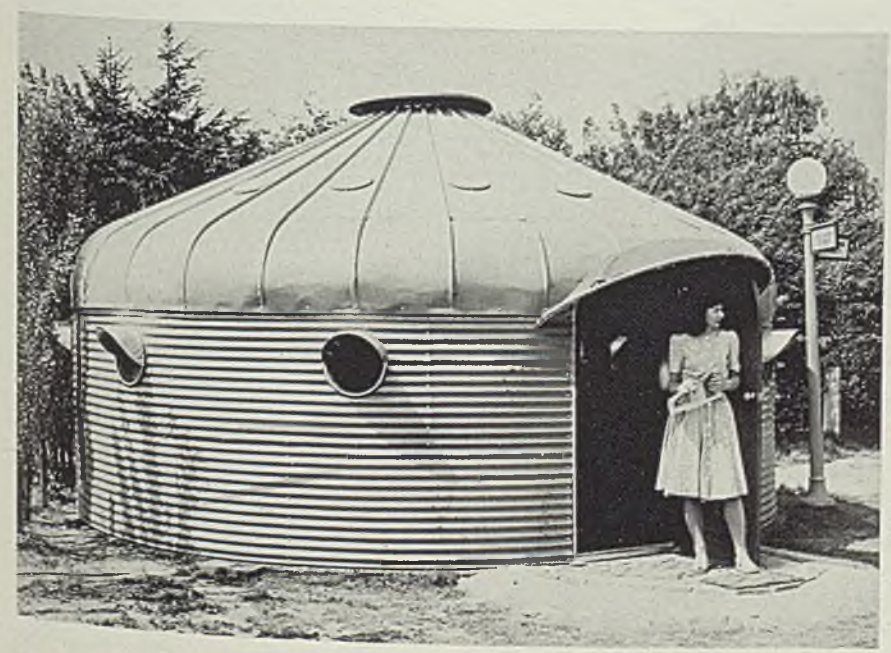
Utilizes Published Data

Published data from many sources were studied to determine the differences which exist among various types of alloy steels. Among those whose findings were utilized, aside from steel manufacturers, were the Climax Molybdenum Co., Electro Metallurgical Co., International Nickel Co., Vanadium Corp. of America and the General Motors Corp.

To simplify the process of selecting suitable substitutes for nickel steels, numerous charts have been included showing the comparable physical characteristics of standard alloy steels, including standard carburizing grades, thorough hardening steels, and low-carbon alloy steels of low hardness value. The charts give such data as tensile strength, yield points, hardness and impact resistance.

Booklet urges that steel manufacturers should be freely consulted and their experience drawn upon before substitute steels are selected and specified by consumers.

Simplified Circular House for Defense Workers



Low cost of about $750 and rapidity with which it can be erected feature this prefabricated unit proposed for housing defense workers, recently demonstrated in Washington. With an interior diameter of 20 feet, and 12 feet high, the house weighs 1½ tons and can be erected in six man-days, according to its designer. Canvas partitions separate the interior into four rooms. Fifteen skylights are set in the ceiling, with 10 portholes or windows in the wall. Known as the Dynaxion House, this unit was one of many types submitted to the Defense Housing Coordination Division. NEA photo

Mirrors of MOTORDOM

By A. H. ALLEN
Detroit Editor, STEEL

Ford six finally appears in passenger cars as companion to V-8 engine at $15 less cost. Good speed-torque characteristics and gasoline economy reported. Unusual feature is high-pressure water system . . . UAW-CIO says 55,000 new members in April, tipping off strength in Ford vote . . . Purchasing offices being set up for "big three" bomber programs . . . Nash to build aircraft propellers

DETROIT

■ COINCIDENT with announcement that the Ford 6-cylinder engine is now available for optional installation in regular Ford models came the news that all Ford V-8 models had been increased $15 in price, while the six will be sold at the old price of the V-8, making it thus $15 lower in price.

Long awaited, the Ford 6 engine has been supplied in a number of trucks and commercial cars so that a good measure of service in the field could be obtained. Original plans to build 25,000 of the engines have had to be somewhat modified because of the inroads of the defense program on Ford production, with the result that only a limited number of engines will be available for installation in passenger cars until next fall. However, several Ford dealers here had sixes last week, though not on display floors.

Report Engine Interchangeable

Company announcement was to the effect the 90-horsepower six was interchangeable with the 90-horsepower V-8 engine, but one dealer here reports that the six calls for a slightly different chassis, identified as 1GA, involving altered frame construction in the front end to provide for mounting the longer engine. The front cross member is moved ahead 3½ inches as is the radiator; however, this requires no changes in exterior sheet metal.

The engine shows exceptionally good speed-torque characteristics, 180 pounds torque at 1200 r.p.m. Bore and stroke are 3.3 by 4.4 inches. Horsepower is 90 at 3300 r.p.m., comparing with 90 at 3800 for the V-8. Unusually good gasoline economy also is claimed, approximating 22 miles per gallon at 40 miles per hour speed. Compression ratio is stepped up to 6.7 to 1. Displacement is 226 cubic inches.

Another unusual feature is the use of a high-pressure water system to insure ample cooling of cylinders and valves. A special type of pump develops 25 pounds pressure and all valves and cylinders are completely surrounded by water cooling passages. Incidentally, no sleeves or liners are used in the cylinders. The high pressure in the water pump, in early experiments, was found to build up end thrust to such a point that pump glands wore out rapidly. Design was changed to bring balanced pressure on the pump, and the wear was eliminated. Lubrication of the pump shaft is through an oil reservoir and a porous bronze bushing.

This is not the original Ford six engine which was being talked about a year or so ago. That engine was being designed for installation in a small 106-inch wheelbase chassis, for a low-price high-performance car which is still on the shelf, though not forgotten, at the Rouge plant. The current engine is at least the fourth design of six which has been developed. Engineers who should know report the present six was developed for defense purposes originally but had to be abandoned when the army recently canceled a large order for automobiles because of alleged failure by Ford to live up to provisions of the Walsh-Healey act. Whereupon the engine was installed in trucks and commercial cars, and now the guess is that shortly it will be promoted actively for passenger cars as a "running mate" to the V-8 engine. Still a distinct possibility for the future is the small low-price job, powered by a six, to provide Ford an entry in the field of "pure transportation" but still competitive with performance of current cars.

The present six should improve Ford's competitive position against Chevrolet in an important way, and further should start to return a part of the company's million-dollar (or more) investment in developing 6-cylinder engines.

Campaign by Radio

Pre-election campaigning by the UAW-CIO in connection with the Ford vote last week assumed big-time proportions. Newspapers carried quarter-page advertisements several times, and on Tuesday evening an hour's time was purchased on the leading NBC radio station here (at a cost of $600) for pep talks by George F. Addes, secretary-treasurer of the union; Walter P. Reuther, head of the General Motors division of the UAW-CIO; Michael F. Widman, head of the Ford organizing committee; R. J. Thomas, president of the UAW-CIO; Allan S. Haywood, organizing director of the CIO, and Philip Murray (by transcription), head of the CIO.

The speeches were amateurish except for those of Murray and Haywood. An amusing angle was that before and after each 5-minute talk, the station announcer repeated the statement that the time for the broadcast was purchased by the UAW-CIO and that the views ex-

pressed "were not necessarily" those of the broadcasting station. One could almost see administrative and sales officials of the Ford Motor Co. listening intently at their radios for every inflection of speakers and announcers. The radio station happens to be owned by or affiliated with the largest newspaper here.

Mr. Addes let drop the observation that the UAW-CIO during April signed up new members at the rate of one every 47 seconds, which figures out to something over 55,000 union neophytes. This appears to testify to the effectiveness of the Ford strike in persuading Ford workmen to join the UAW. What might have been still more enlightening would have been some figures on how many of these "new members" have actually paid enrollment fees or initial dues. The union usually defers such payments until convenient for the signers to pay.

Shortly after settlement of the threatened General Motors strike, featured chiefly by granting of wage increases of 10 cents an hour, Harry Bennett, Ford personnel administrator, announced that wage increases amounting to something like $15,000,000 had been authorized to Ford employes in recent weeks. The surprising part of Mr. Bennett's announcement was his remark that some inequities in wage rates had been called to his attention by "a certain newspaper man" and by the UAW-AFL. The UAW-CIO immediately pounced on this comment, as well they might, for its reflection on the administrative ability of the Ford management.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1939	1940	1941
Jan.	356,962	449,492	524,126
Feb.	317,520	422,225	509,233
March	389,499	440,232	533,912
3 mos.	1,063,981	1,311,949	1,567,271
April	354,266	452,433	.....
May	313,248	412,492	.....
June	324,253	362,566	.....
July	218,600	246,171	.....
Aug.	103,343	89,866	.....
Sept.	192,679	284,583	.....
Oct.	324,689	514,374	.....
Nov.	368,541	510,973	.....
Dec.	469,118	506,931	.....
Year	3,732,718	4,692,338	.....

Estimated by Ward's Reports

Week ended:	1941	1940†
April 26	108,165	101,405
May 3	130,610	99,305
May 10	132,630	98,480
May 17	127,255	99,030
May 24	133,560	99,810

†Comparable week.

Buying for Bombers Starts; Air Corps Buyers Here

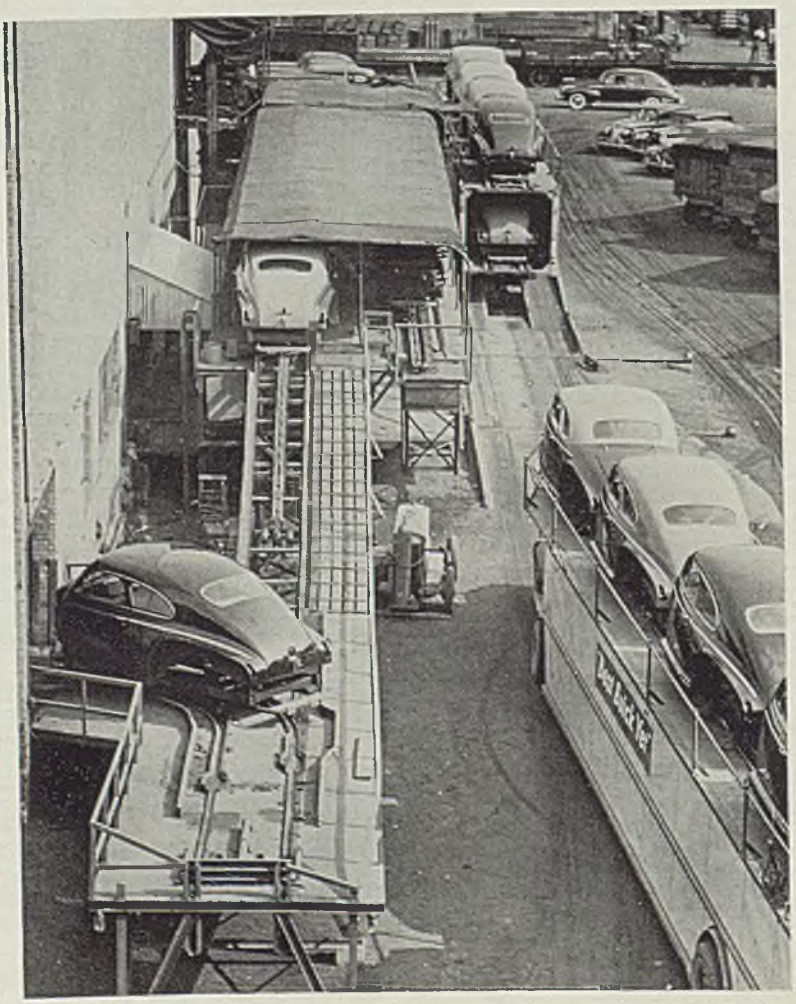
Until last week, the 300-a-month bomber program which the motor industry had assumed was largely conversation. However, it has now reached the active stage and contracts are being let to suppliers by Ford, Fisher Body, and Chrysler. Ford purchases clear through H. C. Kellogg of the purchasing-engineering departments. Fisher Body is buying for its Memphis, Tenn., plant, where bomber work will be centralized, through C. A. Crusoe, director of purchases, who will allocate various phases of the program—parts, materials, equipment—to his assistants. Heading production buying for Chrysler and located at 8505 West Warren avenue in the new Chrysler-Warren division, is W. C. Shepley, acting under direction of the Chrysler central purchasing department.

Meanwhile headquarters of the central air corps procurement district have been moved from Wright Field, Dayton, O., to Detroit, at the above Warren avenue location. District supervisor is Lieut. Col. Alonzo M. Drake, who heads a staff of 25 officers and 100 civilians. Function of this group is to co-ordinate, facilitate and follow up the procurement of airplanes, airplane engines and other aircraft materials after contracts for their manufacture have been let.

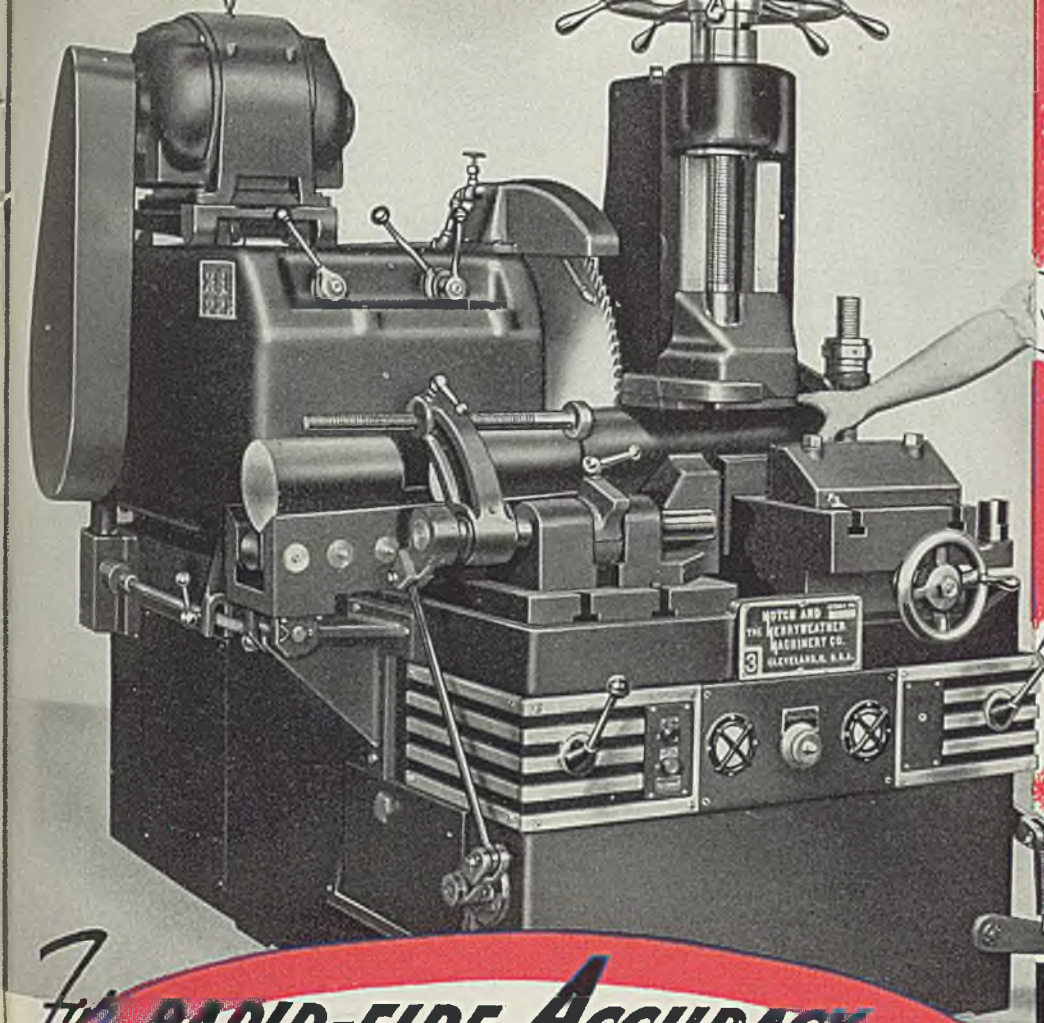
The three large motor manufacturers here will feed subassemblies of airframes and landing gear to four new bomber assembly plants being built at Omaha, Nebr., Kansas City, Mo., Fort Worth, Tex., and Tulsa, Okla. Cost of these four plants will total at least $63,000,000.

Chrysler has authorized addi-

(*Please turn to Page* 48)



■ Roller coaster principles aid this "loaderator" to keep a steady stream of Buick bodies feeding onto assembly lines. At right, a trailer carrying three bodies inside and four atop arrives from Fisher Body plant five miles away. After the trailer draws up on the ramp ahead, the covered traveling bridge slides over behind the load and receives both upper and lower groups of bodies by gravity. It slides back again, as in the illustration, and discharges its load, again by gravity, into two levels of the plant simultaneously. Body in the foreground has descended the roller coaster dip, and sprung automatic switch which diverts it into the assembly building

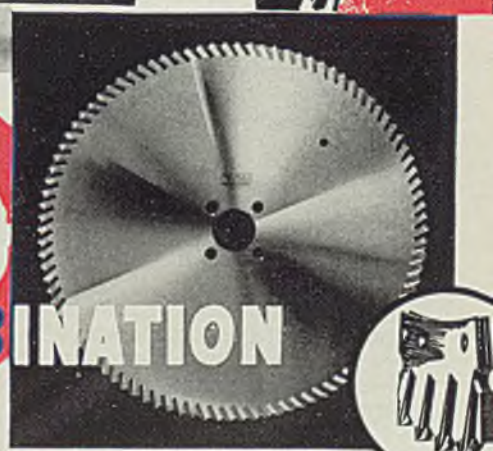


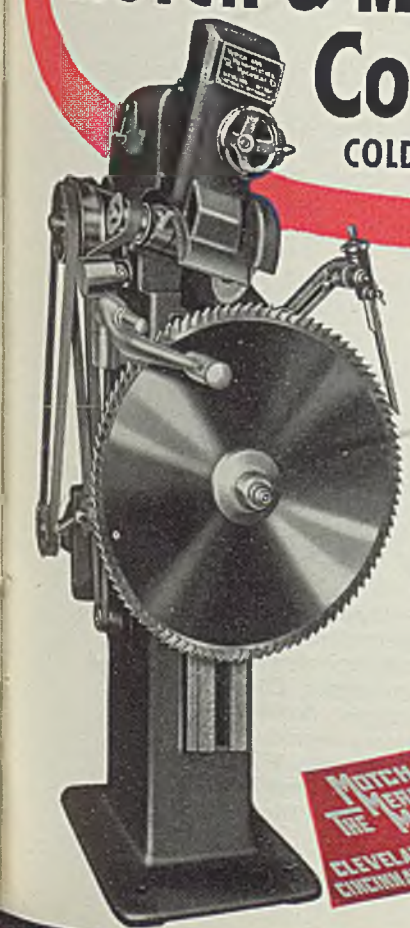
For RAPID-FIRE ACCURACY . . .

CONSIDER THE

MOTCH & MERRYWEATHER COLD SAWING COMBINATION

COLD SAW • SAW GRINDER • SAW BLADES





The Motch & Merryweather Cold Sawing Machine is now offered in two sizes and in both hand-fed and power-fed models. The hand-fed model illustrated has a foot-treadle-operated stock stop and roller conveyor. These attachments enable the operator to feed bar stock without changing position. You get solid, square cuts and sharp, clean, burrless cross sections. Every feature is present which promotes speed, precision, convenience, safety, long life and a good profit.

SAW GRINDER. Fast, accurate sharpening. Rigidity; automatic indexing; fully enclosed drive; safeguarded against vibration; no complicated devices; sliding gears for fast and low speeds; merely position lever for alternate high and low teeth. A grinder that gives you the most from Motch & Merryweather saw blades.

SAW BLADES. Segments of high grade tool steel fitted to heat-treated center, forming a closed ring to stiffen and strengthen the blade; great speed, low cost, long life; new segments set without reducing diameter. Saw blades that give you the most from the Motch & Merryweather Hydraulic Feed Cold Sawing Machine.

Ask for our new photograhic story of Motch & Merryweather No. 3 and No. 4 Cold Sawing Machines, Saw Grinder and Saw Blades.

MOTCH AND MERRYWEATHER MACHINERY CO.
CLEVELAND CINCINNATI DETROIT PITTSBURGH

Built by MOTCH & MERRYWEATHE

MEN of INDUSTRY

Lee H. Hill

■ **LEE H. HILL,** who recently was elected vice president, Allis-Chalmers Mfg. Co., Milwaukee, will head that company's newly established industrial relations department. Formerly assistant manager of the electrical department, Mr. Hill now will have charge of collective bargaining, grievance procedure, wage policies and levels, merit rating and job rating, training programs, safety program, insurance and pension plans and all other subjects which bear on management-employe relations. **W. C. Van Cleaf** will continue his work in industrial relations, reporting to Mr. Hill.

♦

Stephen B. Haynes has been elected assistant treasurer, Cochrane Corp., Philadelphia.

♦

Herbert G. Feth, assistant general freight agent, Chicago & Eastern Illinois railroad, Chicago, has been made assistant to vice president.

♦

Dan L. Graef has been named production manager, Cleveland plant of Thompson Products Inc. He succeeds **Al Gorris.**

♦

Peter E. Sance has been made works manager, Allenport division, Pittsburgh Steel Co., Pittsburgh. Formerly superintendent of finishing departments at Allenport, Mr. Sance succeeds **F. N. Gilmore,** retired.

♦

J. J. Richards, the past 27 years Cleveland district manager, Pittsburgh-Erie Saw Corp., Pittsburgh, has retired on pension. He is succeeded by **C. R. Young,** his assistant for 14 years.

♦

Harry L. Wilcox, assistant chief engineer, Electric Controller & Mfg. Co., Cleveland, has been elected president, Cleveland Engineering Society. Other officers: Vice president, **Walter C. Sutton,** Lindsay Wire Weaving Co.; treasurer, **Carlton R. Sabin,** president, Sabin Engineering Co.; managing secretary, **Richard I. Utter.**

♦

W. T. Mulcahy has been appointed western sales manager, industrial jobber division, Buda Co., Harvey, Ill. Previously he held executive posts with American-Marietta Co., Chicago.

♦

Harvey Le Fevre, formerly identified with Heisler Locomotive Works, Erie, Pa., has been named special representative by H. K. Porter Co., Pittsburgh.

♦

J. M. Howell, executive assistant to **E. D. Spicer,** manager, Schenectady works, General Electric Co., has been named to succeed his chief who has been advanced to assistant to vice president in charge of manufacturing.

♦

Arnold B. Keller, treasurer since 1932, and **Karl O. Schreiber,** assistant to vice president in charge of manufacturing, International Harvester Co., Chicago, have been elected vice presidents.

♦

J. Arthur Deakin has been named eastern district manager, McKenna Metals Co., Latrobe, Pa. He will be in charge of the new eastern sales office established at 50 Church street, New York.

♦

W. W. Kelley, general purchasing agent, Atchison, Topeka & Santa Fe railroad, has been elected president, Western Railway club, Chicago, succeeding **O. N. Harstad,** general manager, Chicago, Milwaukee, St. Paul & Pacific railroad.

♦

R. C. Adams has joined W. H. Bixby Inc., Des Moines, Iowa, in a sales engineering capacity. He will handle the products of Cochrane Corp., C. O. Bartlett & Snow Co., Diamond Power Specialty Corp., Hays Corp., Detroit Stoker Co., and A. P. Green Fire Brick Co.

♦

Stewart S. Hathaway, the past 21 years a director, Buda Co., Harvey, Ill., has been elected chairman of the board, a newly created post. Mr. Hathaway recently resigned as president, Institutional Securities Corp., New York. Other officers and directors of Buda have been re-elected.

♦

Ray J. Thompson, eastern district manager of Ampco Metal Inc., Milwaukee, has changed his address to 57 White avenue, West Hartford, Conn. He has supervision over Ampco field offices at Springfield, Mass., New York, Philadelphia, and Washington.

♦

Lawrence W. Howe, the past five years associated with Lincoln Park Tool & Gage Co., Lincoln Park, Mich., in executive sales and engineering capacities, has been appointed vice president and general manager. He succeeds **George Eglinton,** who has resigned to become vice president and director of sales, Charlesworth Inc., Cleveland.

♦

L. J. Fletcher has been named director of a new training and public relations department, Caterpillar Tractor Co., Peoria, Ill. **W. H. Franklin,** formerly in charge of Peoria assignments, Price, Waterhouse & Co., has joined the company as assistant controller.

♦

C. G. Tyler, formerly associated with the railroad division, Chicago district, Manning, Maxwell & Moore Inc., Bridgeport, Conn., has joined the industrial division, taking over the territory served from Columbus, O. He succeeds **Win Adams,** who has been transferred to Buffalo district. **Arthur B. Bleecker** will repre-

R. J. Lindquist

James Coombe

R. B. Nichols

J. F. Oehlhoffen

sent all four of the industrial divisions of the company in the Pacific northwest, covering Seattle and Portland.

♦

R. J. Lindquist has been elected vice president and a director, Reynolds Metals Co., Richmond, Va. Since 1932 he has served as chief auditor, Reconstruction Finance Corp., Washington, and also of its subsidiaries. He formerly was a vice president and director, Defense Plant Corp. and Rubber Reserve Co.

C. B. Stansbury has joined Reynolds Metals Co. as an executive in the firm's sales promotion department. He has been engaged in the securities business in Louisville, Ky., over 20 years.

♦

James Coombe has been elected president, Wm. Powell Co., Cincinnati. With exception of 2½ years, during which time he served as captain of the artillery in the first World war, he has been associated with the company since graduation from Yale university in 1910. Mr. Coombe is also a director, Crosley Corp., Globe-Wernicke Co., and Randall Corp.

Harry H. Coombe has been elected chairman of the board and treasurer of the Powell company; **George E. Weitkamp,** first vice president and secretary; **David M. Forker, Oliver F. Gang, W. E. Heilig** and **E. R. Noll,** vice presidents, and **W. E. Minor Jr.,** assistant to president.

♦

Arno L. Billeter has been named assistant to general superintendent in charge of manufacturing practice, Carnegie-Illinois Steel Corp., Pittsburgh. **Thomas W. Hunter** has been made superintendent of flat products finishing division at Irvin, Pa., works.

Mr. Billeter, associated with subsidiaries of United States Steel Corp. since 1919, had been superintendent of flat products finishing since October, 1938. Mr. Hunter formerly was assistant division superintendent of flat products finishing. He joined Carnegie-Illinois in 1936.

♦

R. B. Nichols, formerly secretary, Bantam Bearings Corp., South Bend, Ind., has been named vice president and general manager, and **J. Frank Oehlhoffen,** who has been serving as assistant sales manager, has been advanced to sales manager.

♦

John P. Arnoldy has been elected president, Warman Steel Casting Co., Los Angeles, succeeding the late Charles J. Wild. **Florence D. Wild** has been elected treasurer, and continues as vice president. **William P. McGervey Jr.** has been named secretary and assistant general manager.

♦

W. G. Powrie, since 1937 assistant superintendent of track maintenance and also engineer of water service, Chicago, Milwaukee, St. Paul & Pacific railroad, has been named engineer of maintenance of way, with headquarters in Chicago. **William Shea,** superintendent of track maintenance, has voluntarily retired after 57 years' service with the railroad.

♦

J. M. Roberts was re-elected president, Scientific Apparatus Manufacturers' Association, Chicago, at the organization's twenty-third annual meeting in White Sulphur Springs, W. Va., recently. **Frederick Post,** president, Frederick Post Co., Chicago, was named to a vacancy on the board of directors created by retirement of **Thomas Lord,** president, C. F. Pease Co., Chicago.

♦

Oscar N. Lindahl has been elected vice president in charge of finance, Carnegie-Illinois Steel Corp., Pittsburgh. He succeeds **M. D. Howell,** who will devote his time to duties as vice president-financial, secretary and treasurer of United States Steel Corp. of Delaware. Mr. Lindahl had been associated with Universal Atlas Cement Co. since 1911, recently as comptroller and secretary. Mr. Lindahl entered employ of United States Steel subsidiaries with the former Illinois Steel Co. in 1907.

Officers Elected by Tool Engineers' Chapters

■ American Society of Tool Engineers' chapters have elected officers, and the names of the chairmen and secretaries, in that order, are given in the accompanying list. Addresses are the same as the cities after which the chapters are named, with the exceptions noted.

DETROIT: B. L. Diamond, Consolidated Machine Tool Corp.; John Felten, Detroit Lubricator Co.

RACINE, WIS.: H. Ernest Munch, J. I. Case Co.; John Pritchard, J. I. Case Co.

CLEVELAND: C. V. Briner, Pratt & Whitney Co.; W. Reiff Jr., Cleveland Duplex Machine Co.

MILWAUKEE: Harold Heywood, Kearney & Trecker Corp., West Allis, Wis.; M. F. Herbes, Allen-Bradley Co.

CHICAGO: Sven G. Goransson, Union Special Machine Co.; Fred J. Schmitt, D. A. Stuart Oil Co.

HARTFORD, CONN.: Henry I. Moore, Firth-Sterling Steel Co., West Hartford, Conn.; Harry J. Hauck, Goss & DeLeeuw Machine Co., New Britain, Conn.

PITTSBURGH: R. W. Ford, Ex-Cell-O Corp.; W. W. Walters, Curtiss-Wright Propeller Division, Swissvale, Pa.

TOLEDO, O.: Lloyd A. Kelley, Dura Co.; George B. Sisley, Willys-Overland Co.

TWIN CITIES: Glen Roberts, Northwest Automatic Products Corp., South Minneapolis; William E. Boker, V. A. Boker & Sons Inc., Minneapolis.

BUFFALO: Allen C. Siegel, Curtiss-Wright Corp., Williamsville, N. Y.; William J. Noth, Fedders Mfg. Co., Kenmore, N. Y.

ROCKFORD, ILL.: Henry F. Ruehl, Fairbanks, Morse & Co., Beloit, Wis.; George Sorenson, Woodward Governor Co.

BALTIMORE: Godfrey F. Steiner, Glenn

L. Martin Co.; L. MacGregor, Glenn L. Martin Co.

NEW YORK: Frank J. Oliver, *The Iron Age;* Ben C. Brosheer, *American Machinist.*

PHILADELPHIA: John A. McMonagle, Atlantic Refining Co., Yeadon, Pa.; Henry A. Simpson, Machine & Tool Designing Co.

ROCHESTER, N. Y.: Cecil D. Lucas, Lucas Screw Products Co.; Milton L. Roessel, Camera Works, Eastman Kodak Co.

ST. LOUIS: D. D. Burnside, American Stove Co.; Clarence L. Miller, The Measuregraph Co.

DAYTON, O.: Herman O. Poock, Inland Mfg. Division, General Motors Corp.; Harry W. Winter, Leland Electric Co.

SYRACUSE, N. Y.: T. Ray Adams, A. V. Wiggins Co.; Raymond D. Coseo, Crouse-Hinds Co.

SCHENECTADY, N. Y.: A. Schuneman, General Electric Co.; N. Y. Coxe, General Electric Co.

CINCINNATI: W. D. Averill, Cincinnati Milling Machine Co.; Ray Holle, Cincinnati Engineering Tool Co.

CENTRAL PENNSYLVANIA: Hallet D. Jones, Frick Co., Waynesboro; Herbert M. Boyer, York Ice Machinery Co., York.

TRI-CITIES: W. Z. Fidler, Reynolds Engineering Co., Rock Island, Ill.; L. J. Rodgers, Deere & Mansur, Moline, Ill.

ELMIRA, N. Y.: C. D. Thomas, Remington-Rand Co.; Joseph G. Menihan, Corning Saw & Supply Co., Corning, N. Y.

WORCESTER, MASS.: C. John Lindegren, Crompton & Knowles Loom Works; Charles A. Banks, Heald Machine Co.

ONTARIO: E. Barker, Modern Tool Works Ltd., Toronto; L. G. Singer, Williams & Wilson Ltd., Toronto.

LOS ANGELES: Dwight C. Jones, Vultee Aircraft Co.; H. F. Lenz, National Postal Meter Co.

GOLDEN GATE: Karl L. Bues, Merchant Calculating Machine Co., Oakland, Calif.; L. A. Talamini, Friden Calculating Machine Co., Oakland, Calif.

HOUSTON, TEX.: L. M. Cole, Warner & Swasey Sales Co.; Louis M. Krausse, Krausse Mfg. & Tool Co.

SOUTH BEND, IND.: Horace R. Wentzell, Adams E. D. T. Inc.; Eugene J. Hill, Acme School of Die Design.

PEORIA, ILL.: Earl J. Kane, Caterpillar Tractor Co.; Levi W. Hammond, Caterpillar Tractor Co.

SPRINGFIELD, MASS.: Michael Brennan, United States Armory; William Suk, Clark Controller Co.

BOSTON: C. A. Lockwood, United Shoe Machinery Corp., Beverly, Mass.; W. W. Young, Pratt & Whitney Division, Cambridge, Mass.

GREATER NEW YORK: Thomas P. Orchard, Wright Aeronautical Corp., Ridgewood, N. J.; John J. Rodnite, W. L. Koburger Co. Inc., Maspeth, Long Island.

BINGHAMTON, N. Y.: Samuel E. Lenox, International Business Machines Corp., Endicott, N. Y.; Stanley K. Bishop, Scintilla Magneto Co.

INDIANAPOLIS: Ronald W. Updike, Quality Tool & Die Co.; A. F. Westlund, Mouldings Inc.

COLUMBUS, O.: C. E. Nelson, Jeffrey Mfg. Co.; H. T. Spoerlein, Ranco, Inc.

WESTERN MICHIGAN: Joseph Monahan, Joseph Monahan Co., Grand Rapids; Kenneth C. Butterfield, Grand Rapids.

SEATTLE: W. Carl Fields, Boeing Aircraft Co.; Richard J. McCafferty, Boeing Aircraft Co.

TWIN STATES: Wilbur Handy, Fellows Gear Shaper Co., Springfield, Vt.; Milan Jennings, Jones & Lamson Machine Co., Charleston, N. H.

SOUTHERN CONNECTICUT: Harry J. Bellemore, High Standard Mfg. Co., New Haven; A. H. Hitchcock, High Standard Mfg. Co., New Haven.

DIED:

Andrew W. Seacord, 55, director of manufacturing, International Harvester Co., Chicago, in Chicago, May 15. He had been associated with the company since 1911.

♦

Leon Brichant, 65, prominent in the European steel industry, in Brussels, Belgium, April 17. He was president, European Cartel for hoops, bands, skelp and wire rods; executive director, Societe Commerciale d'Ougree; director, Societe Anonyme d'Ougree-Marihay, Laminoirs d'Anvers, Societe des Operations Maritimes et Fluviales, N. V. Handelmaatschappij, and Belgian Steel Syndicate, as well as other important mills.

♦

Harris Creech, 67, president, Cleveland Trust Co., Cleveland, in that city, May 18. He was a director, Ajax Mfg. Co., Philadelphia; Cleveland Cliffs Iron Co., Cleveland; Firestone Tire & Rubber Co., Akron, O.; Interlake Steamship Co., Cleveland; Park Drop Forge Co., Cleveland, and others.

♦

Cornelius K. Chapin 64, president, Murchey Machine & Tool Co., Detroit, in Cleveland, May 6.

♦

William Sanford Bidle, 68, since 1913 president, W. S. Bidle Co., Cleveland, steel treating firm, May 11, in that city.

♦

Lawrence W. Scudder, 54, president, Century Metalcraft Corp.; treasurer, Permo Products Co., and vice president and director, George W. Brady & Co., all of Chicago, at his home in Lake Forest, Ill., May 18.

♦

William Henry Morris, 43, vice president, Edgar T. Ward's Sons Co., Pittsburgh, affiliated with Columbia Steel & Shafting Co. and Summerill Tubing Co., at his home in Pittsburgh, May 21. Mr. Morris had been associated with the organization since 1916, when he joined the company then operating as Columbia Steel & Shafting Co., at its Detroit plant. He later became manager of the Cleveland office, and in February, 1932, was appointed vice president.

♦

William H. Burns, 76, vice president and general auditor, Chicago, Rock Island & Pacific railroad, Chicago, May 20, in that city.

■ Industrial recreation programs are maintained in 38 per cent of 639 companies covered by a survey of such activities by two researchers at Purdue university, Lafayette, Ind. Companies with large numbers of employes are most likely to have such programs, it was revealed.

April Machine Tool Shipments $60,300,000

■ Machine tool shipments in April totaled about $60,300,000, National Machine Tool Builders' Association, Cleveland, reported last week. Deliveries totaled $57,400,000 in March and $54,000,000 in February.

Aggregate of shipments to date this year, the association reports, is more than $220,000,000, about double the volume for the corresponding period in 1940.

430 Electric Tractors, Trucks Booked in April

■ Bookings of electric industrial trucks and tractors in April were down from the February peak and totaled 430 units against 436 in March, according to the Industrial Truck Statistical Association, 208 South La Salle street, Chicago. Units booked in the first four months this year totaled 1605, an increase of 309 per cent over 392 units in the period in 1940.

Total net value in April of chassis only was $1,472,226, compared with $1,557,592 in March. In the first four months of 1941, total value of bookings was $5,360,779, against $1,362,023 in the period last year. Increase was 293 per cent.

April bookings included: 31 nonelevating platform trucks with total net value of $66,347; 356 cantilever trucks, $1,249,799; 22 light and heavy-duty tractors, $35,178; and 21 crane trucks, $120,902.

Convention Calendar

May 26-29—National Association of Purchasing Agents. Annual meeting, Stevens hotel, Chicago. G. A. Renard, 11 Park Place, New York, is secretary.

June 1-6—Society of Automotive Engineers, Inc. Summer meeting at Greenbrier hotel, White Sulphur Springs, W. Va. John A. C. Warner, 29 W. 39th street, New York, is secretary.

June 9-12—American Electroplaters' Society. Twenty-ninth annual convention at Hotel Statler, Boston. W. J. R. Kennedy, 93 Oak Grove Ave., Springfield, Mass., is secretary.

June 10-13—National District Heating Association. Thirty-second annual meeting at William Penn hotel, Pittsburgh. John F. Collins Jr., 1231 Grant building, Pittsburgh, is secretary.

June 16-20—American Society of Mechanical Engineers. Semiannual meeting at Hotel Muehlbach, Kansas City, Mo. C. E. Davies, 29 W. 39th street, New York, is secretary.

June 23-27—American Society for Testing Materials. Forty-fourth annual meeting, Palmer House, Chicago. C. L. Warwick, 260 S. Broad street, Philadelphia, is secretary.

Defense Depends on Workers' Zeal, General Declares, in New Gage Plant

■ MORE people in the United States must become much more enthusiastic about defense if the national program is to be a complete success, Brig. Gen. G. M. Barnes, Assistant Chief of Industrial Service, Engineering, Washington, stated in an address at the dedication of the Sheffield Corp.'s new plant in Dayton, O., May 16.

While fanatical zeal of German military forces generally is recognized, he said, "we are inclined to forget that in the highly mechanized war they are waging they must be backed up with equally fanatical zeal by the industrial workers who supply them with the tools of war."

He spoke before several hundred persons including army officers, civic officials, industrialists and skilled workers. Sheffield Corp.'s facilities now are devoted almost entirely to the making of essential gages for use in armories and arsenals and by companies manufacturing materiel for the army and navy.

Typical of these instruments are multiple gages for shell inspection. When a shell is clamped in a fixture a series of lights indexed by a diagram instantly and simultaneously indicates whether or not every important dimension of the shell is within prescribed limits of accuracy.

The visitors were conducted through the plant, wherein 650 men now are employed. The 80 x 240-foot addition, which includes air conditioned offices and engineering department, embodies air-raid protection facilities. With equipment, it represents an investment of $1,000,000 and makes Sheffield the largest gage manufacturing establishment west of the Atlantic seaboard.

In an address of welcome, Louis Poock, president and general manager, said the plant has not been expanded as a temporary expedient, but rather in the conviction that never again will the United States allow its defense facilities to crumble as it did after the first World war.

"Never again should we permit our country to seek or maintain peace with weakened hands," he said. "Instead, we should make doubly sure of our future peace by means of armed forces capable of backing up our sincere desire to maintain lasting peace."

The speakers were introduced by Col. Fred A. McMahon, Chief of the Cincinnati Ordnance District. They included Charles J. Brennan, mayor of Dayton, and Brig. Gen. W. P. Boatwright, Commanding Officer, Frankford Arsenal, Philadelphia. A message of commendation was received from Mason Britton, Director, Tools Section, Office of Production Management, Washington. Following the dedication, a reception in honor of General Barnes was held at the Moraine Country Club.

■ Army officers inspect gage plant of Sheffield Corp., Dayton, O., at dedication of $1,000,000-addition. Left to right: Brig. Gen. G. M. Barnes; Louis Poock, president and general manager of the company; Brig. Gen. W. P. Boatwright; H. B. Hambleton, Ordnance Department, Industrial Service, Engineering, Washington; Lieut. Col. W. A. Borden, assistant to General Barnes; Lieut. R. Kramer, Ordnance Department, U.S.A.; and Paul Poock, in charge of company's gage and machine tool sales

Farrell Urges Loans to Latin American Countries

■ James A. Farrell, chairman, National Foreign Trade Council, told more than 1000 exporters, financial and business leaders that loans to Latin American countries should not be considered as "pump-priming" and recommended a more realistic acknowledgment that financial aid to republics of South and Central America was, "an indispensable part of our defense program". Mr. Farrell spoke at a luncheon at the Hotel Astor, New York, inaugurating foreign trade week.

Nelson A. Rockefeller, co-ordinator of commercial and cultural relations between the American republics, said that American companies have dismissed hundreds of representatives and agents in Latin-American countries for pro-Nazi bias and subversive activities, and that the housecleaning still is in progress. He pointed out that government departments are assisting in the weeding out of undesirable elements in this country's export trade and that as a result pro-Nazi agents are finding it almost impossible to do business with United States companies.

Eugene P. Thomas, president of the Foreign Trade Council, will be the recipient of the Captain Dollar Memorial Award for 1941, as "the individual in the United States who has made the most outstanding contribution toward the advancement of foreign trade in our country", it was announced.

Government Requisitions Republic's Plane

■ Privately-owned Lockheed Lodestar transport plane used for business trips by T. M. Girdler, president, and other officials of Republic Steel Corp., Cleveland, has been requisitioned by the government.

All private purchasers of the Lodestar model, a twin-engine 1200-horsepower craft, were reported to have been asked by the Office of Production Management to turn in their planes for national defense. Republic's plane, with capacity for nine passengers and two pilots, was immediately delivered to the government.

New Priorities Plan Designed To Aid "Off-the-Shelf" Manufacturers

■ A NEW priorities plan to assist "off-the-shelf" manufacturers obtain scarce materials for defense products was evolved last week by E. R. Stettinius Jr., Director of Priorities. It is known as the Defense Supplies Rating Plan.

Manufacturers who are granted the use of the plan will estimate the proportion of their total production which goes into identifiable defense channels and then will be given an A-10 rating for scarce supplies they must have to meet the defense demand for their products.

Thus a plant which is engaged 60 per cent in defense and 40 per cent in nondefense work may get an A-10 rating which will apply to deliveries of scarce materials flowing into its defense orders.

The plan is designed primarily as a solution to the problem of those producers who do a business calling for immediate deliveries. They will be assisted in maintaining a steady flow of necessary materials. Major points:

For the present, the method will be tried experimentally with a restricted list of about 500 producers of: Industrial motors from 1 to 200 horsepower, cutting tools, portable tools, hack and band saws, lathe tools, files, socket screws, roller and silent chains, and scientific instruments.

The assistance provided will apply only to scarce materials.

The plan will in no case apply to production which cannot be identified with defense.

The new plan supplements other forms of priority aid—for example, individual preference ratings—which will continue to be used. The Defense Supplies Rating Plan, it is emphasized, is designed to provide a special form of assistance.

Methods are provided whereby subcontractors, affected by the ratings granted producers, may themselves extend the A-10 rating to their own suppliers.

The effect of the A-10 rating is to put orders covered by the arrangement ahead of nondefense contracts for orders with lower ratings or no ratings.

Administration of the plan is to be handled by Joseph L. Overlock, Division of Priorities, Office of Production Management.

Details of the plan will be given to selected manufacturers in a letter of instructions.

The three most important points are as follows:

The manufacturer from his *sales* records for the preceding quarter determines the percentage of his defense sales to his total sales.

The manufacturer from his *production* schedules for the current quarter determines the total quantity of scarce materials necessary to complete his total production schedule.

The manufacturer determines the quantities of scarce materials required for his defense production by applying the *percentage* developed in the *sales* analysis to the total quantities of scarce materials necessary to complete his total *production* schedule.

This defense requirement gets an A-10 rating.

For example, if the sales analysis shows that 60 *per cent* of his business is for defense and according to his total *production* schedule he needs a total of 1000 pounds of nickel-steel rods, he gets an A-10 preference rating for 60 per cent of such requirements, or 600 pounds of nickel-steel rods.

TEXT OF DEFENSE SUPPLIES RATING PLAN

LETTER OF INTRODUCTION

In the interest of national defense, the Division of Priorities of the Office of Production Management has formulated a plan known as the "Defense Supplies Rating Plan" to assure the provision in certain well-defined cases of Scarce Materials, including parts and assemblies, which are essential to the production of Defense Supplies: (1) in quantities necessary to maintain the flow of raw materials and work in process for production essential to defense, and (2) to permit production of Defense Supplies for stock to the extent that such production is essential to defense.

1. This Is An Optional Plan

The use of this plan is optional with a producer. If a producer can now obtain the materials essential to manufacture Defense supplies to meet his schedule of deliveries, the Division of Priorities expects he will continue to operate without the assistance of the plan. If, on the other hand, it is extremely difficult or impossible to procure such materials, the plan is designed to assist in their procurement. Before making application to operate under the plan the producer must first make full use of available materials already in his own inventory and second, make every reasonable and determined effort to procure the materials through the use of his own purchasing organization.

2. The Plan Is Limited To Scarce Materials Essential To Defense Production

The Defense Supplies Rating Plan shall be used only to procure scarce materials to be used in the manufacture of Defense Supplies.

"Scarce Materials" means the materials, parts and assemblies which the producer cannot obtain sufficiently promptly to fulfill his required schedule of deliveries of defense supplies.

"Defense Supplies" means the materials, parts and assemblies entering directly or indirectly at any stage of production into material for delivery under any contracts or orders

(a) placed by the Army or Navy, or
(b) for the defense of Great Britain, or
(c) for the government of any other country whose defense the President deems vital to the defense of the United States, or
(d) carrying a preference rating of A-1-a to A-10 inclusive;

also, for any material, parts or assemblies to be used for the manufacture or processing of the foregoing.

3. Outline Of Defense Supplies Rating Plan

Under this plan the producer will request each quarter for a particular plant, division, department, product, or products a preference rating on deliveries of Scarce Materials by his suppliers.

To determine the quantities for which a preference rating is requested, he will each quarter:

(a) Total Dollar Volume: Determine the total dollar volume of business done during the preceding quarter, using incoming orders, shipments, production or any other consistent basis

which fits his method of record keeping.

(b) Defense Supplies Dollar Volume: On the same basis, determine the dollar volume of business in the preceding quarter which can be identified as Defense Supplies by specific identification or affidavit (as explained in Section 7).

(c) Total Scarce Material Requirements: Calculate the total requirements of quantities of Scarce Materials necessary for production during the current quarter.

(A quarter refers to a three month period beginning on the first day of any month in the year. For example, if applicant files a report on Aug. 1, the preceding quarter, referred to in (a) and (b), will begin May 1 and end July 31, while the current quarter, referred to in (c) will begin Aug. 1, and end Oct. 31.)

That proportion of Total Scarce Material Requirements, which Defense Supplies Dollar Volume bears to Total Dollar Volume will determine the quantities of Scarce Materials for which a preference rating is requested. For example: If in terms of incoming orders, shipments or production, the Defense Supplies Volume is 50 per cent of Total Volume, then the producer will be entitled to receive a preference rating on 50 per cent of his requirements of Scarce Materials for the current quarter.

These estimates of requirements of Scarce Materials will be submitted to the Division of Priorities at the beginning of each quarter. The Division of Priorities will examine these estimates and will approve or modify the same and will assign a preference rating of A-10 to deliveries of the quantities approved.

All Producers to whom this plan is extended will be treated on a common basis. All of the materials, parts and assemblies will receive the same rating, A-10.

4. How To Qualify Under The Defense Supplies Rating Plan

If the assistance of this plan is required by a producer to meet his delivery schedules of Defense Supplies, he should fill out in triplicate in accordance with the instructions given, Form PD-25 "Report of Requirements for Scarce Materials" which accompanies this letter and send to the Division of Priorities, Office of Production Management, Washington.

Upon receipt of the Report PD-25, properly filled out, the Division of Priorities will approve or modify the requirements set forth in Form PD-25, issue to the producer its Defense Supplies Rating Order and assign a preference rating of A-10 to deliveries of the quantities of Scarce Materials thus determined.

The producer shall thereupon execute an acceptance of the Order in the manner therein provided and immediately send the same to Division of Priorities, Office of Production Management, Washington, and execute additional copies for his suppliers as explained in Section 8.

5. First Report To Be Filed (Form PD-25)

It is recognized that many producers do not now maintain such records as will quickly permit an entirely accurate determination of Defense Supplies Volume. For this reason, and to expedite defense production, a producer in filing his first report on Form PD-25 need only estimate as closely as possible the proportion that Defense Supplies Volume bears to Total Volume. Although complete accuracy is not required in this one determination, the basis used must be established in a reasonable and prudent manner, and the basis established shall be explained in a letter accompanying the first report filed on Form PD-25. In determining the basis to be used for this estimate you shall as a minimum contact principal customers and obtain from them an estimate of the business placed that is Defense Supplies. This data shall be retained in a form subject to inspection.

In connection with the estimate of Defense Supplies Volume permitted to be used in the original report, the supporting information must be compiled in the form of identification of contracts, projects, or preference ratings, or by affidavits, in the manner prescribed for all subsequent reports in Section 7 below. Such data and analysis shall cover not less than 75 per cent of incoming orders, shipments or production for a period of not less than 30 days immediately preceding the quarter for which the first report is filed. The information compiled and the supporting data shall not be sent to the Division of Priorities but shall be retained in a form which shall 30 days after date of filing of first report be readily subject to identification, inspection and analysis of a field inspector of the Division of Priorities.

The producer shall summarize the information compiled and report the same in a letter to the Division of Priorities immediately upon the completion of said compilation.

If requirements for Defense Supplies in the initial period have been either underestimated or overestimated, a compensating adjustment must be made by the Producer in reporting under Form PD-25 for the succeeding quarterly period.

6. Second And Subsequent PD-25 Forms To Be Filed

In the second and all subsequent reports to be filed, Section 5 of these instructions will not be applicable.

The analysis of Total Volume and Defense Supplies Volume used in the second and all subsequent PD-25 Forms filed will be based on book records for the entire preceding quarterly period as outlined in Section 3. However, the Producer shall have the option of analyzing either:

(a) 85 per cent of his total dollar volume of business in the preceding quarter, in which event the results of such analysis shall be deemed to be applicable to 100 per cent of his Total Dollar Volume, or

(b) Less than 85 per cent of his Dollar Volume of business in the preceding quarter, in which event the portion of his dollar volume of business not analyzed shall be considered as non-defense business.

7. Defense Identification And Customer's Affidavit

To establish as definitely as possible the volume of business in Defense Supplies, a producer upon receiving a Defense Supplies Rating Order shall thereafter require customers to identify by contract, project or preference rating, the contracts and orders placed with him to determine whether the products shipped will be Defense Supplies.

When such definite identification of a contract or order is not possible, such products of the producer may nevertheless be identified as Defense Supplies if the producer can secure from his customers an affidavit in the form of "Customers' Affidavit of Defense Requirements" which accompanies this letter. One such affidavit shall be obtained from each customer each month covering all such unidentifiable contracts or orders placed by such customers with the producer during said month.

If the customer is a dealer, jobber or distributor, such dealer, jobber or distributor shall furnish to the producer one such affidavit each month. But the dealer, jobber or distributor in turn shall procure from each customer each month a "Customers' Affidavit of Defense Requirements" covering all contracts or orders, to support the affidavit made to the producer. In obtaining "Customers' Affidavit of Defense Requirements" to support affidavit made to producer by a dealer, jobber or distributor, the dealer, jobber or distributor shall follow the same procedure as that outlined above for the producer.

"Customers' Affidavit of Defense Requirements" is permitted only when the customer's order is not specifically identifiable by preference rating, project or contract identification.

8. Assignment Of Preference Rat-

ing To Deliveries Of Scarce Materials

When the Producer has filed reports as above provided with the Division of Priorities and a preference rating of A-10 has been assigned to deliveries to the producer of quantities of Scarce Materials, the Division of Priorities will mail a certified copy of Form PD-25 to the producer and at the same time assign a serial number to that producer, whereupon the producer shall in applying the preference rating to the deliveries of said quantities of Scarce Materials from his suppliers, refer to (1) the Defense Supplies Rating Order, (2) the serial number assigned, (3) the expiration date thereof, and (4) the quantities of Scarce Materials to the deliveries of which the preference rating applies.

The producer having executed a copy of the Order and delivered the same to the Division of Priorities, he shall execute an additional copy for each supplier to whose deliveries of Scarce Materials preference rating is applied and furnish one such additional executed copy to each such supplier. One such copy furnished to a supplier shall be deemed to cover all deliveries of such material by such supplier to the producer whether such deliveries are pursuant to one or more orders placed at one time or from time to time and for one or more types of material, provided that the total shall not exceed the quantities certified by the Division of Priorities.

9. Extension Of Order By Suppliers And Sub-Suppliers

After a producer has received a Defense Supplies Rating Order and a preference rating has been assigned to deliveries of Scarce Materials to him, his supplier may in turn require the assistance of the same rating to make possible his deliveries to the producer.

The supplier may extend the preference rating to his sub-supplier by executing additional copies of the same Defense Supplies Rating Order which has been issued to the producer. He shall send one such executed copy to the Division of Priorities, and another to each of his sub-suppliers to whose deliveries he intends to apply the rating. The sub-supplier may re-extend the preference rating by following the same procedure.

In extending and re-extending the preference rating originally assigned to deliveries of Scarce Materials to the producer, each supplier or sub-supplier shall refer on his purchase order to the serial number given by the producer and the period for which the serial number has been granted. The rating so extended or re-extended shall be applied only to the delivery of materials which the supplier or sub-supplier requires to make possible his deliveries which have been rated under the Order.

Extensions of the original preference rating shall carry the same preference rating of A-10.

Any supplier or sub-supplier who thus extends the Order and the preference rating shall fill out and execute in duplicate each month the "Report of Extension of Defense Supplies Rating Order" in the form attached to the Defense Supplies Rating Order and each month send the same to the Division of Priorities.

10. Relief Provisions

A producer may find after filing a report that a specific item of Scarce Materials is inadequate for his current production of Defense Supplies. In such cases he should execute an interim report on Form PD-25 for the materials, parts or assemblies involved and send it to the Division of Priorities with a full letter of explanation, or else file an application for a Preference Rating Certificate on Form PD-1 in the usual manner.

When a producer's requirements of Scarce Materials are smaller than the normal economical manufacturing quantity thereof, he may show on Form PD-25 the commercially procurable quantities provided explanation is made to the Division of Priorities. Such excess must be deducted by the Producer in determining future requirements.

GENERAL

The producer must maintain accurate records of all applications of the preference rating to deliveries of Scarce Materials under the Defense Supplies Rating Order so that the same may readily be examined by a field inspector of the Division of Priorities. Any supplier who extends the Order in the manner above set forth must also maintain such records.

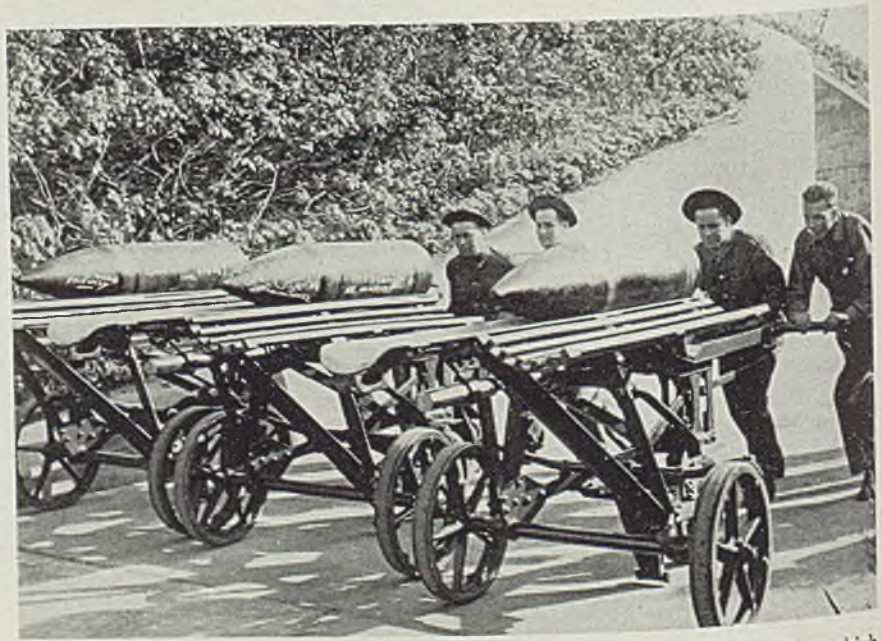
The producer shall not divert Scarce Materials obtained through an application of the rating granted by the Order to the production of other than Defense Supplies; and the producer shall not apply the rating assigned by the Defense Supplies Rating Order and any other preference rating to deliveries of the same Scarce Materials to fill the same production requirement.

It is believed that the proper use of this plan should reduce inventories by assuring a steady flow of Scarce Materials in the quantity and at the time they are needed for production of Defense Supplies. Deliveries of Scarce Materials rated by this Order must not be scheduled by the producer or suppliers for delivery prior to the time they are necessary for the production of Defense Supplies.

All reports to be filed and all inquiries shall be addressed to Division of Priorities, attention Joseph L. Overlock, Office of Production Management, Washington.

■ American Steel & Wire Co. is rebuilding two open-hearth furnaces which have been idle several years, at its Duluth works. The first is expected to be completed late in June and the other late in July. These furnaces, added to the five in operation at Duluth, will increase the company's annual ingot capacity 174,000 tons.

Steel "Serving Tables" for the Coast Artillery



■ "Food" for the 12-guns at Ft. Hancock, N. J., are 1000-pound projectiles, which the gun crews move easily in carriages built of light structurals. NEA photo

Aircraft, Plant Expansion Awards Top Week's $129,429,355 Defense Contracts

■ AWARDS for aircraft, aircraft parts, accessories and subassemblies, together with plant expansion agreements, comprised a large part of the $129,429,355 total of defense contracts reported by the War and Navy departments last week. Army awards' total was much larger than that of the Navy. Following contracts were reported last week by the War department:

Beech Aircraft Corp., Wichita, Kans., airplanes and spare parts, $6,171,000.

Chrysler Corp., Detroit, $5,336,835 educational order for air frames, nose and center fuselage sections for medium bombers.

Curtiss-Wright Corp., Curtiss Airplane Division, Buffalo, airplanes and spare parts, $20,444,414.

Fairchild Engine & Airplane Corp., Fairchild Aircraft Division, Hagerstown, Md., airplanes and spare parts, $4,746,-951.

Perfect Circle Co., Hagerstown, Ind., agreement of lease with Defense Plant Corp., for acquisition of machinery and equipment to be installed in existing plant for production of piston rings for aircraft; cost, $208,850.

Ryan Aeronautical Co., San Diego, Calif., airplanes and spare parts, $4,134,205.

Smith Engineering & Construction Co., Noonan Construction Co., Dyson & Co., all of Pensacola, Fla., and Wilson Construction & Supply Co., Tallahassee, Fla., construction of cantonment including utilities and appurtenances and paving at three auxiliary fields at Eglin field, Florida, at total estimated cost of $1,982,382. Architectural and engineering contract was awarded to Young & Hart, Pensacola.

Vultee Aircraft Inc., Downey, Calif., airplanes and spare parts, $32,912,990.

Watson-Stillman Co., Roselle, N. J., agreement of lease with Defense Plant Corp. for acquisition of machinery and equipment for installation in existing plant for production of hydraulic equipment at cost of $185,549.

Ordnance Department Awards

Ace Drill Co., Detroit, twist drills, $2006.74

Acme Industrial Co., Chicago, gages, $1134.20.

Allegheny Ludlum Steel Corp., Brackenridge, Pa., gages, strip steel, $63,102.

Allen, C. G., Co., Barre, Mass., drill presses, $2206.

Aluminum Ladder Co., Tarentum, Pa., ladders, $1401.60.

American Brass Co., Kenosha, Wis., brass cartridge discs, $246,951.72.

American Car & Foundry Co., Berwick, Pa., parts for tanks, turrets, track links, $27,676.50.

American Chain & Cable Co. Inc., Andrew C. Campbell Division, Bridgeport, Conn., cutting machines, $1335.

American Foundry Equipment Co., Mishawaka, Ind., blasting equipment, $6000.

American Shim Steel Co., New Kensington, Pa., strip steel, $152,445.

American Steel & Wire Co., Cleveland, nails, $6040.05.

Anderson, L., Ridgefield Park, N. J., fixtures and wrenches, $1257.39.

Associated Spring Corp., Wallace Barnes Co. Division, Bristol, Conn., magazines for rifle, $2550.

Automatic Die & Products Co., Cleveland, motor driven fixtures, $2821.

Babcock & Wilcox Tube Co., Morado, Pa., seamless tubing, $7542.50.

Baird Machine Co., Bridgeport, Conn., motor driven tumblers, $1204.

Barber-Colman Co., Rockford, Ill., reamers, $11,759.50.

Barth, Oliver, Jack Co., Milwaukee, jacks, $1285.10.

Bay State Elevator Co., Springfield, Mass., installation of elevators, $1450.

Bear Mfg. Co., Rock Island, Ill., gages and rams, $4582.69.

Bendix Aviation Corp., Eclipse Aviation Division, Bendix, N. J., test stands, tank parts, crank assemblies, $112,-652.42; South Bend, Ind., Division, parts for carburetor, $21,309.77.

Bennel Machine Co., Brooklyn, N. Y., fixtures, $3970.85.

Blanchard, Fred K., Inc., Troy, N. Y., end mills, $8576.40.

Bliss, E. W., Co., Brooklyn, N. Y., punch presses, $1900.

Bliss & Laughlin Inc., Harvey, Ill., carbon steel, $1789.37.

Bonney Forge & Tool Works, Allentown, Pa., socket wrenches, $1188.

Boston & Lockport Block Co., East Boston, Mass., tackle blocks, $6415.

Bowman-Durham-Robbins Inc., Brooklyn, N. Y., accessories, $10,142.20.

Breeze Corporations Inc., Newark, N. J., parts for ignition assembly and engine starters, $11,417.25.

Brown & Sharpe Mfg. Co., Providence, R. I., tools and equipment, hand screw machines, pumps, milling machines, end mills, vises, $41,949.35.

Camera Equipment Co., New York, motion picture equipment, $1629.50.

Carboloy Co. Inc., Detroit, dies, $1264.80.

Carnegie-Illinois Steel Corp., South Chicago, Ill., steel, $2935.64.

Carpenter Steel Co., Reading, Pa., tool steel, $3351.

C. & G. Tool Mfrs., East Orange, N. J., miscellaneous tools and machinery, $4300.

Chase Brass & Copper Co. Inc., Waterbury, Conn., bronze and brass, brass rod, $6107.12.

Christiansen, C. B., Newark, N. J., copper picks, drying trays, $6800.

Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati, milling machines, $14,058.

Cincinnati Planer Co., Cincinnati, die block planers, $22,435.

Clarke Can Co., Philadelphia, oilers, $2516.97.

Cleaver-Brooks Co., Milwaukee, steam generating units, $2727.

Cleveland Chain & Mfg. Co., Cleveland, chains, $1150.58.

Cleveland Twist Drill Co., Cleveland, hand reamers, twist drills, $6008.58.

Cleveland Universal Jig Co., Cleveland, tooling machines, $3493.

Coleman Supply Co., Cambridge, Mass., plumbing supplies, $2053.89.

Colonial Broach Co., Detroit, broaching equipment, $1542.50.

Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., machine guns and component parts, $61,606.65.

Continental Motors Corp., Muskegon, Mich., parts for engines, $24,234.15.

Covel Mfg. Co., Benton Harbor, Mich., grinders, $2165.

Cowles Tool Co., Cleveland, tools, $1881.60.

Crane Co., Springfield, Mass., darkroom equipment, $2098.75.

Crucible Steel Casting Co., Milwaukee, castings, $1015.64.

Crucible Steel Co. of America, New York, tool bits, steel, tool steel, $7590.72.

Cullen-Friestedt Co., Chicago, welding manipulators, $3937.06.

Cummings Machine Works, Boston, trunnion brackets, $6664.

Darwin & Milner Co., Cleveland, cutters, $4380.

Detroit Broach Co. Inc., Detroit, broach section details, $1379.05.

Detroit Seamless Steel Tubes Co., Dearborn, Mich., seamless steel tubing, $4427.59.

Detroit Tap & Tool Co., Detroit, left hand taps, gages, $7739.38.

Doehler Die Casting Co., Pottstown, Pa., plugs, $6650.

Duplex Mfg. Corp., Sherman, N. Y., steel chests, $2560.50.

Durham Mfg. Co., Muncie, Ind., plunger pins, $20,452.50.

Eaton Mfg. Co., Detroit, volute springs, $1259.50.

Eclipse Air Brush Co. Inc., Newark, N. J., chain conveyor machines, $22,-847.

Equipment Co., Detroit, end milling cutters, $3695.

Expanded Metal Safety Guard Co. Inc., Long Island City, N. Y., gages, $8736.

Federal Products Corp., Providence, R. I., gages, $2460.

Fellows Gear Shaper Co., Springfield, Vt., gear shapers, $14,025.20.

Field, William H., Co., Boston, saw table, $1525.50.

Firth-Sterling Steel Co., Philadelphia, tool steel, steel, $2704.51.

Fischer, Charles, Spring Co., Brooklyn, N. Y., butt swivels, assemblies for rifle, spring assemblies, $70,777.30.

Fox Munitions Corp., Philadelphia, gages, $2212.

Frankle, Joseph E., Inc., Philadelphia, cleaning brushes, $4659.12.

Fulton Sylphon Co., Knoxville, Tenn., fuzes, $60,900.

Gairing Tool Co., Detroit, cutting tools, $2916.60.

Garfield Electric Supply Co. Inc., New York, switches, $1935.05.

General Electric Co., Schenectady, N. Y., gages, indoor capacitators, $8329.

General Electric Supply Corp., Springfield, Mass., lighting fixtures, $1180.

General Steel Products Corp., Long Island City, N. Y., bays, $13,183.68.

Genesee Tool Co., Fenton, Mich., tools, $2385.

Gilbert & Barker Mfg. Co., West Springfield, Mass., assemblies, $39,734.27.

Goddard & Goddard Co. Inc., Detroit, cutters, $1520.

Goodyear Tire & Rubber Co. Inc., Akron, O., tracks, $1000.

Graybar Electric Co. Inc., Philadelphia, rigid conduit, $1676.20.

Great Lakes Steel Corp., Ecorse, Detroit, Mich., cold-rolled steel, $22,358.82.

Greenfield Tap & Die Corp., Greenfield, Mass., stocks, $2668.05.

Guiberson Diesel Engine Co., Dallas, Tex., tank tools, $8014.80.

Hanson-Van Winkle-Munning Co., Matawan, N. J., chromium plating tanks, parts for plating barrel, $2495.10.

Hanson-Whitney Machine Co., Hartford, Conn., gages, $25,106.84.

Hauserman, E. F., Co., Philadelphia, erect steel partition, $1049.

Hayes, Charles E., Co., Springfield, Mass., electrical equipment, $4554.90.

Heald Machine Co., Worcester, Mass., boring machines, $45,652.

Hebard, W. F., & Co., Chicago, tractors, $1942.

Heller Bros. Co., Newark, N. J., mill files, $1101.60.

Hendey Machine Co., Torrington, Conn., motor driven shapers, lathes, $23,944.

Heppenstall Co., Bridgeport, Conn., die block steel, $7603.20.

Hermance Machine Co., Williamsport, Pa., ripsaws, $6988.64.

Hess & Barker, Philadelphia, repair shell turning lathe, $1400.

Hole Engineering Service, Detroit, drilling machines, $4979.

Hooper, F. X., Co. Inc., Glenarm, Md., printers, $2607.

Houghton & Richards Co., Boston, bar steel, $5798.95.

Hydraulic Controls Inc., Chicago, steering controls and clutch release, $2343.

Illinois Tool Works, Chicago, Ill., measuring machines, tools, $3762.50.

Industrial Gas Engineering Co. Inc., Chicago, air exhausters, $2541.

Industrial Tool & Die Works Inc., St.

Paul, gages, $3048.54.
Jacobs, F. J., Co., Detroit, fuzes, $424,800.
Jahn, B., Mfg. Co., New Britain, Conn., burring and notch cutting machines, gages, dies, $13,937.
Johnson-Claflin Corp., Marlboro, Mass., gages, $2068.
Jones & Laughlin Steel Corp., Pittsburgh, steel, $8691.94.
Karp Metal Products Co. Inc., Brooklyn, N. Y., portable racks, $3225.36.
Kato Engineering Co., Mankato, Minn., generators, $2136.
Kayel Engineering Co., Newark, N. J., install acid-proof tank pumps, $4230.
Kennedy-Van Saun Mfg. & Engineering Corp., Danville, Pa., traversing assemblies, $1107.72.
King Machine Tool Co., Cincinnati, boring mills, $50,980.
King Refrigerator Corp., Brooklyn, N. Y., steel chests, $17,950.68.
Krueger, H. R., & Co., Detroit, drilling and reaming machines, $18,970.
Kux-Lohner Machine Co., Chicago, pelleting presses, $2330.
LaSalle Steel Co., Hammond, Ind., carbon steel, $2589.72.
Latrobe Electric Steel Co., Philadelphia, tool steel, $2440.
Leland-Gifford Co., Worcester, Mass., drill presses, $2970.
Leonard, Ward, Electric Co., Mt. Vernon, N. Y., regulators, $15,548.
Lincoln Engineering Co., St. Louis, lubricating guns, $11,875.
Lincoln Mfg. Co., Chicago, screws, $2983.80.
Lincoln Park Tool & Gage Co., Lincoln Park, Mich., gages, $15,689.91.
Lincoln Tool & Die Co., Detroit, punches, $1025.
Lindberg Engineering Co., Chicago, furnaces, $3690.
Link-Belt Co., Philadelphia, chain drives, $2151.
Logansport Machine Inc., Logansport, Ind., hydraulic presses, $18,160.
Louden Machinery Co., Philadelphia, furnish and install monorail, $1319.
Ludlum Steel Co., Dunkirk, N. Y., steel, $2485.34.
Madison & Edwards, Cincinnati, lathes, $2075.
Magnaflux Corp., Chicago, inspection machines, $2648.
Majestic Tool & Mfg. Co., Detroit, supports for drilling machines, $6000.
Master Electric Co., Dayton, O., geared head motors, $3301.32.
Mattatuck Mfg. Co., Waterbury, Conn., battery cups, $3150.
Maxon Premix Burner Co., Muncie, Ind., fuel oil burners, $1838.55.
McArdle & Cooney Inc., Philadelphia, pipe and fittings, $1538.78.
McCulloch Mfg. Co., South Boston, Mass., retaining sleeve assemblies, $3726.80.
McKenna Metals Co., Latrobe, Pa., turning tools, $3850.
McKiernan-Terry Corp., Dover, N. J., staking machines, $26,720.
McLaren Screw Products Co., Detroit, plugs for fuse, $3916.28.
Mercen-Johnson Machine Co., Minneapolis, automatic saws, $3920.
Metal Craft Mfg. Co., New York, steel washers, $5747.19.
Metalweld Inc., Philadelphia, pickling and washing units, $14,980.
Midvale Co., Nicetown, Philadelphia, Pa., forgings, steel billets, $16,140.90.
Modern Machine Tool & Die Co., Bridgeport, Conn., dies, $33,600.
Morse Twist Drill & Machine Co., New Bedford, Mass., finish reamers, $1062.
Motor Tool Mfg. Co., Detroit, tools, $1650.
National Forge & Ordnance Co., Irvine, Pa., forgings, $1075.
New York Thread Grinding Corp., New York, gages, $1935.
Nicholson File Co., Providence, R. I., files, $6021.18.
Niles-Bement-Pond Co., Pratt & Whitney Division, West Hartford, Conn., gages, bench lathes, $17,432.70.
Noland Co. Inc., Washington, steel pipe, $4783.88.
Norco Metal Products Co., Philadelphia, tools, $4686.
Northwest Tool & Engineering Co., Milwaukee, material for gages, $7131.25.
Ohio Seamless Tube Co., Shelby, O., seamless steel tubing, $7282.
Oliver Instrument Co., Adrian, Mich., grinding machines, $1645.
Onsrud Machine Works Inc., Chicago, pantograph routers, $2884.
Otto Bernz Co. Inc., Rochester, N. Y., blowtorches, $2263.35.
Pipe Machinery Co., Cleveland, gages, $5226.05.
Poor & Co., Canton Forge & Axle Works Division, Canton, O., chrome steel, $1494.74.
Power Pressed Steel Co., Hubbard, O., all metal skids and boxes, $2862.
Precision Mfg. Co., Philadelphia, gages, $20,178.
Production Machine Co., Greenfield, Mass., polishing machines, $2282.
Progressive Tool & Cutter Co., Ferndale, Mich., end milling cutters, $2575.
Putnam Tool Co., Detroit, end mills, reamers, $6645.
Rahaim Machine & Tool Co., Boston, gages, $2340.55.
Remington Arms Co. Inc., Bridgeport, Conn., percussion assemblies, $8084.50.
Remington Rand Inc., Boston, chairs and desks, $1379.96.
Republic Steel Corp., Cleveland, castings, bar steel, $3515.13.
Reska Spline Products Co., Detroit, gages, $5768.
Revere Copper & Brass Inc., Rome, N. Y., brass cartridge discs, $79,730.
Revolvator Co., North Bergen, N. J., electric elevators, $2365.
R & M Mfg. Co., Royal Oak, Mich., gages, $1919.45.
Rodgers Hydraulic Inc., Minneapolis, tire presses, $10,585.
Roessler Machine Co., Elkins Park, Pa., punches, $4806.
Rotary Electric Steel Co., Ferndale Station, Detroit, steel, $1631.44.
Ryerson, Joseph T., & Son Inc., Chicago, nickel steel, bar steel, steel, $4592.16.
Schramm Inc., West Chester, Pa., portable power-plants, $10,305.
Scully-Jones & Co., Chicago, steel sleeves, $3207.18.
Service Caster & Truck Co., Somerville, Mass., all steel skids, $1150.
Service Tool, Die & Mfg. Co., Chicago, gages, $3768.
Shaw Insulator Co., Irvington, N. J., artillery ammunition materiel, $8125.
Shipley, W. E., Machinery Co., Cincinnati, drilling machines, $4121.
Skinner Chuck Co., New Britain, Conn., chucks, $2138.40.
Smith, A. O., Corp., Milwaukee, ammunition, $1886.76.
South Bend Tool & Die Co., South Bend, Ind., material for gages, $2870.
Standard Dry Kiln Co., Indianapolis, internal fan kilns, $2050.
Starrett, L. S., Co., Athol, Mass., tools, $1493.67.
Stewart-Warner Corp., Chicago, parts for primer assembly, $4314.50.
Sullivan Machinery Co., Michigan City, Ind., portable compressors, $2275.
Taft-Peirce Mfg. Co., Woonsocket, R. I., tools and equipment, $1963.
Tannewitz Works, Grand Rapids, Mich., saw benches, $3622.
Timken-Detroit Axle Co., Wisconsin Axle Division, Oshkosh, Wis., staggered gears, $21,446.25.
Timken Roller Bearing Co., Canton, O., bearings, steel, $3757.69.
Towmotor Co., Cleveland, motor lift trucks, $4497.06.
Transue & Williams Steel Forging Corp., Alliance, O., drop forgings, $2296.
Troy Tool & Gage Co. Inc., Detroit, gages, $2424.
Ulmer, J. C., Co., Cleveland, gages, $1296.
U. S. Electrical Motors Inc., Milford, Conn., motors, $2287.60.
Union Hardware Co., Torrington, Conn., wire cleaning brushes, $2678.
Union Twist Drill Co., Athol, Mass., cutting tools, $12,427.10.
United Drill & Tool Co., Whitman & Barnes Division, Detroit, ear reamers, $1260.
Van Norman Machine Tool Co., Springfield, Mass., stud pullers, $1702.80.
Vascoloy-Ramet Corp., North Chicago, Ill., tools, $3243.90.
Veit & Young, Philadelphia, dies and punch plugs, $28,656.
Vinco Corp., Detroit, gages, $31,726.95.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn., gaging machines, spooning units, $12,800.
Warner, George W., & Co. Inc., New York, carpenter tools, $2988.50.
Weinstein, S., Supply Co., New York, tackle blocks, $1709.90.
Weldon Tool Co., Cleveland, tools, $1992.
Wells Mfg. Corp., Three Rivers, Mich., power hacksaws, $2660.
Westinghouse Electric Supply Co., New York, couplings, $4727.18.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., transformers, indoor capacitators, $9702.
Wiedemann Machine Co., Philadelphia, gages, $14,452.
Wilson Brown Co., New York, multiple tool lathes, $28,560.
Wright Aeronautical Corp., Paterson, N. J., drive assemblies, engine parts, $4080.60.
Wyckoff Drawn Steel Co., Ambridge, Pa., steel bars, $2485.65.
York Safe & Lock Co., York, Pa., proof testing guns, $69,915.50.
Youngstown Sheet & Tube Co., Youngstown, O., hot rolled steel, $11,755.34.
Zimmerman Steel Co., Bettendorf, Iowa, steel castings, $41,264.02.

Air Corps Awards

Air Associates Inc., Bendix, N. J., electric motors, $101,620.
Aluminum Co. of America, Pittsburgh, aluminum alloy, $283,970.81.
Aviation Mfg. Corp., Lycoming Division, Williamsport, Pa., maintenance parts for engines, $112,149.10.
Bendix Aviation Corp., Pioneer Instrument Division, Bendix, N. J., maintenance parts for instruments, $252,545; Scintilla Magneto Division, Sidney, N. Y., manifold assemblies, $126,000.
Cleveland Pneumatic Tool Co., Cleveland, high pressure air pumps, $150,000.
Continental Motors Corp., Muskegon, Mich., engine maintenance parts, $590,942.82.
Curtiss-Wright Corp., Curtiss Aeroplane Division, Buffalo, maintenance parts for airplanes, $168,868.19.
Dayton Acme Co., Cincinnati, portable instruments, $32,250.
Engelhard, Charles, Inc., Newark, N. J., indicator assemblies, $37,416.
General Electric Supply Corp., Dayton, O., head-set lanterns, $31,887.50.
Sharpsville Steel Fabrications Inc., Sharpsville, Pa., tanks, $186,600.
Square D Co., Kollsman Instrument Division, Elmhurst, N. Y., indicator assemblies, $45,362.
Titeflex Metal Hose Co., Newark, N. J., manifold assemblies, $257,760.
United Aircraft Corp., Pratt & Whitney Aircraft Division, East Hartford, Conn., engine overhauls and maintenance parts, $1,781,107.20.
Wright Aeronautical Corp., Paterson, N. J., parts for engines, aeronautical engines, $535,913.25.

Corps of Engineers Awards

Acrmotor Co. Inc., Chicago, triangulation towers, $7280.
Allis-Chalmers Mfg. Co., Milwaukee, oil circuit breaker units, Patterson field, Ohio, $32,791.
American Abrasive Metals Co., Irvington, N. J., abrasive material, $9625.
American Steel & Wire Co., Los Angeles, fencing materials, Hill Field, Ogden, Utah, $25,454.56.
Aqua Systems Inc., New York, gasoline fueling system, Municipal airport, Jacksonville, Fla., $53,463.
Blaw-Knox Co., Union Steel Castings Di-

vision, Pittsburgh, steel gun emplacements, $34,000.
Blickman, S., Inc., Weehawken, N. J., kitchen equipment, Air Corps cantonments at Portland, Oreg.; Boise, Idaho; Pendleton, Oreg., $7088.
Bruning, Charles, Co. Inc., Rahway, N. J., plumbobs and horizontal cabinets, $5038.20.
Buffalo-Springfield Roller Co., Springfield, O., rollers, $13,177.40.
Carter Electric Co., Augusta, Ga., electric distribution system, Augusta air base, Georgia. $17,872.
Carver Refrigeration Co., Tampa, Fla., cold storage rooms, MacDill field, Florida, $1487.
Caterpillar Tractor Co., Peoria, Ill., tractors and graders, $30,751.38.
Central Construction Co., Hoisington, Kans., landing field improvements, Tulsa municipal airport, Oklahoma, $277,768.50.
Cianchette, J. R., Pittsfield, Me., paved runway, Bar Harbor airport, Maine, $66,494.
Crown Iron Works, Minneapolis, assemblies for ferry units, $2300.
El Reno Construction Co., El Reno, Okla., landing strips, municipal airport No. 2, Oklahoma City, Okla., $80,040.
Erie Foundry Co., Erie, Pa., forging hammers, $2295.
Fairchild Aerial Surveys Inc., Los Angeles, polaroid projectors, $5000.
Fegles Construction Co. Ltd., Minneapolis, Fourpole creek and Krouts creek pumping stations and levees, Huntington, W. Va., $954,146.70.
Ford, W. M., Construction Co. Inc., LaFayette, Ala., runways and taxi strip, Dothan municipal airport, Dothan, Ala., $106,360.50.
Gaw Construction Co., Philadelphia, temporary air corps warehouses, Middletown air depot, Middletown, Pa., $128,972.
General Electric Co., Schenectady, N. Y., cable transformers and equipment, $3974.93.
Giles & Ransome, Cape Henlopen, near Lewes, Del., diesel tractor and bulldozer, $9275.
Graybar Electric Co. Inc., New York, electrical supplies, $3565.75.
Gurley, W. & L. E., Troy, N. Y., dumpy levels, $2124.
Highway Machinery & Supply Co. Inc., Aurora, Ill., grader with scarifier, Langley field, Virginia, $6968.
Irving Subway Grating Co. Inc., Long Island City, N. Y., airplane landing matting and tools, $399,455.
Jacobsen Construction Co., Salt Lake City, Utah, water supply reservoir, Hill field, Ogden, Utah, $48,800.
Lang, F. S., Mfg. Co., Seattle, oil fired ranges, Pendleton air corps cantonment, Oregon, and Boise air corps cantonment, Idaho, $17,195.20.
Leonard, Ward, Electric Co., Mt. Vernon, N. Y., ballast resistors, $4032.
Link-Belt Co., Chicago, coal handling equipment, Chanute field, Rantoul, Ill., $3529.
Maine Steel Inc., South Portland, Me., anchors, $50,265.65.
McGeorge Contracting Co., Pine Bluff, Ark., pumping stations, Arkansas river levees, North Little Rock, Ark., $98,186.
McKay, William O., Co., Seattle, Ford trucks, $30,148.75.
Melli-Blumberg Corp., New Holstein, Wis., trailers, $18,148.
North Coast Electric Co., Portland, Oreg., electrical and power line supplies, Boise air corps cantonment, Idaho, $2161.27.
Northern Commercial Co., Evansville, Ind., parts for dragline, motor grader, power units, $11,341.30.
Onan, D. W., & Sons, Minneapolis, portable generator sets, $49,490.
Osgood Co., Marion, O., shovels, $171,054.
Palma Motor Sales & Service Corp., Staten Island, N. Y., Ford station wagons, $2994.28.
Palmer Supply Co., Seattle, plumbing and heating supplies, $2549.73.
Powers-Thompson Construction Co., Joliet, Ill., reconstruction of upper approach wall, Marseilles Lock, Illinois Waterway, Marseilles, Ill., $88,993.63.
Reliance Steel Products Co., McKeesport, Pa., ramps, $2358.
Ritz, Herman F., Lancaster, Pa., theodolites, $22,200.
Sidney Machine Tool Co., Sidney, O., engine lathes, Kansas City Aircraft Assembly plant, Kansas, $3892.30.
Staunton, Thomas, Great Falls, Mont., improvement of airport, Great Falls municipal airport, Montana, $131,846.30.
Thomason, M. R., Montgomery, Ala., airport, Bozeman field, Bozeman, Mont., $58,441.15.
Wagner Electric Corp., Los Angeles, electric distribution transformers, Las Vegas airport, Nevada, $5664.16.
Warren Pipe Co. of Massachusetts Inc., Phillipsburg, N. J., cast iron water pipe and fittings, Westover field, Chicopee Falls, Mass., $14,211.87.
Williams & Van Valkenburgh, South Gate, Calif., water and gas systems, Las Vegas airport, Nevada, $121,610.50.
Yoemans Bros. Co., Chicago, sewage sump pumps, Drew field, Tampa, Fla., $2400.

Chemical Warfare Service Awards

Barcalo Mfg. Co., Buffalo, pliers, $701.
Manning, Maxwell & Moore Inc., Jersey City, N. J., screwdrivers, $934.67.
Salta Corp., Jersey City, N. J., outlet valves, $10,000.
United Carr Fastener Co., Cambridge, Mass., mask fixtures, $143,294.76.

Medical Corps Awards

Blickman, S., Inc., Weehawken, N. J., coffee urns, $28,925.60.
Buck X-Ograph Co., St. Louis, intensifying screens, $25,117.50.
Elgin National Watch Co., Elgin, Ill., stop watches, $1903.
Harris Hub Bed & Spring Co., Chicago, hospital beds, $5100.
Langbein, William, & Bros., Brooklyn, N. Y., operating knives, $13,875.
Legion Utensils Corp., Long Island City, N. Y., sauce pans, $6579.
Miller Mfg. Co. Inc., Richmond, Va., bed trays, $9690.
National Mfg. Corp., Plainfield, Conn., tables and chairs, $19,267.20.
Simmons Co., Kenosha, Wis., steel dressers, $40,675.20.
Swartzbaugh Mfg. Co., Toledo, O., electric food carts, $12,797.50.
United States Catheter & Instrument Corp., Glen Falls, N. Y., surgical instruments, $770.
Zadina, L., New York, surgical knives, $1082.25.

Quartermaster Corps Awards

Acme Metal Goods Mfg. Co., Newark, N. J., ice picks, $100.
Adams, S. G., Metalware Co., St. Louis, mess trays, $356.25.
Anderson, Eivind, Tacoma, Wash., 400-bed hospital and miscellaneous buildings, Ft. Lewis, Washington, $936,517.
Arras, Adam, & Son, San Francisco, locomotive house, Benicia arsenal, California, $9627.
Autocar Co., Ardmore, Pa., 5-ton truck, $4899.
Barnes, James I., Construction Co., Santa Monica, Calif., sentry house and checker's office, Utah general depot, Ogden, Utah, $15,027.
Clyde Cutlery Co., Clyde, O., butcher knives, $2550
Colonial Boat Works, Port Norris, N. J., rescue boats, $162,558.
Corbitt Co., Henderson, N. C., trucks with cargo bodies and winches, $730,000.
Couse & Saunders, Detroit, heating plant, Ft. Wayne, Michigan, $79,500.
Disston, Henry, & Sons Inc., Philadelphia, butcher saws, $145.84.
Federal Prison Industries Inc., Lewisburg, Pa., mess trays, $14,160.
Foote Construction Co. Inc., New York, sheet steel piling at Camp Upton, New York, $7428.
General Excavator Co., Marion, O., cranes and spare parts, $148,653.65.
General Motors Corp., Chevrolet Division, Detroit, trucks, field ambulances, $46,748.04.
Ideal Restaurant Supply Co., New York, egg whips, $660.
Katsinger, Edward, Co., Chicago, muffin pans, $4452.50.
Kermath Mfg. Co., Detroit, diesel marine engines, $30,479.30.
Knox Stove Works, Knoxville, Tenn., cast iron griddles, $66,820.
Lehigh Equipment Co., New York, kitchenware, $4822.80.
Lockwood Mfg. Co., Cincinnati, muffin and cake pans, $8316.
Louisville Tin & Stove Co. Inc., Louisville, Ky., tin dippers and vegetable graters, $5875.
Manteo Boat Building Co., Manteo, N. C., rescue boats, $225,200.
McCarthy, Robert, San Francisco, one 63-man barracks, Ft. Mason, California, $8460.
Measuring Devices Corp., New York, basting spoons, $560.
Morlo Construction Corp., Far Rockaway, Long Island, N. Y., temporary officers' quarters, Ft. Hamilton, New York, $13,750.
Savory Inc., Newark, N. J., cake turners, $3397.50.
Smith & Pew Construction Co., Atlanta, Ga., four barracks buildings, signal communication schools, Camp Forrest, Tennessee, $33,448.
Springfield Bros., Dalton, Ga., barracks building, Ft. Oglethorpe, Georgia, $7480.
Taylor Metal Products Co., Mansfield, O., ladles and skimmers, $2550.
Twaits, Ford J., Co. and Morrison-Knudsen Co. Inc., Los Angeles, ordnance warehouses and motor repair shop, Ft. Ord, California, $16,260.
Watson Automotive Co., Lima, O., metropolitan ambulances, $31,445.

Coast Artillery Corps Awards

Leschen, A., & Sons Rope Co., St. Louis, galvanized clips, $930.
International Resistance Co., Philadelphia, power wire wound resistors, $1352.62.

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Navy department last week reported the following awards:

Burns & Roe Inc., New York, improvement to power plant at naval operating base, Norfolk, Va., $1,225,000 on a cost plus fixed fee basis.
Busch-Sulzer Bros.-Diesel Engine Co., St. Louis, four sets of propelling machinery for mine sweepers at unit cost of $295,000 and total of $1,180,000; also, 12 sets of propelling machinery and spare parts for minesweepers at total price of $8,125,560 and unit cost of $677,130.
Cleveland Diesel Engine Division of General Motors Corp., Cleveland, five sets of propelling machinery complete with spare parts for auxiliary vessels at unit cost of $126,300 and total of $631,500; propelling machinery and spare parts for submarine tenders at total of $5,853,000 and unit cost of $1,951,000; and propelling machinery for fleet tugs at contract price of $430,000 per set and aggregate of $4,300,000.
Los Angeles Shipbuilding & Drydock Co., Los Angeles, supplementary award of $2,237,000 for acquisition, construction and installation of additional facilities.
National Cash Register Co., Dayton, O., ordnance items, $1,490,760.
National Tube Co., Pittsburgh, ordnance equipment, $1,175,000.
Porter, H. K., Co. Inc., Pittsburgh, two 50-ton diesel-electric locomotives, $50,118.
Sturtevant, B. F., Co., Hyde Park, Boston, special additional plant facilities, $36,000.
Sperry Gyroscope Co. Inc., Brooklyn, N. Y., $130,000 for special additional

plant facilities, including a temporary building.

Bureau of Yards and Docks Awards

Diamond, Arnold M., Brooklyn, N. Y., three radio masts at headquarters of third naval district, New York, $5659.

Ellis, W. H., & Son Co., East Boston, Mass., waterfront development at navy yard, Boston, on a cost plus fixed fee basis, $523,000.

Expert Sheet Metal Works, Brooklyn, N. Y., pipe stack for gas fired boilers at naval clothing depot, Brooklyn, $970.

Hooley, Thomas W., New Orleans, repairs and electrical work on two radio towers at naval station, New Orleans, $15,339.

Kvale, T. A., Los Angeles, improvement of railroad track facilities, naval operating base supply depot, San Diego, Calif., $34,490.

Lecoutour-Parsons Construction Co., St. Louis, barracks, hangar, assembly and repair shops, paint and dope spray booth, steam plant, garage, storehouse, pumphouse, magazine and appurtenances at naval reserve aviation base, Robertson, Mo., $941,034.

Bureau of Supplies and Accounts Awards

Aluminum Cooking Utensil Co., New Kensington, Pa., milk cans, fruit extractors, juice and stock pots, $22,666.

Aluminum Goods Mfg. Co., Manitowoc, Wis., tea kettles, and trays, $11,348.

Aluminum Products Co., La Grange, Ill., coffee boilers, pans and pots, $189,125.

American Blower Corp., Detroit, ventilating sets, propeller fans, motors and controllers and spares for motors and controllers, $34,720.

American-LaFrance-Foamite Corp., Elmira, N. Y., fire extinguishers, $105,796.50.

American Tool Works Co., Cincinnati, drilling machines, lathes, $654,486.

Baldt Anchor, Chain & Forge Co., Chester, Pa., chains, anchors, anchor links, shots and tools, $492,497.

Baldwin Locomotive Works, Standard Steel Works Division, Philadelphia, propeller shafts, $10,715.

Balfour, Guthrie & Co. Ltd., San Francisco, foundry pig iron, $8589.40.

Bay City Shovels Inc., Bay City, Mich., mobile crane, $6600.

Bethlehem Steel Co., Bethlehem, Pa., alloy bar steel, $18,738.42.

Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., hydraulic presses, $47,350.

Brown & Sharpe Mfg. Co., Providence, R. I., automatic screw machines, $17,018.50.

Carlton Machine Tool Co., Cincinnati, radial drills, $72,388.

Chase Brass & Copper Co. Inc., Waterbury, Conn., copper-nickel-alloy tubes, $49,430.46.

Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati, milling machines, universal grinders, $44,265.45.

Circle Wire & Cable Corp., Maspeth, Long Island, N. Y., cable, $16,696.

Coates Electric Mfg. Co., Seattle, electric ovens, $5728.

C-O-Two Fire Equipment Co., Newark, N. J., fire extinguishers, $126,546.18.

County Supply Co., Plainfield, N. J., surface plates, bench tops, $6678.02.

Crescent Insulated Wire & Cable Co., Trenton, N. J., cable $48,221.50.

Crucible Steel Co. of America, New York, steel forgings, $57,047.94.

Deacon, B. H., Co. Inc., Philadelphia, brass tube fittings, $9267.23.

Durabilt Steel Locker Co., Aurora, Ill., single metal clothes lockers, $31,846.

Electric Storage Battery Co., Philadelphia, storage battery testing outfits and parts, $32,200.26.

Everlite Pump & Mfg. Co. Inc., Lancaster, Pa., steel stuffing tubes, $550,930.

Fairchild Aviation Corp., Jamaica, N. Y., aircraft cameras, $69,575.

Follansbee Steel Corp., Pittsburgh, terneplate (roofing tin), steel base, and tinned-plate, steel, $5426.73.

Gardner-Denver Co., Quincy, Ill., air compressors, and spare parts, $13,832.

General Cable Corp., New York, cable, $48,132.

General Electric Co., Schenectady, N. Y., rheostat and spare part units, $67,762.50.

General Motors Corp., Cleveland Division, diesel generator sets, and spare parts, submarine engineering spare parts, $204,858.30.

Independent Engineering Co., O'Fallon, Ill., acetylene cylinders, $268,000.

International Nickel Co. Inc., New York, nickel-copper-aluminum-alloy rod $9707.06.

Jones & Lamson Machine Co., Springfield, Vt., turret lathes, $10,058.

Kidde, Walter, & Co. Inc., New York, fire extinguishers, $114,532.50.

Landers, Frary & Clark, New Britain, Conn., steel tubes, $92,745.

Laughlin, Thomas, Co., Portland, Me., anchor screw pin shackles, $52,359.60.

LeBlond, R. K., Machine Tool Co., Cincinnati, heavy duty lathes, $500,702.

Lexington Electric Products Co. Inc., Newark, N. J., switchboards, controls and rheostats, $33,045.

Lietz, A., Co., San Francisco, three-arm, metal protractors, $6600.

Lionel Corp., New York, ship compasses, $9750.

MacLeod Co., Cincinnati, blast cleaning room and dust collecting system, $11,494.20.

Maine Steel Inc., South Portland, Me., shackles, $14,911.83.

Midvale Co., Philadelphia, carbon tool steel, $28,715.95.

Mitchell Camera Corp., West Hollywood, Calif., motion picture cameras, $15,932.

Morton Mfg. Co., Muskegon Heights, Mich., horizontal, boring, drilling and milling machines, $72,675.

Okonite Co., Passaic, N. J., electric cable, $12,549.

Peck, Stow & Wilcox Co., Southington, Conn., notching, beading, former, grooving and combination machines, $8462.40.

Porter, H. K., Co. Inc., Pittsburgh, 5-ton, diesel locomotives, $50,118.

Rochester Ropes Inc., Jamaica, N. Y., aircraft cable, $27,597.

Rockford Machine Tool Co., Rockford, Ill., openside hydraulic shapers, $21,555.

Roebling's, John A., Sons Co., Trenton, N. J., steel thimbles, wire rope, electric cable, $46,352.38.

Sight Light Corp., Deep River, Conn., electric portable lanterns, $71,435.

Sly, W. W., Mfg. Co., Cleveland, blast cleaning rooms, blast cleaning cabinets and dust collecting system, $53,791.

Southern Welding and Machine Co., Charlottesville, Va., steel tubes, $254,089.60.

Tuthill & Co. Inc., Agents, Tin Sales Office, Netherlands Indies Government, New York, grade "A" pig tin, $290,500. $290,500.

United States Hoffman Machinery Corp., New York, aluminum tubes, $365,650.

United Transformer Corp., New York, rectifier equipment, $21,487.

Welsh Mfg. Co., Providence, R. I., jewelers' screwdrivers, $9308.52.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., turbine equipment, $21,833 61.

Wilson, J. G., Corp., New York, steel doors, rolling curtain, $28,000.

Worthington Pump & Machinery Corp., Harrison, N. J., centrifugal type, motor-driven pumps, $48,795.

Yale & Towne Mfg. Co., Philadelphia, crane, trucks, $155,610.

Mirrors of Motordom

(*Concluded from Page* 36)

tions to the Dodge forge plant here on Lynch road to institute production of aluminum aircraft forgings; also to the DeSoto stamping plant on Wyoming avenue for production of aluminum stampings.

Nash Equips Propeller Plant

Nash-Kelvinator Corp. has announced it will operate a plant at Lansing, Mich., for production of steel propellers and propeller hubs of the Hamilton-Standard type, under license from United Aircraft Corp. A plant unit of the Reo Motor Car Co., providing 400,000 square feet of floor space, has been purchased by the Defense Plant Corp. and turned over to Nash to operate, work being started immediately on rehabilitation and equipping, cost estimated at around $8,000,000. Eventually between 2000 and 3000 employes will be needed for full operations.

Buick Motor Division is pushing its airplane engine plant at Melrose Park, Ill., with all possible speed and now is contemplating doubling the number of test cells to be erected, making a total of 48. This suggests the possibility of doubling contemplated production of engines, now set at 500 a month.

Packard is planning to boost production of 1350-horsepower marine engines for torpedo boat installations from the present three a day to ten a day, which will require a major expansion of equipment, buildings and personnel. On its other defense project, Packard will complete three Rolls-Royce engines this month, largely hand built of course, and will expand output gradually week by week to a schedule of 150 in December.

New Building, Equipment Rules Enforced in Canada

TORONTO, ONT.

■ Restrictions limiting erection or extension of plants, installation of equipment, and construction or repair of buildings have been put in effect, according to C. D. Howe, minister of munitions and supply. Order-in-council was recently passed, prohibiting such projects except under license issued by the priority officer. The purpose is to conserve material and man-power.

Buildings and machinery for use in primary industries as farming, logging, mining and fishing, are exempt, as are dwellings other than apartment houses. Permits for building repairs under $2500 will not be required, nor for installation of equipment costing less than $5000, or new buildings at less than $10,000.

Plant expansions for production

of war materials reported last week by the Munitions and Supply department included: Rehabilitation of the plate mill of Dominion Steel & Coal Corp. Ltd., Sydney, N. S., shut down since 1918, with installation of additional facilities at cost of several million dollars; additional facilities at the Windsor, Ont., plant of Ford Motor Co. of Canada Ltd., costing more than $1,500,000, with foundry enlargement alone estimated at $1,000,000; Aluminum Co. of Canada Ltd., Montreal, added facilities to the company's Arvida and Shawinigan Falls, Que., plants at total cost of about $60,000,000.

Defense contracts placed by the Department of Munitions and Supply in the week ended May 9 totaled $15,813,830, with awards to United States companies aggregating $577,391. The orders:

Shipbuilding: Marine Industries Ltd., Sorel, Que., $2,592,000; Collingwood Shipyards Ltd., Collingwood, Ont., $1,296,000; Morton Engineering & Drydock Co. Ltd., Quebec, Que., $857,509; George T. Davie & Sons Ltd., Lauzon-Levis, Que., $648,000; Kingston Shipbuilding Co. Ltd., Kingston, Ont., $648,000; Air Ministry, England, $21,335; J. Fred Williamson Ltd., St. John, N. B., $15,559; Greavette Boats Ltd., Gravenhurst, Ont., $85,000; Minett-Shields Ltd., Bracebridge, Ont., $85,000; Grew Boats Ltd., Penetanguishene, Ont., $170,000; Turner's Boat Works, Vancouver, B. C., $10,692.

Instruments: Air Ministry, England, $34,585; Ontario Hughes-Owens Co. Ltd., Ottawa Ont., $11,888.

Land transport: General Motors Products of Canada Ltd., Oshawa, Ont., $37,989; Dunlop Tire & Rubber Goods Co. Ltd., Toronto, $76,064; Goodyear Tire & Rubber Co. of Canada Ltd., Toronto, $464,348; Dominion Chain Co. Ltd., Niagara Falls, Ont., $10,190; Firestone Tire & Rubber Co. of Canada Ltd., Hamilton, Ont., $191,074; Eastern Steel Products Co. Ltd., Preston, Ont., $18,337; Ford Motor Co. of Canada Ltd., Windsor, Ont., $13,414; Kelsey Wheel Co. Ltd., Windsor, $27,123.

Aircraft: Air Ministry, England, $2,530,899; Canadian Pratt & Whitney Aircraft Co. Ltd., Longueuil, Que., $272,945; Canadian Car & Foundry Co. Ltd., Montreal, $34,538; Hobbs Glass Ltd., Ottawa, $10,318; Macdonald Bros. Aircraft Ltd., Ottawa, $23,583; DeHavilland Aircraft of Canada Ltd., Toronto, $6739; Fleet Aircraft Ltd., Ft. Erie, Ont., $45,855; F. L. Buchanan Ltd., Orillia, Ont., $5863; Morrow Screw & Nut Co. Ltd., Ingersoll, Ont., $24,750; Weaver Industries Ltd., Chatham, Ont., $18,120.

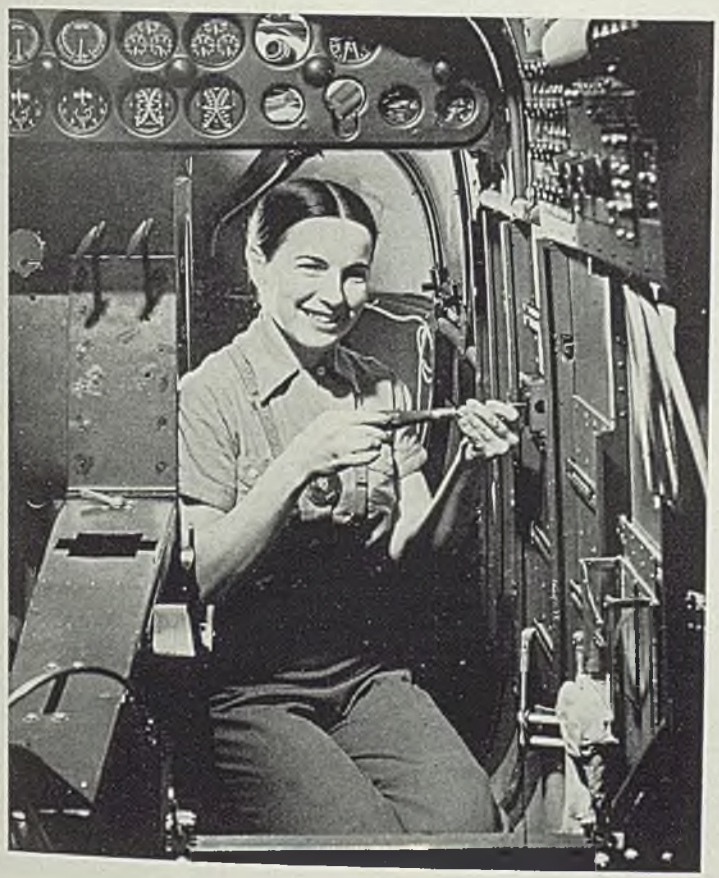
Electrical equipment: Aviation Electric Ltd., Montreal, $5382; Canadian Marconi Co., Montreal, $7088; Kermath Mfg. Co. of Canada Ltd., Toronto, $19,373; Research Enterprises Ltd., Leaside (Toronto), $100,000; Canadian Porcelain Co. Ltd., Hamilton, Ont., $8085; Northern British Columbia Power Co. Ltd., Prince Rupert, B. C., $39,893.

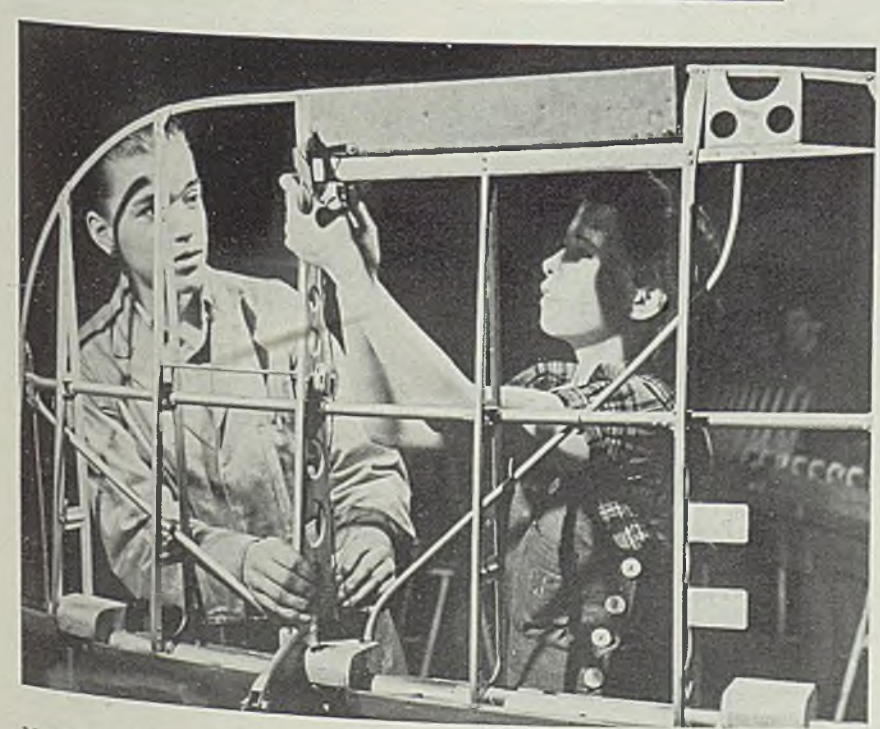
Machinery and tools: Canadian Blower & Forge Co. Ltd., Kitchener, Ont., $6525; Macdonald Bros. Aircraft Ltd., Ottawa, $11,666; Snap-On Tools of Canada Ltd., Ottawa, $26,845.

Ordnance: War Office, England, $48,800; Canadian Locomotive Co. Ltd., Kingston, $126,554; Turnbull Elevator Co. Ltd., Toronto, $12,783; Ford Motor Co. of Canada Ltd., Windsor, $2,110,500; Goderich Organ Co. Ltd., Goderich, Ont., $15,391.

Munitions: Dominion Arsenals, Ottawa, $185,800; Pedlar People Ltd., Oshawa, Ont., $92,372; T. W. Hand Fireworks Co. Ltd., Crooksville, Ont., $18,360.

Miscellaneous: Metal Craft Co. Ltd., Grimsby, Ont., $10,587; Canadian Pratt & Whitney Aircraft Co. Ltd., Longueuil, $5000; Standard Machine Works, Winnipeg, Man., $20,000; Gillette Safety Razor Co. of Canada Ltd., Montreal, $37,000; Safety Supply Co., Toronto, $34,800; Steel Equipment Co. Ltd., Ottawa, $9000; Ontario Hughes-Owens Co. Ltd., Ottawa, $5235; Bennett & Wright, London, $210,000; Horton Steel Works Ltd., Toronto, $13,000; Waterous Ltd., Brantford, Ont., $84,000.





■ Many young men and women now are employed in Canadian aircraft factories, work in which they seem especially interested, and developing skill and self-reliance after the long, discouraging depression. Below, regular employes in the Hurricane plant in Fort William, Ont. Shipments of fighting planes to Britain from this plant average about 15 per week. Above, girl working in cabin of Bolingbroke bomber, Fairchild plant, Montreal. NEA photos passed by censor

Revival in Pipe Line Construction Indicated by Transfer of Tankers

■ DIVERSION to the British war effort of U. S. oil tankers which have been transporting fuel from southwestern oil fields to the northeastern industrial area likely will necessitate an increase in other forms of transportation, and in some instances the substitution of coal.

Twenty-five tankers already have been relinquished, reducing average daily deliveries from the Gulf coast to the north Atlantic seaboard by 100,000 barrels. An additional 25 vessels have been requested from oil companies by the Maritime Commission. Normal daily deliveries are about 1,200,000 barrels, and the transfer of 50 tankers would reduce deliveries by 200,000 barrels daily, or one-sixth. With the higher demand occasioned by defense activity, a reduction of this size poses a considerable problem.

In an effort to meet the emergency, the oil companies are studying other transportation means—new pipe lines or improvements to and greater use of existing lines, more extensive use of river barges and shipment by tank cars.

To Study Future Supplies

American Petroleum Institute, New York, has appointed a fact-finding committee to study the adequacy of future oil deliveries to the heavy consuming districts, at request of the Office of Production Management.

Several pipe line projects are under consideration by the larger oil companies. Their construction will depend on the extent of diversion of United States tankers to Britain, on the availability of steel pipe, and on the success of the oil companies and defense officials in overcoming the opposition of railroads and some states through which the lines would run.

Standard Oil Co. of New Jersey has placed orders for 154,500 tons of steel pipe for two major lines, one to be 1261 miles, from Baton Rouge, La., to Greensboro, N. C., and the other 250 miles from Portland, Me., to Montreal, Que. Latter line will be 12¾-inch and the former from 4½ to 12¾-inch.

Also being considered is the shortening of tanker runs. For example, United States companies supply most of the oil products used by Canada. Instead of shipping oil to western Canada from South America, it is argued that oil could be shipped from California, with use of probably one-fifth the tanker tonnage.

The Portland-Montreal pipeline will save the long voyage around the Gaspe peninsula and up the St. Lawrence river. It also will permit the movement of oil into the Dominion during the winter months when the St. Lawrence is blocked by ice.

The Baton Rouge-Greensboro line could be built in six to nine months, it is estimated, by laying the line in sections and connecting later. This presumes priorities on pipe and pumps would be granted. Ordinarily a line of this size would take about a year to construct.

Dr. Robert E. Wilson, OPM's head consultant on petroleum, last week described transportation facilities from the oil fields to the East coast as the only bottleneck in the petroleum supply situation. Reserves of crude oil and refinery capacity, he said, are adequate.

The completion this year of 25 new tankers has been more than offset by the transfer of such carriers to British service, by the requisitioning of a number of modern ships by the Navy, and by the earlier transfer of tankers to various foreign services.

The Maritime Commission recently arranged for the building of several new ways to be devoted entirely to tanker construction. These will be capable of turning out four a month beginning around next December and should relieve the situation by mid-1942 unless sinkings occur at an excessive rate.

"In spite of everything that can be done this summer," said Dr. Wilson, "it will be very difficult to get the desired amount of petroleum products into the East coast territory, especially if any further diversion of tankers is found necessary."

President Roosevelt said the oil transportation situation "makes restriction of consumption to essential uses a distinct possibility within a few months." In a letter to Speaker Rayburn, the President recommended immediate construction of pipelines between the Gulf coast and the Middle Atlantic ports as "the one means available to relieve this situation."

Recommends Welding To Economize on Use of Steel

■ "Anticipated shortage of steel which is being precipitated by the expanding national defense program will be much less acute if wastes of the metal are eliminated by utilization of modern manufacturing methods," according to the James F. Lincoln Arc Welding Foundation, Cleveland.

Figures released by the foundation indicate an average of 18 per cent less steel is required to build welded products or structures than the same ones riveted.

On this basis, production for national defense would have 360 pounds more usable material in every ton of steel.

In 15 case examples cited by the foundation, savings in amount of steel used where welding was substituted for riveting range from 9 per cent on a field service truck body and freight car underframe to 45 per cent on a scroll case for a turbine. On a 10,490-pound car underframe, welded construction saved 1020 pounds, or sufficient to produce one extra underframe for every ten produced. On the turbine scroll case, 176,810 pounds of steel was saved on a 691,640-pound structure, sufficient, within 5 per cent, to produce an extra case for every two built.

Canadian Foreign Trade Up Sharply in March

■ Canada's steel and iron imports in March were valued at $35,365,000, compared with $20,005,000 in March, 1940. Machinery, except agricultural, was the largest item, $12,310,000, followed by vehicles, $7,020,000; rolling mill products, $4,768,000; farm implements, $2,417,000; engines and boilers, $1,849,000; tools, $342,000; pipe and tubes, $560,000; pig iron, ingots, blooms and billets, $521,000; castings and forgings, $509,000.

March exports totaled $17,474,000, an increase of almost 200 per cent over $6,122,000 valuation in March, 1940. Pig iron, ingots, etc., accounted for $2,045,000, farm implements $1,043,000, machinery other than farm $1,943,000 and automobiles and parts $9,732,000.

Coal Strike Reduces April River Shipments

■ Pittsburgh area river commerce declined sharply during April as result of the strike in bituminous coal mines. Coal normally accounts for the major portion of river shipments and very little was shipped during the month.

Shipments for the year to date:

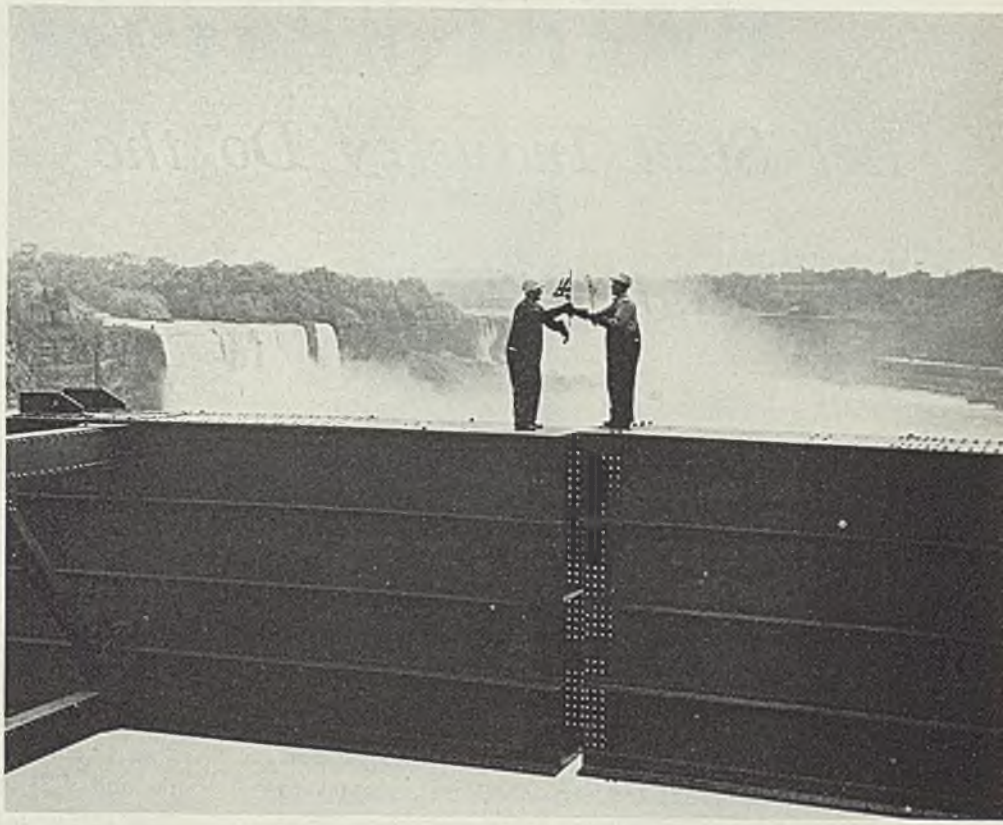
TOTAL SHIPMENTS

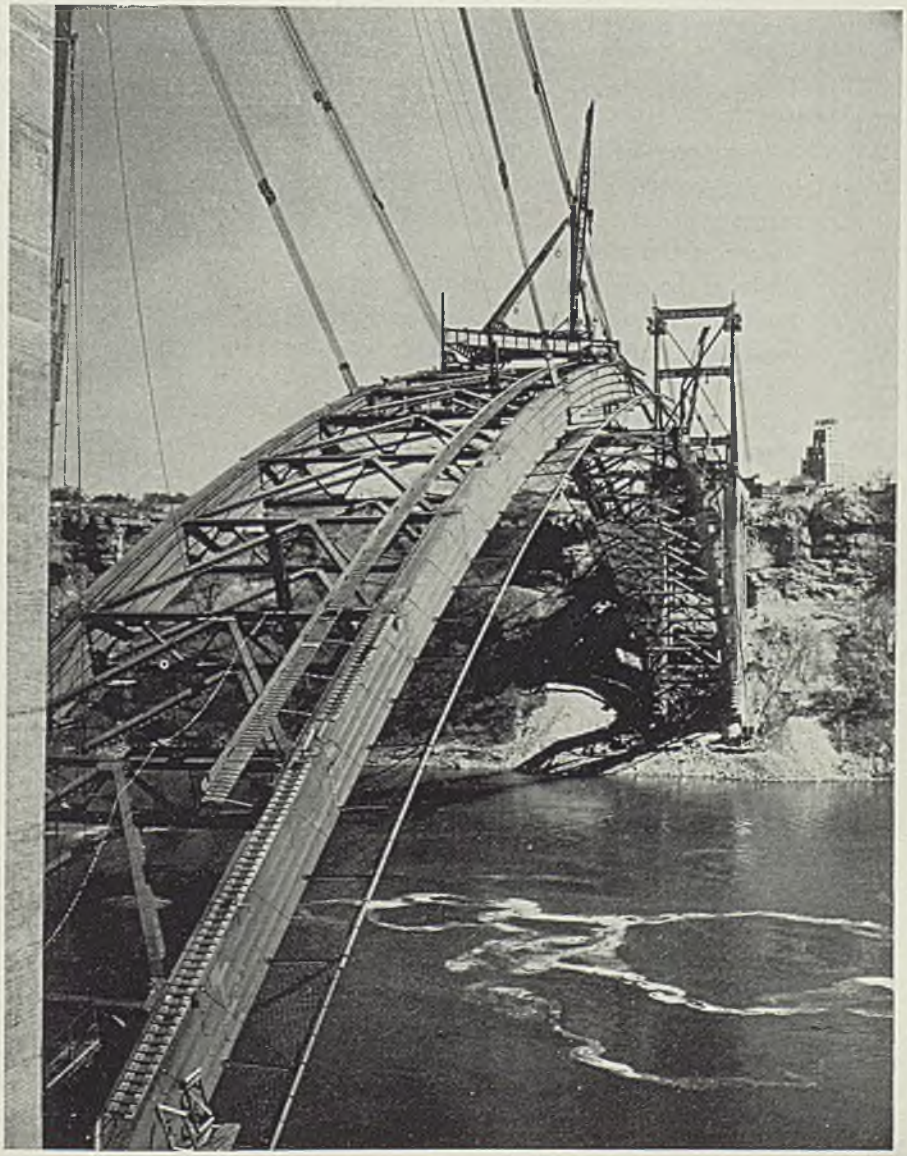
1941	Ohio	Monongahela	Allegheny
January ...	1,581,300	2,809,300	214,500
February ..	1,424,100	2,532,300	187,300
March	1,587,400	2,906,800	212,900
April	652,900	563,000	186,600

STEEL SHIPMENTS

January ...	227,000	160,000	9,200
February ..	193,000	135,200	4,900
March	252,900	168,500	6,600
April	220,900	131,900	11,100

Steel Arms Meet Across Niagara; Flags Exchanged





■ SECTIONS of the new Rainbow bridge, built from Canadian and United States shores across the Niagara river, were joined last week. Symbolic of the increasing amity between this country and the Dominion, foremen of the two steel construction crews met in the center of the arch and exchanged Canadian and American flags.

Replacing the Falls View bridge, more popularly known as the Honeymoon bridge, which was destroyed by ice in 1938, the new structure has a span of 950 feet.

The main arch span, of the hingeless ribbed type, consists of two steel box girder ribs spaced 56 feet apart. Each arch section is made up of 24 girders 12 feet high and weighing from 49 to 75 tons. About 3500 tons of steel was used in the arch and 2000 tons more in the superstructure and decking.

The two ribs are braced together with steel members for rigidity and to resist forces produced by wind pressure or live loads on the structure. Steel spandrel columns, resting on the arch ribs, carry the steel floor girders and roadway deck.

Deck of the bridge will be 1450 feet long with two 22-foot roadways separated by a 4-foot central mall and a 10-foot sidewalk along the south side facing the falls.

Use of supporting substructure was considered impractical due to the depth and turbulence of the water beneath; consequently the engineers in charge evolved a novel method for setting the large arch in position.

Atop the abutments on both Canadian and New York sides, steel towers, 130 feet tall, were built. Sections of the arch were delivered to the head of each abutment and lowered by derrick into the gorge where they were received by a stiff-leg derrick which traveled the arch, setting each section into position. With all sections in place a carefully machined keystone of steel joined the 475-foot sections extending from either shore.

The Bethlehem Steel Co. is contractor for the steel arch span, with the Canadian Bridge Co., Walkerville, Ont., associated with them in the fabrication of steelwork manufactured in Canada.

Accompanying photos show, above, crew foremen exchanging flags (Wide World), and, right, a general view of the span with only a few sections to be fitted into position (NEA).

Let Steel Industry Do the Job—and It Will Be Done!

■ FROM the formal addresses, discussions and corridor conversations heard at the fiftieth general meeting of the American Iron and Steel Institute in New York last Thursday, it was apparent that the iron and steel fraternity holds very definite convictions on the problems involved in its participation in the nation's defense program.

For one thing, steel men are eager that their great industry shall measure up to the responsibilities of this emergency. They feel that thus far they have given a good account of themselves.

• • •

In support of this conviction, they point to the record of the industry's achievements outlined by President Walter S. Tower at the morning session. They take pride in the realization that their expenditures for replacements, modernization and expansion during the past decade enabled the industry to be in a high state of preparedness when war broke out.

They are proud of their foresight in expanding facilities for producing heavy forgings and electric furnace steel, in reducing the varieties of alloy steels and pig irons, in being among the first to create an industry defense committee to co-operate with government agencies, etc.

• • •

Because they feel they have done their job satisfactorily to date, steel men resent the current criticism by politicians, pseudo-economists and others who declare that steel's leaders are blind to the capacity requirements of this emergency. They are particularly annoyed at those who submit fantastic estimates of the amount of steel which will be required in 1942—inasmuch as these estimates are based upon theory and run contrary to the best judgment of men who know better than anybody else the industry's potentialities and limitations.

The feeling about steel capacity is typical of the industry's attitude on many other phases of the defense program. Most steel men are intensely practical. They believe that if somebody will give them a job to do and will let them do it in their way, they can do it better and quicker than anybody else can.

Perhaps that is why—in all of the discussions at the institute meeting — one heard expressions of absolute confidence that the steel industry can do anything within reason in the emergency, if given a chance.

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However, grave misgivings were voiced as to whether steel will be given a chance to do its best. Fear was expressed that production may be lost through strikes, unintelligent meddling and interference by bureaucrats, unfair punitive policies of minority groups and of government, etc.

Also noticeable was the undercurrent of anxiety lest this nation, in its preoccupation with defense, may permit private enterprise to be seriously impaired, if not destroyed.

The steel industry is sound in head, heart and body. It can do its job well. Will it get the chance to do so?

E. L. Shaner

EDITOR-IN-CHIEF

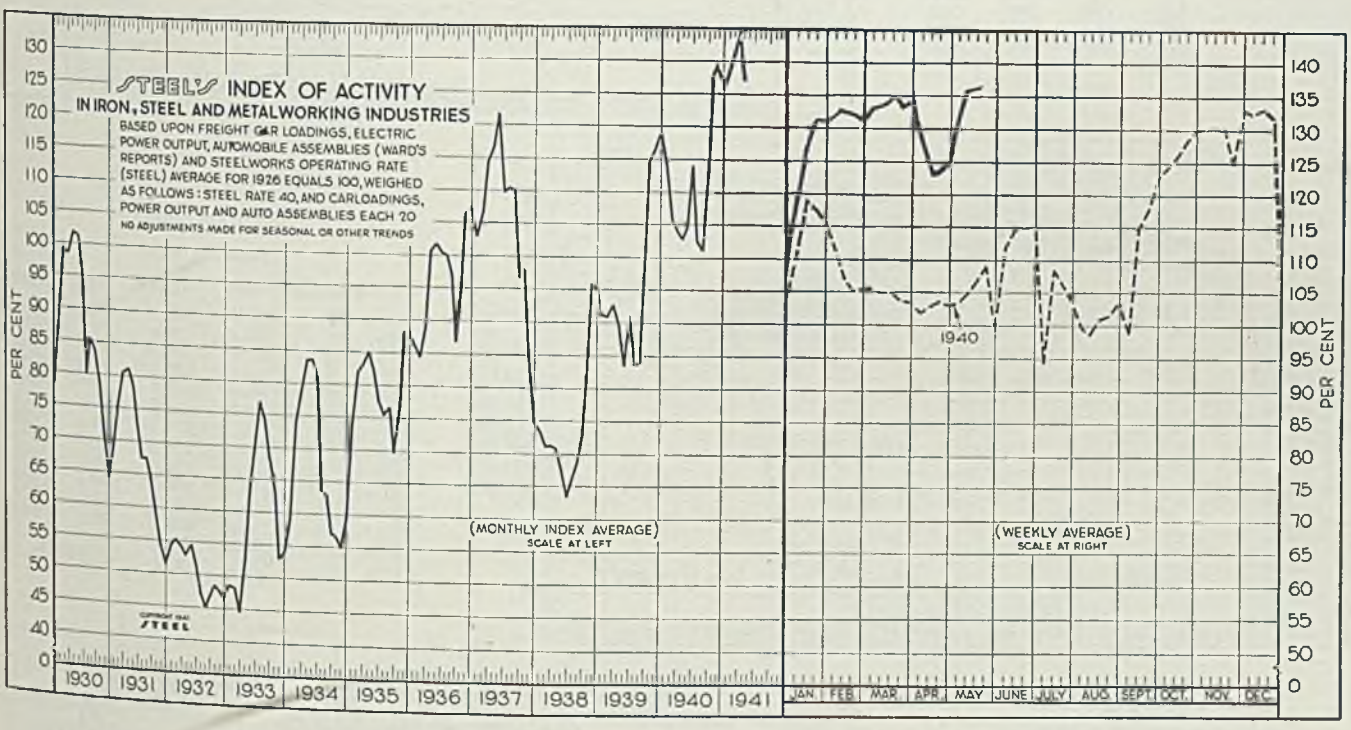
The BUSINESS TREND

Activity Index Moves To Higher Level

■ INDUSTRIAL activity has moved steadily upward so far this month, following the temporary setback experienced in April as a result of the automotive and bituminous coal strikes. Operating schedules in those lines affected by the strikes have virtually recovered to the pre-strike level, and in some instances exceed it.

During the week ended May 17, STEEL's index of activity recorded the fourth consecutive weekly advance. For that week the index stood at 136.1, a gain of 0.2 point over the preceding week's index figure of 135.9, and compared with 106.8 in the corresponding week last year. With the exception of automobile production, each of the industrial indicators composing the index moved upward during the latest period.

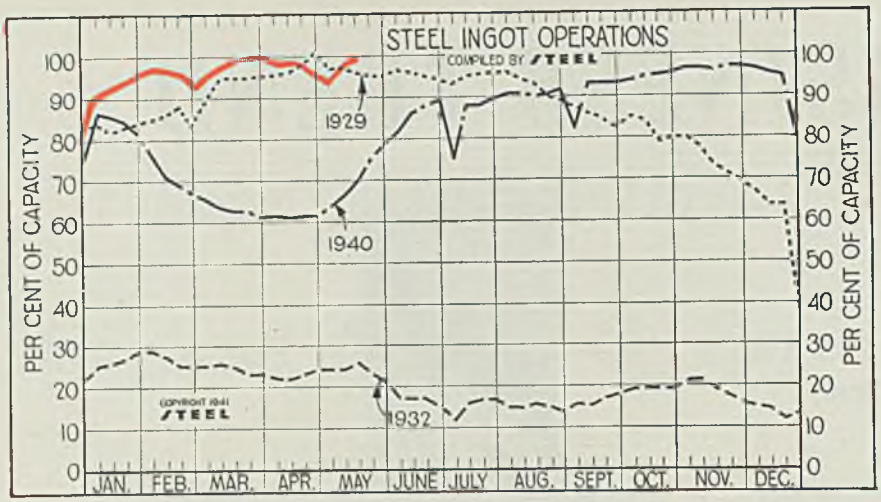
The national steel rate advanced to 99.5 per cent of capacity during the week of May 17, and continued the upturn last week to reach a new all-time high on a tonnage basis. Revenue freight carloadings gained more than seasonally during the week of May 17, while electric power output approached the 2,800,000,000 kilowatt hour weekly level. Automobile assemblies eased moderately to 127,255 units.



STEEL'S index of activity gained 0.2 points to 136.1 in the week ended May 17:

Week Ended	1941	1940
March 1	133.0	105.6
March 8	133.1	104.7
March 15	135.0	104.9
March 22	133.5	103.7
March 29	133.9	103.2
April 5	128.9	101.8
April 12	123.8	102.7
April 19	124.2	103.4
April 26	126.5	102.8
May 3	132.6	103.3
May 10	135.9	104.8
May 17	136.1	106.8

Mo. Data	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930
Jan.	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6
Feb.	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2
March	133.9	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2	80.4	98.6
April	127.2	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7
May	.....	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2
June	.....	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8
July	.....	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9
Aug.	.....	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4
Sept.	.....	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7
Oct.	.....	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8
Nov.	.....	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0
Dec.	.....	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3



Steel Ingot Operations

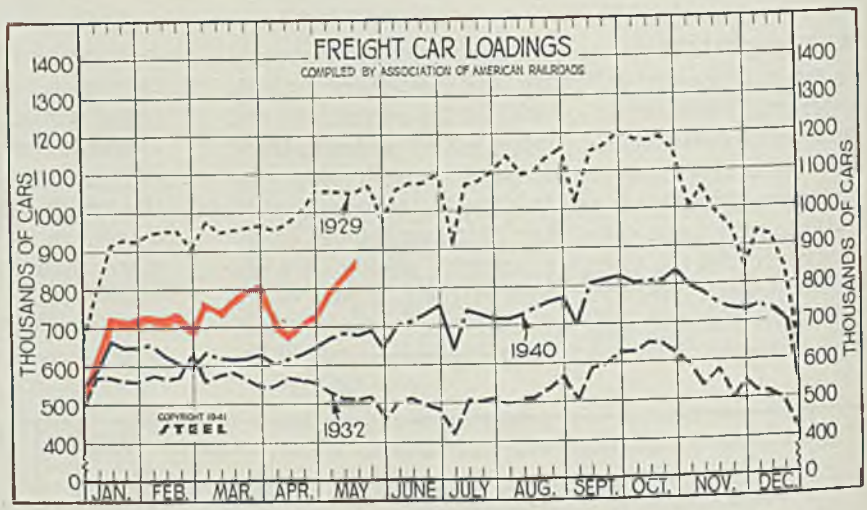
(Per Cent)

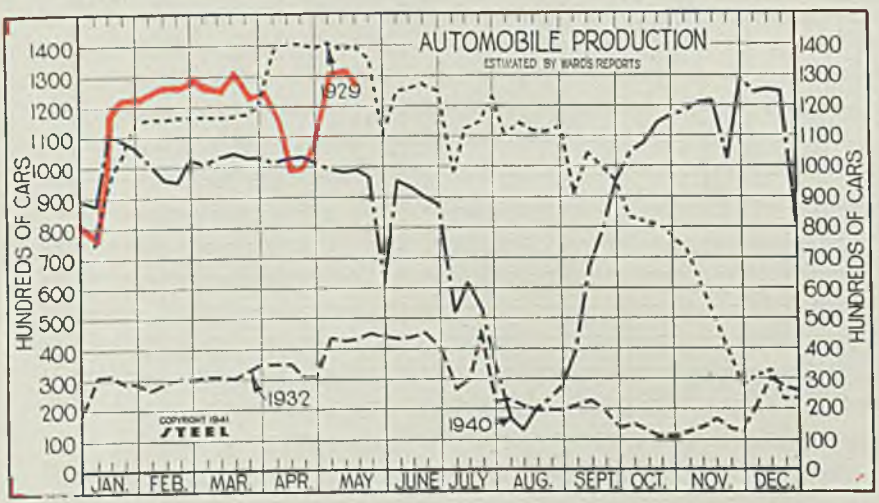
Week ended	1941	1940	1939	1938
May 17....	99.5	70.0	45.5	30.0
May 10....	97.5	66.5	47.0	30.0
May 3....	95.0	63.5	49.0	31.0
April 26...	96.0	61.5	49.0	32.0
April 19...	98.0	61.5	50.5	32.5
April 12...	98.0	61.0	51.5	32.0
April 5 ..	98.0	61.5	53.5	32.0
March 29 ..	99.5	61.0	54.5	36.0
March 22 ..	99.5	62.5	55.5	35.0
March 15 ..	98.5	62.5	56.5	32.0
March 8...	97.5	63.5	56.5	30.0
March 1...	96.5	65.5	56.0	29.5
Feb. 22....	94.5	67.0	55.0	30.5
Feb. 15....	96.5	69.0	55.0	31.0

Freight Car Loadings

(1000 Cars)

Week ended	1941	1940	1939	1938
May 17.....	864	679	616	546
May 10.....	837	681	555	542
May 3.....	794	666	573	536
April 26.....	722	645	586	543
April 19.....	698	628	559	524
April 12	680	619	548	538
April 5	682	603	535	522
March 29....	792	628	604	523
March 22....	769	619	605	573
March 15 ...	759	619	595	540
March 8.....	742	620	592	557
March 1.....	757	634	599	553
Feb. 22.....	678	595	561	512
Feb. 15.....	721	608	580	536





Auto Production

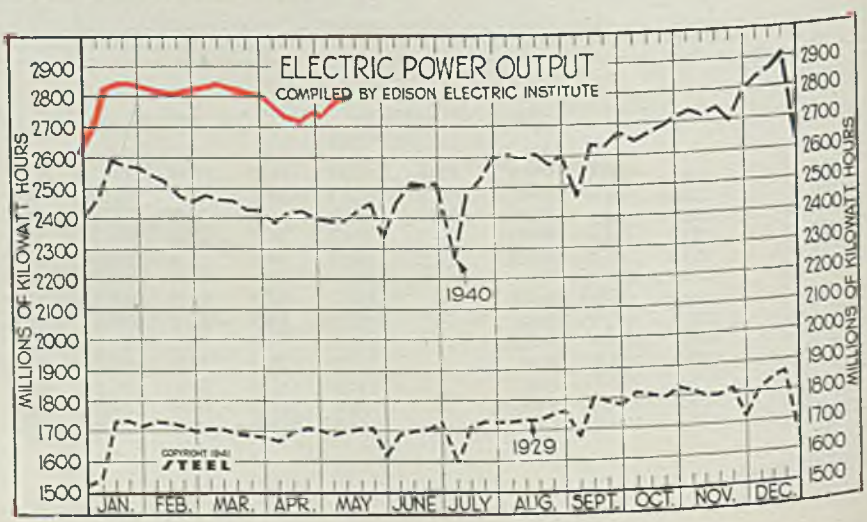
(1000 Units)

Week ended	1941	1940	1939	1938
May 17....	127.3	99.0	80.1	46.8
May 10....	132.6	98.5	72.4	47.4
May 3....	130.6	99.3	71.4	53.4
April 26...	108.2	101.4	86.6	50.8
April 19...	99.9	103.7	90.3	60.6
April 12...	99.3	101.9	88.1	62.0
April 5....	116.3	101.7	87.0	61.0
March 29..	124.2	103.4	86.0	57.5
March 22..	123.8	103.4	89.4	56.8
March 15 ..	131.6	105.7	86.7	57.6
March 8...	125.9	103.6	84.1	57.4
March 1...	126.6	100.9	78.7	54.4
Feb. 22....	129.2	102.7	75.7	57.0
Feb. 15....	127.5	95.1	79.9	59.1

Electric Power Output

(Million KWH)

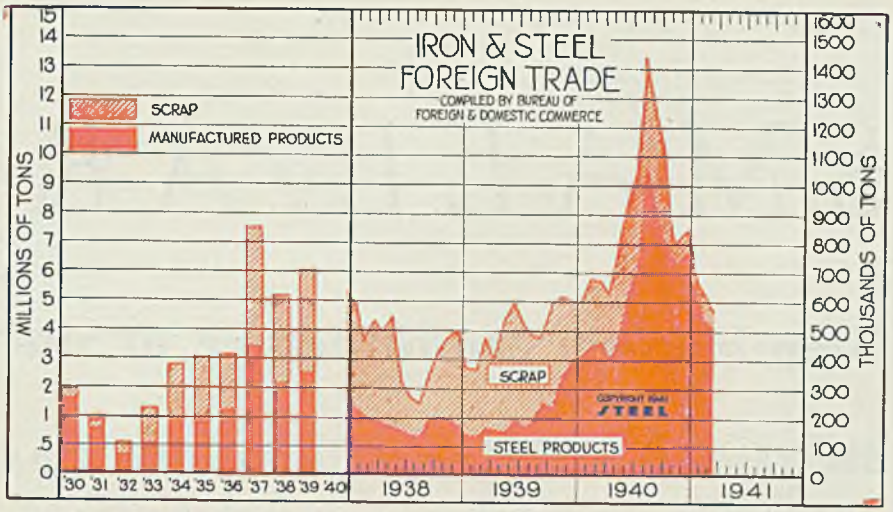
Week ended	1941	1940	1939	1938
May 17...	2,800	2,422	2,170	1,968
May 10...	2,792	2,388	2,171	1,968
May 3...	2,734	2,386	2,164	1,939
April 26..	2,750	2,398	2,183	1,939
April 19..	2,702	2,422	2,199	1,951
April 12..	2,721	2,418	2,171	1,958
April 5...	2,779	2,381	2,174	1,990
March 29.	2,802	2,422	2,210	1,979
March 22.	2,809	2,424	2,199	1,975
March 15.	2,818	2,460	2,225	2,018
March 8..	2,835	2,464	2,238	2,015
March 1..	2,826	2,479	2,244	2,036
Feb. 22...	2,820	2,455	2,226	2,031
Feb. 15...	2,810	2,476	2,249	2,059
Feb. 8...	2,824	2,523	2,268	2,052

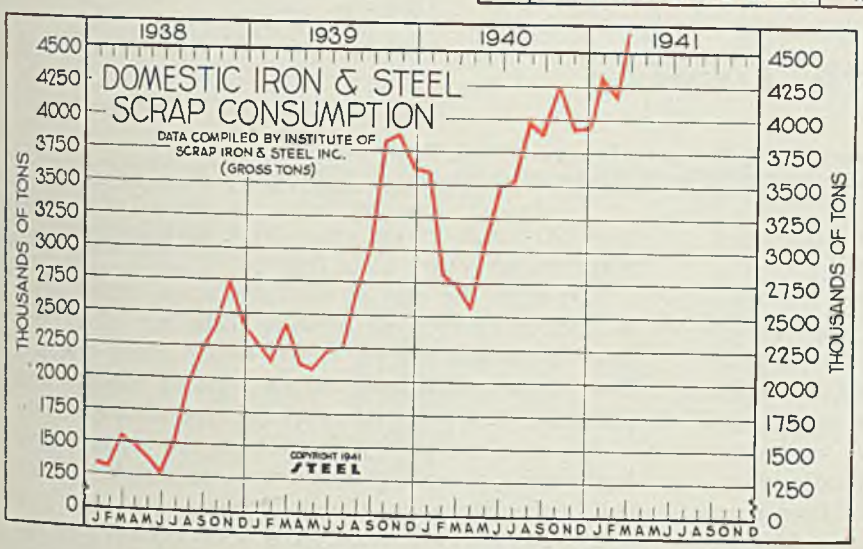


Iron and Steel Exports

(Thousands of Gross Tons)

	Steel Products		Scrap		Total
	1941	1940	1941	1940	1941
Jan.	653.8	396.1	45.1	187.5	698.9
Feb.	525.9	436.6	74.4	234.7	600.2
Mar.	512.8	457.1	54.4	206.9	567.2
April	.....	391.8	.....	221.2	.....
May	.....	471.5	.....	312.5	.....
June	.....	617.7	.....	318.4	.....
July	.....	707.8	.....	327.1	.....
Aug.	.....	1046.1	.....	346.1	.....
Sept.	.....	965.4	.....	251.1	.....
Oct.	.....	846.6	.....	258.5	.....
Nov.	.....	713.8	.....	74.3	.....
Dec.	.....	735.2	.....	70.0	.....
Total	.....	7,785.5	.....	2,823.1	.....





Iron and Steel Scrap Consumption

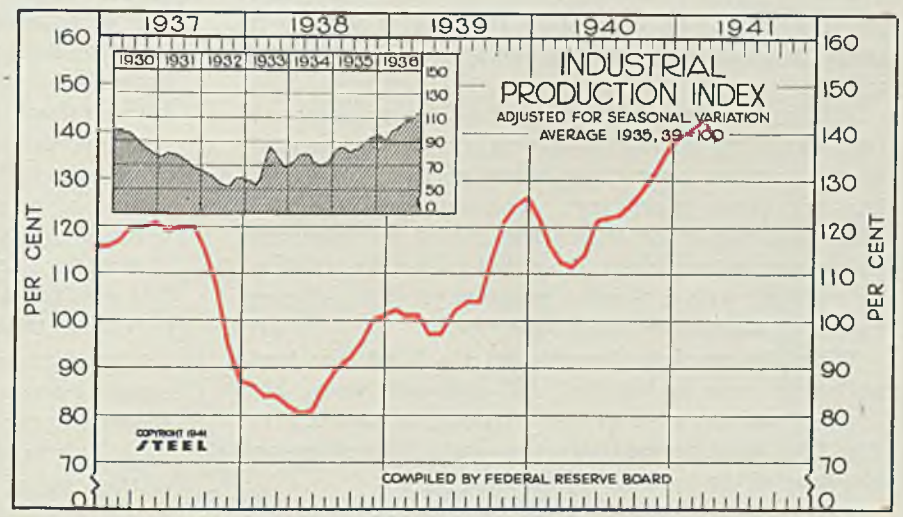
(Gross Tons)

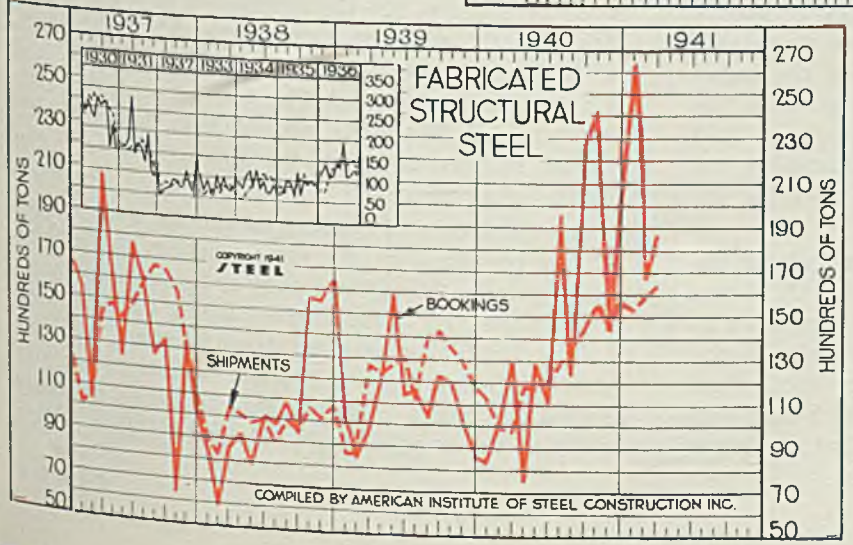
	1941	1940	1939	1938
		(000 omitted)		
Jan.	4,278	3,581	2,257	1,331
Feb.	4,172	2,812	2,124	1,306
Mar.	4,662	2,728	2,419	1,543
Apr.	.....	2,548	2,114	1,477
May	.....	3,061	2,079	1,387
June	.....	3,482	2,221	1,257
July	.....	3,526	2,247	1,520
Aug.	.....	3,968	2,675	1,953
Sept.	.....	3,876	3,018	2,218
Oct.	.....	4,233	3,809	2,393
Nov.	.....	3,922	3,858	2,732
Dec.	.....	3.950	3,613	2,411
Total	.....	41,687	32,434	21,528
Mo. Av.	.....	3,474	2,703	1,794

Industrial Production
Federal Reserve Board's Index

(1935-39 = 100)

	1941	1940	1939	1938	1937
Jan.	139	122	102	86	116
Feb.	141	116	101	84	117
March	143	112	101	84	120
April	139	111	97	82	120
May	...	115	97	80	121
June	...	121	102	81	119
July	...	121	104	86	120
Aug.	...	121	104	90	120
Sept.	...	125	113	92	115
Oct.	...	129	121	95	107
Nov.	...	133	124	100	95
Dec.	...	138	126	101	87
Year Ave.	...	122	108	88	113





Fabricated Structural Steel

(1000 tons)

	Shipments			Bookings		
	1941	1940	1939	1941	1940	1939
Jan.	154.2	110.9	84.3	266.6	81.7	101.7
Feb.	165.4	97.2	84.4	165.4	98.9	82.7
Mar.	187.1	95.9	125.3	187.1	128.3	95.1
Apr.	.....	116.3	120.9	.....	73.8	118.3
May	.....	115.6	125.9	.....	126.8	156.9
June	.....	119.1	130.1	.....	109.7	111.6
July	.....	127.1	110.5	.....	194.9	114.1
Aug.	.....	134.9	139.7	.....	122.5	100.9
Sept.	.....	142.8	140.8	.....	225.5	121.4
Oct.	.....	153.2	133.8	.....	233.1	118.8
Nov.	.....	147.0	128.2	.....	141.9	99.3
Dec.	.....	155.5	116.2	.....	203.1	84.4
Tot.	.....	1515.5	1440.1	.....	1748.1	1305.0

SMALL-ARMS AM

Step-by-Step Manufacture of the British 0.303-Inch Cartridge Case And Its Bullet, with Tooling

(This Is Number 16 in a Series on Ordnance Work, Prepared Especially for STEEL by Professor Macconochie)

■ WHILE some minor changes have been made, modern small-arms manufacture closely follows that at Woolwich Arsenal in 1914-18, detailed here. The manufacture of the British 0.303-inch bullet envelope follows lines similar to the manufacture of the cartridge case for large shells as described in STEEL last week. It starts with a cupro-nickel slab which is rolled down into strip 0.039 to 0.043-inch thick. This is blanked, Fig. 1A, and cupped, Fig. 2A, in a double operation—see the tooling for it in Figs. 1B and 2B. Then there follows a series of draws, Figs. 3A, 4A and 5A, ending in a trim, Fig. 6A, before the nose is worked to shape in a series of forming operations, Figs. 7A, 8A and 9A.

Although cupro-nickel work hardens to some extent, annealing during manufacture is unnecessary, all of the various operations being performed without heat treatment of any sort. The sequence Figs. 10A, 12A, 14A and so on shows the use of an aluminum point but, as mentioned in a previous article, this can be replaced with a pressed paper point if a sufficient supply of aluminum is not available.

With the envelope formed and tip filled, the lead-antimony core is inserted and rammed home, Fig. 14A. Now the edge of the envelope is turned over, Fig. 15A, then pressed into the recess formed around the base of the lead core, Fig. 16A.

The cannelure, Fig. 17A, is a depression or groove April 28, 1941, p. 52) the small-arms case starts as a tween revolving and stationary surfaces, the bullet resting on the base in an upright position as the action proceeds. The cannelure serves as a channel to hold lubricant and to provide a means of fastening the bullet securely in the cartridge case by indenting the case at this point, see Fig. 26C.

The tools used in these various bullet-forming operations are shown in Figs. 1B to 16B, this "B" series of drawings corresponding to similarly numbered illustrations in the "A" series just described. In the earlier drawing operations, two dies are used, Figs. 3B and 4B. In third draw, we manage with only one, Fig. 5B. The machines employed are a rather simple type of crank-driven press with arrangements for magazine or rotary plate feed.

Just as in the case of cartridge brass, cupro-nickel is heir to its crop of troubles including "thick and thin" cups and draws, splits, ringed noses and the like. Improper lapping of the forming punches and failure to distribute the work of expanding the body of the envelope properly results in the second forming punch proceeding to the nose, producing a small bell in the interior of the envelope.

Ringed noses are usually the result of improper fitting or adjustment of the ejector pin but may result from the design of the envelope. In 1914-18, the Russians used a rather thin-walled bullet envelope which gave so much trouble that the writer made the necessary changes in an experimental pressing machine to permit the bullets to be ejected from the die by inertia instead of by a pin, thus avoiding entirely the possibility of injury to the nose. The incidence of the revolution in Russia prevented further development of this ejection method, since no other bullet gave any particular trouble.

Manufacture of British 0.303-inch small-arms ammunition cartridge case is shown in the "C" series of accompanying illustrations. With minor modifications, this is the method still generally followed. As in the case of the artillery ammunition case (STEEL, April 28, 1941, p. 52) the small-arms case starts as a disk, Fig. 1C, which is cupped, Fig. 2C; drawn, Figs. 3C to 7C; trimmed, Fig. 8C; indented, Figs. 5C and 9C; annealed and headed, Fig. 10C; pierced, Fig. 11C; semiannealed, Fig. 12C; tapered, Figs. 13C and 14C; necked, bulleted and so on as is clearly shown in the illustrated sequence.

The blanking and cupping operations, Figs. 1C and 2C, are combined on the same machine, the cupping punch passing through the body of the blanking punch to push the disk through the cupping die. Drawing is done familiarly between drawing punch and dies while the indenting and heading operations are performed on powerful toggle-action horizontal machines in which the component is fed forward on a bolster

MUNITION

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ENVELOPE

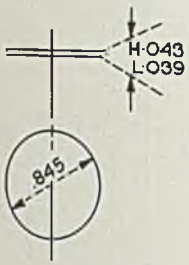


Fig. 1A—Above, bullet envelope starts from cupronickel disk, blanked from strip. Note maximum and minimum dimensions denoted by H and L respectively

Fig. 2A—First step is cupping; both blanking and cupping are handled by combination tool, Figs. 1B and 2B

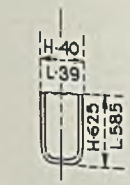


Fig. 3A—First draw, done with tool shown in Fig. 3B. Note tolerances are given all through this series of drawings

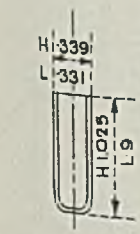


Fig. 4A — Second draw, done with tool shown in Fig. 4B. All dimensions are inches

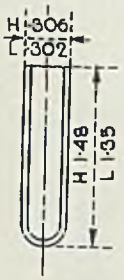


Fig. 5A — Third draw, done using tool shown in Fig. 5B

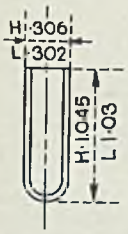


Fig. 6A—Now envelope is trimmed to exact length, see tooling in Fig. 6B

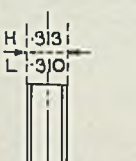


Fig. 7A—First forming of nose, tooling shown in Fig. 7B

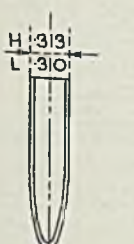


Fig. 8A—Second forming of nose, dimensions and tooling in Fig. 8B

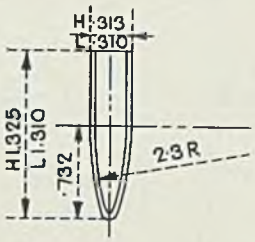


Fig. 9A — Third forming of nose; Fig. 9B shows tooling

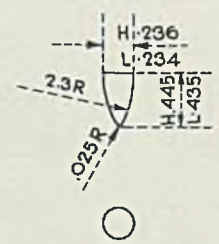


Fig. 10A—Dimensions of aluminum core or tip. This may also be of paper

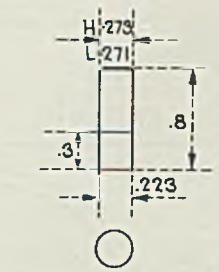


Fig. 11A—Dimensions of lead - antimony core of bullet body

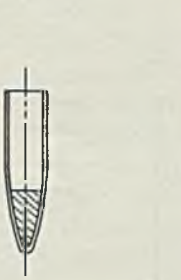


Fig. 12A—Inserting aluminum or paper core in bullet tip

Fig. 13A—Lead-antimony core is inserted next

Fig. 14A — Cores are pressed tightly in place, tooling in Fig. 14B

Fig. 15A—Open end of envelope is turned over, starting to lock cores in place. See tool, Fig. 15B

Fig. 16A—Now open end is pressed tightly shut, completely locking cores. Tool shown in Fig. 16B

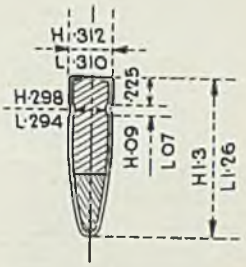


Fig. 17A—Bullet is cannelured, forming a groove around circumference

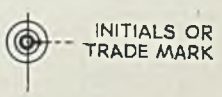


Fig. 18A—Bullet is now rectified to give exact and uniform circular cross section; stamped for identification

Fig. 19A—Lubricant is applied to depth shown

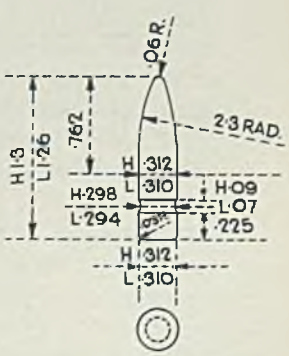


Fig. 20A — Dimensions and tolerances of completed bullet

ENVELOPE TOOLING

Fig. 1B—Below, disk is blanked from strip, using lower edge of outer slide as punch, depositing blank in cup of lower die

Fig. 2B—Next, inner punch descends, forcing blank through die and producing cup shown in Fig. 2A

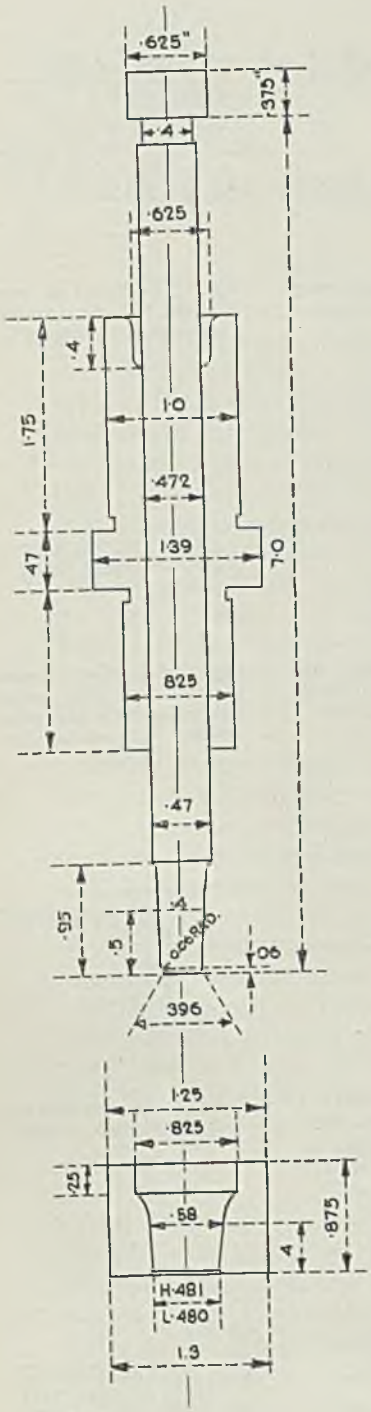


Fig. 3B—Below, punch and double die set for making first draw

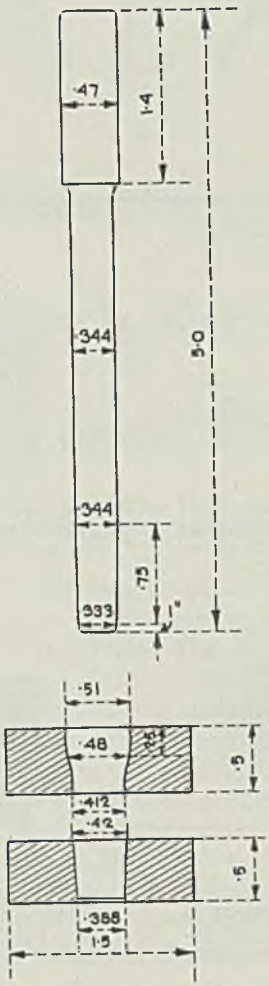


Fig. 4B—Below, punch and double die set for making second draw

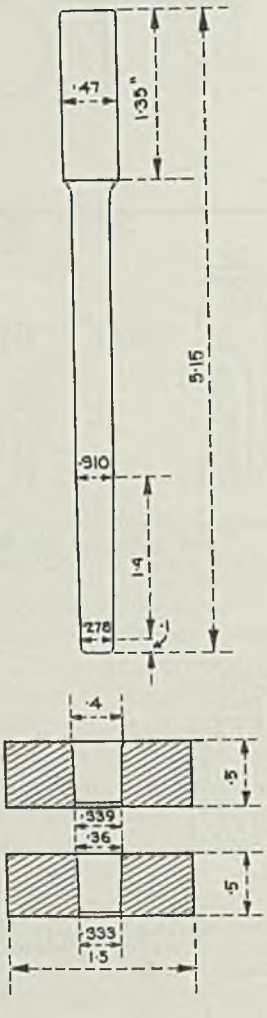
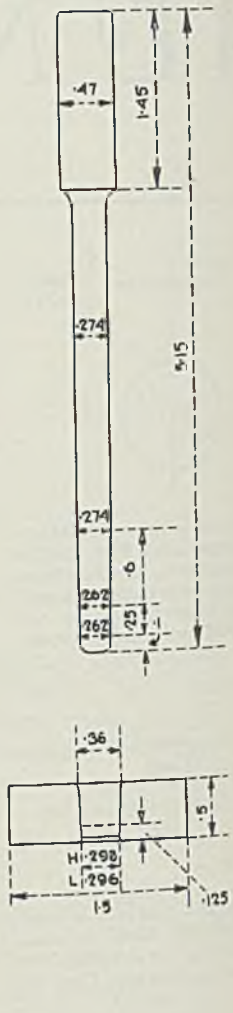


Fig. 5B—Below, punch and die for making third draw



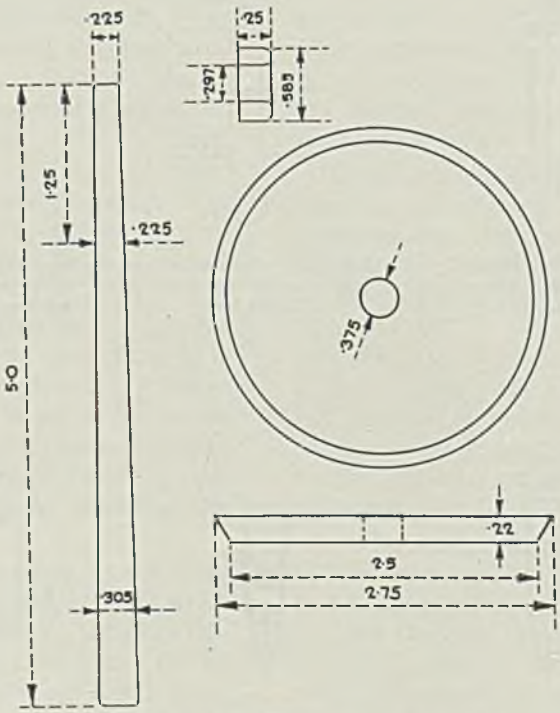


Fig. 6B—Above is arbor, collar and cutting wheel used to trim envelope

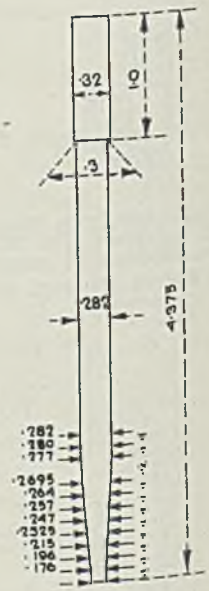


Fig. 7B — First forming punch above. Forming die and ejector shown Fig. 8B, next page

Fig. 8B — Below, second forming punch; uses die and ejector shown below

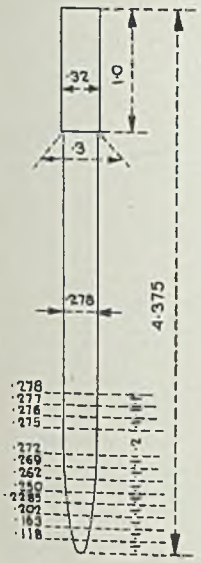


Fig. 9B—Third forming punch below uses same die and ejector as 7B and 8B

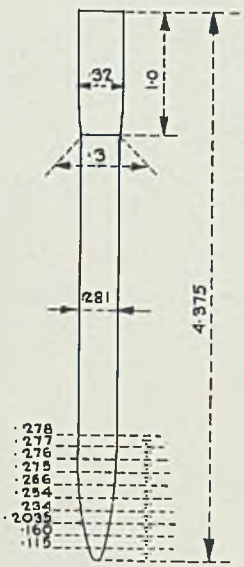


Fig. 14B—Below, envelope and cores are placed in lower die, punch pressing them firmly in place

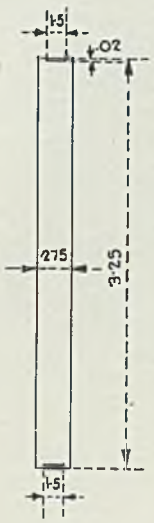
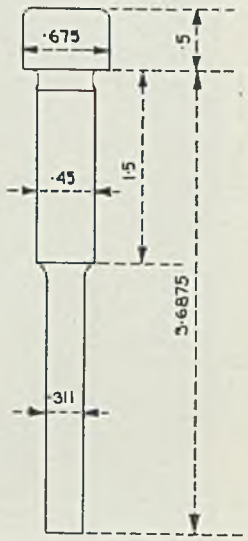
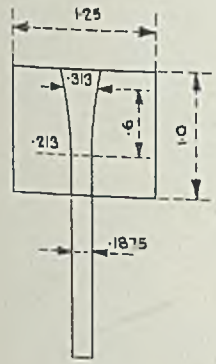


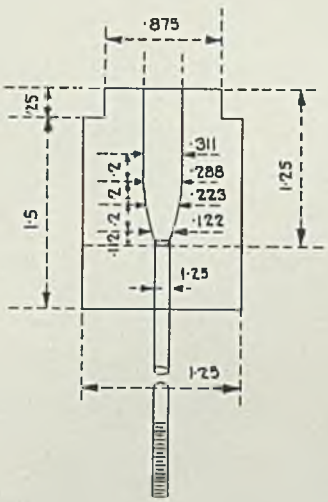
Fig. 16B—Now cores are locked tightly in place, using same die as Fig. 14B but the punch shown below





Figs. 10B, 11B, 12B and 13B are omitted since no tooling is involved in these operations inserting the bullet cores

Fig. 15B — A double-ended tool then turns over open end of envelope after cores are placed, not shown



Figs. 17B, 18B and 19B are omitted since these operations involve merely grooving, rectifying cross section, and application of lubricant

through an encircling die and held while the indenting tool is brought forward by the toggle gear. Heading, Fig. 10C, is a similar operation.

The piercing of the fire-holes, Fig. 11C, is done with a couple of needles. This operation used to give some trouble from breakage of the needles, components passing through meanwhile without being pierced. To avoid mis-fires from this source, a large examination branch is maintained for inspecting all components before they are passed to the filling factories in the danger building area.

As may be observed, the percussion cap and main cordite charge are placed before necking, so the charge of "stick" cordite can be inserted before the open end is necked down. This might appear to be a rather dangerous procedure, but actually few accidents ever happen despite the fact that capping and filling are done on the same machine. The "hanks" of cordite are contained in a cell outside the machine room, each machine being provided with its own cell.

The bundle of cordite filaments emerges from the cell through a hole in the fireproof partition. This hole is protected by a guillotine knife held in suspension by a thread passing across the machine in the neighborhood of the greatest fire hazard. Accidental ignition of the cordite near the machine causes the thread to burn through and the knife to fall before the flame can reach the supply in the cell. In operation, the filling machine feeds the cordite forward and shears off the exact weight desired before pushing the charge home into the cartridge case.

Then the glazed cardboard disk is inserted, Fig. 23C; the case necked in four operations, Fig. 24C; the bullet inserted, Fig. 25C; and secured with three indents, Fig. 26C; and the assembly given a final forming or "coning" operation in a finishing die, Fig. 27C. The completed cartridge is shown in cross section in Fig. 28C with outside dimensions given in Fig. 29C.

CARTRIDGE CASE AND ASSEMBLY

(See p. 62 also)

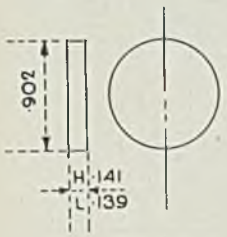


Fig. 1C — Above, cartridge case starts from disk blanked from heavy strip of brass

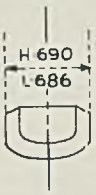


Fig. 2C—Cupping is first step in forming. Note tolerances indicated by maximum and minimum dimensions, in inches. Weight, 193 grains

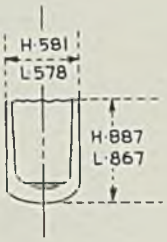


Fig. 3C—First draw extends cup

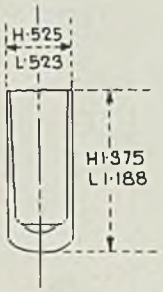


Fig. 4C — Second draw lengthens it still further

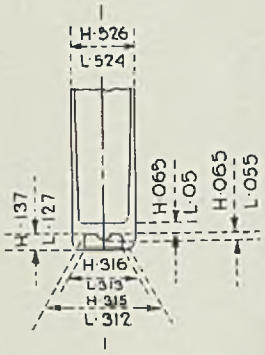


Fig. 5C—Now base is indented, first step in forming cavity for cap

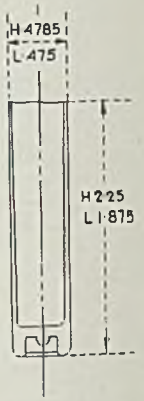


Fig. 6C—Third draw thins walls, lengthens case

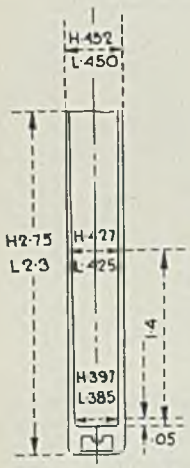


Fig. 7C—Fourth draw gets length wanted

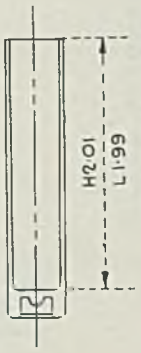


Fig. 8C—Next case is trimmed accurately to length. Weight now is 175 grains

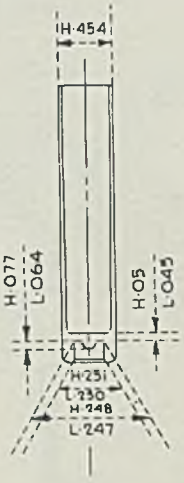


Fig. 9C—The second indenting completes cavity for cap

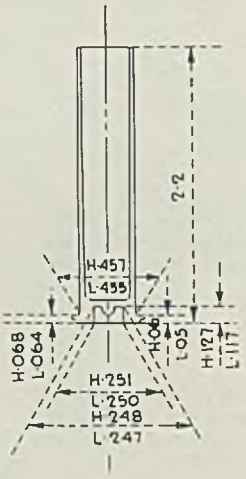


Fig. 10C—After annealing, case is headed to form extraction ring

Fig. 11C—Two holes are pierced from cap cavity to interior to allow cap to ignite charge

Fig 12C—All case except lower one-third is annealed by dipping inverted case in heated salt bath to depth wanted

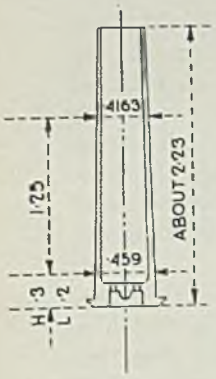


Fig. 13C — Softened shell now can be tapered. This is first operation

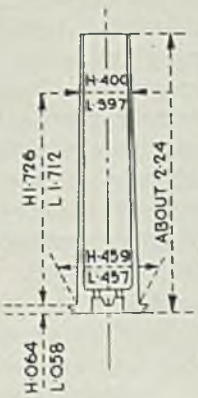


Fig. 14C—Tapering is completed in a second operation

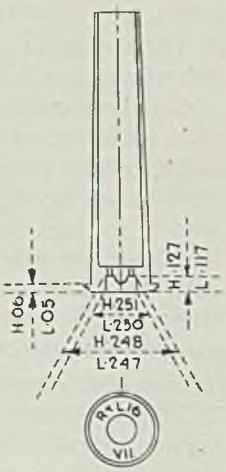


Fig. 15C—Case is rectified and identification stamped on base end

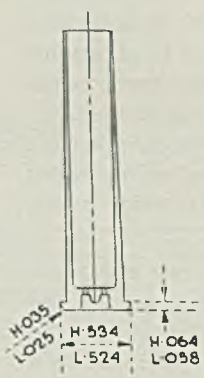


Fig. 16C — Head (base) is turned to exact contour and dimensions. Now weight is 173.5 grains

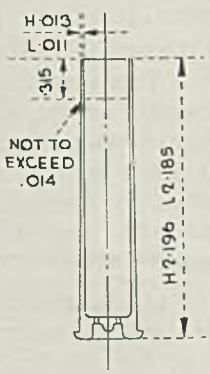


Fig. 17C—Main cavity of case is reamed so charge will fit exactly. Final weight is 170 grains, plus or minus 5 grains

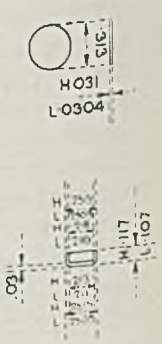
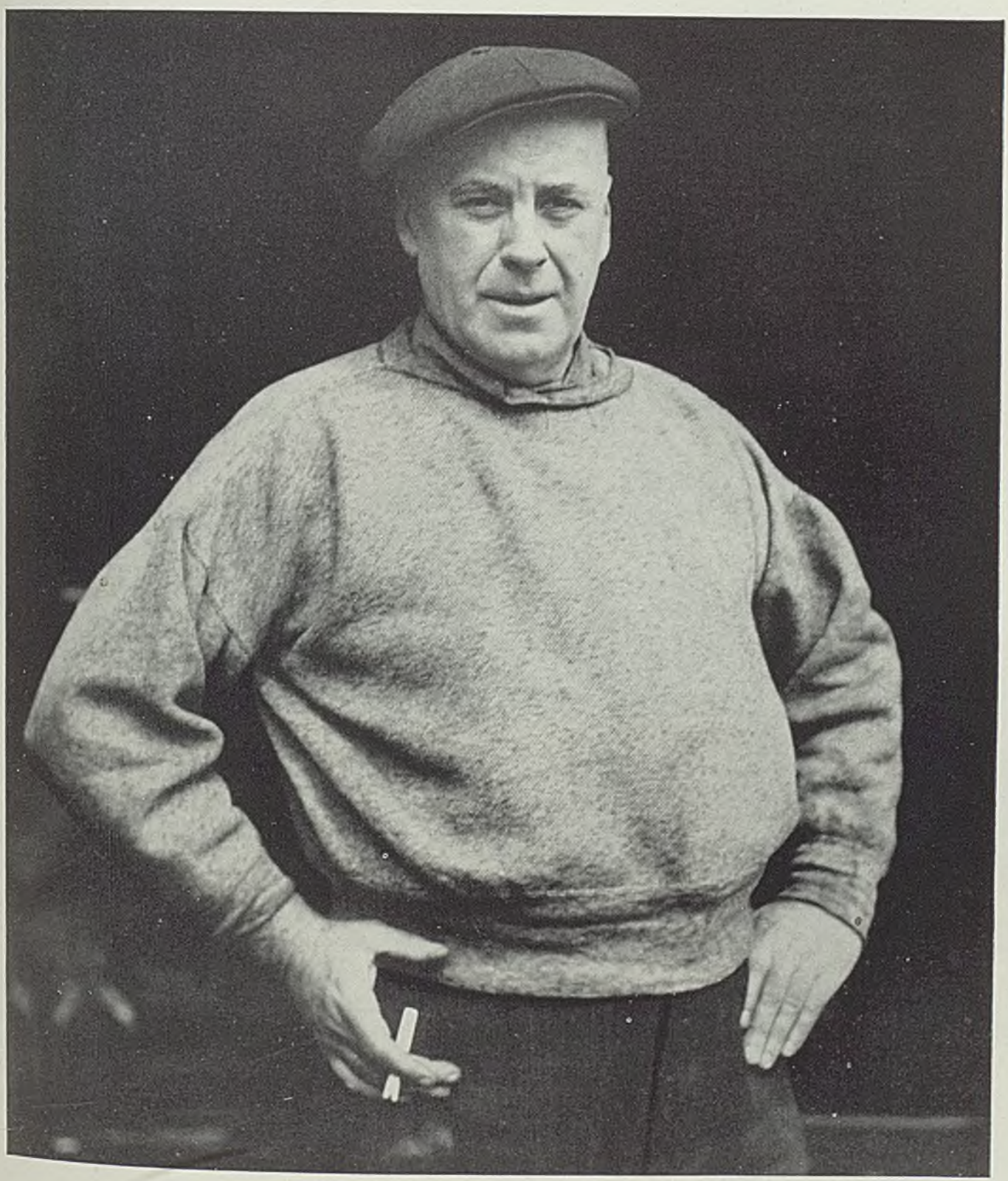


Fig. 18C — Cap is made from a copper alloy, drawn and flattened. It weighs 5.2 grains



THE "FEEL" OF BRASS. Brass isn't just a matter of pyrometers and chemical analyses. It's also a matter of men like Tom Carroll. For over 35 years, Tom has been casting brass for Revere Copper and Brass Incorporated. Today, he and thousands of other Revere workers like him stand behind defense orders, as they always have stood behind Revere metals. They furnish the *human touch* in fabricating copper, brass, bronze, and other copper-base alloys. In fostering this *human touch*—as well as research and plant modernization—during the depression years, Revere has been well able, in the present emergency, to meet the nation's defense needs. Just as in the brighter times coming, Revere will meet the demands of a new vitalized American industry. Revere Copper and Brass Incorporated, 230 Park Avenue, New York.

Fig. 19C—Percussion cap above is filled with 0.6 grain of this composition:

Sulphide of Antimony	18 parts
Chlorate of Potash	14 parts
Fulminate of Mercury	8 parts
Sulphur	1 part
Mealed Powder	1 part

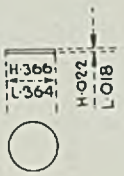


Fig. 20C—Above is the glazed board disk blanked from sheet and used to hold cordite charge in place and to act as a filler between charge and bullet

Fig. 21C — Percussion cap is applied. It extends below base a maximum of 0.007-inch, minimum of 0.001-inch

Fig. 22C — Case is filled with charge, cordite M.D.T. size 5-2, 36 to 37 grains

Fig. 23C — Glazed board disk is inserted to hold charge in place

Fig. 24C—Left, now cartridge case is necked down in four operations

Fig. 25C—Right, then the bullet is inserted. See Figs. 1A to 20A for bullet sequence

Fig. 26C—Left, bullet is locked into cartridge case by three indents at arrow

Fig. 27C—Right, after cartridge case is coned to fit bullet tightly, it is cleaned and then is ready for use

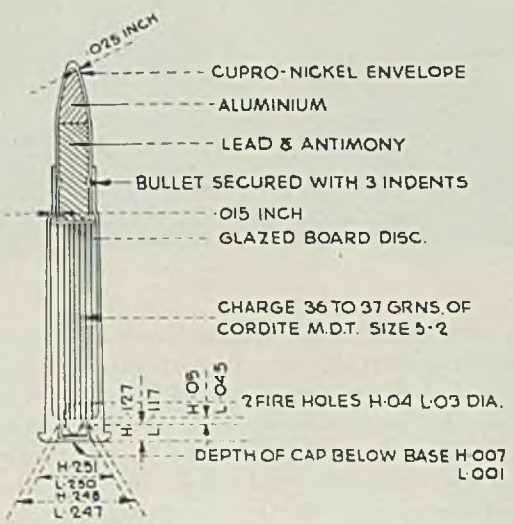


Fig. 28C—Above, cross section through completed British 0.303-inch cartridge. All dimensions are in inches

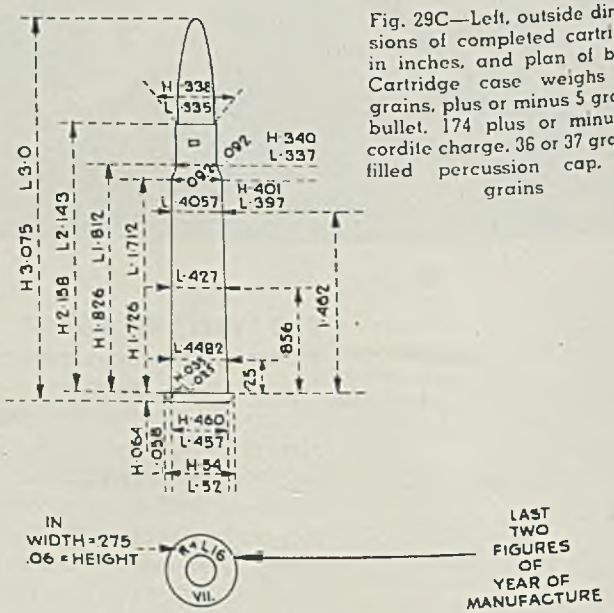
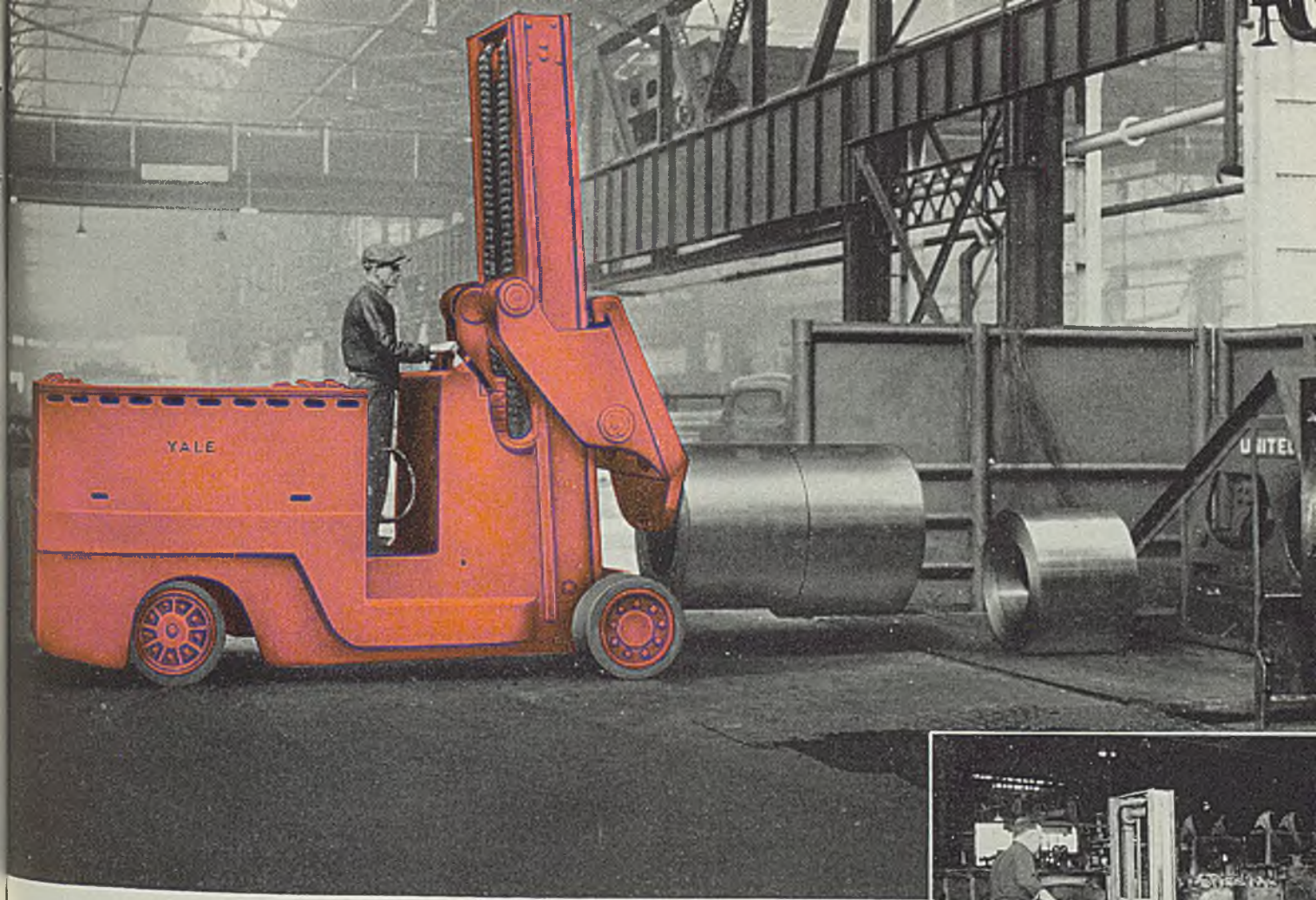
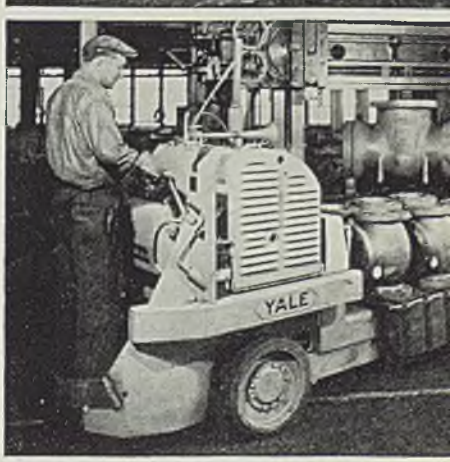
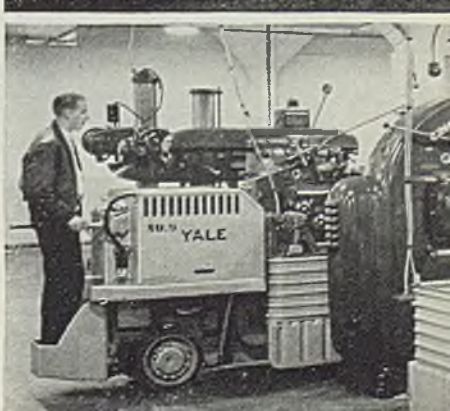


Fig. 29C—Left, outside dimensions of completed cartridge, in inches, and plan of base. Cartridge case weighs 170 grains, plus or minus 5 grains; bullet, 174 plus or minus 2; cordite charge, 36 or 37 grains; filled percussion cap, 5.8 grains







YALE ELECTRIC TRUCKS CUT COSTS, SPEED HANDLING FOR INDUSTRY

Executives know the answer to the speed-up demanded by the National Defense Program. That answer is modernized materials handling—the elimination of waste time, the lowering of handling costs.

All of these may be accomplished by the right kind of materials handling equipment. Yale Electric Industrial Trucks are such equipment. They do more work in less time, maintain the flow of materials, are safer, require less time out for maintenance, cut handling costs.

Executives are buying more Yale Electric Trucks because they get more ton miles per handling dollar. Operators like them, too. They find they are safer, have greater visibility and are easier to operate.

Find out about this Yale line of Electric Trucks. There is a type for your every handling need. Call in your nearest Yale representative. Ask him to show you how Yale Electric Trucks can speed your operations, cut your costs. Or, write to us for full information.

THE YALE & TOWNE MANUFACTURING CO.

PHILADELPHIA DIVISION—PHILADELPHIA, PA., U. S. A. IN CANADA: ST. CATHARINES, ONT.

TRADE YALE MARK

World's oldest and largest makers of Materials Handling Equipment, including Hand and Electric Hoists, Hand Lift Trucks, Electric Industrial Trucks and Tractors, Skid Platforms, and allied products

German Tungsten Supply Good for Six Years

■ Pointing out that the conduct of modern warfare is dependent on tungsten, Dr. Colin G. Fink, Columbia university, in an address at Stevens Institute of Technology, Hoboken, N. J., recently said that Germany imported 60,000 tons of tungsten ore during the six years prior to this war and still has enough enough on hand to last more than an additional six years.

Dr. Fink was the institute's second annual guest lecturer on the subject of powder metallurgy. The major portion of his talk discussed the extraction of tungsten from its ore and its manufacture into fine wire used for incandescent lamp filaments.

Tungsten powder, he said, usually is obtained by chemical processes in which concentrates first are mixed with crude soda and fused. The molten material then is ground and the sodium tungstate, when treated with hydrochloric acid, precipitates tungsten oxide. The latter is reduced to metallic tungsten powder.

Since tungsten has the highest melting point of any known metal, 3370 degrees Cent., it is impossible to form it into ingots by the melting process commonly employed for other metals. Even the best refractory available melts at 2400 degrees Cent.

Consequently, it is necessary to compress the powder into a small ingot and heat it in a sintering furnace to a temperature near the melting point.

Dr. Fink described a number of the difficulties experienced years ago when he was engaged in the development of a process for the drawing of metallic tungsten bars into fine wire. Tungsten requires a high temperature for both drawing and swaging in order to overcome the metal's inherent brittleness. However, its high tensile strength permits it to be drawn to diameters as small as 0.0005-inch.

Because of the high working temperature it was found necessary to use a short bearing die in order to prevent rapid cooling. Likewise, the commoner die lubricants cannot be employed in high-temperature drawing. This proved a stumbling block in the industry's early days but was overcome when Acheson graphite became available and was found to work successfully.

Great Lakes Red Book Gives Shipping Data

■ *Great Lakes Red Book*, 1941; paper, 170 pages, 3 x 9¾ inches; published by Penton Publishing Co., Cleveland, for $1, in United States and Canada.

With Great Lakes shipping in the most active season in its history, many changes of major importance are noted in the thirty-eighth annual edition, just issued.

In addition to the names of more than 1500 vessels registered on the Great Lakes, both American and Canadian, with the names of owners, operators, captains and engineers, directory contains a complete list of shipbuilding yards on the Great Lakes, with executive personnel and other pertinent information. An alphabetical list of all ships, an index of the capacity of ore carriers and a complete port directory are also included.

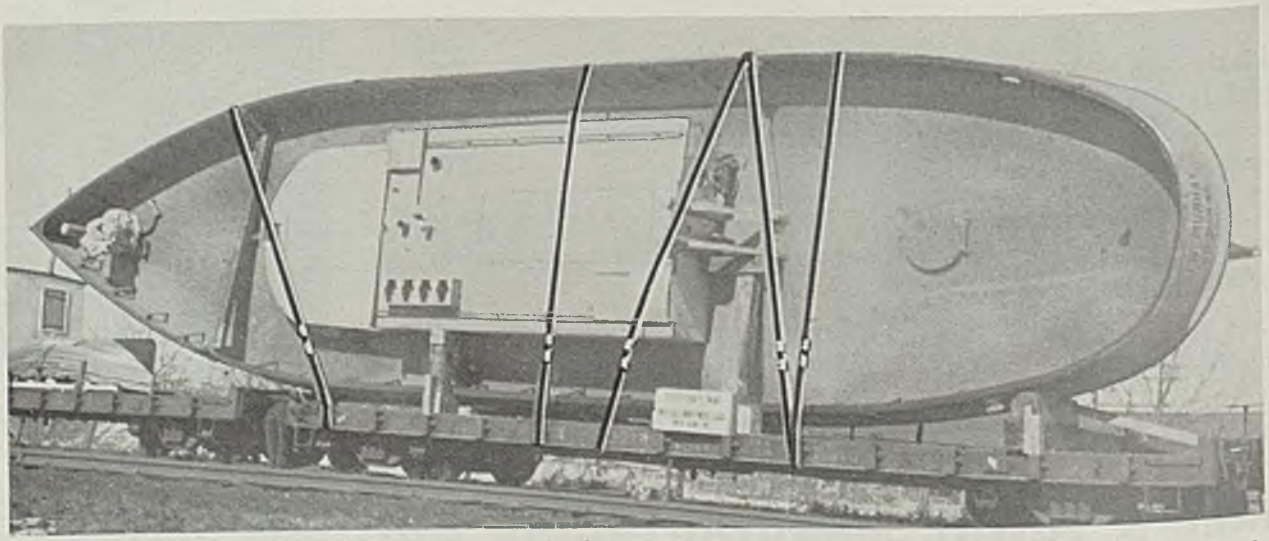
Offers Cutting Oils for Machining Gun Barrels

■ Ready-mixed cutting oils, recently announced by E. F. Houghton & Co., Philadelphia, for drilling, reaming rifling and honing gun barrels for small arms are said to assure faster speeds with longer tool life and the requisite fine finish.

For many years the company has supplied a cutting base mixed in the user's plant with a suitable blending oil and fed under high pressure through the barrels during the drilling operation. When taking on defense contracts, however, some plants were found to prefer a ready-to-use oil, thus eliminating the possibility of error in mixing or diluting.

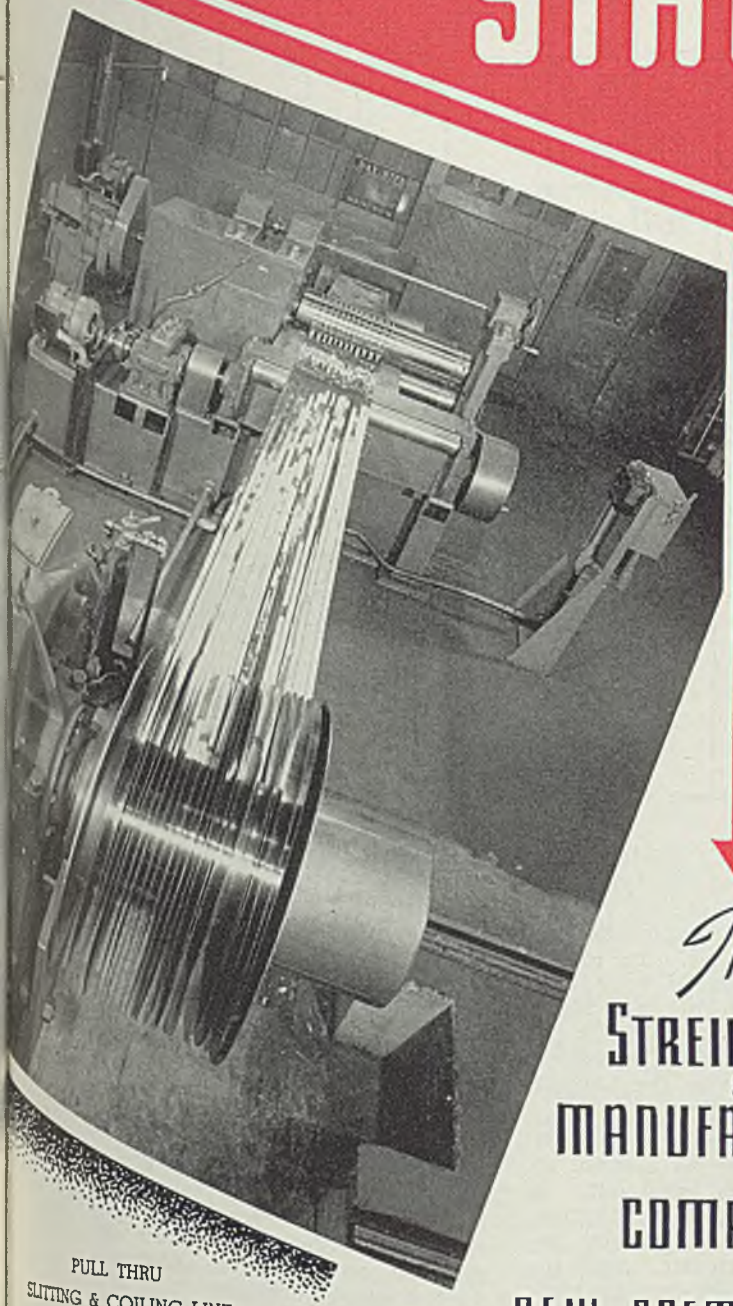
Now for drilling operations, the company is supplying a ready-mixed cutting oil designated as W. R. No. 5. For reaming and rifling, it offers Cut-Max No. 1025, a light-colored nonstaining oil. This also is suitable for chambering operations. Replacing staple fatty oils, is the company's gun barrel honing oil. It provides the necessary high finish and is said to provide longer stone life.

Steel Strapping a Big One



■ Here is an example that shows steel strapping can be applied to big jobs as well as the more familiar small ones. This Steelcraft tug, built by Russel Brothers Ltd., Owen Sound, Ont., is 60 feet long and 15.5 feet wide. Note it extends beyond the end of one flat car and almost touches the pilot house which is steel strapped onto the second car. Today, many shipments of structural shapes are being steel strapped into unit loads, not only facilitating anchorage in the car but aiding loading and unloading. Cut shows steel strapping supplied by Acme Steel Co., Chicago

"STAMCO"



PULL THRU
SLITTING & COILING LINE

The
STREINE TOOL
&
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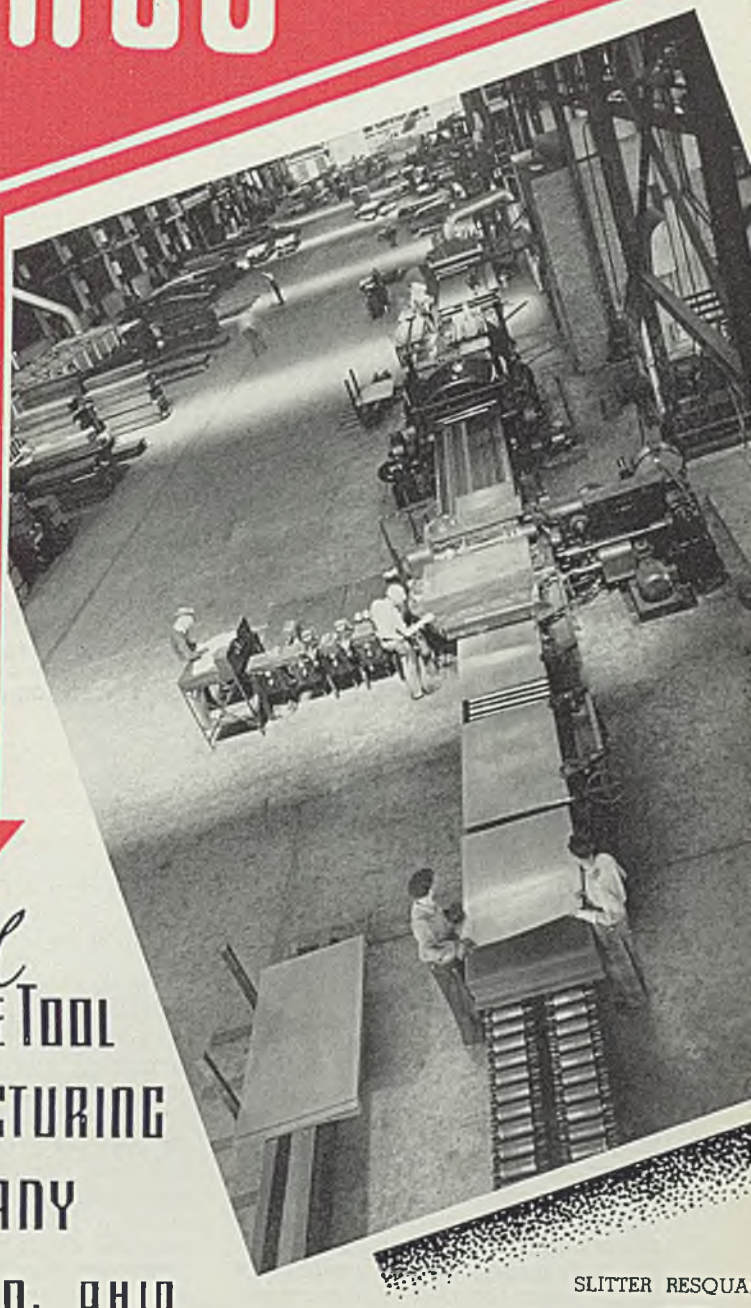


SLITTER RESQUA
UNIT

STAMCO

Pull Thru Slitting and Coiling Lines for shearing from full coil into narrow widths and recoiling QUICKLY, ACCURATELY AND FREE OF CAMBER. Capacities 10 gauge mild steel and lighter, 24" to 62" wide. Standard Unit consists of Stamco Pay Off Reel, Heavy Duty Slitter, Scrap Cutter and Heavy Duty Tension Reel.

STAMCO

Slitter Resquaring Units for resquaring ACCURATELY and FREE OF CAMBER full finished steel sheets, barrel stock and plates, ¼" thick and lighter, 44" to 240" long. Standard Unit consists of Stamco Skew Feed Table, Heavy Duty Slitter equipped with Patented Holddown Feed and Delivery Conveyors, Scrap Cutter, Transfer Table, Double End Cut Unit, and Collapsible Delivery Table.

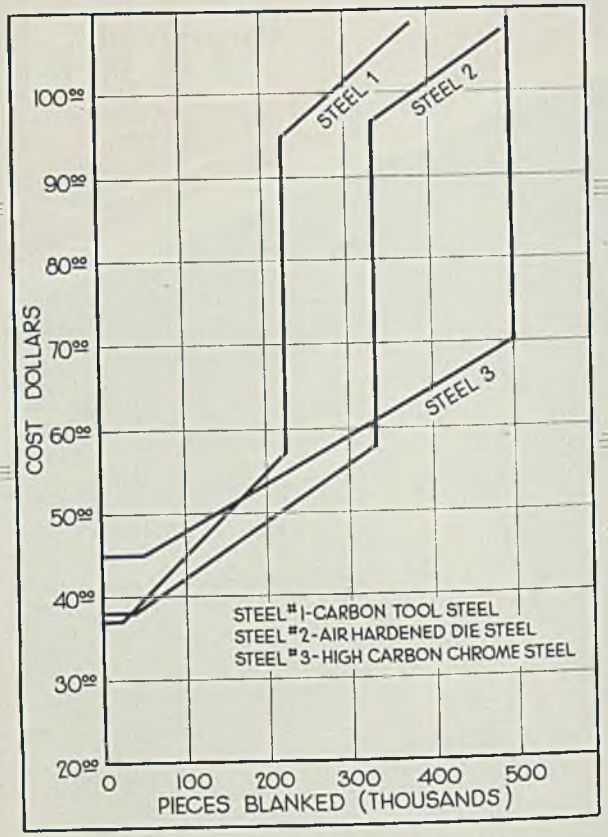
"STAMCO" AUTOMATIC STEARING SPECIALIST

How Do You Figure

DIE COSTS?

While it is well known that long run jobs warrant a more expensive die steel, how to determine exactly when an expensive steel should be used and how expensive it should be are problems that often receive too little attention. Here a practical metallurgist presents a method that works well on a wide variety of jobs

By JOHN P. WALSTED
Metallurgist
Whitin Machine Works
Whitinsville, Mass.



This chart shows how the various cost factors add up for different die steels. Note—any of the three steels can be cheapest, depending entirely upon the quantity of pieces to be worked

■ DIE COST in a press shop is one item of vital importance that is seldom calculated properly. Many shops estimate their die cost on a fairly sound basis; using a cheaper steel for short-run jobs and a more expensive, but longer life die, for long-run jobs. Just where the dividing line should be is left more or less to chance.

A little experimenting to obtain figures for various jobs would settle the question and would pay many times the cost of the experimental work. The accompanying table gives the figures obtained on one job only. Use it as a guide rather than as accurate for all types of work.

In very light work where the die will last almost indefinitely even when made of a cheap steel, it is obviously good business to make dies of cheap steel. Unfortunately, there are few jobs of this type. In most work a definite die life will be found. In such cases exploration of the field is necessary. In tough jobs where die life is poor and production requirements are high, the best die steel obtainable is none too good. No time should be wasted in putting into service the highest production steel available.

The last item in Table I gives the die cost per 1000 pieces blanked at the time the die is worn out. It does not, however, tell anything about a job which is finished before the die is worn out. Such information may be obtained by plotting costs as the production proceeds. Such a chart is shown here. The cost as production increases appears as a straight line. To be perfectly accurate, the cost should be shown as a series of steps, as the grinding cost is encountered at definite intervals rather than over the entire range.

The curves show, first, a horizontal line up to the first grind. This represents the production to be expected for the initial die investment. The second part of the curve is a sloping line representing the ratio between the grinding cost and the added production. When the die has finally reached its limit and is ready to be discarded, the new die investment is represented by a vertical line. Obviously, a new die must be provided before added production can be obtained.

Steel No. 1 will be recognized as a low-carbon steel of good quality. For very short runs, this steel is cheaper than any other that could be obtained. There is another factor which must be considered, however. Low-carbon steels do not harden in large sections. Where the die is fairly large, low-carbon steel is automatically rejected because of this factor.

The chart shows that where production goes beyond that obtained up to the first grind, it is cheaper to use steel No. 2. This steel will be recognized as one of the air-hardening nondeforming die steels. These steels are quite satisfactory for dies and are replacing the manganese oil-hardening types so long in popular demand. They give better production and are no more costly to machine. They are no harder

(*Please turn to Page 95*)

TABLE I—Blanking ⅛-Inch Cold Rolled Steel

	Steel No. 1	Steel No. 2	Steel No. 3
Base price, dollars per pound	0.18	0.24	0.43
Weight of piece to make die, pounds	10	10	10
Total cost die steel, dollars	1.80	2.40	4.30
Machining cost, dollars	35.00	35.00	40.00
Heat-treating cost, dollars	1.00	1.20	1.20
Pieces made per grind	20,000	30,000	45,000
Number grinds per die	10	10	10
Total pieces per die	220,000	330,000	495,000
Cost per grind, dollars	2.00	2.00	2.50
Cost 10 grinds, dollars	20.00	20.00	25.00
Total cost per worn out die, dollars	57.80	58.60	70.50
Die cost per 1000 pieces	$0.263	$0.178	$0.161

Improved

WELDING FACILITIES

increase output—protect operators

■ KILLING two birds with one stone, Reliance Electric & Engineering Co., Cleveland, in carrying out its expansion program recently, introduced improvements in the facilities afforded the men who handle welding operations.

New type of canvas enclosures now is used for welding booths at the plant. The canvas serves as three sides of each booth while the fourth and only rigid part of the booth is formed by the plant wall against which all the booths are located. The canvas is hung by its corners from standard safety zone stanchions 6 feet 2 inches in height equipped with bases weighing 25 pounds. Each stanchion has bolted to it a light sheet steel strip which projects approximately 12 inches on either side of the upright to prevent injurious light rays from passing through the curtain junctions. Those used at the corners have two of these light sheet steel strips bolted at right angles to each other to form tight corners.

Eyelets in the top corners of each section of welding canvas permit fastening it securely to hooks in the stanchion tops. This method of fastening eliminates the use of wires or pipe supports across the tops of the booths, permitting greater freedom and safety in depositing work from overhead cranes. It also makes it possible to take the curtains down or put them up quickly.

The canvas is of standardized size measuring 10 x 5 feet, enabling it to be interchanged with those of other departments where similar enclosures are utilized.

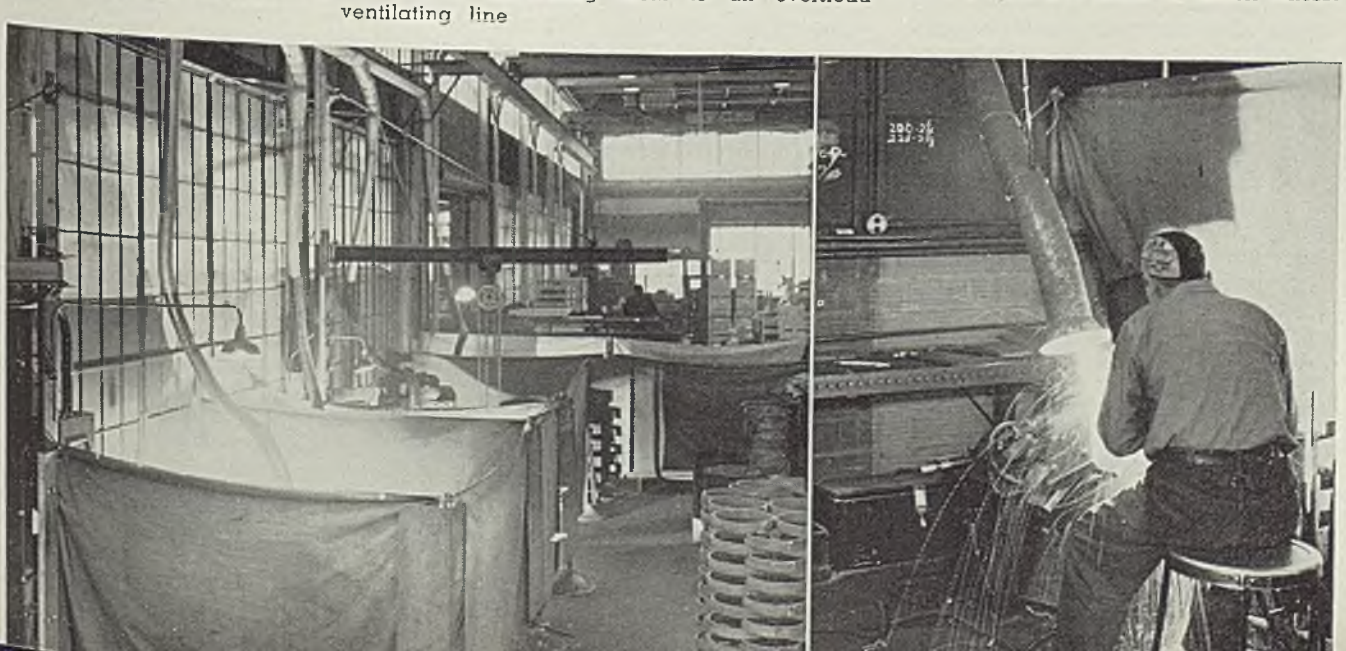
Ordinarily the booths cover an area of 10 x 10 feet,which is found large enough for handling regular work. Should the size of the work necessitate it, however, spare curtains and stanchions can be set up to make the booth enclosure 10 x 20 feet or larger in any desired combination of 10-foot additions. The whole interior of a booth is available as working space; bulk supplies purposely are kept outside the enclosures to decrease the injury hazard.

The second innovation made in conjunction with the welding booths is the method of ventilation. Ventilation is brought about by means of a 15-foot flexible tube dropped into each booth from an overhead ventilating line serving all stations. Measuring about 5 inches in diameter, the tube is counterweighted with light airplane cable. It is equipped with a screened bell at the work end, which is maneuvered around and above the work. The tube is not long enough to touch the floor, but where large pieces of equipment are being welded and must be handled some distance from the regular booth enclosure a 5-foot extension is provided.

In order to facilitate servicing each of the booths with the least interference, the company has installed two jib cranes over the line of booths. These are placed so they can serve a wide area in in picking up and depositing work.

Fig. 1. (Left)—Absence of rigid frames around welding booths or across their tops makes it easier to move equipment into or out of the enclosures, particularly by overhead cranes

Fig. 2—A 5-inch flexible tube, right, equipped with screened bell end is positioned directly over welder's work. Air traveling at high velocity through it picks up fumes from welding operations, exhausting them to an overhead ventilating line



Develops Lubricant for Drawing Shell

■ To prevent scratches on the surfaces of cartridge cases during drawing operations, Wayne Chemical Products Co., 9502 Copeland avenue, Detroit, is offering a new lubricant, No. 1025 Nonscratch. According to tests, it will produce from 100 to 150 per cent more casings between stops for honing dies than anything else known.

The product contains all the necessary properties needed for such exacting work. For example, the drawing of cartridge cases requires four operations, the third being the most difficult as it entails the greatest change in the shape and thickness of the shell. Starting from a thick blank, first a cup is made, and then, by drawing and re-drawing, a highly finished casing is made. To lubricate these draws the parts are dipped into a solution, and washed immediately after coming out of the press between each operation to remove any particles that might cause a scratch in the next draw. Thus the lubricant used must be flexible enough to serve its purpose and also must be soluble enough in water to be removed during the washing operation.

In making the lubricating solution, the new lubricant may be diluted with five times as much water.

New Joining Method

for structural sections

. . . . offers important possibilities for cantonments, camps, scaffoldings and all types of temporary structures as well as houses, storage buildings and others

■ ONE OF the most unusual types of systems for joining structural steel sections for cantonment buildings, houses and similar structures has been patented by A. N. Doud, consulting engineer, 1869 Windermere, East Cleveland, O. Structural sections are prefabricated from standard rolled shapes such as L, T and I-sections. These are connected by a specially developed interlocking system which forms an extremely rigid, durable and easily assembled structure without use of bolts, rivets, welds or other conventional connections.

Actually, the ends of the various members have an ingenious key and lock connection die cut into them, no machining being required. A tight, rigid assembly that will not loosen under vibration is produced by a key which locks each joint. The same interlocking joint and key system is utilized along the sections as well as at their ends for connections at only point in the structure. Result is that the framework can be salvaged 100 per cent when it becomes desirable to dismantle the structure. Also, all sections can be reused and the structure reassembled in another floor design at any time.

Material Reclaimed Easily

Thus the system appears to have important possibilities for all types of temporary structures such as cantonments and camps where originally the material would be employed to form a large number of individual structures. However, when there was no need for the small individual structures, all of the material could be reclaimed to build larger single houses, factory units or other construction for which there might be a market later on.

A design for a house using this system includes a number of other extremely interesting features. For example, the frame can be covered both on the inside and outside to form wall surfaces by sliding weldwood, plywood or similar sheet material into slots formed integrally with the frame. Thus the system is particularly adapted to the construction of demountable buildings. Similarly, a sheet material can be used for ceilings and roofs. Metal clamps are fitted to the sheets in the shop before shipment to the point of erection. Then sheets are quickly and easily slipped into place, no nailing, bolting or other time consuming operations being required. This permits all material including wall surfaces as well as framework to be salvaged, allowing the entire structure to be moved and re-erected at another location with practically no loss of material. Fireproof sheet material for surfacing can be obtained which will make the building 100 per cent fireproof, yet retaining the completely demountable features.

Provides Good Insulation

All floors of standard construction are prefabricated from wood planks in units that are easily and quickly laid in place and rigidly clamped to flanges of the steel floor joists.

The design for houses, known as the "Doud Prefabricated Universal Steel Frame," provides frost-proof and damp-proof wall construction by including a clear space of over 2 inches between inside and outside wall studding, extending entirely throughout the outer walls. This provides effective insulation since the only straight through points for heat conduction is at top and bottom of each panel where the cross units are located.

The system, in addition to being adapted to completely demountable houses, also has been developed for use with brick or stone for permanent constructions.

Speed of erection is one of the most important advantages. It is estimated that the steel frame for a building 23 x 30 feet in plan, single story, with gable roof, can be erected by 10 or 12 good workmen in from 45 to 60 minutes. However, usual practice is not to erect the frame completely as the sheathing is erected along with the framework, erection proceeding about as follows:

Upon preparation of the foundation, all steel sills are placed, leaving a small space between adjacent ends.

Next, all the corner studs, both inside and outside, are put in position and locked to the sills. Next, the other studs are placed and locked.

Then saw horses or scaffolds are placed around the outer sides of the structure to afford plank walkways to support several workmen while raising the light steel plates to the tops of the studding where they are fitted into the proper recesses in the plates and locked.

Then both inside and outside wall sheets are slid down into place from the tops of the guides, which are integral with the frame. Full length sheets are placed first. The sections under and over doors and windows are placed later.

Wiring—a Simple Job

Next step is to place the roof trusses, which are locked and assembled into the structure using the same interlocking joint and key system. The trusses are light enough so two men can raise one truss at a time to four men who receive the trusses and place each end in the proper notch in the tops of the plates, then lock them into position. With all trusses in position, the ridge bar is placed tying all trusses together. Then one or more tie bars as necessary are assembled, tying the trusses at mid-rafter point.

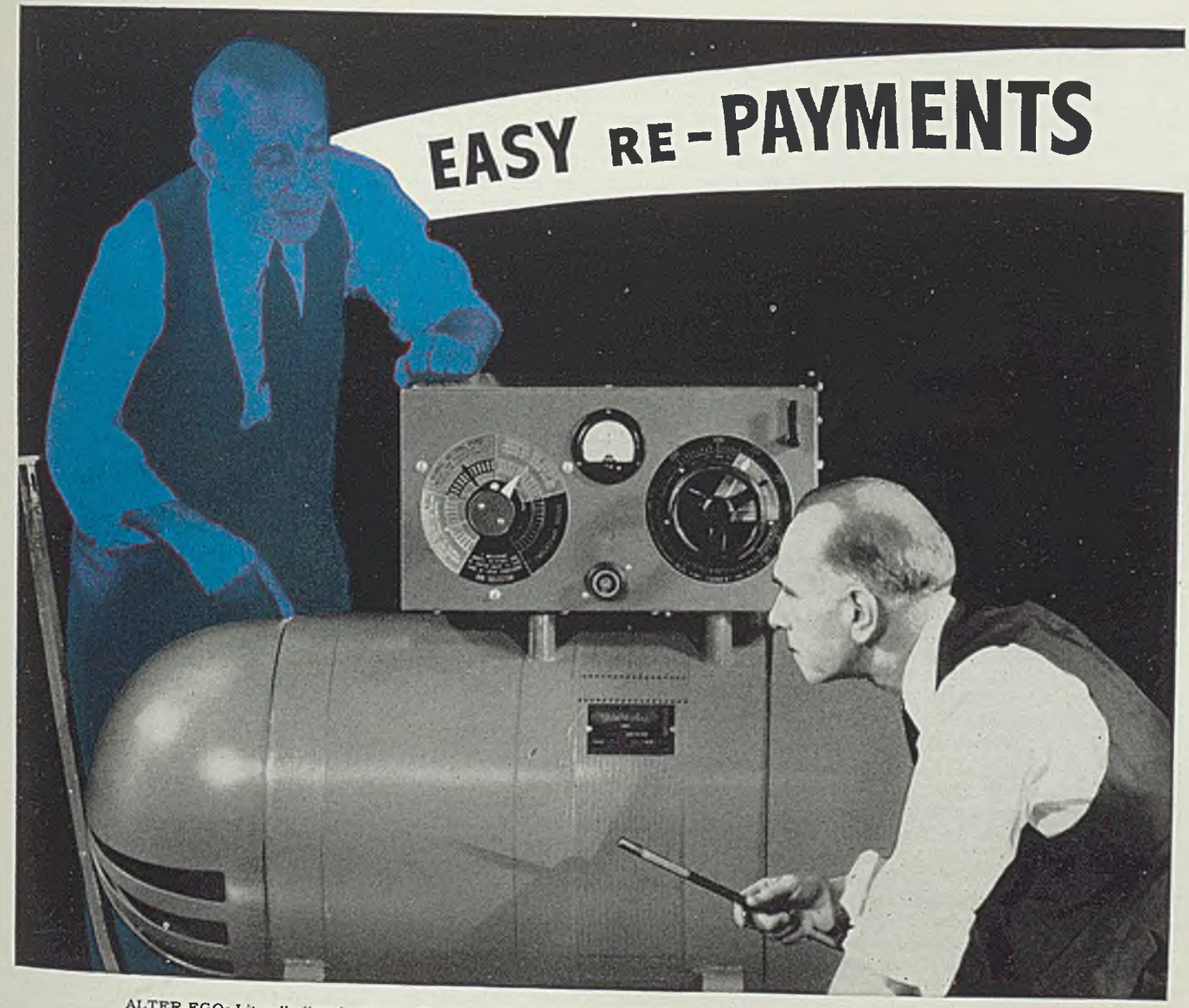
Now gable sheeting is slid into place at both ends, followed by sliding the roofing sheets into place and assembling the cornice and eaves boards, ridge comb, etc.

Next step is to place the floor units, clamped to flanges of steel floor joists. Then frames of doors and windows and also the surface sheets above and below doors and windows are fastened in place.

These nine simple steps practically complete the main portion of the building. Electric cable is run around between the inner and outer studs previous to placing the inside wall sheeting. Due to the hollow wall construction, wiring is said to be extremely simple as the cable can lie on the tops of the sills or can be suspended by hangers at any elevation desired. There are no holes to bore, no insulation sleeves to insert.

An entire building of this design can be erected complete in a few hours. Similarly, it can be taken down in a short period and re-erected in another location, or the units can be changed around to form a different arrangement of rooms.

Insulation can be included in the air space between the inner and outer walls. Also, it can be placed over the ceilings and hung from the floors with little difficulty. When erected with asbestos composition sheeting, the structure is 100 per cent fire-proof, with 100 per cent salvage value being assured. Such structures could well be used to store cement, gun powder, ammuni-



ALTER EGO: Literally "one's other self"—the still, small voice that questions, inspires and corrects our conscious action.

ALTER EGO: So at long last it's settled . . . we buy a new welder.

Yes, but the tough decision is still to come . . . whether to get the brand that gives us the best trade-in allowance or reciprocate with some company which throws an order our way.

ALTER EGO: Is this to be a business deal or a charity bazaar? Let's decide on the basis of VALUE RECEIVED. Think this over: A 1% increase in welding speed can easily save us $100 during the life of a welder.

Then if we'd get 5% more speed from one welder than another, we'd pay off our investment with savings alone!

ALTER EGO: Right. And if we'd get not 5% faster production, but 25% or more, (like many users have) with Lincoln Welders and Lincoln Procedure Cooperation—we'd save the price many times over! There you have *EASY RE-PAYMENTS!*

• •

LINCOLN SUGGESTS: The largest part of welding cost is for labor. By increasing welding speed only slightly, large savings in such costs can be made. That's how a speedy Lincoln Welder often pays for itself many times over. 30 reasons for Lincoln savings are discussed in Bulletin 412. Want a free copy?

LINCOLN "SHIELD-ARC" WELDING THE LINCOLN ELECTRIC COMPANY Cleveland, Ohio

Largest Manufacturers of Arc Welding Equipment in the World

tion, fruit and vegetables and many other products. The design appears particularly advantageous for much of the temporary construction required at cantonments and for other structures involved in defense work.

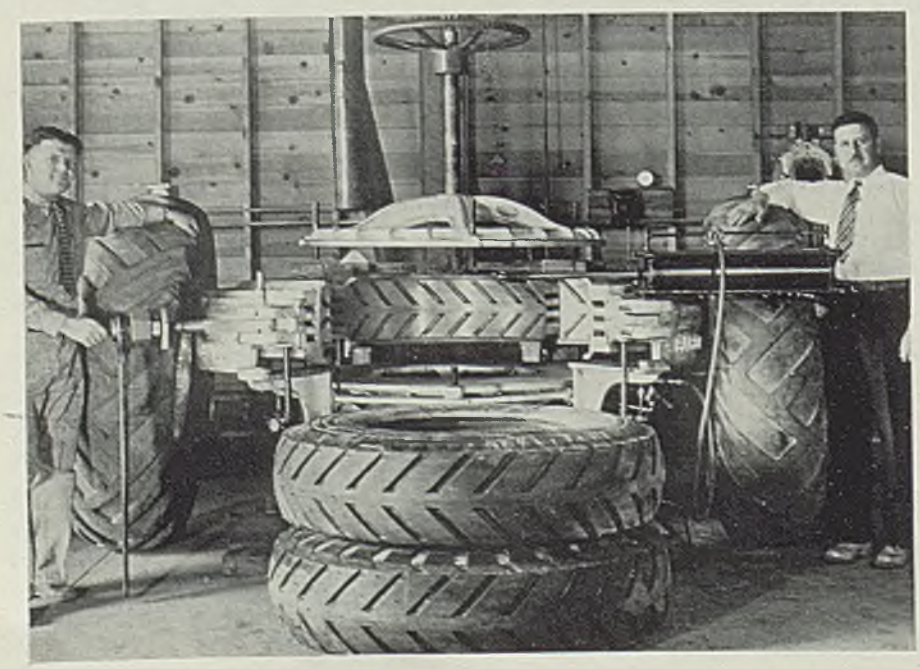
Recapping Process for Tires Reduces Costs

■ Out in Oakland, Calif., Bacon Vulcanizer Co., by means of a process for recapping tires is reported to be saving many haulers of heavy materials considerable money on tire costs. This process, according to the company, replaces worn rubber at a cost of about one-fourth that of a new tire. In addition it brings about further savings by enabling the same tire to be recapped several times.

The process differs from other retreading methods in that no heat is applied to the tire side walls, and no removal of rubber is involved. The tread surface of the tire is merely roughened and the new tread applied. A tire, however, should be recapped as soon as the tread has been worn smooth; tires worn to the breaker are not suitable for the process.

The greatest economies of recapping is said to be made on larger tires such as those used on heavy trucks. The savings, however, vary with the particular operation and also with the size of truck used. Recaps usually cost from 20 to 30 per cent of new tire cost—estimated about 25 per cent for the larger tires. Thus for a 100 per cent new tire cost, plus 25 per cent for the first recap, plus 25 per cent more for the second recap, an operator stands to get 300 per cent or more of new tire wear or nearly twice as much tire mileage per dollar, according to the company.

This view shows some of the tires used on trucks which did the hauling at Shasta Dam, Calif., with gross loads up to 35 tons on 10 tires. Those standing beside the mold in which the recapping work is done are worn tires. They were pulled off the trucks earlier than normal practice requires owing to the extremely rough service. In front of the mold are some of the recapped tires



British Practice in Nonferrous Castings

■ *Nonferrous Foundry Practice,* by J. Laing and R. T. Rolfe; cloth, 336 pages, 5⅜ x 8½ inches; published by D. Van Nostrand Co., New York, for $6.

This is a valuable addition to literature of the nonferrous foundry field, and is well worth studying by every nonferrous foundryman, and engineers and designers concerned with nonferrous castings. However, it should be pointed out that this volume covers characteristics and metallurgy of the metals and alloys as well as their founding.

Since successful production of satisfactory nonferrous castings in many cases depends primarily upon proper metallurgical technique, the authors have emphasized that phase by devoting the greatest portion of the book to a discussion of the constitution and properties, compositions and mechanical test requirements, effects of additions and impurities, metallurgy and uses. Melting and molding phases are given attention from the practical viewpoint covering the essential principles and precautions to be pursued in production of sound castings. It also should be mentioned that the book is by British authors and some of the practices are not followed in this country.

The book is divided into 11 chapters of which the first two discuss briefly nonferrous molding sands and melting furnaces. While the sands mentioned are British, and mean little to foundrymen here, the information on sand properties is applicable. Chapter III, devoted to bronzes, is the longest, occupying 112 pages, of which about 30 relate to molding. Most of the chapter is devoted to discussion of the 88-10-2 alloy and its modifications. The remainder of the volume covers brass, bronze, nickel-zinc and copper-nickel alloys, aluminum and magnesium alloys.

First part of each chapter is devoted to constitution and properties of the alloy or alloys under consideration, the composition and mechanical test requirements with reference to existing specifications, effects of additional elements and impurities, metallurgy and uses and the remainder to melting and molding.

Westinghouse Announces New Engineering Journal

■ *The Westinghouse Engineer,* a new quarterly journal of engineering information is announced by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. It will offer up-to-the-minute information on the generation, transmission and distribution of electric power and will be issued in February, May, August and November. It will be distributed to a selected list of engineers and executives of firms using electric power and equipment; however it will also be available by subscription.

Authoritative articles will be devoted to all phases of practical engineering encountered in the selection, application, operation and maintenance of electrical equipment.

Cuts Plastics Easily

■ While high-speed steel heated up and dulled in about 30 seconds when used to machine plastics, grade 20 Ampco metal has proved very satisfactory for tool bits for machining plastics.

One builder of machine tools recently reported that in their experimental machine shop they took a thick walled cylinder of plastic about 2½ inches outside diameter and 2 inches long, faced one end and turned it. The tool bit was in as good condition after the operation was completed as before. The resultant surface was excellent and a portion buffed showed a clean, smooth surface.

★ LEST • IT • HAPPEN • HERE ★

Yoloy Is Ready

Successful light-weight construction is made available for our national defense

It is not by chance that a substantial part of Yoloy production is going now into gun mounts, gun shields, combat tanks, military truck frames and bodies, and other defense material.

Six years ago, Youngstown research was at work to further develop this high-tensile, low-alloy steel, to anticipate the rigorous requirements of military equipment. Even then famous for its adaptability for light weight construction, greater impact strength even at sub-zero temperatures, ready weldability, remarkable ductility and unusual corrosion resistance, Yoloy was steadily improved, until today it meets the call of an accelerated defense program for all those wanted characteristics in extra measure.

So it is that Yoloy steel, developed and tested and proved worthy by performance in the severest services of industry -- in trucks and buses and railroad cars, in steam shovels and tractors and scores of other types of capital goods equipment -- is ready now to serve the nation's greater need. Where it is desirable to eliminate dead weight and clumsy bulk without the sacrifice of strength or durability, America is using Yoloy. 3-15D

YOUNGSTOWN

Manufacturers of Carbon, Alloy and Yoloy Steels

THE YOUNGSTOWN SHEET AND TUBE COMPANY, General Offices, YOUNGSTOWN, OHIO

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

Progress in OPEN-HEARTH Practice

European procedure in laying up steelmaking furnace bottoms with fine grain dolomite is about to be introduced in this country. Largest consumer of manganese of all steel commodities is plates and shapes. Consumers may be requested to alter their manganese specification to further conserve this element. Life of linings for hot metal mixers is reduced about 20 per cent when handling desulphurized metal

■ VARIOUS operating procedures followed at open-hearth shops and blast furnace plants in this country were described at the annual conference of Open-Hearth Steel and Blast Furnace and Raw Materials Committees of the American Institute of Mining and Metallurgical Engineers, Palmer House, Chicago, April 23-25. A resume of some of the subjects discussed follows:

Trends and developments in open-hearth refractories.

Increased production at open-hearth plants has not helped the cost of refractories. A large amount of effort is being exerted to shorten the time of furnace rebuild. There is a tendency toward a larger use of shooting to get the slag out of slag pockets. Plants are building up larger refractory stocks for emergency. More companies are becoming engaged in the manufacture of ladle stoppers and refractories. An effort is being made to get bottom-making materials that will mix at a much faster speed than those in present use. While the basic brick bottom is not moving ahead at great speed,

yet it is holding its own. The use of basic brick instead of silica brick for front wall construction is gaining favor.

Details of "Crespi" bottom.

This type of bottom was developed by an Italian for open-hearth, electric and other type furnaces, and employs fine dolomite. It effects a decrease in the use of insulating material and affords a better quality of steel by reducing the amount of inclusions. The unit has been used with great success for over 4 years in Italian 60-ton open-hearth and 25-ton electric furnaces. No conglomerates are required in the application of the fine dolomite. There is no slag penetration; the cost of maintaining the slag line is one-half that

of present practice. Installation is made by common labor. In laying up a bottom of this type the dolomite, ground to the fineness of rice grains and flour, is applied cold in successive layers on the hearth plates without the addition of conglomerates. The compactness increases with the thickness of the hearth. After one heat the hearth takes on the form of a marble-like body on the surface.

Open-hearth furnace doors lined with monolithic refractories.

Doors lined with this material have lasted from 234 to 254 heats without requiring replacement compared with 30 to 40 heats when lined with firebrick.

Use of 3-inch vs. 2½-inch brick in the construction of open hearths.

The 3-inch brick is finding wide usage because of 20 per cent more brick can be laid per hour, there is a greater salvage, a 12 per cent saving in joining, less mason labor required, a saving in the amount of clay required, a reduction in inventory and less breakage. Inventory at one plant was reduced 35 per cent by the adoption of the 3-inch size.

Progress in ladle appurtenances.

A newly developed bottom sleeve is being used with success. The skirt is brought down 2 inches over the stopper head with the result that the head is doing three times the work it did previously.

Improved checker design.

A shop in the Chicago district unable to increase the size of checker chambers to obtain greater heat exchange, installed Smallie checkers. These have withstood 1700 heats. While they had no effect in stepping up furnace output, they are easier to keep clean. An air turbine fitted with three short pieces of chain at the end of the shaft is used to clean out checkers, two chambers requiring 8 hours. The chambers are blown with steam once every three weeks, requiring about 36 man-hours.

Manganese conservation.

About 1,500,000 tons of manganese will be required for the 80,000,000 tons of ingots that are expected to be poured this year. A survey discloses that the amount of manganese consumed for sheet and strip production is greater than that used in the manufacture of bar steel and that shapes and plates are the largest manganese consumer in the American steel industry. Steel consumers may have to lower their manganese content in order that steel producers may be in a position to meet a working manganese specification and at the same time to conserve the element for defense purposes.

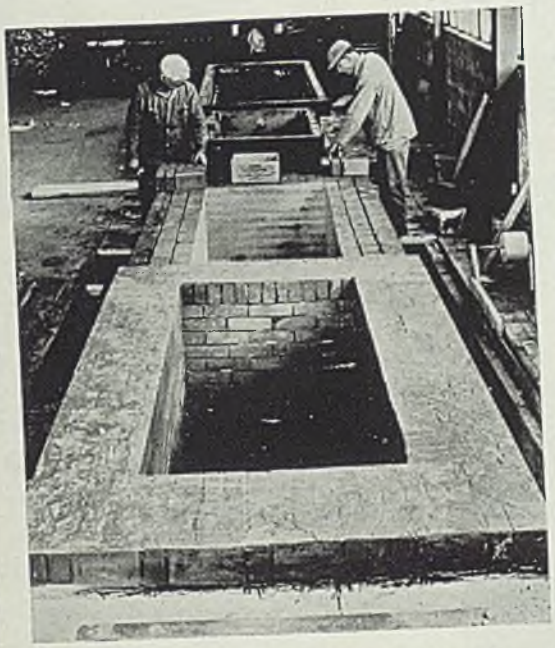
When spiegel is substituted for ferromanganese it must be left a little longer in the furnace in order to secure a good recovery. Practice on the occasion of a 7000-pound spiegel addition is to add 2000 pounds in one batch and after an interval of 5 minutes, the remaining 5000 pounds. The heat is tapped 12 minutes later with a recovery of 64 per cent.

The addition of manganese to the ladle is 5 per cent more efficient than when adding it to the furnace.

German steelmakers are effecting

CARBON

The Corrosion Resistant Lining Material



● High resistance to the destructive action of corrosive materials, including hydrofluoric acid and caustic alkalies, and ability to withstand severe thermal shock, lead to extensive use of carbon and graphite brick and structural shapes as linings for pickling tanks and other processing equipment. Experience has proved the economy of carbon and graphite linings in the presence of corrosive materials.

Corrosive waste liquids can be effectively handled in sump tanks lined with carbon or graphite brick. Temperature differential between waste materials run into the tank does not endanger the lining when carbon or graphite is used. Latent heat in hot corrosive waste can be effectively recovered by the use of heat exchangers made of graphite pipe.

This background is the machined surface of one of the several grades of "National" carbon materials.

CARBON MOLD PLUGS

offer economies when used in steel ingot molds. They eliminate ceramic inclusions and prevent sticking of plug to ingot. Each plug is good for several pourings. Sizes other than standard can be made to purchaser's order.

STANDARD SIZES

5 11/16" to 5¼" diameter by 3" long
5¾" to 5 7/16" diameter by 3" long

Write for information ON THE USE OF CARBON OR GRAPHITE PRODUCTS TO SOLVE YOUR DIFFICULTIES ARISING FROM CORROSION OR SEVERE THERMAL SHOCK

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UCC

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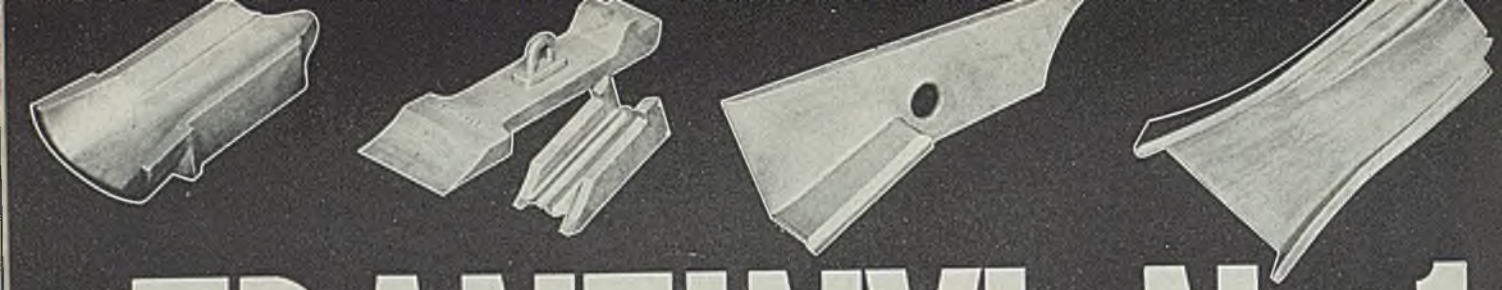
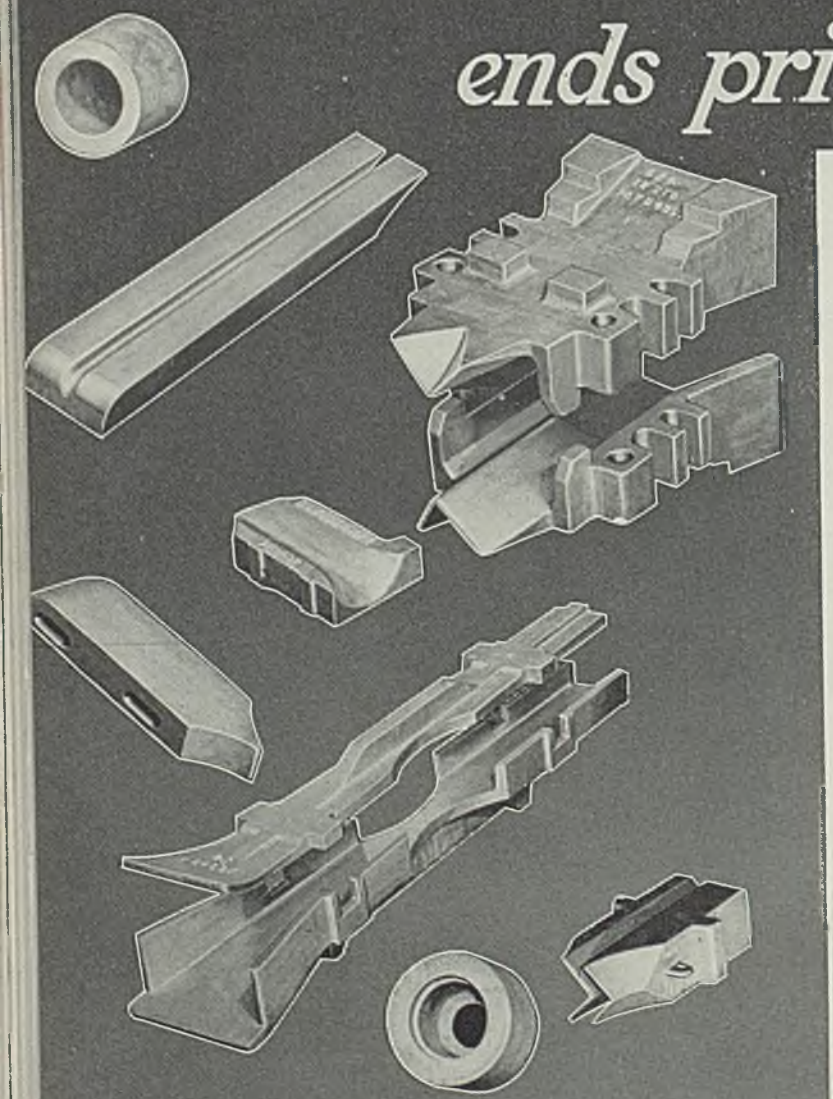
The word "National" is a trade-mark of National Carbon Company, Inc.



TRANTINYL No. 1

ends priority worries...



For Users of

FORMING ROLLS; BAR, SHAPE & STRIP MILL GUIDES; SEAMLESS TUBE MILL CASTINGS & PLUGS; WELDED TUBE MILL ENTRY & DELIVERY GUIDES; WEARING PLATES; GRINDING WHEEL MOLDS, ETC.

We make TRANTINYL alloys Nos. 1, 4, 5, 6 and 7 for guides and other parts, of which *Nos. 1, 4, 6 and 7 do not carry priorities.*

We will demonstrate on your equipment that TRANTINYL guides, rolls, plugs etc. last 10 times longer, are free from pick-up and scratch, can be heat treated, are machinable—and fewer shut downs are necessary.

Deliveries are prompt in the quantities you need—pick up your phone and call us for detailed information.

TRANTINYL QUALITY DISTINCTION

SEAMLESS TUBE MILL: Guide Shoes - Plugs - WELDED TUBE MILL: Rolls - Plugs
Miscellaneous Castings - BAR, SHAPE AND STRIP MILL: Guides - Rollers

YOUNGSTOWN ALLOY CASTING CORPORATION

Youngstown, Ohio, U.S.A.

a saving in the use of manganese by designing their open-hearth ports to obtain a sharp flame and rapid melting. They melt with high carbon, not too much ore, high temperature and low slag volume. By positioning the lip of the ladle beneath the runner and tilting the ladle with the auxiliary crane hook so that the stream of metal flows down the side of the ladle instead of dropping in a stream to the bottom, German steelmakers claim they are able to avoid entrapment of air in the metal, and the stopper and sleeve are heated up slowly. They add carbon in the ladle with the result that the steel effects a carbon pickup and reduces the loss of manganese.

Experience in the use of Chrome-X.

Operating results appear to be that when this refractory is added to the ladle there is a 95 per cent recovery compared with a 90 per cent recovery when straight chrome is used. No difference in the physical values of Chrome-X treated steel and straight chrome treated steel is noticed. It is advisable to remove the carton from the material and place only the briquettes in the bottom of the ladle. The pickup in carbon amounts to 12 points for each 1 per cent Chrome-X used in steel, whereas there is an 8-point pickup in cast iron for each 1 per cent addition.

Desiliconization of basic iron by roll scale additions.

At the blast furnace scale is fed from a hopper which discharges into the stream of molten iron just below the skimmer box. Slag is skimmed off near the ladle. About 75 pounds of scale is added per ton of metal. If the temperature of the metal ranges from 2750 to 2800 degrees Fahr. a good skim is possible but below this range not all of the scale goes into solution with the result that a slag on the order of buckshot appears and is difficult to remove. With the metal at 2750 degrees an efficiency of 74 to 92 per cent is possible, depending upon the furnace rate.

Desulphurization of molten iron with soda ash.

Application of soda ash gives a 30 per cent reduction in the sulphur content especially when it is added uniformly. This is done by a regulated feed at the runner in the cast house. The reduction is most effective when the metal in the runner is agitated. The use of soda ash causes no loss in silicon or manganese content, no reversion of sulphur because of the holding time; ladle life under its usage is around 135 heats.

Practice at one plant involves reladeling the iron upon delivery at the mixer. Soda ash is placed in the bottom of one ladle and then the molten iron in the blast furnace ladle is poured into it at a rapid rate, thus causing a churning action. Performing this work at the mixer avoids heavy fumes at the blast furnaces. Iron leaving the blast furnace at a temperature of 2600 degrees Fahr. and subjected to the desulphurizing process is delivered at the open hearth at a temperature of 2250 degrees.

The life of mixer linings is shorter when desulphurized iron is passed through than when straight metal is handled. Linings in contact with ordinary iron lasted 23 months compared with 12 months for desulphurized iron. Metal subjected to the desulphurized treatment is responsible for a 20 per cent reduction in the life of hot metal mixer brick.

Ordnance steel ingots poured into small-end-up and big-end-up molds.

Certain grades of armor can be made of semikilled steel and with a dense structure big-end-down molds are recommended. Big-end-up molds are used most effectively for ingots having a dense internal structure. There is little or no difference in the quality of surface between the two types of ingots.

Training personnel.

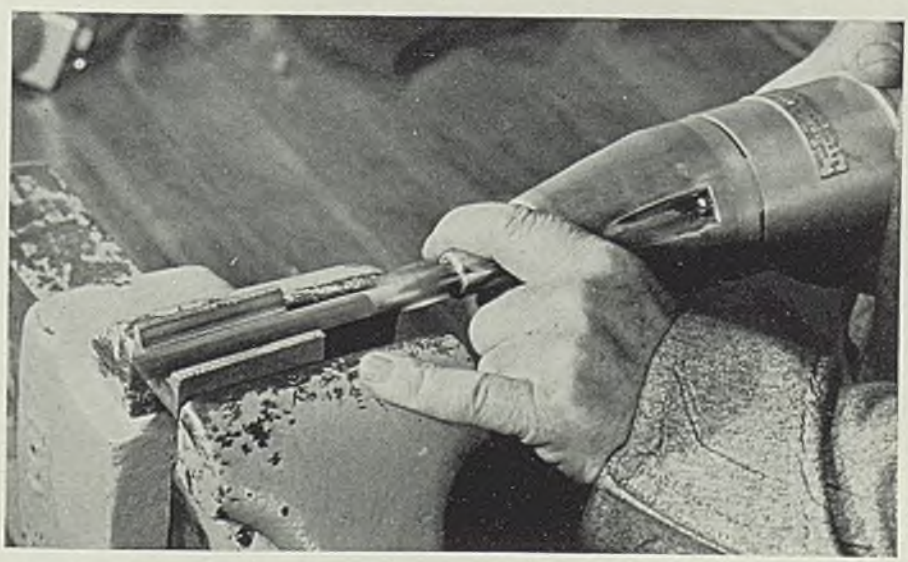
With the rapid expansion in 1933 it became necessary to make first

helpers rapidly at a shop on the Great Lakes. The first sifting operation was accomplished through the medium of an examination of all the men. In many cases the examination disclosed that some of the men working in the shop for 5 years had only a meager knowledge of furnace construction. Hence, it was easy to eliminate such men as prospects for first helpers. Men who passed the examination were put on a furnace with a first helper who had the reputation as being a good operator and who would impart the necessary information to the apprentice. Every three months the men in training were rotated. Upon graduating they were given a first-helpers job, or if there was no room for them, they would return to their original position until an opening occurred. While the men were in training their pay was the average of the second helper's.

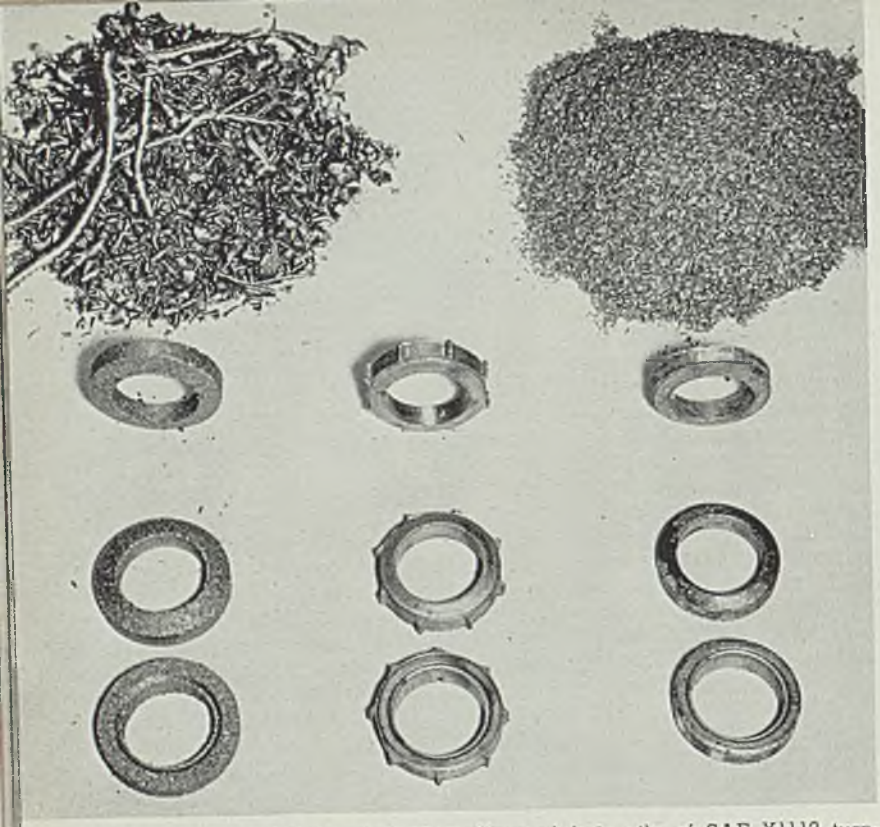
How has slag control assisted first helpers?

It has afforded a reduction of 30 pounds of limestone per ton of ingots, as well as a greater uniformity of product, though it is necessary to train the personnel the meaning of the slag pancakes.

Utopia! Motionless Work



■ One way to utilize semiskilled labor for precision filing: Illustration above shows an H & H research Multi-purpose tool "in action." Note that the hands and arms of the worker are motionless, the only motion caught by the camera being the reciprocating action of the file in the chuck of the tool. Use of the tool requires little training on the part of the operator. In addition, it eliminates the rocking motion of the file on the work, resulting from arm movement



PARTS
made from steel
TURNINGS
by compressing and sintering

Starting with a raw material valued at little over ½-cent per pound, a part with roughly six times the strength of cast iron is produced in only six operations

Ingredients and finished product. Upper left is pile of SAE X1112 turnings as received, while upper right shows turnings after crushing to uniform size. Three vertical rows of parts are: Left, after initial compacting; center, after sintering and hot pressing; and right, after cold coining. Part is a bearing lock sleeve for automobile differential carrier bearing

■ THE intriguing problem of how to short circuit some of the many steps in the devious genealogical path of most ferrous metal products—that is, from ore mine to blast furnace and then either to cupola and molding floor or to bessemer, open-hearth or electric furnace, and on to rolling mills, shears, forging hammers, stamping presses or machine tools—is one which has captured the attention of technicians for decades. Some progress appears to have been made, principally in the early stages of this progression. Examples are the direct reduction of iron ore to circumvent the blast furnace; and the compression and sintering of metal powders to circumvent the foundry and machining phases.

What appears to be a promising start in the utilization of scrap steel as a raw material for subsequent fabrication into parts by compression and sintering has been made by a Chevrolet engineer, Herman Tormyn, expert tool and die man and one time head of the Chevrolet sheet metal plants, now assigned to special problems in the Gear & Axle Division of Chevrolet, Detroit.

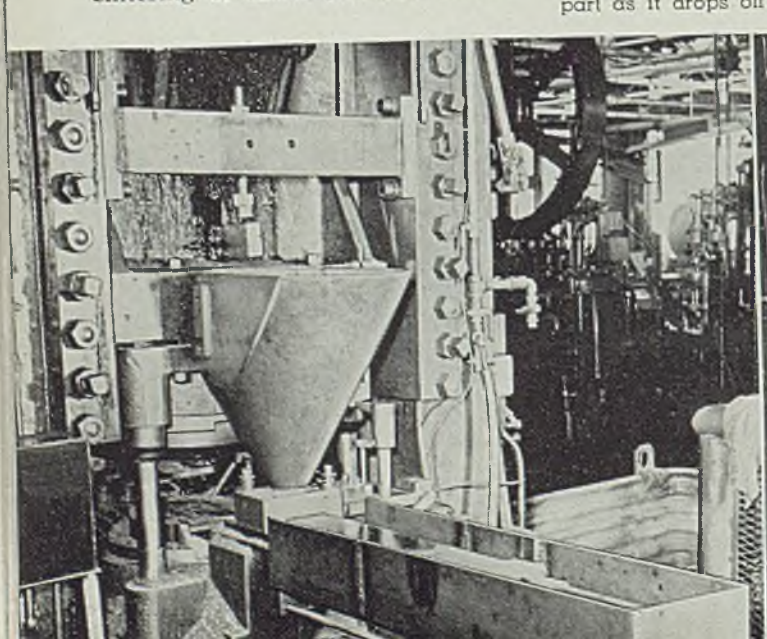
Essentially what Tormyn has done—and done on a production basis with standard types of production tools—is to take scrap steel turnings, crush them, compress into the rough shape of a finished part, sinter in an electric furnace, hot press to final size, cold trim the outer edges and cold coin press to finished dimensions, with tolerance of but 0.002-inch.

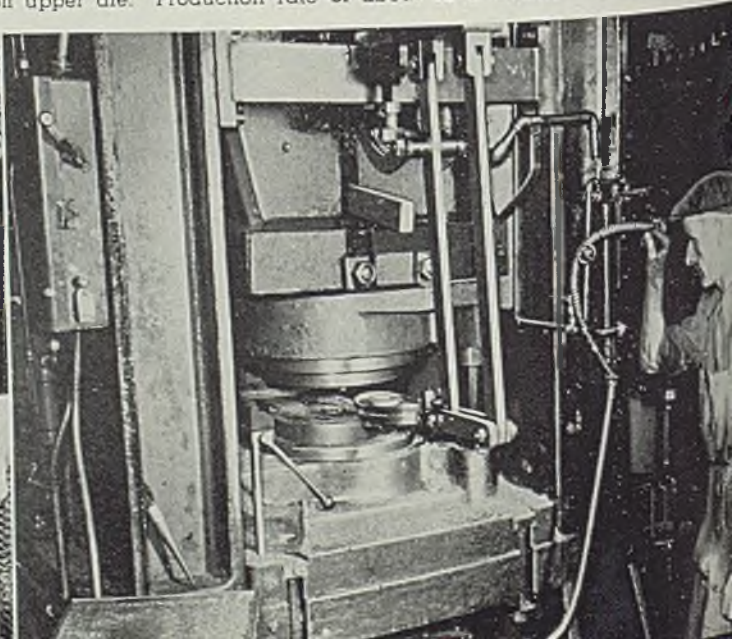
Starting with a raw material valued today at a little over ½-cent per pound, he produces in six operations a part with roughly three times the strength of cast iron and requiring no machining. Cost savings in the finished piece are obvious.

The part now being produced by

Compacting press, left, showing hopper into which crushed turnings are fed. Slide in foreground carries measured amount into die of the press where shape is formed under pressure of 60,000 pounds per square inch

Discharge side of compacting press, right, swinging arm removing compacted part as it drops off upper die. Production rate of about 12 a minute is possible





PRECISION AND SPEED

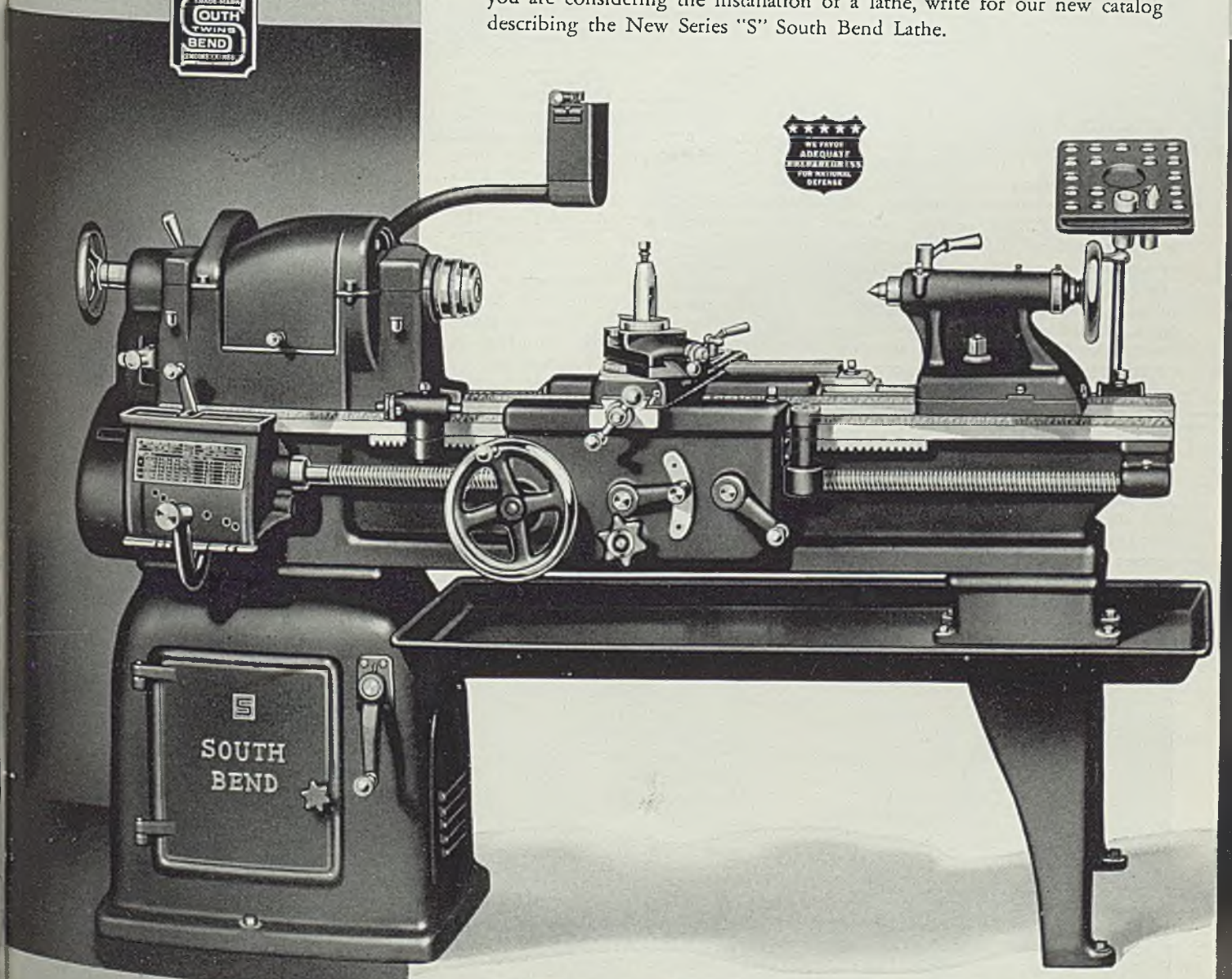
WITH SOUTH BEND LATHES

To make a profit, in these highly competitive times, machine operations must be performed quickly and accurately. High spindle speeds and extreme rigidity are essential for efficient machining with sintered carbide or diamond tipped tools, especially when finishing die castings, plastics and other fast cutting materials. Precision and speed are therefore important factors to consider when selecting a lathe.

South Bend Lathes have extreme precision and ample speed for turning out work efficiently and profitably. They are giving satisfactory service in the tool rooms and production shops of America's topmost industries.

Features responsible for the excellent performance of South Bend Lathes include an alloy steel spindle with hardened and superfinished bearing surfaces, a one-piece double wall apron with steel gears running in oil, a powerful worm drive and multiple disc friction clutch for operating the power carriage feeds, and a direct belt drive to the spindle.

South Bend Lathes are manufactured in five sizes, 9" to 16" swing. If you are considering the installation of a lathe, write for our new catalog describing the New Series "S" South Bend Lathe.



Lathe Builders Since 1906

SOUTH BEND LATHE WORKS

863 East Madison Street, South Bend, Indiana

TABLE I—Analysis Comparison

	X1112 Steel	Cast Iron	Compressed Turnings
Total carbon	0.08–0.16	3.41	0.019
Combined carbon	.....	0.08	.....
Graphitic carbon	.....	3.33	.....
Manganese	0.60–0.90	0.52	0.79
Phosphorus	0.09–0.13	0.280	.....
Sulphur	0.20–0.30	0.067	0.157
Nickel	.....	0.03	0.07
Chromium	.....	0.03	0.04
Silicon	.....	2.21	.....

this method is a bearing lock sleeve used to hold the roller bearing in the differential carrier of Chevrolet cars. A heavy round washer, it is about 3 inches in diameter, about ⅝-inch thick, with a section thickness of ⅜-inch. One face is smooth, at an angle of about 20 degrees; the other with concentric recesses near the inner and outer edges. It weighs 8 ounces finished. Installed in a car it is held by three set screws against the bearing retainer to prevent the latter from slipping out. Hitherto this piece has been made of gray cast iron, and was machined on the outside rim and on the two faces. Now Chevrolet has adopted the sintered part for all its current production.

Steps in making the new steel ring are as follows: Steel chips and turnings SAE X1112 from the plant, in assorted sizes and thicknesses, are fed into a swing-hammer crusher which reduces them to particles of a fairly uniform size. The crusher comprises a series of manganese steel hammers pivoted on a rotating drum. The turnings are fed into a 13 x 21-inch opening and pass between the hammers and a striking plate where they are broken up and descend over a grating in the base of the machine through which they pass into a collection pan.

The crushing or breaking-up action does not reduce the turnings to anywhere near powder form, but simply breaks up long ribbons, irregular chips and smaller curled pieces into a much more uniform aggregate, particles ranging in size from possibly those of a coarse sand up to those of rock salt. Many of the particles still retain their flat, sharp nature, not being rounded off in the crushing operation.

The only reason for crushing the turnings is so a constant weight-to-volume ratio can be maintained. This is necessary because the amount of turnings required for one piece is measured by volume only, and it is essential that the turnings be in such form that a measured volume will have a fairly constant weight.

Compressed by 30-Ton Pressure

The crushed turnings are loaded into the hopper of the briquetting press, from which they are fed into a slide which works in conjunction with the dies of the press. The lower die cavity on the press has a volume approximately twice that of the finished sleeve. As the slide passes over it, the turnings fall into the cavity, a scraper bag clearing off all excess material to leave the cavity flush full. The upper die descends, located firmly by vertical guide bars and a center guide, exerting a pressure of 30 tons or 60,000 pounds per square inch on the loose material, sufficient to compress it to half its original volume and to form a completely adherent "pressing" which in appearance is just about what you would expect to see if you compacted some loose turnings into the shape of a heavy washer.

Die steel used in this press is a new material of the low-tungsten molybdenum type, designed to provide long wearing qualities either hot or cold. As a matter of fact a recent inspection of the compressing die after 50,000 pieces had been made showed no wear whatsoever. The same steel is used for the dies in the hot pressing operation.

The compacted washers then are transferred to a pusher-type controlled-atmosphere furnace for sintering. Atmosphere is supplied by a standard 700 cubic feet per hour DX gas generator. The furnace has a sloping hearth, with the discharge end several inches higher than the charging end. This arrangement was designed to avoid concentration of the atmosphere gas at the charging end; with the inclined hearth, the gas is uniformly distributed and comes off at both ends of the furnace.

Parts are handled in a series of six parallel and adjacent alloy tracks or rails accommodating individual trays in which the washers travel flat. A pusher mechanism at the charge end moves each line of washers ahead one position alternately so one piece is loaded and discharged at a time. Pusher cams are synchronized with flap doors at the discharge end of each track so doors open as the line of trays is advanced one position. A return conveyor is provided to carry empty trays back to the charging end.

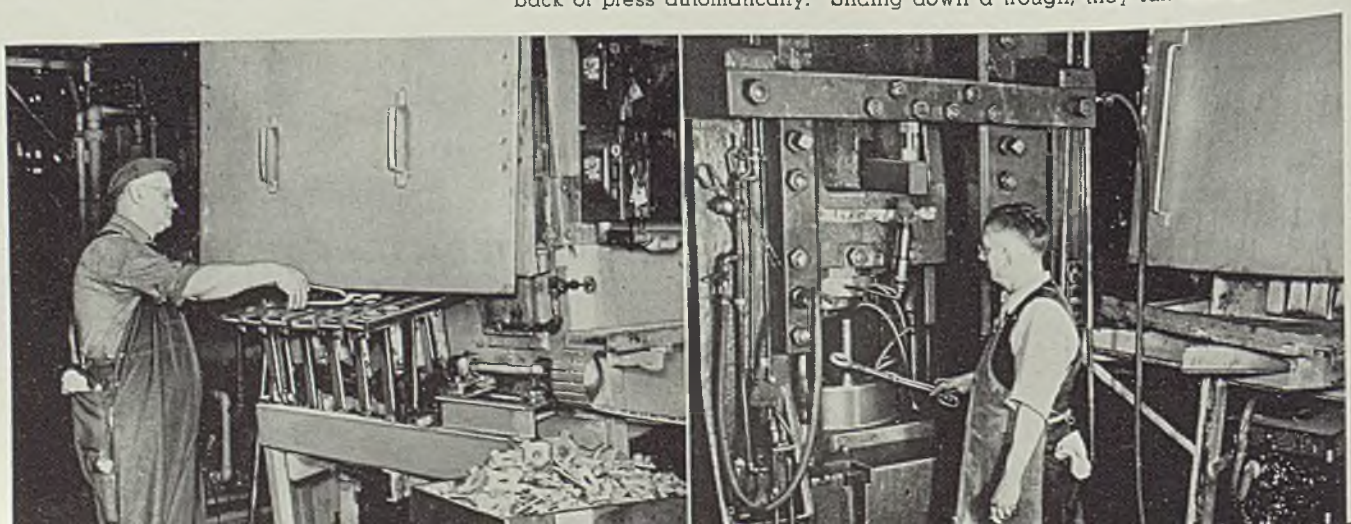
Speed of travel is such that production of better than 500 pieces per hour is realized. Each piece is in the furnace approximately 15 minutes, and each of the six tracks holds 21 trays.

Temperatures are regulated auto-

(*Please turn to Page 94*)

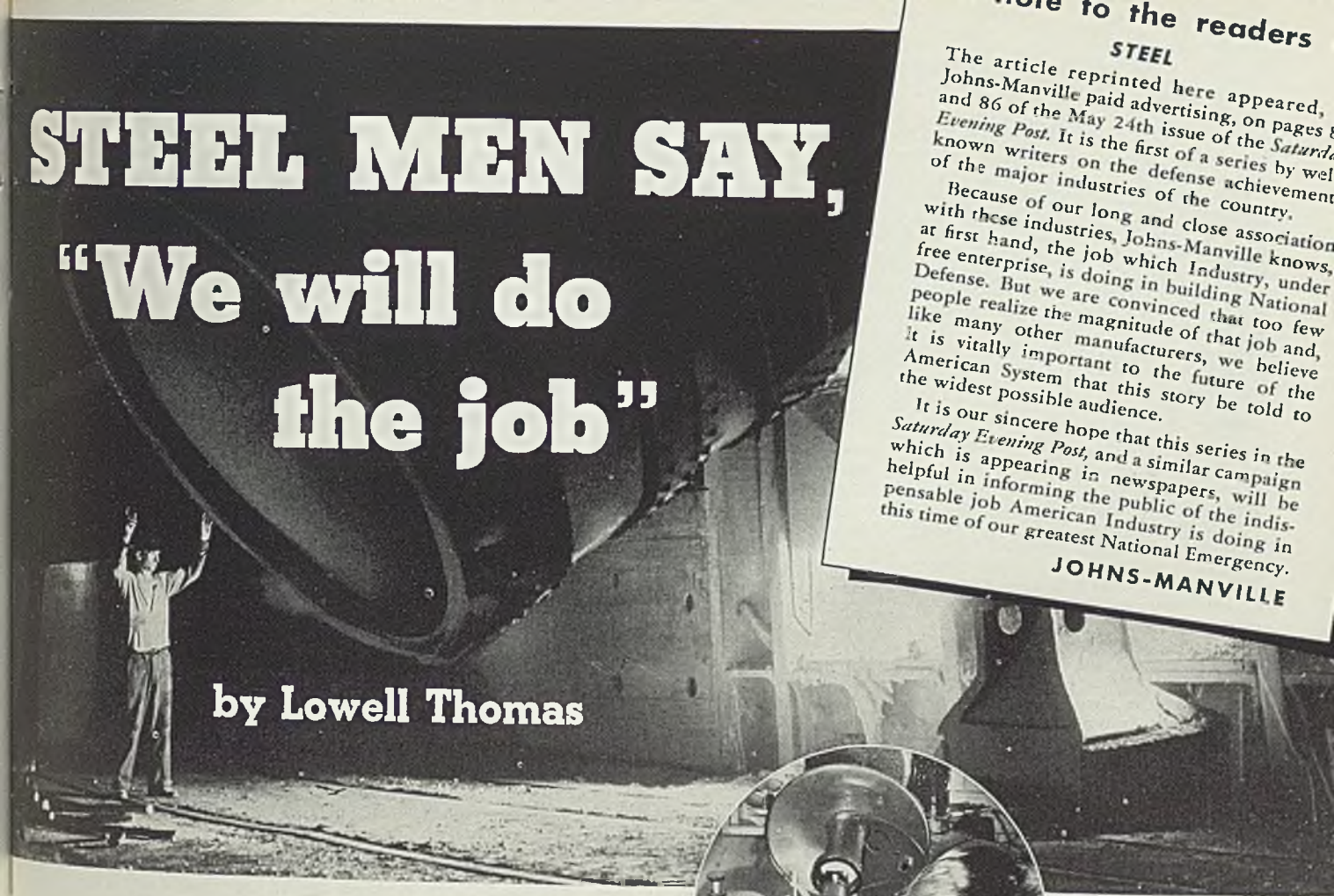
Left, parts are placed in carriers which convey them through electric furnace for sintering at 1850 degrees Fahr., traveling in six adjacent tracks. Carriers are returned to charging end of furnace on conveyor belt at right

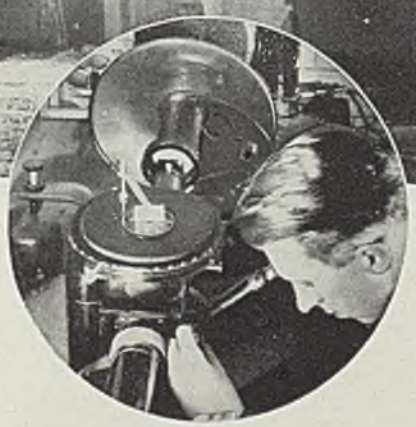
Right, heated sleeves emerge from pusher-type furnace one at a time and are transferred immediately to hot press at left where they are squeezed to final shape, volume being reduced about one-third. A swinging arm removes pieces from back of press automatically. Sliding down a trough, they fall into quench



STEEL MEN SAY, "We will do the job"

by Lowell Thomas





It all starts like this. Above—A giant ladle pours 100 tons of molten pig iron into an Open-Hearth Steel Furnace.

Left—Investment for the Future. One of Steel's 2,550 research men looks through a metallurgical microscope.

WHAT about defense? When I left New York for the Front—the Front of Steel—in Pittsburgh and Ohio, the words of Ben Fairless were still echoing in my ears, "Never mind the alarmists. *Steel will do the job.*"

But I was a little bewildered—maybe even a little skeptical, even though Fairless is President of U. S. Steel and ought to know.

After all, I am not an economist. I am not even a steel man. I have, like most Americans, a complete faith in native American ingenuity and "drive." But I had talked to men in Washington who told me steel "did not have nearly enough capacity to meet normal demands plus the needs of National Defense."

This was before the Gano Dunn report had been made to the President—the official report which said that we will have enough of most kinds of steel, both for war and commerce, even if the national income climbs to 90 billion dollars. (Last year it was 74 billion plus.)

Then, of course, there's always the "labor-question"—Yes, it's just one word the way people use it. But there wasn't any "laborquestion" when I was going through the Armco plant (American Rolling Mill Co.) at Middletown, Ohio, the next morning. There were just some Americans, most of them in the kind of fine physical condition that makes office workers and radio broadcasters envious. And these Americans have, I assure you, got what it takes. It's in the atmosphere all around them. They have morale. They have that something that can't be faked. It's what Wavell's British Army had in North Africa and what Graziani's army (twice as big) just didn't have.

We stopped to look at a pile of stainless steel sheets ready for shipment to the Navy. Each sheet was covered with a soft, fluffy layer of paper and then with a layer of brown wrapping paper. I asked the nearest steelworker if we could have a look.

Have you ever gone into a really crack artillery regiment and asked to inspect a fieldpiece ready for action? I have. And the man who opens the spotless, perfectly oiled breechblock for you will pack plenty into that gesture. He will pack into it pride. He will pack into it something very close to love. He will, finally, actively resent even the shadow of a criticism of that gun. He will fight *for* that gun as well as with it.

Well, Joe Stouras, ex-football player, husband, father, steelworker of Middletown, Ohio, lifted the paper layers off the top sheet of stainless steel. The man going through the plant with me was filling his pipe . . . One crumb of tobacco fell on the mirror-like surface of that sheet of steel—just one crumb.

Joe Stouras reached out and brushed it off with his middle finger—brushed it off with decision, with a trace of rebuke, with a fine protective gesture of defiance.

"This here order's going to the Navy tonight," he said. "Got to be careful."

Joe Stouras is typical of the men of steel

(*Continued on next page*)

DD411, the U. S. S. ANDERSON, knifes through the water of Penobscot Bay on her full-speed trial run off the coast of Maine. This destroyer was built and delivered to the Navy in advance of contract requirements. The U. S. S. EDISON, referred to in this article, was completed four and a half months ahead of schedule.

A note to the readers of STEEL

The article reprinted here appeared, Johns-Manville paid advertising, on pages and 86 of the May 24th issue of the *Saturday Evening Post.* It is the first of a series by well known writers on the defense achievement of the major industries of the country.

Because of our long and close association with these industries, Johns-Manville knows, at first hand, the job which Industry, under free enterprise, is doing in building National Defense. But we are convinced that too few people realize the magnitude of that job and, like many other manufacturers, we believe it is vitally important to the future of the American System that this story be told to the widest possible audience.

It is our sincere hope that this series in the *Saturday Evening Post,* and a similar campaign which is appearing in newspapers, will be helpful in informing the public of the indispensable job American Industry is doing in this time of our greatest National Emergency.

JOHNS-MANVILLE

WHAT STEEL MEN SAY

(Continued from preceding page)

to me. Men who are keeping open hearths and blast furnaces running 24 hours a day (three eight-hour shifts). Men who, when an order is posted on the bulletin board marked "National Defense," just "high-tail it into the shop," as one assistant works manager put it to me. And they are American craftsmen, fully aware of the fact that poor quality, just a slight flaw, in armor plate, airplane frame or Navy searchlight reflector may cost an American or British life somewhere, sometime. They know, almost all of them, what Joe meant when he said, "Got to be careful."

I say "almost all of them," because no honest reporter can deny the existence of some unrest, of some disloyalty, even of some sabotage. But, in the words of Irving S. Olds, Chairman of the Board of U. S. Steel, "All but a few of the workers throughout the industry *want* to do the job. And the minority, although they can make trouble, cannot buck that majority's determination to do the job on time—even ahead of time."

Mr. Olds can show you what he means with deeds, not words. He knows; the Government knows; and every American *ought* to know that two destroyers completed last summer by The Federal Shipbuilding and Dry Dock Company, U. S. Steel's shipbuilding subsidiary, were delivered *seven months* ahead of contract requirements . . . The U. S. S. EDISON, one of that company's more recent deliveries, was completed ten and a half months after the keel was laid—4½ months ahead of the contract delivery date.

Can American private enterprise do the job? "Yes," say the men of steel. And they say it with a full-throated voice that will be heard from Bethlehem to Berlin.

Steel is an industry vast in its five-billion-dollar investment; immense in its giant plants and huge machinery, and tremendous in its man power—half a million workers who "bulk big" in stature, a wide-shouldered, thick-thewed multitude, confident of their strength and skill, proud of their trade. And from executive offices to timekeepers' windows, from blast furnace to finishing mill, my tour of steel seemed tuned to the rhythm of an exultant, irresistable drive for national defense.

This drive starts full-powered because during the long doldrums of the depression, here is a private enterprise that spent a billion and a half dollars increasing its capacity in the face of diminishing returns. Because management believed in an expanding America and discounted the idea of a "static economy," the steel industry increased the annual capacity of their plants from sixty-five million tons in 1929 to eighty-five million tons in the somber year of 1940.

Yes, the steel industry is big enough and strong enough, but is it flexible enough?

The Boys Were Cold

An incident told me by Charles Hook, President of the American Rolling Mills, will, I think, answer that.

"On December 5th," said Mr. Hook, "a government man called me up from Washington. 'The boys in the Tennessee camps,' he said, 'are shivering in unheated tents. We are ordering several thousand camp stoves from the Tennessee Enamel Manufacturing Company. I understand you furnish their sheet steel. What kind of priority order do you need?'

" 'We don't need any,' I said. 'Order your stoves and leave the rest to us.'

"We called Tennessee and learned the sizes they needed. We supplied most of them from stock. Within a week we had shipped the sheets—250 tons of them. Inside of ten days from the Washington phone call, the boys in the draft camps were snug in their heated tents."

That is flexibility—and it is also speed.

The twenty million tons of steel needed by John Bull and for Uncle Sam's defense is regarded by steel men as no vast amount. Yet this is greater than the total production of any other nation save Germany. And except in relation to our total 85,000,000-ton capacity, it *is* an enormous volume of steel. It will take half a million cars to ship it, and they would make a freight train six thousand miles long.

And it isn't, of course, mere bulk and weight like coal and ore and limestone. It is in thousands of shapes and sizes, from rough ingots to stainless-steel needles for hypodermic syringes, and from eighteen-inch armor plate to sheets that are used in making plane generators—sheets so thin you can typewrite on them. With all its multiplicity and complexity, steel is being fabricated on schedule and delivered on time—whether it's 100 tons for hobnailed shoes, fifty thousand tons of structural steel for a new tank factory, or fifty pounds of tiny, microscopically finished steel springs for the innards of a torpedo.

The men of steel, from top to bottom, don't talk much. They're too busy getting the job done. I left the office of one prominent steel executive late on a Friday afternoon with a mountain of work on his desk high enough to chain him there until Sunday night. There is no "weekend blackout" in steel, for management or labor.

Director General of Production Knudsen said last January, "If we are willing to spend a little sweat for a year or so, then we may be able to save a little blood later on." Steel is spending sweat, right now. In the plant, and in the offices, far into the night. And in the laboratory. Research is, in truth, the universal ingredient that goes into every "heat" in steel's furnaces, and enters into every process from the ore and coal mines to the ultimate consumer. Only in the chemical industry does the laboratory function so incessantly and microscopically as in metallurgy.

And in no other business is the research equipment so varied and so expensive. It ranges from scales that will weigh a wisp of mist to machines that will pull a one-inch tool-steel bar apart. Research is responsible for the development of every high-speed steel and every alloy that gives the machine age its infinite variety. Research, for example, reduced the weight of airplane engines from the twenty-one pounds per horse power of the Wrights' *Kittyhawk* to the one-pound-per-horsepower of a modern motor. If only I were at liberty to tell you about other, and even more amazing, achievements I saw or heard about "behind the scenes."

Then, of course, I asked executive after executive, "Are there any bottlenecks in steel?" They answered this way: "All steel needs is to know what is required for defense. We'll find a way to take care of it."

Here, for example, is one way they deal with shortages. If any one alloying agent, molybdenum, tungsten, chromium or vanadium, becomes scarce, steel's research staffs find means of substituting and shuffling them about to get the same results by different combinations. Steel companies' scouts are always finding new sources of supply for their engineers to develop.

Perhaps I ought to break in here, and explain that there is, in steel, no disposition to belittle the importance of governmental authorities in the vast panorama of steel. Steel men contend only that the most efficient and satisfactory functioning of the tremendous defense machine results when government leaves actual operations to the ingenuity, initiative and adaptability of men educated in a competitive school of change and progress.

Those qualities can respond to sudden stress with the resiliency of a fine steel spring. Less than a year ago, steel executives sensed—long before an emergency developed—that electric-furnace capacity was not adequate to future requirements. Only 1½% of steel production comes from these furnaces, but that small per cent comprises nearly all the fine steels for high-speed machine tools, airplane engines and instruments, and bomb and gun sights. Today electric-furnace capacity is fifty per cent greater than that of early 1940 and further increases are keeping in step with defense demands.

In my search for the facts, one of my most valuable sources proved to be W. S. Tower, President of the American Iron and Steel Institute and Ambassador of Steel to the United States Government. The Institute has a membership of more than 90 operating steel companies and performs an indispensable function in making it possible for these vast enterprises to operate as one great industry in National Defense. Mr. Tower's confidence that steel can do the job is not based on hope, but on a great volume of hard, cold statistics he has constantly at his fingertips.

A New Crop of Millionaires?

"—And how about a new group of multi-millionaires?" I asked Mr. Tower. "Is rearmament going to make us any?" "Not in steel," said Mr. Tower. "For big figures no longer mean big *profits*. Steel is a *five-billion-dollar* business. . . That's how much capital (savings) is invested in it. But for the past ten years, it has earned only an average of 2% on that investment.

"As for this year, well, steel is spending $282,000,000 for plant expansion and equipment, for one thing. For another, steel, right now, is employing 20 per cent more men than in 1929."

"And what about the men of that steel army?" I asked.

"Hourly wages in steel today are nearly 50% higher than in 1929. Also, between 1926 and 1939, the average severity of accidents was reduced 35%. One out of every three severe accidents that used to happen doesn't happen any more."

TO SUM UP:—It seems to me that this titan industry is demonstrating its fitness for a titanic task. It has the scientific management, the skilled workers, the materials, the capacity and the production.

Somehow the roar and rumble of the mills and forges, the hiss and crackle of molten metal, the blast of furnaces and converters, mingle in one sound, and that sound is the Voice of Steel.

Winston Churchill said, "Give us the tools, and we will do the job."

The Voice of Steel can say, for its part in the defense program, "We *have* the tools, and we will do the job."

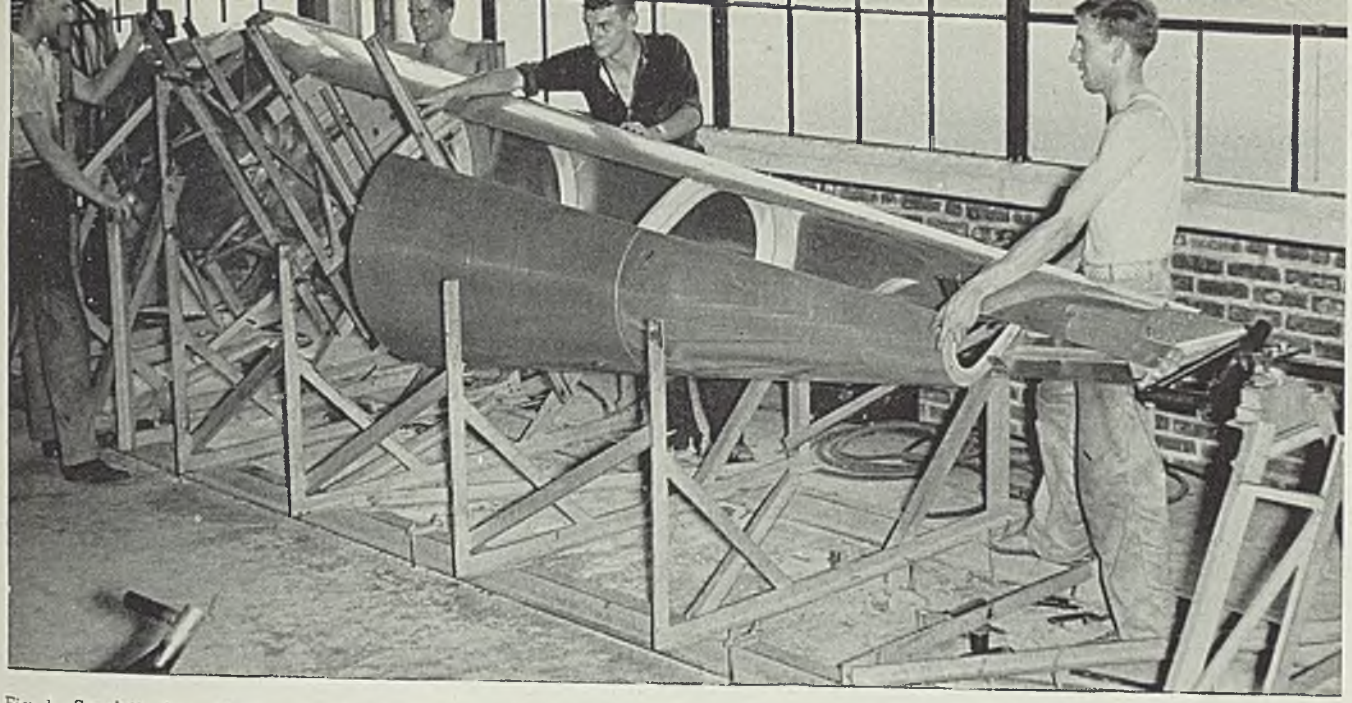


Fig. 1—Steel jig in which assembly of plane fuselage starts: Thin aluminum alloy sheets are fitted around bulkheads to provide a monocoque type of construction. Use of this jig insures that each plane will be built to constant dimensions, permitting interchangeability of parts. Fuselage may be revolved to facilitate application of skins to sides and bottom

Handling Assembly Operations

on production line basis

speeds aircraft manufacture

Lightplane fabrication is so simple that assembly methods closely approaching mass production methods employed in automotive industry can be applied to their manufacture. Materials handling operations follow well-worked-out flow for maximum efficiency

■ PRODUCTION assembly methods somewhat similar to those used in the automobile industry are employed by Luscombe Airplane Corp., West Trenton, N. J., a leading builder of small planes for civilian use. It is easy to visualize that the practice adopted by this interest is typical of what may be seen some day on a large scale with sufficient popularity of the airplane for peacetime pursuits.

In general the manufacture of airplanes is a far cry from the mass production methods of the automobile industry—as has been discovered with attempts to accelerate the defense program. Not only are manufacturing problems dissimilar, but the volume of available business in planes heretofore has not made it practicable to employ the expensive machinery required to put the aircraft industry's output on a mass-production basis.

This is especially true in building the modern warplane, which incorporates many complicated and time consuming operations in its construction, but is less applicable in the case of the lightplane. By comparison the latter is simple in design and manufacture, and in certain respects it involves less intricate fabricating processes than are required of the automobile builder.

Luscombe's cabin planes comprise three two-place land models and a seaplane. Each is 20 feet long, has a wing span of 35 feet and is powered by a 65 or 75-horsepower air-cooled engine. The cheapest model sells for about $1900. Maximum output of the plant is four planes a day with 14 to 16 units in process of assembly.

The planes are of all-metal construction, thus referring to all structural members, including the strut-supported wings. Surface covering of the wings, however, is fabric. Fuselage is the monocoque type, in which curved metal skins riveted to bulkheads — instead of a welded tubular framework or longitudinal stringers — are primarily depended on to carry stresses arising in that part of the plane.

Aluminum, either Alclad or Dural, is the principal metal of which the planes are built. Wing struts are low-carbon steel welded tubing, and chrome molybdenum tubing is used for the mount supporting the engine. Other applications of steel are in the

Fig. 3—After the planes are equipped with wheels they are lowered from the conveyor and pushed along the floor to subsequent assembly stations for installation of stabilizers, gasoline tank, engine, etc.

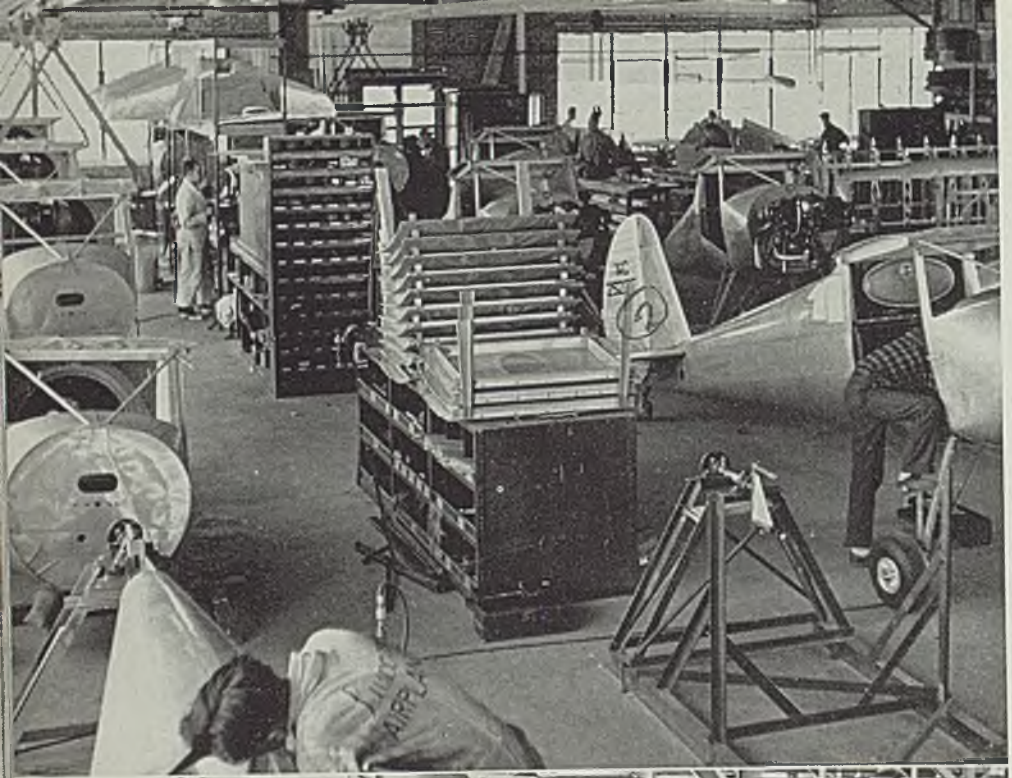


Fig. 2—View from start of assembly line, above. After being removed from the jig, the fuselage is suspended from an overhead monorail conveyor by a pair of tongs and starts down the line for installation of additional parts. At the end of the building a cross-over rail transfers the fuselage to a parallel line, the assembly flow following a large U-shaped path. Pre-assembled parts are stocked along the assembly line so as to be readily accessible to workers

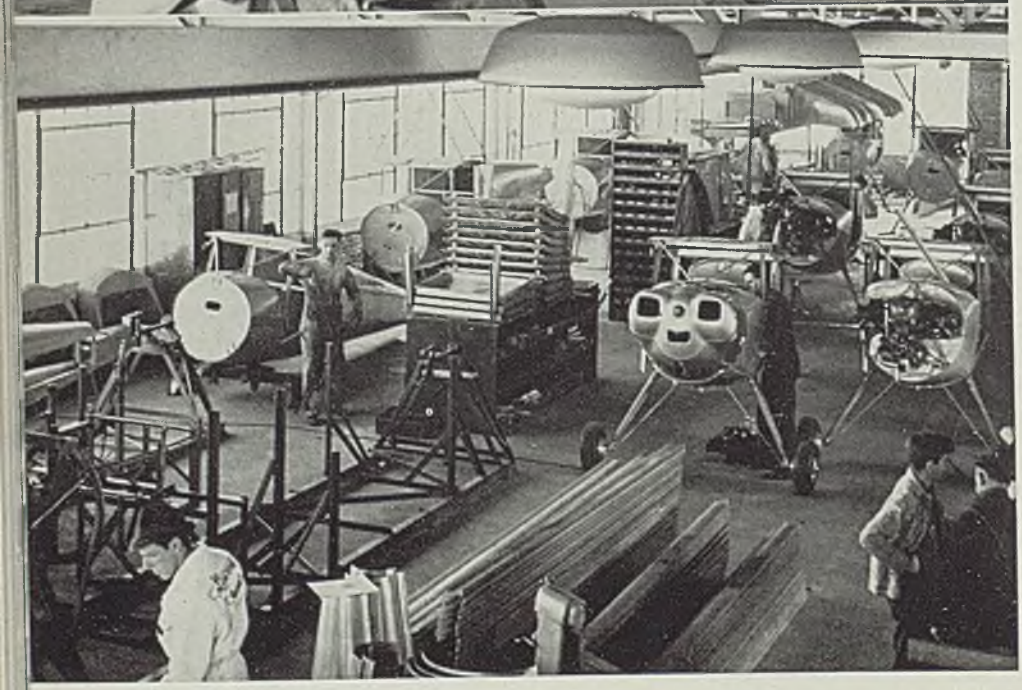


Fig. 4—General view of assembly line, below, showing fuselage in process of construction at left. Planes in return line at right have been equipped with engines and are almost ready for transfer to adjoining floor where wings are installed

landing gear, control assembly, tail shock absorber and many small fittings. The firewall located behind the engine is shotwelded stainless steel. Landing gear tie-rods are shotwelded stainless steel, 14,000 pounds tensile strength.

Assembly of a Luscombe plane starts in a fixed jig located at one end of the assembly line. This jig, built ruggedly of steel angles, serves to place the forward bulkheads and tail assembly in their proper relation to each other and insures an accurate fit of the preformed and predrilled metal skins. In addition to facilitating assembly of the fuselage, this maintenance of constant dimensions in each plane simplifies subsequent repairs through interchangeability of parts in case of damage in service.

Front end of the jig includes a framework which is mounted on a shaft and which may be revolved. Rear end of the jig which holds the tail assembly is similarly equipped, thereby permitting the fuselage to be rotated and simplifying application of the skins to the sides and bottom.

With the bulkheads, tall section and cabin frame members bolted in position in the jig, the fuselage is secured by riveting. These skins, consisting of Alclad sheets, previously had been cut to size on a shear and punched for rivets on a press brake. Sheets to be fitted to the upper and lower sections of the oval-shaped fuselage are formed to the required curvature by passing through a set of rolls.

In riveting the skins, they are first clipped to the bulkheads by spring fasteners. Rivets then are inserted in the holes already drilled and are covered by masking tape to hold them temporarily in place. Various sizes and shapes of bucking irons are used to back up the force of the air hammers. These pneumatic hammers take various sizes of rivet sets, a separate set being used for each rivet size. When the rivets are headed, the fasteners are removed and rivets inserted in those holes as well. The main structure is riveted together by four men in a little over three hours.

Handling of Material No Problem

Since the skins, as well as other parts, are made to fixed dimensions it is possible to maintain stocks which are drawn upon as required by the assembly line. Production of most parts is carried on intermittently, with as many as 200 each of certain parts made at a time. When orders are issued for a plane assembly, the necessary parts are taken from stock and placed in an assembly stock along the line so as to be readily accessible to the workers. Handling of material is no problem because of the light weight of the various parts.

Parts which are made up as preassemblies before being fitted in the main assembly include: Seat bottom, firewall, superstructure, bulkheads, landing gear, stabilizer, elevator, fin, rudder, gas tank, engine mount, control system, ailerons, baggage compartment frame, control cables, tail bracket, cowling, fuel lines, doors, wings and instrument panel.

After the skins have been applied, the fuselage is removed from the jig and suspended from an overhead monorail conveyor by means of two pairs of tongs which hook onto the cabin roof. Weighing only about 100 pounds, the plane at this point is easily lifted to the conveyor by hand and is pushed along to subsequent assembly stages without mechanical aid.

Assembly is carried on in two

Exide-Ironclad equipped for 24-hour operation

New fleet of five heavy-duty ram trucks keeps coils moving at Gary Sheet Mill

Exide IRONCLAD BATTERIES

Trucks illustrated made by Automatic Transportation Co., Inc.

RECENTLY delivered to the Gary, Indiana, Sheet and Tin Mill of the Carnegie Illinois Steel Corporation was this fleet of five heavy-duty coil tractors. For each truck two 24-cell MEH-31 Exide-Ironclad Batteries were provided—ten Exide-Ironclads in all—in order to insure continuous, 24-hour operation.

Not only are these units of the latest type, able to maneuver in cramped space with massive loads, but their Exide-Ironclad power enables them to handle such loads with ease, to remain lively, responsive and speedy during each full turn, and to stay on the job day in and day out without service interruption.

In these days of high production you need such batteries as these. The experience of industry through the years confirms the sure dependability of Exide-Ironclads. Their choice today by leading industries, for the extreme demands of National Defense, is further proof that you can rely on Exide-Ironclads for speedy and dependable material handling service. Write for free booklet, "The Exide System for Better Material Handling."

THE ELECTRIC STORAGE BATTERY CO., Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

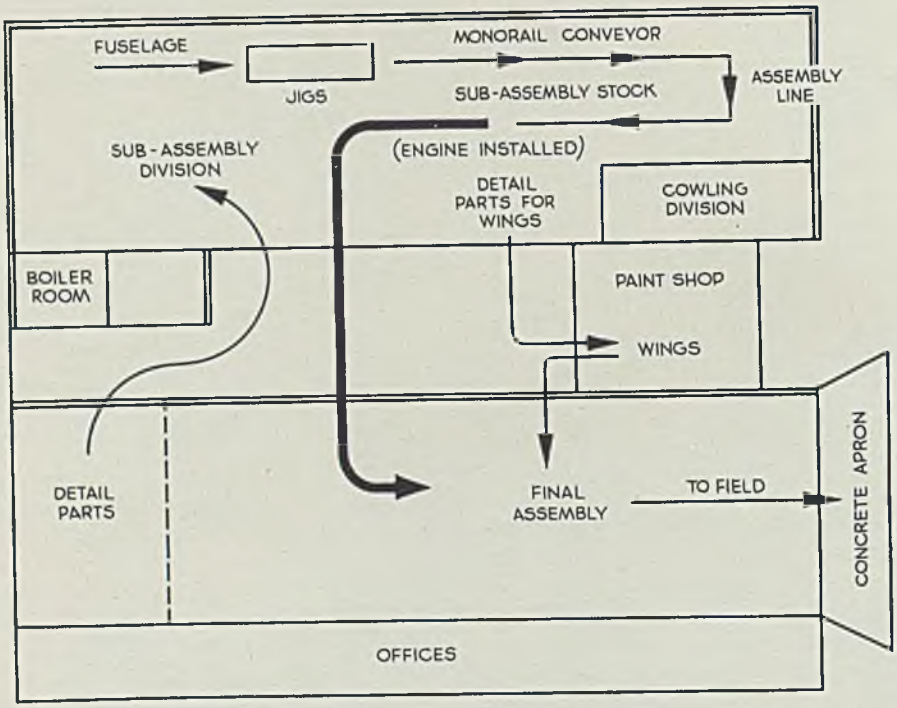


Fig. 5—Floor plan of Luscombe factory showing flow of material and various assembly lines. Not complete nor to scale

parallel lines rather than on a straight-line basis. This is accomplished through a cross-over rail which transfers the tong conveyors from one monorail to the adjoining one and starts the assembly flowing in the reverse direction.

Work progresses simultaneously on planes in various degrees of assembly, with separate groups of men assigned to the different operations. Four men usually are at work on each plane, and upon completion of their part of the assembly the unit is moved to the next station. Inspectors check each of the 70 to 80 assembly operations upon its completion and must approve it before work is permitted to be started on the next one.

At subsequent stops along the assembly line, the fuselage receives the seat bottom and hydraulic landing gear, tail surfaces and controls, wheels, gasoline tank, dashboard, instruments and the engine.

After the planes' wheels are affixed it is lowered from the conveyor to the floor and rolled as required to remaining points on the assembly line. The last step includes installation of the engine and interior fittings. The mount to which the engine is affixed is a welded tubular framework which is bolted at three points to flanges welded to the firewall bulkhead. These bolts, as well as those which hold the engine to the mount, are located in rubber bushings to minimize vibration.

Manufacture of the wings is progressing simultaneously with the above operations, work being scheduled so that fuselage and wings will be completed at the same time. Wings are fabricated at another plant in Trenton but are given their fabric covering at the main plant.

These wings are unusually strong for a lightplane, being fabricated from two Dural spars and removable Dural ribs. The spars are I-beam extrusions. These are drilled with the aid of templets, placed on wing racks and the ribs riveted in position. The completed wing structure is given a primer coat, the fabric covering is fitted and dope is applied. Wings then are moved to the final assembly division to await the planes to which they are assigned.

After installation of the engine, the plane is pushed to the final assembly floor located in an adjacent building, where sufficient room is available to accommodate the wing spread and where the plane also is equipped with propellor, cabin doors, windshield and miscellaneous equipment. This floor opens on a flying field used in testing the finished plane.

Principles of Aviation For the General Reader

■ *Flight*, by Captain Bailey Wright, James J. Smiley Jr. and Rex Martin; two volumes, cloth; first volume on first principles, 283 pages 6 x 9 inches, second volume on construction and maintenance, 259 pages; published by American Technical Society, Chicago, at $2.50 each.

These volumes give an interesting general survey of fundamentals of the aviation industry, in simple language, for the general reader and those who intend later to enter the air transport service, giving the latter a good foundation for further specialized study.

The text is embellished by numerous illustrations and diagrams and a department of quiz questions is provided for the reader to test his acquired knowledge.

Develops Fire-Resistant Building Partition

■ Building partitions in which all materials except plastering supplies, are designed, fabricated and shipped to the job as a complete unit, is the latest development of Reynolds Metals Co., Richmond, Va.

The new product is a 2-inch hollow core, lightweight partition system called Reyn-O-Wall. Simplified erection is an outstanding advantage of this type of partition wall, which consists of a core of membrane sheets securely attached to each other. The core is reinforced on both sides with galvanized steel ribs. Fire-resistant and sound deadening, it is suitable for many applications.

Handbook Promotes Welded Steel Tubing

■ *Handbook of Welded Steel Tubing*, loose-leaf, 86 pages, 4¾ x 8¼ inches; published by Formed Steel Tube Institute, 1621 Euclid avenue, Cleveland, for $1.

Improvements and refinements in manufacturing welded carbon and alloy steel tubing during the past ten years have resulted in its adoption for structural uses in many large industries. Inherent advantages in welded tubing are due to its high physical properties and true concentricity of section.

The handbook has been published to furnish designing engineers information regarding standard sizes and properties. It is devoted to grades of welded tubing which can be figured as having a solid wall structure with no discontinuity or variation in physical properties in the welded area. Standard sizes, commercial tolerances for roundness, wall thickness, straightness, etc., are tabulated for various grades. Manufacturing and fabricating processes are illustrated, and dimensioned drawings show in typical examples to what degree welded tubing can be cold worked in such operations as bending, beading, flanging, expanding, tapering, etc. Special attention is given to recommendations for laying out fabricated parts and methods of checking. Suggestions aid in developing designs for most economical use of tubular sections. Numerous illustrations show the wide variety of possibilities for its use.

NEW TURBINE PLANT

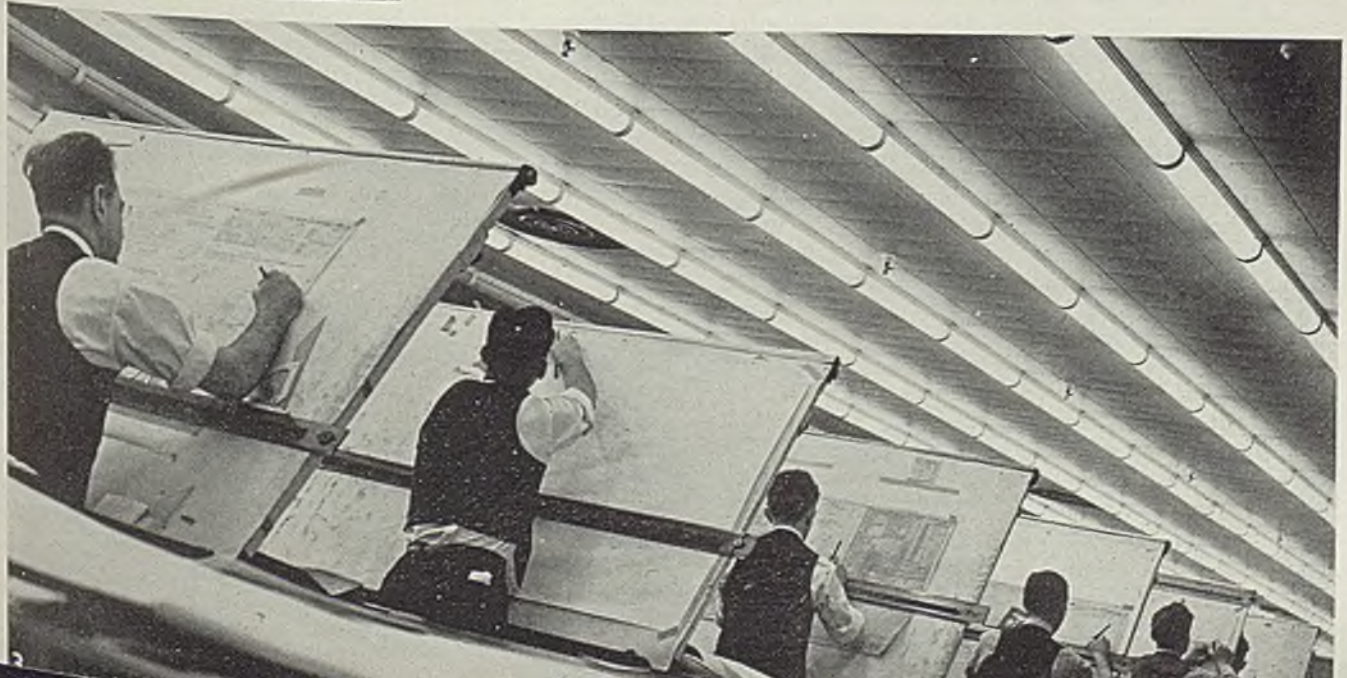
already in production

THE NEW Westinghouse Steam Division plant, Lester, Pa., although only started last fall and not to be finished till later this year, already is working 24 hours a day on $130,000,000 backlog of orders, mostly for defense work. It is said to be turning out more marine propulsion equipment than any other American factory. The cost of $9,000,000 will also cover more than 4000 new machine tools, from 200-ton gear planing machines on down to small units. Some 5000 workmen are busy here with 300 apprentices also being trained. Turbines produced range up to 250,000-horsepower units. To meet close tolerances, 15-ton bull gear wheels are machined in air-conditioned rooms so temperature changes will not affect work. Gear tooth surfaces are held to less than 0.0002-inch.

Top view, **Fig. 1**, shows portion of 35 acres of manufacturing floor space as seen from top of new office building which employs a 70,000-gallon 3-foot deep "lake" of water to keep heat from sun's rays from radiating into the building. Year around, 250-ton capacity air-conditioning system employs steam jet refrigeration—said to be first installation of its kind. Cost was 25 per cent lower than that of conventional system. It needs only 101 horsepower to cool the 300 x 120-foot, 3-story building and only 75 to heat it.

Other features of new office building are: Duplicate ventilation systems; Precipitron air cleaners; glass block windows with "islands" of clear glass; huge, unobstructed drafting room—100 x 300 feet—on second floor, see **Fig. 2**; complete sound proofing; over 3 miles of continuous high-intensity fluorescent lighting strips, **Fig. 3**, in drafting room consume only 1.4 watts per square foot—just about 28 per cent of equivalent incandescent lamp consumption; 50-foot-candle illumination on drawing boards, 30 to 35 in general office area. Watt for watt, fluorescent lamps dissipate 50 per cent less heat, give 2.5 times as much light.

Fig. 2 shows welding steel supports for a mobile overhead crane in one of the new shops.



BETWEEN HEATS

WITH Shorty

Say Fellers:

We've been swingin' so much steel 'cross the pourin' aisle of our steel-makin' shop these past few months that the boys up on the pourin' platform have been cryin' "have a heart, Boss". The fellers on that platform have been openin' and closin' the stopper rod on 150-ton ladles 'till you'd think they wouldn't 'ave enough strength left to handle any more steel. But when the boys on the chargin' floor of the open-hearth would stick the tappin' bar through one of the wickets on the chargin' door of the furnace and knock out another heat, the fellers over at the pourin' station jus' across the aisle would give a heave, pull their goggles down over their eyes and yell across the aisle to the fellers tappin' the heat, "send 'er over y' guys, we kin take it if y' kin." They're a great bunch of fellers—these guys that pour the steel into the molds at our plant.

Sure Can Swing 'er

'N I'll tell ya another thing, fellers. We gotta lad up in the crane cab who can certainly manipulate the ladle. He can swing the 150 "tonner" from one mold to another jus' as if it was floatin' on air. Y' wonder how he does it but I guess that's his business. The other day the fellers on the pourin' platform opened up on a heat of steel and after they poured a couple of molds or so, a leaky ladle stopper developed. They couldn't get a clean shut-off 'n then young Hank up in the crane cab had to do the rest. The boys on the platform would give 'im a signal when it was time to move the big ladle to another mold 'n then he'd start pullin' levers in 'is cab and the ol' ladle of steel would glide from the full mold to the next one to be poured and he'd bring 'er to a halt in jus' the right spot. 'Course the sparks 'd fly like the dickens but the fellers poured the whole heat jus' as though nothin' happened.

One of our observers—Skeek Dibble—was followin' through a heat the other day 'n he gotta talkin' to Red Owens, the foreman over in the mold yard. He sez to Red, "Whadda puttin' straw down in the molds for?"

Quick as a wink Red pipes up with this answer: "Son, y' ever heard of snakes? Y' 'ave, heh. Well sir, we 'xpect a lotta snakes in the next heat 'n we thought perhaps we'd make it jus' as easy for 'em as we possibly could. Y' know—jus' like Barnum used to do for his elephants." 'N then he broke into a laugh.

Skeek started laughin' too, 'n then he sez, "Sorta dumb question, heh? But I kin see what you're tryin' to do."

Cuts Down Splashin'

"I thought y'd tumble alright kid", sez Red. "Y' see if y' tamp the straw down pretty good, y' don't git as much of a splash up on the sides of the mold as y' ordinarily do. 'N if y' kin cut down the splash y' don't gouge out your surface 'n y' kin get a longer life outta your molds."

"How many heats do y' calculate gettin' outta your molds?", Skeek asked.

"All depends", replied Red. "The life of the big ones we're usin' for ordnance work is usually short. 'Course we try takin' care of 'em but they go bad on us jus' the same."

"Lemmi ask y' another question, Red. When do y' consider a forgin' mold too old for service? Y' know, them molds we're usin' for forgin' steel."

"Well, I'll tellya. Whenever y' can't get an ingot out. Y' know—sorta stickers. 'N when we bump agin this condition we throw the mold out."

"Y' figure there's no use monkeyin' 'round with stickers, heh?"

"Yeah, your right, Skeek. Y' see, we don't have any trouble on our 80,000-pound molds until a defect on the inside interferes with the strippin'. 'N when the fellers have trouble liftin' the mold away from the ingot, then we scrap the mold. For instance not long ago we had a 60-inch fluted mold go bad on us after the fourth heat. We poured another heat 'n then we took 'er outta service."

"Y' mean y' scrapped 'er?" inquired Skeek.

"Naw, we piled 'er 'long with some other molds that went bad on the inside with firecracks. Then a funny thing happened."

"What's that?'" asked Skeek.

"We tried to buy some new molds from our source and we found we couldn't get delivery and so we sez, 'alright fellers, we'll put some of our discarded molds back in service ag'in', 'n so we did. We looked over the pile, picked out the ones we wanted and brought them over in the mold yard ag'in."

"That's why the weldin' gang is workin' with their torches over here, huh?"

Weldin' Does the Trick

"Yeah. That's the dope. We took one mold that had 'bout four holes gouged out on the inside. We chipped 'em out clean 'n then we welded 'em 'n used a grindin' wheel to smooth 'em up ag'in. 'N say, she did the trick alright."

"How much did the job cost?" asked Skeek.

"Somethin' like $4", sez Red. "We got 'bout 13 more heats out of 'er with a couple more repairs and a couple more grindin's. 'Course after 'bout 28 heats we found that the weldin' and grindin' were beginnin' to show up on the surface of the ingot 'n then we scrapped the mold for good. Now whenever we see firecracks startin' to appear we wait for a couple of heats 'n then we grind them. 'N we've found that if we grind off firecracks, say every five to seven heats, they won't grow."

"I noticed the welders were usin' a small bare rod in most of the jobs."

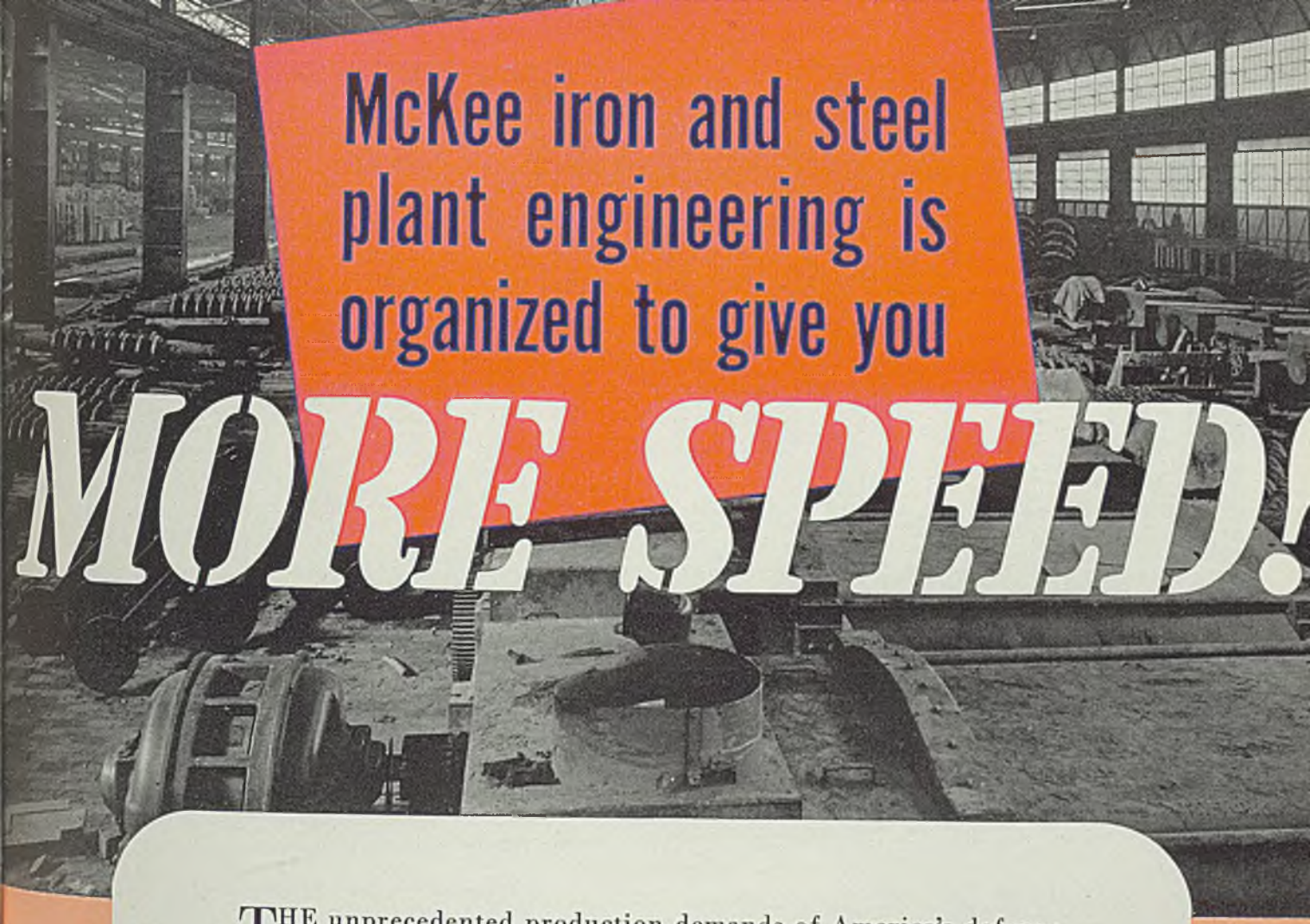
"Yeah", sez Red, "they give us the best results. 'Course the fellers on the weldin' job go slow 'n weld at room temperatures cuz this all helps."

"Didya ever try usin' No. 695 in some of the holes?" asked Skeek.

"Yeah, an' she works okay. She stays in the mold after the ingot is out but in case the boys knocks the stuff out, we patch 'er ag'in and put the mold back in service. We're even usin' this material 'round the edges of our big-end-up forgin' molds 'n she's workin' out in good shape. Take a look at some of 'em, Skeek, as you're passin' through the mold yard."

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

"Shorty" Long



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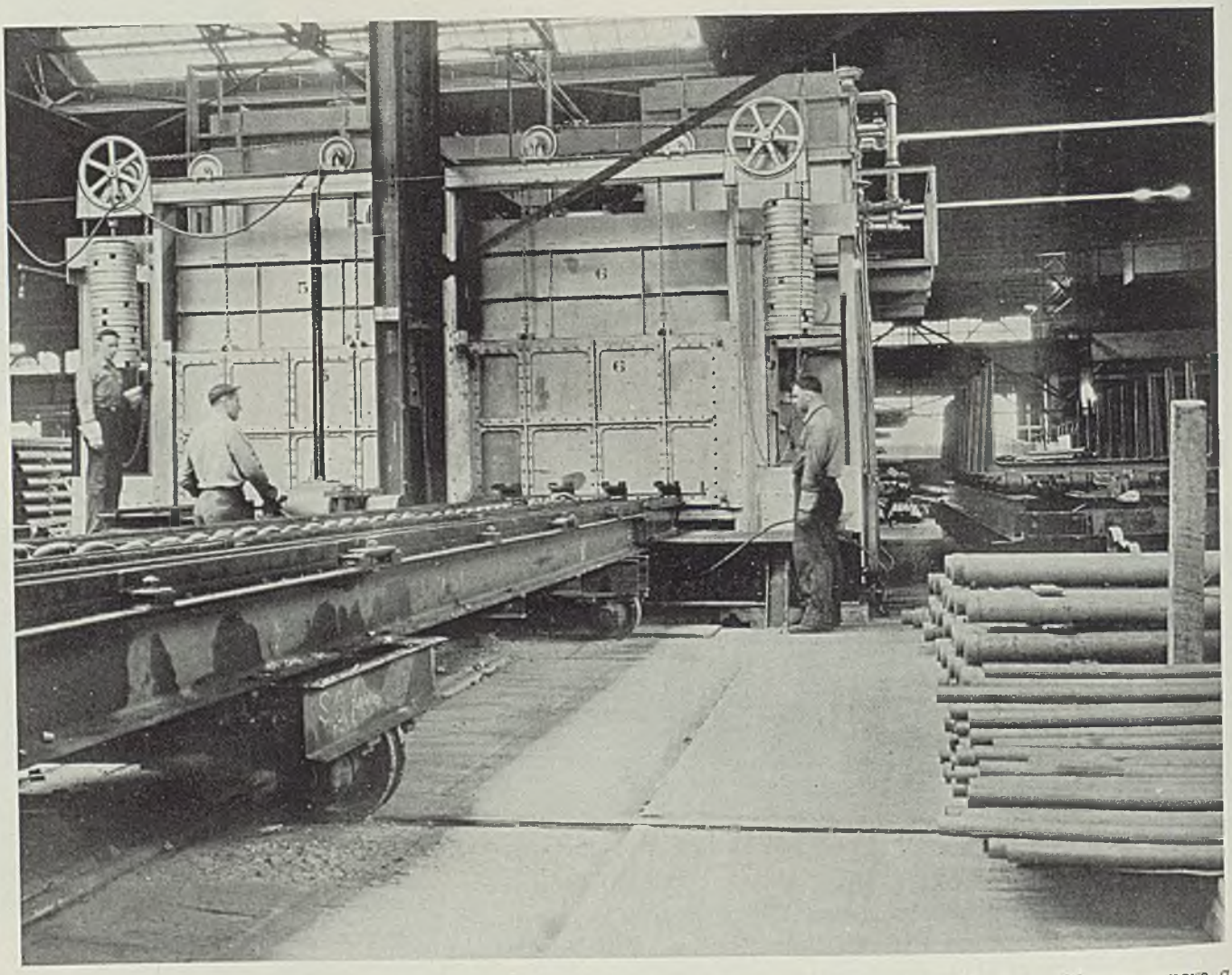

Fig. 3—Front view of furnaces showing charging table in position to remove a loaded cradle and empty cradle on loading station at right of furnace

Precise Heating-Cooling Cycles Afforded by New Batch-Type Annealing Furnace

A new and improved tool for application of laboratory-determined heat treatments in full-scale mass production materially aids in bridging the gap between the laboratory and the production approach to the alloy-steel annealing problem

■ THE NEED for a production batch-annealing furnace has long been acute, particularly in the seamless tube industry where the product is generally of such physical dimensions as to make a rather loosely compacted charge not only difficult to heat uniformly, but also bulky and cumbersome to handle in large tonnages. Following a long and intensive study of the annealing problem as it relates to alloy-steel products, The Babcock & Wilcox Tube Co. very recently installed at its plant at Beaver Falls, Pa., a new type of batch-annealing furnace that represents the closest approach thus far to a furnace capable of treating large tonnages with the same degree of accuracy and also with the same response to control normally obtained only in small laboratory furnaces.

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The past decade has seen a tremendous increase in the alloy steel tonnage in seamless tubes, particularly in the alloys of the air-hardening type that require "furnace cool" annealing, or accurately controlled spheroidizing treatments. A group of typical analyses of the "air-hardening" type are shown in Table I.

A typical cyclic anneal of this type of steel consists of heating uniformly and rapidly to some predetermined temperature in the neighborhood of the upper critical, holding for a specified time and then cooling at a rate of 10 to 50 degrees Fahr. per hour through the range in which transformation

TABLE I—Analysis of Typical "Air Hardening" Steels in Per Cent

Name	Carbon	Manganese	Silicon	Chromium	Nickel	Molybdenum	Vanadium
SAE 3250	0.45-0.55	0.30-0.60	0.15-0.30	0.90-1.25	1.50-2.00	.....	.....
SAE 52100	0.95-1.10	0.20-0.50	0.15-0.30	1.20-1.50	.....	.....	.....
SAE 6150	0.45-0.55	0.60-0.90	0.15-0.30	0.80-1.10	.....	.....	0.15 Min.
B&W Croloy 2	0.15 Max.	0.30-0.60	0.50 Max.	1.75-2.25	.....	0.45-0.65	.....
B&W Croloy 3	0.15 Max.	0.30-0.60	0.50 Max.	2.75-3.25	.....	0.80-1.00	.....
B&W Croloy 5	0.15 Max.	0.50 Max.	0.50 Max.	4.00-6.00	.....	0.45-0.65	.....
B&W Croloy 9	0.15 Max.	0.50 Max.	0.50 Max.	8.00-10.00	.....	0.90-1.10	.....

occurs. The homogenizing temperature, holding time, cooling rates and temperature range over which the cooling rates must be applied have been developed for each individual analysis.

An important element of the production of such analyses is adequate and efficient annealing capacity. Recently, the defense program has further expanded the use of these alloys and it is safe to say that one of the most vital elements of the entire program is annealing capacity of this type.

A great many of the cyclic types of anneals can be performed in continuous furnaces. However, such furnaces represent a rather large initial cost and require somewhat larger floor space than batch-type furnaces. Basically, the requirements for a batch-type annealing furnace for alloy steels of the air-hardening type may be summarized as follows:

1—Uniformity of temperature throughout the charge during the entire annealing cycle.

2—Rapid and accurately controlled heating rates.

3—Control of furnace atmospheres.

4—Control of cooling rate.

5—Convenient means of charging and unloading the furnace.

These requirements can quite easily be met in laboratory furnaces, and ideal cycles of annealing for each analysis have been thoroughly investigated on a small scale. The problem of large bulky charges is a more difficult matter, and the ideal cycle of temperatures may have to be entirely changed in practice, mainly due to the mass effect and the general performance of the furnace equipment.

After a thorough study of the problems of annealing alloy-steel tubing of the air-hardening type, which extended over a period of several years and involved the plant scale annealing of several thousand tons of these materials, the company recently installed a furnace of the type generally known as a convection or recirculated-air type, designed and constructed by Surface Combustion Corp., Toledo, O.

A convection-type furnace was selected for several reasons. First and foremost was its rapid and uniform heating characteristic. In the conventional type of furnace, heated by a group of individual burners or electric elements, heat is transferred chiefly by radiation and starts at the exposed outside surfaces of the charge and proceeds inward by conduction. Since the tubes are charged into the furnace in a bundle, the outside tubes become heated first and those in the center last—in the conventional type of furnace. Hence, all tubes in the charge are not subjected to the same time-temperature cycle with consequent variation in metallurgical properties throughout the charge.

In the convection-type furnace, hot gases are circulated at a high velocity and are forced through the charge. Hence, heating proceeds from all directions and is, therefore, more uniform and rapid. As will be pointed out later, the length of the heating cycle of the new furnace is less than half that of the other designs and the uniformity of temperature throughout the charge can be maintained to within plus or minus 10 degrees Fahr.—practically an unheard-of

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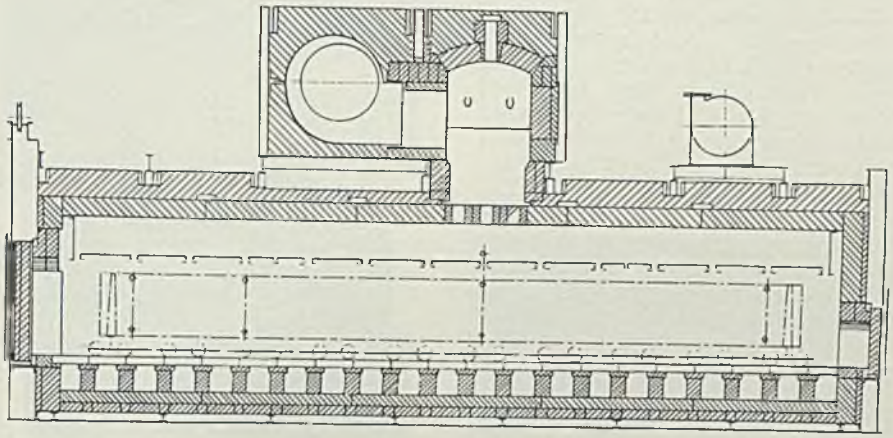
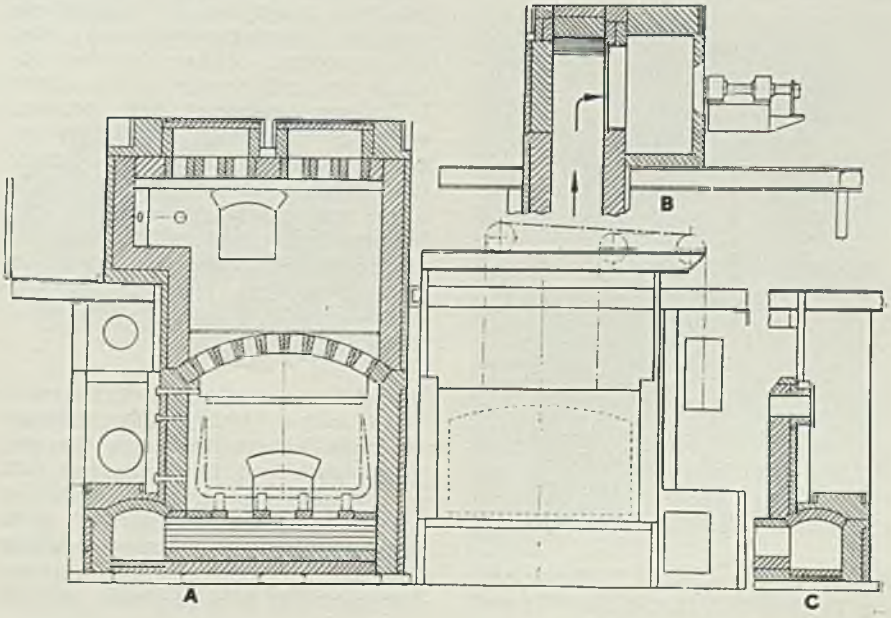


Fig. 1—Longitudinal section of furnace, top view, showing location of circulating fan, combustion chamber and alloy plate manifold immediately above charge which is carried on the roller truck cradles

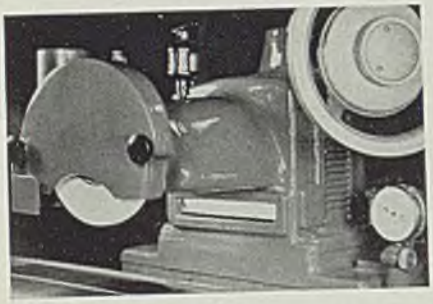
Fig. 2—This transverse section through the furnace shows: At A, section through combustion chamber, annealing chamber and return duct; at B, section through circulating fan chamber and inlet; at C, section through return duct exhaust port



Industrial

Surface Grinder

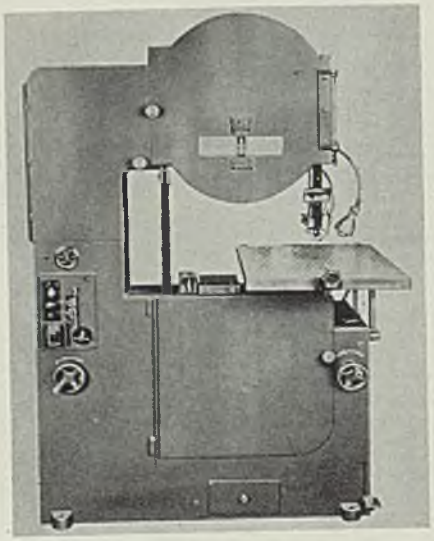
■ Continental Machines Inc., 1301 Washington avenue, South, Minneapolis, has placed on the market a new DOALL precision surface grinder to meet rigid standards of accuracy demanded by the army and navy in the present rearmament program. It is capable of "splitting" that last tenth or "grind flat to 4 RMS finish." The illustration shows the spindle head of this machine. Precision ball bearings carried in a ground heat treated forged SAE



3140 quill make up the "heart" of this assembly. The assembly includes a built in flush type lighting unit which directs light to where it is needed, a dial indicator giving direct measurement between wheel and work in tenths, and an adjustable dust or splash guard. The wheel guard rotates and can be locked in any position when using a tangent-to-radius wheel dresser. The handwheel of the grinder is graduated in half-thousandths and has an auxiliary vernier adjustment for feeding in tenths.

Die-Saw

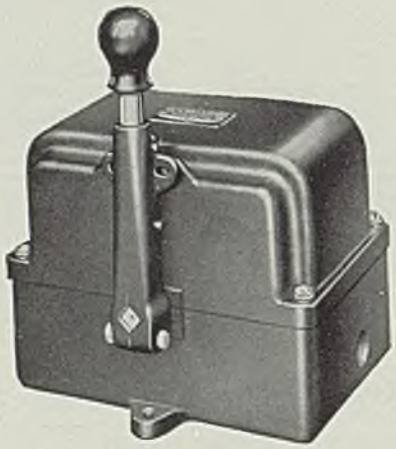
■ Tannewitz Works, Grand Rapids, Mich., has introduced a Di-Saw featuring a 30-inch throat for cutting shoes, dies, templets and many other operations. It is the smallest of several machines of this type available from the company to meet



special requirements. Di-Saws having 36 to 48-inch throat capacity and even larger sizes can be supplied. All are built along the lines of the standard No. 24 M model.

Cam-Operated Controller

■ Cutler-Hammer Inc., 315 North Twelfth street, Milwaukee, has placed on the market a new cam-operated mill-duty controller. Designated as Bulletin 14951, it is available in 2, 3 and multispeed types, being ideal for mill auxiliaries, crane hoist, bridge, and trolley ap-



plications. Extreme ease of operation with positive feel of all speed positions is obtained through an adjustable compression type star wheel spring. Other features include vertical, double break, silver to silver contacts, ball bearing equipped cam shaft and easily accessible terminal board. A heavy cast case and cover, for either separate or bench board mounting can be provided. Optional features include; spring return; off position latch, two, three, or five speeds.

Butterfly Valve

■ R-S Products Corp., 4530 Germantown avenue, Philadelphia, has introduced a butterfly valve for air, gas, steam and liquid control. It is available for hand, hydraulic or motor operation. Illustrated is a hand-wheel operated design in which internal parts are machined to assist operation and to obtain a tight fit between housing and vane. A feature in the design is the pair of adjustable stops which stop the vane

in either of two set positions between "open" and "closed." This permits constant duplication of any set maximum or minimum opening, in addition to full-open and tight-closed positions. The unit also has a graduated dial and pointer for exterial determination of the butterfly vane. Illustrated unit operates through a self-locking worm and quadrant. The line includes a standard range of sizes from 2 to 48 inches for working pressures up to 15 pounds.

Clamp for Welding

■ J. H. Williams & Co., 225 Lafayette street, New York, are now offering on their drop-forged C clamp a "spatter-resisting" finish which resists the adherence of welding

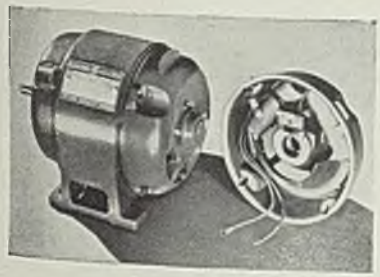
spatter to the body, swivel and screw. The clamp which is cadmium plated is available in 7 sizes, with capacity opening range from 2 to 12 inches.

Capacitor Motor

■ General Electric Co., Schenectady, N. Y., has introduced a new Tri-Clad capacitor motor to meet a large number of varied industrial applications. Like the polyphase Tri-Clad unit, it features modern

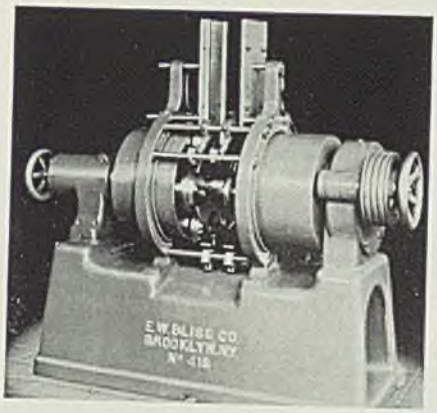
Equipment

appearance, and better mechanical and electrical protection as well as protection against operating wear and tear. The new motor may be obtained with either ball-bearing or sleeve-bearing construction, and is available in two types, KC and KCJ. Type KC is for applications requiring moderate starting torques such as fans, blowers and centrifugal pumps while the KCJ is for compressors, loaded conveyors, reciprocating pumps, and any other applications requiring high starting torque. The capacitors are mounted inside the end shield on the normal-torque motor, while on the high-starting torque motor, 1½ horsepower and larger, they are mounted in a compact case on top of the motor frame. In both forms, the motor incorporates complete mechanical protection through the use of a cast-iron frame, electric protection through use of Formex wire in the magnet coils, and improved bearing design and lubricating arrangements. It also utilizes the cast-aluminum rotor and double-end ventilation. The transfer switch consists of a centrifugal mechanism mounted on the rotor shaft, and a stationary switch located in the end shield. As the motor approaches full speed, centrifugal force moves the collar of the rotating mechanism away from the switch by snap action, causing the switch to open. A new pressed-steel conduit box provides large working space and simplifies installation in close quarters.



Can-Body Flanger

■ E. W. Bliss Co., Fifty-third street and Second avenue, Brooklyn, N. Y., has introduced a new No. 416 automatic can-body flanger which produces uniform flanges on both ends of can bodies simultaneously. Operating with all vital parts running in a bath of oil, it will flange cans with a minimum and maximum diameter of 4 to 6⅝ inches and a minimum and maximum height of 2 to 12 inches. Adjustments necessary to change from one size can to another are few and easily made.

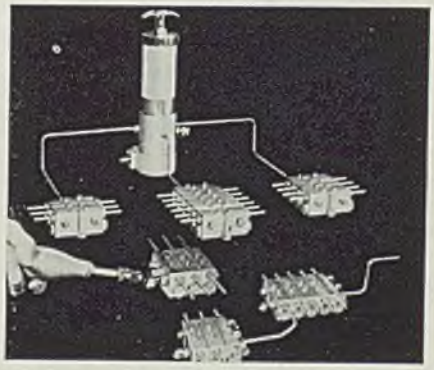


Portable Compressors

■ Ingersoll-Rand Co., Phillipsburg, N. J., has introduced a new line of Mobil-Air portable air compressors which are claimed to reduce average fuel costs up to 40 per cent. Machines in the line feature engines which are convertible from gasoline to oil or vice versa. The type of engine utilized is a Waukesha multi-fuel engine. On gasoline it employs the same high-turbulence combustion chamber used in the type H oil engine. On fuel oil, the engine operates like the familiar low-compression Hesselman type. Another feature of each compressor is the Drill-More multi-speed regulator which automatically adjusts the engine speed to the use of air. This device selects automatically the slowest and most efficient of three working speeds to deliver the required capacity. All compressors in the line weigh up to 1/3 less than previous models. Another new development for users interested in operation of fuel oil only, is the 315-cubic-feet-per-minute size with the International Harvester UD-18 full-diesel engine—this portable unit is designated as model IK-315 Mobil-Air. A unique starting device provides easy starting on gasoline without the use of high-voltage batteries or extra starting engines. The UD-18 engine is not convertible to operation on gasoline or natural gas.

Automatic Lubricator

■ Trabon Engineering Corp., 1814 East Fortieth street, Cleveland, announces a new nonreversing single inlet, multi-outlet distributor feeder and series MP variable feed multi-outlet pump to provide automatic centralized lubrication. The feeder consists of a bank of 3 or more sections each of which discharges a known and measured quantity of lubricant alternately through one or two discharge outlets which are directly connected to bearings. The capacity or volume of the different sections of the same distributor may vary from 0.005 to 0.035 cubic inch. Consequently by selecting the proper number and capacity of sections, and supplying the proper amount of lubricant to the inlet, a single distributor discharging progressively through one outlet after another will deliver just the desired amount of lubricant to all the connected bearings even though individual bearings have widely varying lubricating requirements. The distributors handle either oil or grease. A distributor, fitted with a simple pressure lubrication fitting can be mounted on a machine and all the connected bearings lubricated manually with a simple hand or "gat" gun. Also, the distributors can be fed from a discharge outlet of another "distributor" or from a metering feeder. The new MP multi-outlet pumps, designed specially for use with these nonreversing systems are available in 3 sizes having different reservoir capacities. They are driven with a worm gear, avail-



able in various ratios for use with any chain, gear, V-belt or direct motor connection, or can be furnished with over-running clutch. The pumps have one to three outlets, each connected to a separate cylinder so the quantity of lubricant delivered through any pipe can be varied without affecting the other pipes.

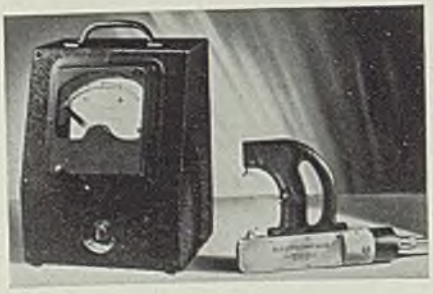
Welding Goggles

■ Bausch & Lomb Optical Co., Rochester, N. Y., has placed on the market a new line of welding goggles incorporating safety features

not found in previous goggles. Known as Arc-Ban, the goggles are of the louver sideshield construction. The louvers are automatically located in such a way that there is a direct channel for air passage although all light is excluded. They are designed so that there are no projections either on the outside or the inside of the goggle which might cause abrasion or injury. The lightweight composition cups conform to facial contours and fit all types of faces. Two models are offered—to take care of workmen with corrective spectacles and those whose eyes require no correction.

Snap Gage

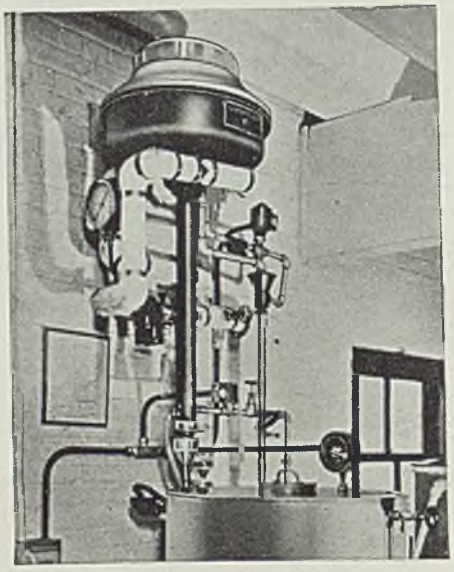
■ Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford, Conn., announces a new electrolimit snap gage for use with work which must be held within a few ten-thousandths of an inch. With its use work need not be taken from the machine as in the case of a crank-



shaft, for example. It brings accurate "tenth" measurements right to the work in the machine. The gage is light and easy to handle, and its electric circuit magnifies any errors into an easily read needle movement on a dial. Two gage bodies are available, and several sizes of frames for each body. By using the right combination, the snap gage can be arranged for dimensions from ½ up to 6 inches. The two smallest frames have ¼-inch adjustment, and all the others ½-inch adjustment. If several diameters are to be checked, and conditions are favorable, a portable instrument cabinet with a selector switch and connections for several gage heads can be furnished.

Atmosphere Control In Heat Treating

■ F. J. Stokes Machine Co., Philadelphia, announces an improved model 3-gallon capacity electrically-heated water still with complete automatic controls for producing distilled water suitable for the most exacting research or other laboratory purposes. It features a heavy cast boiling chamber and condenser housing, for added strength and durability, and is so designed that formations of scale may readily and thoroughly be cleaned. The condenser tubes are of seamless brass, heavily tinned. Other parts coming



into contact with the distillate are also heavily tinned to prevent metallic contamination. The heating element incorporates a built-in dual-purpose thermal safety switch and combined low-water cut-off to prevent burn-out from overheating in case of water supply failure or excessive accumulation of scale. The automatic controls start and stop the still and maintain a fixed level of water in a storage tank.

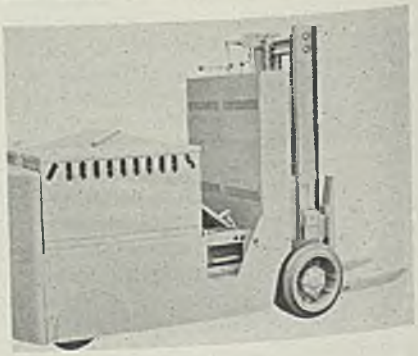
Twin Lamp Luminaire

■ Westinghouse Electric & Mfg. Co., Lighting Division, Edgewater Park, Cleveland, announces a new 2-FP-100 open-end twin lamp luminaire utilizing a 100-watt, 60-inch, white or daylight fluorescent lamp for general high level illumination in industrial plants. It is available for operation on 110-125, 199-216, and 220-250 volts, 60-cycle alternating current. It consists of a hood, reflector, lamp holders, starting device and ballast equipment. A fabricated sheet steel hood with all auxiliary

equipment mounted and wired as part of the whole assembly provides easy access for line connections during installation. Two reflector types provide a choice between totally direct and diffused, or semidirect illumination. The direct type throws the light downward, whereas the diffuser unit allows a minimum of approximately 2½ per cent upward light to pass through openings above each lamp reducing brightness contract between the ceiling and the lighted area. Both reflectors are 18-gage porcelain enameled steel, and provide a shielding angle of 14 degrees below the horizontal. Standard units are arranged for rigid, flexible conduit or chain suspension mounting. They have a smooth silver-gray baked enamel finish.

Fork Truck

■ Baker Industrial Truck Division, Baker-Raulang Co., 2168 West Twenty-fifth street, Cleveland, has introduced a heavy duty 10,000-pound capacity ram and fork truck incorporating full contactor control. It features a fork lift of 60½ inches and a ram travel of 70 feet. Its control apparatus is of the same design as used in transportation service—such as electric and diesel loco-

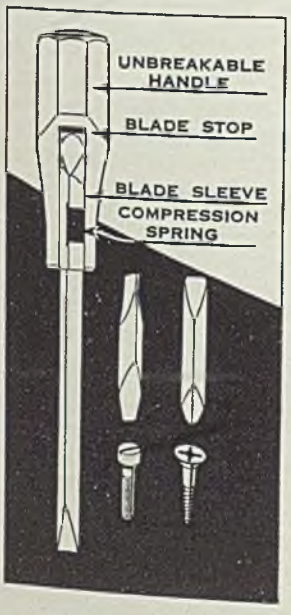


motives. Contactors are of the single unit type and are mounted on the panel as individual units. Each can be removed from the front of the contactor. The master switch

is of the double brake cam type. Each circuit here is broken twice by the quick action of the cam. Time tactors are incorporated to cut out steps of resistance in series with the travel motor. They are made to close in a definite time interval, insuring a definite time for acceleration. The "no-plug" relay of the truck is a simple series coil relay with one set of contacts to open or close the circuit to prevent or start the progression of the control. This relay is set to close its contacts and start the progression of the control at a current which is slightly higher than the maximum starting current on the first point of the control. It requires current on the reverse motion to be about equal to starting current before the control will progress and accelerate the motor in the reverse direction. The travel motion uses the four reversing standard contactors, two time tactors, the "no-plug" relay. This truck incorporates all known features of former units and uses internal expanding hydraulic brakes on the drive wheels. The operation of parking brakes is mechanical by linkage interlocked with the control system and operator's platform. Hoist brakes are magnetic dry disk type on motor shaft.

Screw Drivers

■ Servwell Products Co., Vickers building, Cleveland, announces a Fitzem screw driver which can be used on both Phillips recessed-head and slotted-head screws. Manufactured from molybdenum, it features



a blade that is both reversible and interchangeable. Its handle is of Nitrate (plastic) and is unbreakable, nonchipping, nonsplitting, shockproof, and is not affected by oil, water or grease. The tool is available in sizes Nos. 1 to 4 in various blade lengths.

Steel Turnings

(*Concluded from Page 78*)

matically within the range from 1850 to 1900 degrees Fahr. There are two heat zones in the furnace—front and back. The front zone is the high-heat region, while the other zone is merely a holding section to keep the pieces up to temperature.

As the pieces drop from the sintering furnace, they are transferred quickly to a hot press where under hydraulic pressure the hot washers are so compacted that their volume is reduced about 33 per cent. Dies are of the hinged type, water cooled, with a series of eight jaws applying pressure uniformly around the outer edge of the washer while upper and lower dies compress the surface. Pieces are handled at a rate of 12 a minute in this press and are automatically removed from the dies, sliding down a chute into a water quench.

When cool, the part goes to a trimming press where small fins on the outer edge are shaved off; these fins develop in the hot pressing operation, metal flowing out between the eight jaws previously mentioned.

After cold trimming, the washer is cold coined in another press to give a final smooth surface which does not require machining.

A comparison of the analyses of SAE X1112 steel turnings, the gray cast iron from which the washers formerly were made, and the finished washer formed and sintered from turnings is given in Table I.

A sharp decrease in carbon content in the compressed and sintered sleeves can be explained only by decarburization in the furnace. Nickel and chromium, of course, are residual amounts which might be expected in a commercial steel of this type. The sleeve weighs 8¼ ounces in the original compact and after final cold coining has been reduced only ⅛-ounce to 8⅛ ounces.

Physical tests to compare the cast iron against the steel sleeve were made by gripping one half of the ring rigidly and applying a ¾-inch punch against the side of the exposed portion. Failure loads of three samples of each material were as follows: Sintered steel pressing—4000 pounds, 4090, 4950; cast iron—1470 pounds, 1180, 1670.

Rockwell hardness measurements made on sections of both the cast iron and the sintered sleeves showed a range of 80 to 93 on eight measurements over the sintered steel, and a range of 69 to 73 on eight measurements at identical spots on the cast iron.

Invisible Light Used In Night Flying

■ Invisible light has been adopted in the new fluorescent system of illuminating airplane instrument panels according to the Material Division, Wright Field, Dayton, O. A source of ultra-violet light, invisible to human eyes, is fixed to shine on the dials whose markings and indicators become visible by being painted with a substance which becomes luminous when exposed to ultra-violet radiations. Thus markings become visible, appearing to give off a soft glow. Such a system provides light without glare. It has been standardized after four years of experimental development by Wright engineers working in conjunction with commercial firms.

Pilots who flight-tested it under all conceivable conditions were particularly impressed with its performance in night formation flying, night landings, and in the tricky half-light of dawn and dusk.

The invisible light is easy on the eyes during the long-range missions wherein the pilot is obliged to read the instruments for hours on end. And with a low level of light intensity, there is less contrast between the inside of the airplane and points outside. Other points of superiority are; costs are reduced, wattage is less, service life is longer and maintenance is greatly simplified.

Figuring Die Costs

(*Concluded from Page* 66)

to heat treat if proper equipment is used. This discussion is not intended to take into account those shops that do not have proper heat-treating equipment.

A particular advantage possessed by this type of steel is the small amount of distortion obtained on heat treating. This distinct advantage is not taken into account in the table because of the impossibility of accurately evaluating this factor.

Steel No. 3 will be recognized as the high-carbon high-chromium type. This is a particularly wear-resistant steel and is seen to be the cheapest for long runs up to the life of the die. For this particular job where production required between 330,000 and 495,000 pieces, the high-carbon high-chromium type should be used. Beyond 495,000 pieces, however, No. 2 steel should be used as the cost of a new die would again put the cost of No. 3 over No. 2.

Busy shops, and who isn't busy just now, should also take account of several other factors that do not appear on the chart.

If the die must be taken out of production and ground every 30,000 pieces instead of every 20,000 pieces, the job is going to be finished sooner. In a busy shop, a half day lost in regrinding dies is not uncommon. The longer a die can be kept in production, the less time will be lost from production schedules and the fewer mechanics will be needed for setup and maintenance. Also, fewer diemakers will be needed. This is sometimes as important as lower cost. Fewer machine tools will be needed for die making and grinding, another important factor at present.

All these factors must be properly weighed and entered into the consideration when selecting a die steel and when figuring die costs. Often one or more of them may overbalance some of the other cost factors that were taken into account in figuring the curves of the chart.

New Annealing Furnace

(*Concluded from Page* 89)

value until work was done with this new unit.

The furnace is shown diagramatically in Figs. 1 and 2 and consists of the following basic elements: A combustion chamber separate from the furnace chamber proper, a circulating fan of high capacity, a manifold distributing system with adjustable dampers, a duct return system to permit the recirculation of the furnace gases, exhaust dampers to relieve the pressure in the furnace.

Prior to this time, this type of furnace had been used quite successfully in the nonferrous field and for stress relieving welded-steel structures. But all applications of this type have been for temperatures below 1300 degrees Fahr. The present furnace has maximum operating temperature of 1525 degrees Fahr., with ample factors of design on this top temperature to permit operation up to 1600 degrees Fahr., if occasion requires.

All alloy parts exposed to the furnace temperatures are made of either cast or wrought 25-12 chromium-nickel steel. The furnace casing is gas tight, with welded seams and carefully constructed seals on all openings. Except for the checker arch and a small zone in the combustion chamber, the entire furnace is lined with B&W insulating firebrick. This type of material was selected on the basis of satisfactory results in other furnaces as its low thermal capacity and high insulating value contribute materially to the performance and economy of operation.

This installation consists of two separate units placed wall to wall to conserve floor space. Each furnace will accommodate a gross load

of 20 tons and a net load of 16 tons. Effective dimensions of each heating chamber are approximately 6¾ feet wide, 4 feet high and 31 feet long.

The units are fired with natural gas having a heat content of 1000 B. t. u. per cubic foot, and each unit has three gas burners of low-pressure type installed in the combustion chamber. The burners have micrometer adjustment for gas-air ratio to permit accurate control of furnace atmosphere from strongly reducing to strongly oxidizing. Under general operating conditions, these furnaces have been run with atmospheres carrying from 2 to 4 per cent oxygen, this being found the most desirable range for preventing decarburization and for producing a scale that can be removed readily.

Reducing atmospheres are possible in this unit, but experience has shown that such atmospheres quite frequently produce excessive decarburization on the high-carbon alloy steels. The use of slightly oxidizing atmospheres has long been known to be a cure for this shortcoming, and the problem of scale removal is not a serious one as long as the scale is loosely adherent.

The means of charging and unloading the furnace were carefully studied. As it was desirable to have a fairly uniformly-spaced charge to enable the gases to circulate properly, it was decided that alloy cradles with roller trucks under them would offer the best solution to this problem. The charges are made up outside the furnace on a separate cradle. Immediately after one charge is pulled from the furnace, the new charge can be run in and the heat treating continued. A maximum time of one hour is allowed for this operation.

The cradles are handled by means of a transfer table operating in front of the furnaces and capable of extracting or delivering the loaded cradle to either of the chambers of the furnace or to either of the loading stations. This arrangement allows for almost continuous operation of the furnace equipment and materially reduces the charging and discharging time as compared with that required for other batch-type furnaces, such as the car-type or dead-bottom furnace.

Control of the furnace is extremely accurate and quickly responsive. The control couple is placed immediately below the discharge of the circulating fan. From three to six check couples are placed in the charge itself. The temperature of the charge determines the operation of the controls. The heating rate is set to be dependent upon the temperature head—the difference between the charge temperature and the furnace gas temperature. Burner capacity is ample for any practical operation.

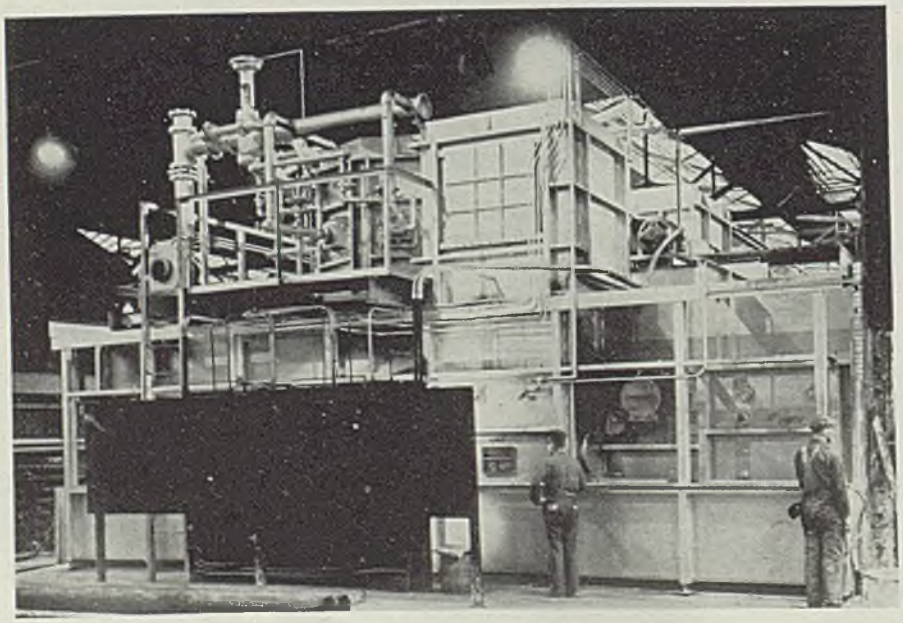
One of the most important advantages in the operation of the furnace is that, irrespective of heating rate, it is impossible to have a temperature in the charge above the furnace gas temperature, thus completely eliminating the possibility of overheating any one zone or spot in the charge. In cooling, the same advantage exists, inasmuch as the charge can be cooled at any rate. With accurate control of the gas temperature, under-cooling or too rapid a rate of cooling can be avoided.

Performance: A specific instance of the performance of this type of furnace on production annealing of a tonnage item is the annealing of SAE 52100 bearing tubing. The metallurgy of this problem is rather simple. However, in the past, the plant scale annealing cycle for this analysis has been from 45 to 60 hours duration in open-fired or radiant-element furnaces. One of the big problems has been the long and careful heating time necessary in these furnaces to obtain a uniform temperature throughout the charge and to prevent overheating. With the present convection-type furnace, the annealing cycle on this type of steel has been reduced by more than 50 per cent. This does not include charges. The uniformity of the product also has been greatly improved.

Thus far in operating these furnaces, the fuel consumption has been from 1800 to 1900 cubic feet of gas per ton of steel annealed. This compares with 9000 to 9500 cubic feet per ton consumed in the conventional open-fired furnace on the same type of annealing. This represents a saving of approximately 80 per cent in fuel and a substantial reduction in overall operating cost.

Improvements are still being made in the operation of these furnaces, and the possibilities along these lines have by no means been exhausted. This type of furnace represents a new and improved tool for the application of plant-scale metallurgy, and it may be said that it has materially aided in bridging the gap between the laboratory and production approach to the annealing problem.

Fig. 4—Side view of furnaces showing back of control panel and arrangement of combustion chamber and fan chamber



Mechanism, a Treatise On Motion Transmission

■ *Mechanism*, by Stanton E. Winston; cloth, 372 pages, 5½ x 8¼ inches; published by American Technical Society, Chicago, for $3.50.

The text of this volume is the fundamental theory of the modification and transmission of motion. The author has limited the purely descriptive matter as much as possible and has emphasized the fundamental theory. The basic principles of the three ordinary modes of transmission of motion are developed and a limited number of types of mechanisms of each mode are studied.

The student is advised to study each chapter carefully and then solve each graphical construction and example and prove any statement or formula given therein, without aid of the text. The aim of the author has been to arrange and present the subject matter so that it may be assimilated readily without help from any other source.

Steel Distribution to Civilians Main Problem

Many borderline cases between defense and ordinary needs. Inventory control reports have unearthed some maladjustments. Bolt and nut prices are readjusted.

MARKET IN TABLOID

Demand
Tapers gradually but still e ceeds production.

Prices
More liberal policy on "free ing" welcomed warmly.

Production
Up ½ point to 100.

■ RATIONING of steel for civilian use becomes ever more of a problem and several steelmakers have expressed desire that Washington lay down rules to govern them. Many cases are borderline ones between direct defense and civilian use. Thus a maker of plates notified a maker of smokestacks that his delivery schedule would be postponed for a year, original specifications having named next September. The smokestack manufacturer replied that some of his contracts were for industrial plants engaged largely in defense and for other jobs of a defense nature.

This platemaker is now concentrating on supplying shipbuilders at all costs. Another case is refrigerators which might seem purely a civilian product, yet refrigerators are needed for army cantonments, battleships and other service branches. Moreover it is reported that Washington has purchased 35,000 refrigerators for distribution into the TVA district. Where buyers display priority ratings the problem of the steelmaker in rationing is simpler.

Though a few plants using steel as raw material have shut down because of lack of supply, the situation holds its own fairly well. The volume of orders continues to taper but still tops output.

The inventory control ruling laid down by Washington, providing for reports by June 10, has uncovered some unfair distribution of steel, indicating again that with perfectly equitable distribution there is plenty of steel to go around. Because of the shortage of zinc one of the tightest items is galvanized merchant pipe. Yet inventory reports revealed one distributor holding four months' supply, at the same time making inquiry for three times that volume, which if honored, would make over a year's supply.

Zinc still appears the No. 1 raw material from standpoint of scarcity. Some note that the nickel supply becomes freer, partly because of rigid priority regulations and partly because of use of substitutes.

The present conspicuous phase of defense buying is of bars for shell rounds, about 600,000 tons now being in process of being purchased in the Middle West. Hot-rolled bars are usually sold out for the rest of the year, though certain sizes and descriptions of cold-finished can yet be bought for 1941.

A large widely-integrated company notes that deliveries on many major carbon steel items are further extended than for alloy steel, which is the reverse from a few months ago, reasons being closer control on alloy steel and greater demand in recent months for bulk products such as plates for shipbuilding, shapes for industrial plants and bars for general use.

Certain makers of by-product foundry coke who made no change on May 1 at the time that other producers raised quotations 50 cents or 75 cents per ton, put into effect the major advance at the middle of the month, making two sets of prices in several districts. Makers of bolts, nuts and rivets have readjusted quotations of certain products to bring them into line with changing costs.

Steelmakers generally agree with the statement made by Walter Tower, president of the American Iron and Steel Institute, at last week's spring meeting that there is enough capacity to take care of British and American armament needs and supply civilians on the scale of their consumption averaged over the past ten years.

A maker of galvanized standard pipe has started to ration customers on the basis of their 1939-1940 takings, based on current production of his company. Assuming that his galvanized pipe department produces at 70 per cent of capacity in June, consumers will get that percentage of their takings of previous years.

Scheduled automobile production for last week was 133,560 units, up 6305 for the week, comparing with 96,810 for the corresponding 1940 period.

Steel ingot production reached par last week, 100 per cent, through a gain of ½ point. Gains took place in six districts as follows: Youngstown 2 points to 97 per cent; Cleveland and Pittsburgh, each up 1½ points, to 96½ and 101½, with three districts gaining 1 point to 89 for Detroit, 96 for eastern Pennsylvania and 89 for Wheeling. Cincinnati dropped 3½ points to 89 and New England lost 10 points to 90. Unchanged were Chicago at 102½, Buffalo at 93, Birmingham at 95 and St. Louis at 98.

STEEL's three composite price groups for last week were unchanged: iron and steel at $38.15, finished steel at $56.60 and steelworks scrap at $19.16.

COMPOSITE MARKET AVERAGES

	May 24	May 17	May 10	One Month Ago April, 1941	Three Months Ago Feb., 1941	One Year Ago May, 1940	Five Years Ago May, 1936
Iron and Steel	$38.15	$38.15	$38.15	$38.15	$38.22	$37.33	$32.92
Finished Steel	56.60	56.60	56.60	56.60	56.60	56.60	52.20
Steelworks Scrap..	19.16	19.16	19.16	19.16	19.95	16.00	14.39

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

	May 24, 1941	April 1941	Feb. 1941	May 1940
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	2.25	2.25	2.25
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	2.21	2.225	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
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	2.10
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	2.55

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	2.00

Pig Iron

	May 24, 1941	April 1941	Feb. 1941	May 1940
Bessemer, del. Pittsburgh	$25.34	$25.34	$25.34	$24.34
Basic, Valley	23.50	23.50	23.50	22.50
Basic, eastern, del. Philadelphia	25.34	25.34	25.34	24.34
No. 2 fdry., del. Pgh., N.&S. Sides	24.69	24.69	24.69	23.69
No. 2 foundry, Chicago	24.00	24.00	24.00	23.00
Southern No. 2, Birmingham	20.38	20.38	20.38	19.38
Southern No. 2, del. Cincinnati	24.06	24.06	24.06	23.06
No. 2X, del. Phila. (differ. av.)	26.215	26.215	26.215	25.215
Malleable, Valley	24.00	24.00	24.00	23.00
Malleable, Chicago	24.00	24.00	24.00	23.00
Lake Sup., charcoal, del. Chicago	31.34	30.34	30.34	30.34
Gray forge, del. Pittsburgh	24.19	24.19	24.17	23.17
Ferromanganese, del. Pittsburgh	125.33	125.33	125.33	105.33

Scrap

Heavy melting steel, Pitts.	$20.00	$20.20	$20.75	$18.00
Heavy melt. steel, No. 2, E. Pa.	17.75	18.00	18.50	16.00
Heavy melting steel, Chicago	18.75	18.80	19.25	17.25
Rails for rolling, Chicago	22.25	22.65	23.75	21.25
Railroad steel specialties, Chicago	23.75	23.75	23.55	20.25

Coke

Connellsville, furnace, ovens	$6.25	$5.50	$5.50	$4.75
Connellsville, foundry, ovens	7.25	6.00	6.00	5.75
Chicago, by-product fdry., del.	12.25	11.75	11.75	11.25

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. 20 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. 303	No 304
Bars	24.00	26.00	25.00
Plates	27.00	29.00	29.00
Sheets	34.00	36.00	36.00
Hot strip	21.50	27.00	23.50
Cold strip	28.00	33.00	30.00

20% Ni.-Cr. Clad

Plates	18.00*
Sheets	19.00

**Annealed and pickled*

Straight Chromes

	No. 410	No. 416	No. 430	No. 442
Bars	18.50	19.00	19.00	22.50
Plates	21.50	22.00	22.00	25.50
Sheets	26.50	27.00	29.00	32.50
Hot strip	17.00	18.25	17.50	24.00
Cold stp.	22.00	23.50	22.50	32.00

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c
Philadelphia, del.	2.15c
Boston, delivered	2.43c-2.57c
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.	2.34c
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

Roofing Ternes

Pittsburgh base, package 112 sheets 20 x 28 in., coating I.C.

8-lb.	$12.00	25-lb.	$16.00
15-lb.	14.00	30-lb.	17.25
20-lb.	15.00	40-lb.	19.50

Bars

Soft Steel

(Base, 20 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Duluth	2.25c
Birmingham	2.15c
Cleveland	2.15c
Buffalo	2.15c
Detroit, delivered	2.25c
Philadelphia, del.	2.47c
Boston, delivered	2.52c
New York, del.	2.49c
Gulf ports	2.50c
Pacific Coast ports	2.80c

Rail Steel

(Base, 5 tons or over)

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

Buffalo	2.15c
Birmingham	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.80c

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.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

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)	59
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....65½ off
Do., ⅝ and ¾ x 6-in. and shorter....63½ off
Do., ⅞ to 1 x 6-in. and shorter....61 off
1⅛ and larger, all lengths 59 off
All diameters, over 6-in. long....59 off
Tire bolts....50 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.
Step bolts....56 off
Plow bolts....65 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
½-inch and less.	62	64
⅝-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger	56	..

Hexagon Cap Screws

Upset 1-in., smaller....64 off

Square Head Set Screws

Upset, 1-in., smaller....71 off
Headless set screws....60 off

Piling

Pitts., Chgo., Buffalo 2.40c

Rivets, Washers

F.o.b. Pitts., Cleve., Chgo., Bham.

Structural 3.75c
⅞-inch and under....60-5-5 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off

Welded Iron, Steel, Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½" and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

In.	Blk.	Galv.
Steel		
½	63½	51
¾	66½	55
1—3	68½	57½
Iron		
¾	30	10
1—1¼	34	16
1½	38	18½
2	37½	18

Lap Weld

Steel		
2	61	49½
2½—3	64	52½
3½—6	66	54½
7 and 8	65	52½
Iron		
2	30½	12
2½—3½	31½	14½
4	33½	18
4½—8	32½	17
9—12	28½	12

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	4
1 and 1¼ butt weld	29	10
1½ butt weld	33	12½
2 butt weld	32½	13
1½ lap weld	23½	4
2 lap weld	25½	6
2½ to 3½ lap weld	26½	8½
4 lap weld	28½	12
4½ to 8 lap weld	27½	11
9 to 12 lap weld	23½	6

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut-lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½"O.D.	13	$ 9.72	$23.71
1¾"O.D.	13	11.06	22.93
2" O.D.	13	12.38	19.35
2¼"O.D.	13	13.79	21.68
2¼"O.D.	12	15.16	....
2½"O.D.	12	16.58	26.57
2¾"O.D.	12	17.54	29.00
3" O.D.	12	18.35	31.36
3½"O.D.	11	23.15	39.81
4" O.D.	10	28.66	49.90
5" O.D.	9	44.25	73.93
6" O.D.	7	68.14	....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O.D.	13	$ 7.82	$ 9.01
1¼"O.D.	13	9.26	10.67
1½"O.D.	13	10.23	11.79
1¾"O.D.	13	11.64	13.42
2" O.D.	13	13.04	15.03
2¼"O.D.	13	14.54	16.76
2¼"O.D.	12	16.01	18.45
2½"O.D.	12	17.54	20.21
2¾"O.D.	12	18.59	21.42
3" O.D.	12	19.50	22.48
3½"O.D.	11	24.62	28.37
4" O.D.	10	30.54	35.20
4½"O.D.	10	37.35	43.04
5" O.D.	9	46.87	54.01
6" O.D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$45.00-46.00
4-in., Birmingham	48.00-49.00
4-in., Chicago	56.80-57.80
6-in. & over, Chicago	53.80-54.80
6-in. & over, east fdy.	49.00
Do., 4-in.	52.00

Class A Pipe $3 over Class B Stnd. fitgs., Birm., base $100.00.

Semifinished Steel

Rerolling Billets, Slabs (Gross Tons)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, 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

Shell Steel

Pittsburgh, Chicago, base, 1000 tons of one size, open hearth

3-12-inch	$52.00
12-18-inch	54.00
18-inch and over	56.00

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$6.00- 6.25
Connellsville, fdry.	7.00- 7.50
Connell. prem. fdry.	7.25- 7.60
New River fdry.	6.50- 7.00
Wise county fdry.	5.50- 6.50
Wise county fur.	5.00- 5.25

By-Product Foundry

Newark, N. J., del.	12.60-13.05
Chicago, outside del.	11.50
Chicago, delivered	12.25
Terre Haute, del.	11.75
Milwaukee, ovens	12.25
New England, del.	13.75
St. Louis, del.	12.25
Birmingham, ovens	8.50
Indianapolis, del.	12.00
Cincinnati, del.	11.75
Cleveland, del.	12.30
Buffalo, del.	12.50
Detroit, del.	12.25
Philadelphia, del.	12.13

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	14.00c
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.)	13.75c
Do. (1000 lbs. or over)	12.75c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	7.00c

Per ton, bulk, f.o.b. port

Sulphate of ammonia	$30.00

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

	No. 2 Fdry.	Malleable	Basic	Bessemer
Basing Points:				
Bethlehem, Pa.	$25.00	$25.50	$24.50	$26.00
Birmingham, Ala.§	20.38	....	19.38	24.00
Birdsboro, Pa.	25.00	25.50	24.50	26.00
Buffalo	24.00	24.50	23.00	25.00
Chicago	24.00	24.00	23.50	24.50
Cleveland	24.00	24.00	23.50	24.50
Detroit	24.00	24.00	23.50	24.50
Duluth	24.50	24.50	....	25.00
Erie, Pa.	24.00	24.50	23.50	25.00
Everett, Mass.	25.00	25.50	24.50	26.00
Granite City, Ill.	24.00	24.00	23.50	24.50
Hamilton, O.	24.00	24.00	23.50	24.50
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	22.00	....	....	....
Sharpsville, Pa.	{24.00-24.50	24.00-24.50	23.50-24.50	24.50-25.00
Sparrow's Point, Md.	25.00	....	24.50	....
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.	{24.00-24.50	24.00-24.50	23.50-24.50	24.50-25.00
Saginaw, Mich., from Detroit	26.31	26.31	25.81	26.81
St. Louis, northern	24.50	24.50	24.00	....
St. Louis from Birmingham	†24.12	....	23.62	....
St. Paul from Duluth	26.63	26.63	....	27.13

§Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

†Over 0.70 phos.

Delivered from Basing Points:				
Akron, O., from Cleveland	25.39	25.39	24.89	25.89
Baltimore from Birmingham†	25.61	....	25.11	....
Boston from Birmingham†	25.12	....	....	....
Boston from Everett, Mass.	25.50	26.00	25.00	26.50
Boston from Buffalo	25.50	26.00	25.00	26.50
Brooklyn, N. Y., from Bethlehem	27.50	28.00	....	....
Canton, O. from Cleveland	25.39	25.39	24.89	25.89
Chicago from Birmingham	†24.22	....	....	....
Cincinnati from Hamilton, O.	24.44	25.11	24.61	....
Cincinnati from Birmingham†	24.06	....	23.06	....
Cleveland from Birmingham†	24.12	....	23.62	....
Mansfield, O., from Toledo, O.	25.94	25.94	25.44	....
Milwaukee from Chicago	25.10	25.10	24.60	25.60
Muskegon, Mich., from Chicago, Toledo or Detroit	27.19	27.19	....	....
Newark, N. J., from Birmingham†	26.15	....	....	....
Newark, N. J., from Bethlehem	26.53	27.03	....	....
Philadelphia from Birmingham†	25.46	....	24.96	....
Philadelphia from Swedeland, Pa.	25.84	26.34	25.34	....

Pittsburgh dist.: Add to Neville Island base, North and South Sides, 69c; McKees Rocks, 55c; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, 84c; Monessen, Monongahela City, $1.07; Oakmont, Verona, $1.11; Brackenridge, $1.24.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50, base; $30.74 delivered Philadelphia.

Gray Forge

Valley furnace	$23.50
Pitts. dist. fur.	23.50

Charcoal

Lake Superior fur.	$28.00
do., del. Chicago	31.34
Lyles, Tenn., high phos.	28.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $29.50; 6.51-7—$30.00; 7-7.50—$30.50; 7.51-8—$31.00; 8-8.50—$31.50; 8.51-9—$32.00; 9-9.50—$32.50; 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	56.00

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	20.00-21.00
Do. barge	20.00
No. 2 lump	20.00-21.00

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

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; 1½% carbon 128.00; 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; less than 200 lb. lots 12.25c

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. carlots, bulk 7.00c; Do., ton lots 7.50c; Do., less-ton lots 7.75c; Do., less 200 lbs. 8.00c

Spot ¼c lb. 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., contract, lb. con. chrome, ton lots 80.00c; Do., spot 85.00c

88% chrome, cont. tons 79.00c; Do., spot 84.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ⅛-in., lb. 14.50c; Do., 2% 13.00c

Spot ¼c higher

Silicon Briquets, contract carloads, bulk, freight allowed, ton $74.50; Ton lots 84.50; Less-ton lots, lb. 4.00; Less 200 lb. lots, lb. 4.25

Spot ¼-cent higher

Manganese Briquets, contract carloads, bulk freight allowed, lb. 5.50; Ton lots 6.00; Less-ton lots 6.25

Spot ¼c higher

Zirconium Alloy, 12-15% contract, carloads, bulk, gross ton 102.50; Do., ton 108.00; 35-40%, contract, carloads, lb., alloy 14.00; Do., ton lots 15.00; Do., less-ton lots 16.00

Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. $2.; 200-lb. kegs, lb. 2.; Do., 100-200 lb. lots 3.; Do., under 100-lb. lots

Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant 80.0

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	4.06	5.06	3.85	3.85	5.66	3.71	4.48	5.11	3.46	4.13	8.88	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	5.00	3.51	4.09	8.84	7.19
Philadelphia	3.85	3.95	4.45	3.55	3.55	5.25	3.55	4.05	4.75	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	3.82	3.82	3.62	3.40	5.25	3.25	4.30	4.75	3.52	3.75	8.40	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.65	....	3.65	8.40	6.75
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.62	3.20	3.75	8.40	6.75
Detroit	3.43	3.43	3.68	3.60	3.65	5.27	3.43	4.30	4.84	3.40	3.80	8.70	7.05
Omaha	4.10	4.20	4.20	4.15	4.15	5.75	3.85	5.32	5.50	....	4.42	....	....
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.00	4.92	3.47	4.00	8.75	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.25	4.10	4.85	3.30	3.75	8.40	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.50	4.35	5.00	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	3.64	3.74	3.74	3.69	3.69	5.29	3.39	4.24	4.99	3.61	4.02	8.77	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	3.75	3.75	3.70	3.70	5.30	3.45	....	5.01	....	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	5.80	3.75	....	4.50	....	4.39	....	....
Tulsa, Okla.	4.44	4.34	4.34	4.49	4.49	6.09	4.19	....	5.79	....	4.69	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.93	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.	3.75	5.95	5.95	4.10	4.10	5.50	4.20	....	5.25	....	6.90	....	....
Seattle	4.00	4.00	5.20	4.00	4.00	5.75	4.00	6.50	5.25	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	5.00	....	5.75	....	....
Los Angeles	4.15	4.65	6.45	4.15	4.15	6.40	4.30	6.50	5.50	....	6.60	10.55	9.80
San Francisco	3.90	4.40	6.00	3.90	3.90	5.60	3.90	6.40	5.65	....	6.80	10.65	9.80

	S.A.E. Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.28	7.75	6.05	5.80	7.90
New York (Met.)	4.04	7.60	5.90	5.65	....
Philadelphia	4.10	7.56	5.86	5.61	8.56
Baltimore	4.45	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.35	5.65	5.40	7.50
Pittsburgh	3.40	7.45	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	3.84	7.72	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	5.25	9.65	8.80	8.65	9.30

EUROPEAN IRON, STEEL PRICES

Dollars at $4.02½ per Pound Sterling

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	BRITISH Gross Tons f.o.b U.K. Ports	£	s	d
Merchant bars, 3-inch and over	$66.50	16	10	0
Merchant bars, small, under 3-in. h, re-rolled	3.60c	20	0	0
Structural shapes	2.75c	15	10	0
Ship plates	2.90c	16	2	6
Boiler plates	3.17c	17	12	6
Sheets, black, 24 gage	4.00c	22	5	0
Sheets, galvanized, corrugated, 24 gage	4.61c	25	12	6
Tin plate, base box, 20 x 14, 108 pounds	$ 6.29	1	11	4

British ferromanganese $120.00 delivered Atlantic seaboard duty paid.

Domestic Prices Delivered at Works or Furnace—

	£	s	d
Foundry No. 1 Pig Iron, Silicon 2.50—3.00	$25.79	6	8 (a)
Basic pig iron	24.28	6	0 6(a)
Furnace coke, f.o.t. ovens	7.15	1	15 6
Billets, basic soft, 100-ton lots and over	49.37	12	5 0
Standard rails, 60 lbs. per yard, 500-ton lots & over	2.61c	14	10 6
Merchant bars, rounds and squares, under 3-inch	3.17c	17	12 0††
Shapes	2.77c	15	8 0††
Ship plates	2.91c	16	3 0††
Boiler plates	3.06c	17	0 6††
Sheets, black, 24 gage, 4-ton lots and over	4.10c	22	15 0
Sheets, galvanized 24 gage, corrugated, 4-ton lots & over	4.70c	26	2 6
Plain wire, mild drawn, catch weight coils, 2-ton lots and over	4.28c	23	15 0
Bands and strips, hot-rolled	3.30c	18	7 0

(a) del. Middlesbrough 5s rebate to approved customers. ††Rebate 15s on certain conditions.

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 pounds and over, Portland, Seattle; 400-14,999 Twin Cities; 400-3999 Birmingham; 400 pounds and over in Memphis.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Omaha, Kansas City, St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 750-4999 in San Francisco; 300-4999 in Portland, Seattle; any quantity in Twin Cities; 300-1999 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; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 3500 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; 750-4999 in San Francisco.

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.

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.	$24.00-25.00
Brazil iron ore, 68-69%, ord.	7.50c
Low phos. (.02 max.)	8.00c

F.O.B. Rio Janeiro.

Scheelite, imp.	23.50-24.00
Chrome ore, Indian, 48% gross ton, cif.	$43.00-46.00

Manganese Ore

Including war risk but not duty, cents per unit cargo lots.

Caucasian, 50-52%	....
So. African, 48%	68.00-70.00
Brazilian, 46%	63.00-65.00
Chilean, 47%	65.00
Cuban, 50-51%, duty free	67.50

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

IRON AND STEEL SCRAP PRICES

Maximum Prices Announced by Office of Price Administration and Civilian Supply

	Pittsburgh, Wheeling, Steubenville	Youngstown, Canton, Sharon	Chicago, Kokomo, Peoria	S. Bethlehem	*East. Pa.	Sparrows Pt.	Cleveland	Buffalo	South Ohio†
No. 1 heavy melting	$20.00	$20.00	$18.75	$18.25	$18.75	$18.25	$19.50	$19.25	$18.50
No. 1 hyd. comp. black sheets	20.00	20.00	18.75	18.25	18.75	18.25	19.50	19.25	18.50
No. 2 heavy melting	19.00	19.00	17.75	17.25	17.75	17.25	18.50	18.25	17.50
Dealer No. 1 bundles	19.00	19.00	17.75	17.25	17.75	17.25	18.50	18.25	17.50
Dealer No. 2 bundles	18.00	18.00	16.75	16.25	16.75	16.25	17.50	17.25	16.50
Mixed borings and turnings	15.25	15.25	14.00	13.50	14.00	13.50	14.75	14.50	13.75
Machine shop turnings	15.50	15.50	14.25	13.75	14.25	13.75	15.00	14.75	14.00
Shovel turnings	16.50	16.50	15.25	14.75	15.25	14.75	16.00	15.75	15.00
No. 1 busheling	19.50	19.50	18.25	17.75	18.25	17.75	19.00	18.75	18.00
No. 2 busheling	15.50	15.50	14.25	13.75	14.25	13.75	15.00	14.75	14.00
Cast iron borings	15.75	15.75	14.50	14.00	14.50	14.00	15.25	15.00	14.25
Uncut structurals and plate	19.00	19.00	17.75	17.25	17.75	17.25	18.50	18.25	17.50
No. 1 cupola	21.00	21.00	20.00	22.50	23.00	22.00	22.00	20.00	21.00
Heavy breakable cast	19.50	19.50	18.50	21.00	21.50	21.00	20.50	18.50	19.50
Stove plate	19.00	.....	16.00	18.00	18.50	18.00	15.75	19.00	13.00
Low phos. billet, bloom crops	25.00	25.00	23.75	23.25	23.25	23.25	24.50	24.25	23.50
Low phos. bar crops and smaller	23.00	23.00	21.75	21.25	21.75	21.25	22.50	22.25	21.50
Low phos. punch., plate scrap	23.00	23.00	21.75	21.25	21.75	21.25	22.50	22.25	21.50
No. 2 cupola	20.00	20.00	19.00	21.50	22.00	21.50	21.00	19.00	20.00
Machinery cast cupola size	22.00	22.00	21.00	23.50	24.00	23.50	23.00	21.00	22.00
No. 1 machine cast, drop broken, 150 pounds and under	22.50	22.50	21.50	24.00	24.50	24.00	23.50	21.50	22.50
Clean auto cast	22.50	22.50	21.50	24.00	24.50	24.00	23.50	21.50	22.50
Punchings and plate scrap‡‡	22.00	22.00	20.75	20.25	20.75	20.25	21.50	21.25	20.50
Punchings and plate scrap§§	21.00	21.00	19.75	19.25	19.75	19.25	20.50	20.25	19.50
Heavy axle and forge turnings	19.50	19.50	18.25	17.75	18.25	17.75	19.00	18.75	18.00
Medium heavy elec. furnace turnings	18.00	18.00	16.75	16.25	16.75	16.25	17.50	17.25	16.50

	St. Louis	Kansas City	Detroit	Duluth	Birmingham¶	Chattanooga	Radford, Va.	New England‡	Pacific Coast§
No. 1 heavy melting	$17.50	$16.00	$17.85	$18.00	$17.00	$.....	$.....	$15.50	$14.50
No. 1 hyd. comp. black sheets	17.50	16.00	17.85	18.00	17.00	.....	.....	15.50	14.50
No. 2 heavy melting	16.50	15.00	16.85	17.00	16.00	.....	.....	14.50	13.50
Dealer No. 1 bundles	16.50	15.00	16.85	17.00	16.00	.....	.....	14.50	13.50
Dealer No. 2 bundles	15.50	14.00	15.85	16.00	15.00	.....	.....	13.50	12.50
Mixed borings and turnings	12.75	11.25	13.10	13.25	12.25	.....	.....	10.75	9.75
Machine shop turnings	13.00	11.50	13.35	13.50	12.50	.....	.....	11.00	10.00
Shoveling turnings	14.00	12.50	14.35	14.50	13.50	.....	.....	12.00	11.00
No. 1 busheling	17.00	15.50	17.35	17.50	16.50	.....	.....	15.00	14.00
No. 2 busheling	13.00	11.50	13.35	13.50	12.50	.....	.....	11.00	10.00
Cast iron borings	13.25	11.75	13.50	13.75	12.75	.....	.....	11.25	10.25
Uncut structurals and plate	16.50	15.00	16.25	17.00	16.00	.....	.....	14.50	13.50
No. 1 cupola	20.00	15.00	19.00	21.00	17.75	20.00	21.00	22.00	18.00
Heavy breakable cast	18.50	13.50	17.50	19.50	16.25	.....	.....	20.50	17.00
Stove plate	14.50	12.50	12.75	..	12.00	.....	.....	14.00	14.00
Low phos. billet and bloom crops	22.50	21.00	22.85	23.00	22.00	.....	.....	20.50	..
Low phos. bar crops and smaller	20.50	19.00	20.85	21.00	20.00	.....	.....	18.50	....
Low phos. punch. and plate scrap**	20.50	19.00	20.85	21.00	20.00	.....	.....	18.50	..
No. 2 cupola	19.00	14.00	18.00	20.00	16.75	19.00	20.00	21.00	17.00
Machinery cast cupola size††	21.00	16.00	20.00	22.00	18.75	21.00	22.00	23.00	19.00
No. 1 machine cast, drop broken, 150 pounds and under	21.50	16.50	20.50	22.50	19.25	21.50	22.50	23.50	19.50
Clean auto cast	21.50	16.50	20.50	22.50	19.75	21.50	22.50	23.50	19.50
Punchings and plate scrap‡‡	19.50	18.00	19.85	20.00	19.00	.....	.....	17.50	..
Punchings and plate scrap§§	18.50	17.00	18.85	19.00	18.00	.....	.....	16.50	..
Heavy axle and forge turnings	17.00	15.50	17.35	17.50	16.50	.....	.....	15.00	14.00
Medium heavy elec. furnace turnings	15.50	14.00	15.85	16.00	15.00	.....	.....	13.50	12.50

*Claymont, Del., Coatesville, Phoenixville, Harrisburg, Pa. †Portsmouth, Middletown, O., Ashland, Ky. ‡Worcester, Mass.; Bridgeport, Conn.; Phillipsdale, R. I. §Los Angeles, San Francisco, Portland, Oreg., Seattle; ¶Prices are for scrap delivered to the Birmingham, Ala., consuming point, excepting scrap for Birmingham consumption originating west of the western boundary of Alabama. In the latter case the Birmingham, Ala., consumer may pay $1 more than the prices indicated under "Birmingham"; **⅜-inch and heavier, cut 12 inches and under; ††may include clean agricultural cast; ‡‡under ⅜-inch to ¼-inch, cut 12 inches and under; §§under ¼-inch to No. 12 gage, cut 12 inches and under.

Maximum Prices for Iron and Steel Scrap Originating from Railroads

	Pittsburgh, Wheeling, Steubenville	Youngstown, Canton, Sharon	Chicago, Kokomo, Peoria	S. Bethlehem	*East. Pa.	Sparrows Pt.	Cleveland	Buffalo	South Ohio†
No. 1 Railroad grade heavy melting steel	$21.00	$21.00	$19.75	$.....	$19.75	$19.75	$20.50	$20.25	$19.50
Scrap rails	22.00	22.00	20.75	.....	20.75	20.75	21.50	21.25	20.50
Rerolling quality rails	23.50	23.50	22.25	.....	22.25	22.25	23.00	22.75	22.00
Scrap rails 3 feet and under	24.00	24.00	22.75	.....	22.75	22.75	23.50	23.25	22.50
Scrap rails 2 feet and under	24.25	24.25	23.00	.....	23.00	23.00	23.75	23.50	22.75
Scrap rails 18 inches and under	24.50	24.75	23.50	.....	23.50	23.50	24.25	24.00	23.25

	St. Louis	Kansas City	Detroit	Duluth	Birmingham	Chattanooga	Radford, Va.	New England‡	Pacific Coast§
No. 1 Railroad grade heavy melting steel	$18.50	$17.00	$18.85	$19.00	$18.00	$...	$...	$16.50	$15.50
Scrap rails	19.50	18.00	19.85	20.00	19.00	.....	.....	17.50	16.50
Rerolling quality rails	21.00	19.50	21.35	21.50	20.50	.....	.....	19.00	18.00
Scrap rails 3 feet and under	21.50	20.00	21.85	22.00	21.00	.....	.....	19.50	18.50
Scrap rails 2 feet and under	21.75	20.25	22.10	22.25	21.25	.....	.....	19.75	18.75
Scrap rails 18 inches and under	22.25	20.50	22.60	22.75	21.75	.....	.....	20.25	19.25

*Philadelphia, Wilmington, Del. †Portsmouth, Middletown, O., Ashland, Ky. ‡Worcester, Mass.; Bridgeport, Conn.; Phillipsdale, R. I. §Los Angeles, San Francisco, Portland, Oreg., Seattle.

NOTE: Where the railroad maker of scrap operates in two or more of the consuming points named above, the highest of the maximum prices set out above for such consuming points shall be the maximum price at consumer's plant at any point on the railroad's line, except: Where a railroad from which scrap originates operates in two or more consuming points having the different switching charges, the price of such railroad scrap: (1) To a consumer located within a consuming point having the highest switching charge, shall not exceed the maximum on-the-line price established above; (2) To a consumer located within a consuming point not having the highest switching charge, shall not exceed the maximum on-the-line price established above less the difference between the switching charges at that consuming point and at the consuming point having the highest switching charges; (3) To a consumer located on the line of the railroad at a point having no switching charges, shall not exceed the maximum on-the-line price established above less the highest switching charge at any consuming point on the line; and (4) To a consumer located off the line of the railroad, shall not exceed the maximum off-the-line price established below less the highest switching charge at any consuming point on the line.

Sheets, Strip

Sheet & Strip Prices, Pages 98, 99

Sheet mills are sold heavily through the remainder of the year but producers are not making definite delivery promises beyond third quarter. Most sheet consumers are willing and anxious to place tonnage for 1942 delivery, though most present pressure is for nearby delivery. Whatever curtailment in sheet requirements is made by the automotive industry will be readily absorbed in defense work.

Present rate of sheet and strip allocation is likely to continue through June and perhaps July before drastic reductions become necessary in shipments to non-defense consumers. Principal reason for limiting sheets is increasing utilization of continuous sheet mills for rolling plates.

Production is being diverted more generally to defense requirements but even these projects have difficulty in obtaining tonnage under a preference rating, as there are so many such jobs that the rating loses much of its effect.

Many companies producing commercial articles are maintaining production at a higher than normal seasonal rate. This includes some refrigerator, washing machines and other domestic equipment makers, the effort being to build up stocks to cover the time when material may be entirely cut off.

There has been little tendency to swing from cold-rolled to hot-rolled sheets, principally because of the rapid expansion in cold-rolling facilities. This leaves the only tight spot in the sheet mills at semifinished supplies. Nonintegrated producers are having some difficulty in obtaining sufficient sheet bars and slabs, and the same is true in cold reduction departments of integrated mills. In finished sheets it is no more difficult to obtain deliveries on cold-reduced than on hot-rolled. In some cases it is actually easier, because the cold-rolled sheet reflects better profits for the mill.

Stoppage of Swedish steel imports, the last shipment of which came in several months ago by way of Russia, has led makers of razor blades to use high-carbon domestic strip. Developments in tempering has caused this material to meet all tests used on Swedish steel.

A mill in Ohio is selling an electrogalvanized sheet which uses a type of zinc not suitable for hot-dip galvanizing, supply of which is fairly ample. However, sales of this type of sheets is limited by capacity for coating.

Tin Plate

Tin Plate Prices, Page 98

Tin plate production promises to be at capacity for the remainder of the year and demand probably will exceed ability of mills to meet. In addition to large domestic needs British requirements now being allocated, about 25,000 tons per

month for the next 12 months, will impose a heavy burden.

Government information to tin plate makers is that tin supply in this country is sufficient for 14 months production, although former estimates were for two years.

Plates

Plate Prices, Page 98

Only in the most urgent cases, for defense work, is it possible for consumers to purchase plates for delivery within five to six months and it is difficult to have tonnage scheduled for delivery before the end of the year. Most sellers have not opened books for first quarter, although some business has been taken which will run into that period.

Freight car builders and producers of some other types of equipment feel this situation especially as they have no preference rating. Particular attention is being given by OPM to this situation of railroad equipment builders as increased car supply is regarded as necessary to meet transportation needs. If preference is given this class of consumers others will find it more difficult to obtain material.

Some plate fabricators, realizing inability to get mill deliveries to meet their needs are obtaining plates from warehouses or using second-hand material. Redesign of products is done in some cases where usual gage and size plates cannot be obtained.

Several smaller platemakers are still out of the market, pending a decision at Washington as to whether they will be entitled to an exception from the price-freezing order.

Biggs Boiler Works Co., Akron, O., has issued an inquiry for 1500 tons of 3/16 inch steel plates for fabricating into pontoons for use at Quonset Point, R. I.

The navy closes June 13 on 32 harbor tugs for navy yards at Boston, Brooklyn, Norfolk and Mare Island.

PLATE CONTRACTS PLACED

100 tons, 200,000-gallon tank, pumps, etc., Fort Custer, Michigan, to Pittsburgh-Des Moines Steel Co., Pittsburgh, at $33,950.

PLATE CONTRACTS PENDING

100 tons, four 50,000-gallon water tanks, semispherical bottoms, and steel towers, bids May 27; 100 tons, 250,000-gallon elevated steel water tank, bids May 29, quartermaster, general depot, Ogden, Utah.

Bars

Bar Prices, Page 98

Barmakers are able to accept only limited tonnages of carbon steel for delivery in the next six months, with alloy bars even scarcer. Future delivery promises are only tentative, subject to interruption by defense orders. Consumption of bars in ordnance production is increasing steadily.

Cold-finished bars can be obtained for 1941 delivery more easily than hot-rolled, heavy tonnages of the latter being required for shell production, with further large orders about to be distributed. Some producers are sold further ahead on carbon steel than on alloys, though this is not the general rule.

In New England manufacture of small arms is attaining peak proportions, consuming large tonnages of bars. Forging shops are operating at capacity, processing much greater bar supplies than normal.

Boston navy yard opens bids June 3 on 703 tons of nickel steel bars for chainmaking.

Pipe

Pipe Prices, Page 99

Principal interest in the steel pipe market last week was distribution of 154,500 tons by Standard Oil Co. of New Jersey for two pipe lines for transporting crude oil, made necessary by curtailed ocean tanker facilities. The longer line will connect Baton Rouge, La., and Greensboro, N. C., 1261 miles, requiring 4½ to 12¾-inch pipe. National Tube Co., Pittsburgh, was given 66,000 tons. Jones & Laughlin Steel Corp., Pittsburgh, 25,000 tons, Youngstown Sheet & Tube Co., Youngstown, O., 18,000 tons, Republic Steel Corp., Cleveland, 8500 tons and Spang Chalfant Inc., Pittsburgh, 1500 tons, with 2500 tons yet to be placed.

The shorter line connects Port-

land, Me., and Montreal, Que., 250 miles, requiring 33,000 tons of 12¾-inch pipe, Youngstown Sheet & Tube Co. being awarded 25,000 tons and Spang Chalfant Inc. 7000 tons.

The greatest scarcity is in cold-drawn mechanical tubing, particularly alloy grades, with little available except on first priority. The situation is not quite so tight in hot-rolled and carbon steel tubing but all mechanical grades are extremely scarce for non-defense work.

Galvanized pipe is also in short supply, due to lack of zinc. An important merchant pipe maker is allocating galvanized pipe to regular customers in proportion to his rate of production and the consumer's purchases in 1939 and 1940. Inventory control plan has revealed some instances of heavy stocks in hands of distributors, who also have large orders on makers' books.

CAST PIPE PLACED

350 tons, Phinney Bay district, Bremerton, Wash., to Hugh G. Purcell, Seattle, for United States Pipe & Foundry Co., Burlington, N. J.; Soule & Walters, Elma, Wash., contractors.

260 tons, 6 to 12-inch, Umatilla ordnance depot, Hermiston, Oreg., to Pacific States Cast Iron Pipe Co., Provo, Utah; J. A. Terteling & Sons, Boise, Idaho, contractor.

209 tons, various sizes, ordnance work at Hermiston, Oreg., to unstated interest by contractors J. A. Terteling & Sons.

CAST PIPE PENDING

420 tons, 6 to 12-inch, Portland, Oreg.; bids opened.

300 tons, various sizes, improvement at Hoquiam, Wash.; bids in.

170 tons, 4 to 10-inch, Waterville, Wash.; city purchased transite pipe.

100 tons or more, housing project, Manette, Wash.; bids in.

100 tons or more, 6 to 16-inch for Alaska Railroad; bids to J. R. Ummel, purchasing agent, Seattle, May 22.

STEEL PIPE PLACED

335 tons, 30-inch water pipe, for city of Denver, to Thompson Mfg. Co., Denver.

Wire

Wire Prices, Page 99

Few priorities are being applied on either merchant or manufacturers' wire and no definite ratings have been established. In some cases, such as fencing for new arms plants and similar purposes, prior delivery has been asked.

Finished wire deliveries are much better than on wire rods as integrated producers are filling their own needs first and running finishing departments to capacity, thus limiting wire rod tonnages available to other users.

Substitution of high-carbon steel for Swedish material is being undertaken for products in which it was formerly considered impossible, an example being automobile spring steel. Hardening and annealing cause some delays in production, although installation of additional equipment for these purposes has been general.

Rails, Cars

Track Material Prices, Page 99

Railroad carbuilders estimate more than 1,000,000 tons of plates, shapes, sheets and bars will be required for cars on order and planned for delivery this year. About 500,000 tons of wheels, axles, forgings and other specialties will be needed. About half the latter will be used for repairs and cars built in railroad shops. This estimate is based on an average of 12 to 15 tons of rolled steel per car.

There is some opinion that 160,000 new freight cars must be completed in the first three quarters of 1942 and to do this builders assert they must have better steel supply.

LOCOMOTIVES PLACED

Minneapolis, St. Paul & Sault Ste. Marie, one 44-ton diesel-electric switch engine to General Electric Co., Schenectady, N. Y., which also has booked two 70-ton diesel-electrics for the Steelton & Highspire; one 65-ton diesel-electric, East Erie Commercial; one 44-ton diesel-electric, Denver & Rio Grande Western; one 44-ton diesel-electric, Missouri & Illinois Bridge & Belt; and one 45-ton diesel-electric, Alabama, Tennessee & Northern.

New York, New Haven & Hartford, five 4000-horsepower diesel-electric engines, to American Locomotive Co., New York, and six 44-ton diesel-electric switch engines, to General Electric Co., Schenectady, N. Y.

War Department, five 2-6-2 type steam locomotives for service in Newfoundland, to American Locomotive Co., New York.

LOCOMOTIVES PENDING

Great Northern, 17 diesel-electric switch engines, contemplated.

New York Central, 15 4-8-2 type locomotives and 15 diesel-electric switch engines, 350 and 600-horsepower, bids to be closed shortly.

Ordnance Department, Aberdeen Proving Ground, Md., one 70-ton diesel-electric, bids closed.

Puget Sound navy yard, Washington, one 45-ton, diesel-electric, double end, dual power; Spec. NSA 1668; bids to supply officer, June 9.

CAR ORDERS PLACED

Boston & Maine, four 90-ton well cars, to its own shops.

Delaware & Hudson, 300 fifty-ton steel twin hoppers, 200 fifty-ton gondolas, 50 seventy-ton covered hoppers, to American Car & Foundry Co., New York.

Erie, seven 70-foot express cars, to American Car & Foundry Co., New York.

Southern, 100 cement cars, to Greenville Steel Car Co., Greenville, Pa.

Southern Pacific, four 200-ton flat cars, to Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill.

Southern Railway, 25 baggage-express cars, to St. Louis Car Co., St. Louis.

Wabash Car & Equipment Co., St. Louis, 10 seventy-ton covered hoppers, to American Car & Foundry Co., New York.

CAR ORDERS PENDING

Boston & Maine, 1300 cars, including 600 box, 500 gondolas, 200 hoppers.

Southern Railway, two 100-ton well cars, bids asked.

Western Maryland, 1525 cars, including 800 hoppers, 500 box, 200 gondolas, 25 flats.

Structural Shapes

Structural Shape Prices, Page 98

Inquiries and awards are considerably lighter, but many maintain this is temporary as they know of much work still on drawing boards. Lengthening deliveries have discouraged much potential work, particularly of a civilian nature, though the New Haven railroad has awarded some initial contracts for replacing of wooden bridges with steel between New York and Boston. Though tonnages are small the aggregate is impressive.

Chicago fabricators have enough orders on books to keep them at top speed for three to four months. The problem is to obtain standard shapes. Boston notes that light shapes for bomb shelters are being bought freely, many of which are to be exported.

SHAPE AWARDS COMPARED

	Tons
Week ended May 24	40,611
Week ended May 17	37,442
Week ended May 10	29,710
This week, 1940	20,234
Weekly average, 1941	34,219
Weekly average, 1940	28,414
Weekly average, April 1941	28,441
Total to date, 1940	375,201
Total to date, 1941	718,589

Includes awards of 100 tons or more.

SHAPE CONTRACTS PLACED

14,500 tons, drydock, No. 5, Philadelphia navy yard, including 7500 tons, H-piling and 3500 tons of structurals, latter for tremie concrete units, to Bethlehem Steel Co., Bethlehem, Pa.; also 3500 tons, H-piling to Carnegie-Illinois Steel Corp., through Drydock Associates.

5000 tons, shell loading line, Kingsbury ordnance plant, Laporte, Ind., for government, to American Bridge Co., Pittsburgh; Bates & Rogers Construction Corp., Laport, Ind., contractor.

3700 tons, contract 7, grade crossing elimination, Long Island railroad, Brooklyn, N. Y., to American Bridge Co., Pittsburgh; through Tully & Di Napoli Construction Co., New York, contractor.

3650 tons, including 2600 tons sheet piling and 1050 tons H-piling, lock, Mississippi river, to Carnegie-Illinois Steel Corp., Pittsburgh, through Winston Bros., Minneapolis, contractors; bids May 13.

3150 tons, superstructure, North State bridge, City of Chicago, to American Bridge Co., Pittsburgh; Overland Construction Co., Chicago, contractor; bids April 11.

2900 tons, addition, gun director plant, General Electric Co., Pittsfield, Mass., to American Bridge Co., Pittsburgh; Stone & Webster Engineering Corp., Boston, contractor.

850 tons, building No. 16, General Electric Co., Schenectady, N. Y., to Lehigh Structural Steel Co., Allentown, Pa.; J. G. White Engineering Corp., contractor.

680 tons, additions, du Pont rayon plant, Richmond, Va., to Harris Structural Steel Co., New York.

600 tons, T-house, Midvale Co., Nicetown, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

500 tons, gates for shipways, New York Shipbuilding Corp., Camden, N. J., to Lehigh Structural Steel Co., Allentown, Pa.

485 tons, bridges, mostly in Kansas; Chicago & North Western railroad, 326 tons to American Bridge Co., Pittsburgh, 159 tons to unnamed fabricator.

482 tons, Ohio state bridge, Wood county, to American Bridge Co., Pittsburgh.

460 tons, clothing renovating depot, U. S. army, Columbus, O., to Bethlehem Steel Co., Bethlehem, Pa.

400 tons, crane beams for two North Pacific shipyards, to Isaacson Iron Works, Seattle.

365 tons, plant addition, Carborundum Co., Niagara Falls, N. Y., to F. L. Heughes Co., Rochester, N. Y.

350 tons, factory extension, Western Automatic Machine Screw Co., Elyria, O., to Fort Pitt Bridge Works, Pittsburgh.

321 tons, state bridge underpass 5777, Duluth, to American Bridge Co., Pittsburgh; A. A. Bodine, Duluth, contractor; bids May 16.

300 tons, Ohio state bridge, Scioto county, to American Bridge Co., Pittsburgh.

300 tons, hangar and facilities, Pine Camp, N. Y., to R. S. McMannus Steel Construction Co., Buffalo; John W. Cowper Construction Co., Buffalo, contractor.

260 tons, power house, Monsanto Chemical Co., Springfield, Mass., to Haarmann Structural Steel Co., Holyoke.

250 tons, battery storage building, Philadelphia navy yard, to Lehigh Structural Steel Co., Allentown, Pa.

250 tons, sheet piling, substructure, bridge, Mississippi river, Dubuque, Iowa-East Dubuque, Ill., for Dubuque bridge commission to Bethlehem Steel Co., Bethlehem, Pa.; Ferd Robers Co., Burlington, Wis., contractor; bids May 14.

225 tons, four gantry cranes, for U. S. navy, Norfolk, Va., to Fort Pitt Bridge Works, Pittsburgh, through R. W. Kaltenbach Corp., Bedford, O.

220 tons, kitchen building, Kings county hospital, New York, to Schacht Steel Construction Co., New York.

220 tons, grade crossing elimination over Wabash railroad, Sec. 26-SF, Decatur, Ill., for state of Illinois, to Joseph T. Ryerson & Son Inc., Chicago; bids April 11.

165 tons, metal storage building, navy yard, Washington, to Atlas Machine & Iron Co., Washington.

160 tons, state bridge FAP-209-C (5), Antelope creek, Douglas, Wyo., to American Bridge Co., Pittsburgh.

158 tons, beam spans mostly in Montana, Chicago, Milwaukee, St. Paul & Pacific railroad, to American Bridge Co., Pittsburgh.

150 tons, addition, Torrington Mfg. Co., Torrington, Conn., to Berlin Construction Co., Berlin, Conn.; Torrington Building Co., Torrington, contractor.

135 tons, state bridge 30, FAS-160-A (1), Green Bay, Wis., to Wausau Iron Works, Wausau, Wis.; Schuster Constructions Co., contractor.

110 tons, grade crossing eliminations, Oneida county, New York, to American Bridge Co., Pittsburgh, through Collins Bros., Mechanicsville, N. Y., contractor.

105 tons, Herrick bridge, Gardiner, N. Y., to American Bridge Co., Pittsburgh.

100 tons, state highway bridge, Warren county, New York, to American Bridge Co., Pittsburgh, through Green Island Construction Co., Green Island, N. Y.

Unstated tonnage, addition, Kerite Insulated Wire & Cable Co., Seymour, Conn., to New England Iron Works, New Haven; H. Wales Lines Co., Meriden, Conn., contractor.

SHAPE CONTRACTS PENDING

10,000 tons wind tunnel, Moffet Field, Calif.; bids soon.

5000 tons, ten aircorps hangars, including door assemblies, aviation mechanics school, Wichita Falls, Tex.; bids June 3, material to be fabricated and delivered, but erected by others.

4000 tons, warehouse, Rock Island arsenal, Rock Island, Ill., for government. 125 tons, Broad street bridge, Providence, R. I.

2500 tons, five two-unit shop hangars, aircorps, aviation mechanics school, Biloxi, Miss.

2000 tons, Salinas River bridge, Calif.; bids soon.

700 tons, warehouse, armory, Springfield, Mass.

600 tons, piling, dry dock, navy yard, Portsmouth, N. H.; Aberthaw Construction Co., Boston, contractor.

575 tons, grade separation, Lake county, Ohio, for state.

500 tons, extension to building 5, Saginaw Malleable Iron division, General Motors Corp., Saginaw, Mich.

450 tons, quartermaster depot, New Cumberland, Pa.; H. B. Alexander, Harrisburg, Pa., contractor.

439 tons, state bridges, Massachusetts, including opening of June 3, Richmond, Westport, and Greenfield, fourth at Northbridge, May 27.

410 tons, bridges FAS-51-A and B, Falls City, Nebr.

400 tons, substations, Niagara Falls Power Co., Niagara Falls, N. Y.

378 tons, trash racks, speci. 1510-D, Friant, Calif.; bids being taken.

300 tons, state bridge, Licking river, Farmers, Ky.

250 tons, grade crossing elimination, Heald street cut-off, Wilmington, Del.; bids June 11.

250 tons, armory, Syracuse, N. Y.; A. E. Stephens Co., Springfield, Mass., contractor.

230 tons, state bridge, Route 30, Wayne county, Ohio.

215 tons, generating station extension, Connecticut Light & Power Co., Devon, Conn.

200 tons, bridge, Jefferson County, N. Y.; bid May 28.

200 tons, warehouse, proving ground, Savanna, Ill., for government.

200 tons, buildings, Standard Oil Co. of Indiana, Woodriver, Ill.; Dravo Corp., contractor.

200 tons, building addition, Linde Air Products Co., Tonawanda, N. Y.; John W. Cowper Co. Inc., Buffalo, contractor.

200 tons, mess, boiler house and cold storage building, Jefferson Barracks, Mo.; Dickie Construction Co., St. Louis, low.

165 tons, James river bridge, Seaboard Air Line railway, Norfolk, Va.

165 tons, bridge, Humboldt county, Calif., for state; bids June 11.

155 tons, Shepherd dial center, Chesapeake & Potomac Telephone Co., Silver Springs, Md.

135 tons, route 6, sect. 21 A, Morris county, New Jersey; bids June 6, Trenton, N. J.

125 tons, repairs to bridge 0.88, Union Pacific railroad, Kansas City, Mo.

115 tons, bridge 160, Cranston, R. I., New York, New Haven & Hartford railroad.

110 tons, bridges, Elmira, N. Y., for city.

Unstated, 577-ft. steel and concrete state span, Big Horn river, Mont.; W. P. Roscoe, Billings, low.

Unstated, 244-ft. steel and concrete state span, Bonner road, Mont.; Portland Bridge Co., Portland, Oreg., low.

Unstated, materials for two substations; bids to Bonneville project, Portland, June 2; No. 1933.

Reinforcing Bars

Reinforcing Bar Prices, Page 99

Purchasers for nondefense projects have difficulty in purchasing and find few sizes and descriptions to choose from. In Ohio highway work, which came out for bids in some half dozen sections for as many counties, no bids were received in two cases, though aggregate tonnages are also being shipped to Iceland, where Canadian troops are reported extending defenses.

Some suppliers are booked solidly and refuse to consider new orders. A Pittsburgh mill is turning out 1500 tons of bars for a Newfoundland defense project and large

REINFORCING STEEL AWARDS

1300 tons, Clinton-Peabody Terrace housing project, St. Louis, to Laclede Steel Co., St. Louis; L. Millstone Construc-

CONCRETE BARS COMPARED

	Tons
Week ended May 24	6,242
Week ended May 17	15,532
Week ended May 10	8,965
This week, 1940	7,899
Weekly average, 1941	11,778
Weekly average, 1940	9,661
Weekly average, April, 1941	18,030
Total to date, 1940	171,753
Total to date, 1941	247,329

Includes awards of 100 tons or more.

tion Co., St. Louis, contractor.

825 tons, substructure, extension of pump and blower and sludge disposal building, West-Southwest Sewage treatment works, division P, City of Chicago, to Olney J. Dean Steel Co., Cicero, Ill.; Casey & Emmert, Chicago, contractors; bids April 24.

800 tons, housing project, Newark, N. J., to Igoe Bros., Newark, through H.R.H. Construction Co., New York, contractor.

708 tons, superstructure, airplane engine parts plant, Studebaker Corp., South Bend, Ind., 408 tons to Ceco Steel Products Corp., Chicago, and 300 tons to Concrete Steel Co., Chicago; Consolidated Construction Co., Chicago, contractor; bids April 2. Part of total of 1932 tons, some previously placed, some still to be placed.

630 tons, substructure, bridge, Mississippi river, Dubuque, Iowa-East Dubuque, Ill., for Dubuque bridge commission, to Bethlehem Steel Co., Bethlehem, Pa.; Ferd Robers Co., Burlington, Wis., contractors; bids, May 14.

525 tons, bars and reinforcement trusses, bridge, route S-3, Rutherford, N. J., to Bethlehem Steel Co., Bethlehem, Pa., through Fehlhabor Pile Co., New York, contractor.

500 tons, bars and mesh, highway project, Wethersfield, Conn., bars to Truscon Steel Co., Boston; 100 tons, mesh, to American Steel & Wire Co., Boston; New Haven Roads Construction Co., New Haven, contractor.

200 tons, pattern shop, Philadelphia navy yard, to Bethlehem Steel Co., Bethlehem, Pa.

150 tons, store, Sears, Roebuck & Co., Wausau, Wis., to Concrete Steel Co., Chicago; Permanent Construction Co., Milwaukee, contractor.

140 tons, housing project, Baltimore, to Bethlehem Steel Co., Bethlehem, Pa., through Woodcrest Construction Co., New York, contractor.

125 tons, hospital, Hartford, Conn., to Truscon Steel Co., Youngstown, O.

123 tons, store, Montgomery Ward, Madison, Wis., to Ceco Steel Products Co., Milwaukee; Fritz Construction Co., Madison, Wis., contractor.

116 tons, yard repairs, Santa Fe railroad, Chicago, to Truscon Steel Co., Youngstown, O.

100 tons, two buildings, Philadelphia navy yard, to Taylor-Davis Inc., Philadelphia.

REINFORCING STEEL PENDING

1200 tons, contract 7, grade crossing, Long Island railroad, Brooklyn, N. Y.; Tully-Dinapoli Co., low.

1000 tons, quay wall, Puget Sound navy yard, Wash.; bids May 28.

900 tons, paving and miscellaneous work, air fields, various New England points.

874 tons, Ohio state projects; bids opened as follows: 114 tons, proj. 31, Scioto county, George H. Cheek, Frankfurt, Ky., low; 120 tons, proj. 32, Wayne County, no bids received; 127 tons, proj. 33, Wood county, Midland Construction Co., Columbus, O., low; 93 tons, proj. 36, Lake county, no bids; 230 tons, proj. 37, Richland county, Lombardo Bros. Construction Co., Cleveland, low; 190 tons, proj. 38, Summit county, Louis & Frisfissinger, Ann Arbor, Mich., low.

860 tons, including 200 tons of mesh, Brooklyn tunnel section, Battery tunnel, New York; bids May 27.

850 tons, quay wall, navy yard, South Boston, Mass.; bids June 3.

850 tons, Panama, schedule 5129; bids June 2, Washington; also 100 tons track spikes, same schedule.

367 tons, Bureau of Reclamation, inv. 48,828-A, for delivery at Friant, Calif.; bids May 26.

300 tons, highway project, Worcester-Providence section, Massachusetts; C & R Construction Co., Boston, low.

305 tons, substructure, South Canal street bridge, Chicago; Midwest Construction & Asphalt Co., Chicago, low; bids May 21.

300 tons, $1,750,000 Indian hospital, near Tacoma, Wash.; bids to Interior Department, Washington, D. C., June 11.

285 tons, highways and bridge, Monmouth and Morris counties, New Jersey; bids June 6, Trenton, N. J.

240 tons, bridge, Humboldt county, California, for state; bids June 11.

200 tons, highway project, Springfield-Holyoke route, Massachusetts; Lane Construction Co., Meriden, Conn., low.

200 tons, Riverside high school, Milwaukee, Walter W. Oeflein Inc., Milwaukee, low.

175 tons, sewage disposal plant, Lackawanna, N. Y.

150 tons, addition, gun director unit, General Electric Co., Pittsfield, Mass.; Stone & Webster Engineering Corp., Boston, contractor.

140 tons, building, Plasken Co. Inc., Danbury, Conn.; Turner Construction Co., New York, contractor.

132 tons, over-crossing, Multnomah county, Oregon, for state; bids opened.

103 tons, Epiphany school, Chicago; bids May 20.

100 tons, apartment and garage, Madison, Wis., J. H. Findorff & Son, Madison, Wis., low, postponed until fall.

Unstated, $130,000 addition to high school, Renton, Wash.; bids in.

Unstated, plant, addition to Hostess Cake Co., Seattle; bids soon; Wm. Aitkin, architect.

Unstated, rearing ponds, etc., Shamokane fish hatchery, Washington state; David A. Richardson, Winthrop, Wash., low.

Unstated, two state bridge projects, Montana; W. P. Roscoe, Billings, and Portland Bridge Co., Portland, Oreg., low.

Pig Iron

Pig Iron Prices, Page 100

Pig iron production is approaching the rate maintained before the coal strike but still is below the level of demand. Merchant iron is being taken up as fast as produced and steelmaking iron no more than meets needs.

Delivery is the most important factor in the market, rather than booking of orders. Most producers are not quoting beyond mid-year, although melters are willing to buy well ahead. Indications are that supply will be increasingly short and melters believe it would be well to be covered as far ahead as possible. Books for third quarter are expected to be opened within the next ten days and there is some speculation whether prices will be reaffirmed or increased. Higher costs are pinching merchant furnaces. No announcement has been made by the price administrator and the situation will depend on what consideration is given by him. Opinion is divided but most forecasts are for continuance of present prices.

In effort to spread iron among as many melters as possible shipments of 25 tons per car are made frequently instead of the usual 50 tons. No shortage of cars has been encountered so far.

Silvery and bessemer ferrosilicon are in small supply and deliveries are much deferred, with little prospect for relief until new plants are completed, late in the year. Pittsburgh Metallurgical Corp. is making good progress on its West Virginia plant.

Export inquiry is being given little attention as domestic needs are so pressing. A formal inquiry for 240,000 tons for Great Britain is expected soon. As little low phos is available it is believed bessemer may be taken as an alternative. The inquiry is expected to come out through the emergency relief branch of the procurement division of the Treasury Department, under the lease-lend law.

Consumers are receiving inventory report blanks from producers, under orders of OPM, to be filed before the 10th of the following month. Consumers who do not supply information will be unable to buy further, under the rules.

Scrap

Scrap Prices, Page 102

Scrap trading is restricted and conditions are still confused as producers and dealers seek to apply the new conditions imposed by the price-fixing effort by Washington. Some interests believe further action will be necessary before the situation will be made clear. One effect has been to decrease the quantity of scrap offered, a waiting attitude being characteristic of producers with tonnage. Railroads are offering much less than usual and an important Detroit motor company last week sold only ten cars of bundled sheets where its normal offering is about 50 cars.

In the case of scrap grades not listed in the price ceiling announcement efforts are being made to determine a price on the basis of the usual differential over or under a grade which has a set price.

Many dealers abstain from making large commitments, on the plea that with prices fixed there is no advantage in selling ahead. Difficulty is also experienced in obtaining usual tonnages as collectors claim prices are too low to warrant usual activities. In the effort to obtain needed material many consumers are going afield into areas not usually serving them, thus complicating the situation. Consumers are in need of material to support the high rate of consumption and in many cases are unable to obtain their requirements. Fairly good reserves were built up by many melters from deliveries before May 10 when contracts entered into before April 3 were completed.

Shortage continues in cast grades for foundry use, the reduction in the maximum price in the second announcement acting to limit offerings.

In the East larger offerings of certain grades are appearing, such as borings and turnings, as metalworking operations expand. In some cases mills are less particular about the grades they will accept and this results in a better market for lighter materials, but this

is not overcoming the growing deficiency in total requirements of steelworks.

Southern Ohio interests have applied to OPACS for relief, on the plea that present differentials prevent normal flow of scrap to that district, sources formerly supplying tonnage now selling to other consuming points. Stove plate, normally a heavy item in this district, is one of the items most affected, the present differential being $6 per ton under the Pittsburgh price.

In New England ceiling prices are based on three steel producing centers, which causes confusion in foundry grades, which are consumed at other points. As an instance, stove plate brings $13.65, f.o.b. for Pennsylvania shipment, higher than can be paid for New England delivery at most points, notably eastern Massachusetts, where the heavier volume of stove plate is consumed.

Watertown, Mass., arsenal closes today on 9500 tons of hot-rolled remelting bars, short lengths, for castings, delivery over the next six months. Most mills, though well filled on this slightly premium material, feel obligated to quote and it is probable the tonnage will be distributed among several.

Pacific Coast

Seattle—Bids to United States engineer, Seattle, for construction of proposed terminal for Alaska railroad at Passage Bay, Alaska, are in excess of estimates and decision is awaited. Seaboard Construction Corp., Mt. Kisco, N. Y., is low at $4,074,616. Project involves 11.2 miles of roadbed and two long tunnels.

Navy has awarded to Willamette Iron & Steel Corp., Portland, Oreg., the contract to build 30 reciprocating steam units, costing $3,450,000, for freighters under construction on this coast. This job will absorb most of the capacity of Portland's cast iron and steel foundries.

Fabricators, struggling under a 90-day backlog, are not seeking large contracts but are booking numerous small jobs of less than 100 tons each. Two sizable state bridge jobs in Montana are pending, bids in, tonnage unstated. Isaacson Iron Works, Seattle, has taken 400 tons of crane beams for two shipyards in Washington state and California.

Cast iron pipe requirements are in excess of ability of agencies to supply, deliveries being uncertain and well in the future. For this reason some companies cannot bid.

While cast iron scrap continues scarce, the price has been generally stabilized at $17 to $18.50. Rolling mills are paying top prices permitted for melting steel, $13.50 for No. 2 and $14.50 for No. 1. While stocks are ample for immediate requirements, current prices are not attractive to dealers in the interior and receipts are decreasing.

San Francisco — The structural shape market was the most active last week, 4077 tons being placed, bringing the aggregate for the year to 171,637 tons, compared with 74,247 tons for the corresponding period in 1940. Pending business calls for more than 77,000 tons.

Awards of cast iron pipe totaled 386 tons and brought the year's aggregate to 22,423 tons compared with 14,098 tons for the same period a year ago.

Plate business and new inquiries were confined to lots of less than 100 tons. So far this year 211,051 tons have been booked, compared with 25,363 tons for the corresponding period in 1940. Pending business involves close to 83,000 tons.

Most private work in the reinforcing bar market consists of lots of from 20 to 60 or 70 tons. Awards totaled 45,913 tons compared with 58,675 tons for the same period last year. The Bureau of Reclamation will open bids May 26 for 567 tons for delivery at Friant, Calif. The bureau of reclamation has several other fair sized inquiries out, which are expected to be placed within the near future. These include 805 tons for delivery at Earp, Calif., and another lot for delivery at Friant, Calif., calling for 440 tons.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 99

Superimposed on an already filled American defense schedule, the British Aircraft Commission has ordered large tonnages of screws, nuts and bolts from Amer-

Behind the Scenes with STEEL

Back Again

■ Anyone who tries to pull our leg by saying he missed us last week is a prevaricator of the first water. Fact is, we were out of town and didn't work up the ambition to pound out two columns at one sitting before leaving.

Tycoons' Escape

■ Back in the dark and dreary days of 1931 four well-known executives of metalworking companies said "t'hell with it" and slipped off for a few days of relaxation and fun down in Nashville, Tenn. Each year since, the annual outing has increased in numbers until nearly 100 were on hand last week ten years later. The list of those attending was studded with names of business greats, whose private cars dot the railroad yards and whose planes are familiar to the country's airport hangars. All mention of profits and losses is strictly taboo—the one idea being to "get away from it all" with a vengeance.

Changing Scene

■ But in ten short years look at the difference in what these tired tycoons are "getting away from." When they first "escaped" STEEL's index of metalworking activity was skidding on down to a low of 45, bread lines were forming and little shoots of grass could be seen on many a city street. Last week STEEL's index was shoving its way through the top of the chart, bread lines had given way to picket lines, and the grass was back on the putting greens where it belongs. Almost twice as much iron ore was shipped in the single month of April as in the entire year of 1932.

Bundsters

■ The national president and national secretary of the German American Bund happened to be in South Bend recently, at a time when a CIO-sponsored strike was brewing at Bendix. South Bend coppers were on the ball, however, and had a special reception committee waiting even before these two, and other bundsters, happened to have a meeting at a place that happened to be within earshot of Bendix's whirring machinery, grinding out vital defense parts. Said coppers followed the big car containing the two big shots and when the car went 21 M. P. H. in a 20-mile zone, that was too much for their civic pride, and besides the license plates didn't match the color of the car. So the bundsters were bundled over to the police station, fingerprinted, mugged and questioned. One question that was not asked, with an answer that these gentlemen would never give: "Are you in favor of all-out defense strikes?" "Yes, with all the votes we are able to cast."

Brother Harry

■ If we had been on deck last week we would have taken special pains to introduce Harry L. Allen Jr., open-hearth worker at Republic's Cleveland plant whose picture appeared on page 30 presenting a block of steel to the British War Relief Society in the person of Miss Flora Wright. Harry is Detroit editor Art Allen's look-alike brother.

Top Flight

■ We should like to stick our necks out to the extent of saying that Johns-Manville, in their two-page ad (79-80) this week, are doing one of the most effective jobs we've ever seen in an industrial paper. And, by coincidence, you will find an interesting correlation between the story Lowell Thomas unfolds and the theme of Earl Shaner's editorial this week. *We have the tools and we will do the job,* says Mr. Thomas' Voice of Steel. *The steel industry is sound in head, heart and body,* says Mr. Shaner. *It can do its job well.*

Revere Again

■ Another real pleasure this week was to have the opportunity to meet Tom Carroll on page 61. There's a man!

SHRDLU.

ican makers. Producers report volume of sales and shipments is greater each month, with aggregates far ahead of current production. A larger share of current orders is for defense, particularly for mobile units such as tanks, airplanes and army trucks. Prices have been readjusted to line up better with existing costs of manufacture.

Canada

Toronto, Ont.—With war contracts exceeding all previous records Canada's primary steel producers are being pushed to meet demands for raw materials.

To meet increasing demand for steel all producing plants are expanding and new capital expenditure of about $20,000,000 is proposed by Algoma Steel Corp., Steel Co. of Canada Ltd., and Dominion Steel & Coal Corp.

Demand for plates in connection with expanding shipbuilding now far exceeds supply and production has been contracted for a couple of years. The government will finance repairs and improvements to the plate mill of Dominion Steel & Coal Co., to provide plates for shipbuilding. In addition to ship plates steadily expanding demand is reported for armor plate in connection with tank construction, it being announced that the Angus shops of the Canadian Pacific Railway is now ready for continuous production of heavy war tanks.

Orders for sheets continue large, despite the fact that most producers can take no more orders for 1941 delivery. Inquiries are numerous and consumers not engaged on war work report difficulty in obtaining supplies.

License requirements for large building undertakings are expected to result in some slowing down in structural steel, but so far there has been no sharp reduction. Included in awards of the past week was one for steel for addition to DeHavilland Aircraft plant, valued at $120,000, to Dominion Bridge Co., Toronto, Ont. Other awards total around 8000 tons.

Demand for iron and steel scrap is more pressing in the Toronto and Montreal markets but no actual shortage has developed. Steel mills and electric furnace interests are inquiring for steel scrap and local dealers state they are being rushed to make deliveries. Larger tonnages of steel scrap are coming in from the country. Foundries are seeking better deliveries of machinery cast and stove plate, and while dealers are taking care of customers with regard to cast, they report shortage of stove plate.

Metallurgical Coke

Coke Prices, Page 99

Threat of another strike of bituminous coal miners has not disturbed coke consumers unduly and little buying is being done for stock. Production is being increased in both beehive and by-product, some fu

naces of the former type being put into service after 25 years idleness.

In the Birmingham, Ala., district some 210 ovens have been put in service after being idle many years. Carnegie-Illinois Steel Corp. has all its ovens in service at Chicago.

Prices have been increased 50 cents to $1 per ton at practically all producing points.

Laclede Gas Light Co., St. Louis, has announced its coke production has been taken off the market for domestic heating and will be used for operation of Granite City Pig Iron Co., one of whose blast furnace stacks will be placed in production soon. This will obviate delay which would result from reconditioning coke ovens at the company's plant.

Iron Ore

Iron Ore Prices, Page 101

Consumption of Lake Superior iron ore in April was 5,802,088 gross tons, against 6,411,531 tons in the longer month of March and 3,934,853 tons in April, 1940, states the Lake Superior Iron Ore Association, Cleveland. Consumption for the first four months has been 24,217,803 tons compared with 17,553,767 tons for the like 1940 period. The decline in April may be attributed in part to the coal strike which caused shutdowns and banking of some blast furnace stacks.

Total ore at furnaces and on Lake Erie docks May 1, 1941, was 16,937,173 tons, against 17,760,742 tons a month ago and 18,106,151 tons a year ago. May 1, 1941 ore at furnaces was 15,002,104 gross tons and on Lake Erie docks, 1,935,069 tons.

Ferroalloys

Ferroalloy Prices, Page 100

Ferroalloy sellers believe that the movement in May will be fully comparable with that in April. It is possible, some believe, that shipments will equal March deliveries, the heaviest for the year.

Last month the soft coal strike slowed up deliveries in some instances, and it was thought the May movement would show a slight further decline. However, so rapid has been the recovery of the steel industry that this does not now appear likely, unless a further strike occurs, and even then trade leaders doubt if the effect would amount to much.

There is heavy pressure for ferromanganese, but apparently needs have not resulted in any important shift to spiegeleisen so far. Sellers of both products assert there may be some instances, but not important enough to establish a trend. There is also heavy pressure for 15 per cent ferrosilicon, for which spiegeleisen might be substituted in some instances.

With second quarter now well along, there is increasing speculation as to prices for the third period. Normally, contract prices are not named for a new quarter until about the middle of the month preceding. However, over recent months there have been exceptions.

Steel Industry on War Footing—W. S. Tower

(*Continued from Page 22*)

capacity, but of too little capacity: Instead of the accusation that steelmakers stupidly refused to write off obsolete equipment, they are now charged with stubbornly objecting to expansion on a fantastic scale.

In place of their economic astigmatism of last year, steelmakers are now regarded as completely blind to the magnitude of the task which they face. On one side of this controversy a group of administration economists have maintained that defense, plus British, plus civilian, demands for steel in 1941, and especially in 1942, will substantially exceed the ability of the industry to produce. It has been reported recently that the conservative estimates from such sources foresee a deficit of 10,000,000 tons of steel ingots in 1942, while the really enthusiastic have tilted their deficit as high as 30,000,000.

On the other hand, members of the industry generally have taken the position that the industry will be able to furnish much more steel than any possible requirements can amount to for the defense program and for Britain, and that civilian consumption need not suffer as a result. In that position they have been soundly supported by a report to the President by Gano Dunn . . .

Need Not Evident

In the first place, experience does not show that the demand for different classes of steel products always varies in the same way with changes in the total of national income . . .

In the second place, what is this civilian demand that will work such magic in markets for steel? Who are those that will make this approaching paradise of buying? Certainly it is not the corporations, abraded as they will be between the nether stone of rising costs and the upper stone of frozen prices. It can not be the salaried people, or those of fixed incomes, who already hear the ominous tread of the tax collector. Are the wage earners to need so much more steel? Even prodigious numbers of automobiles, refrigerators, washing machines and the like would hardly make a dent in 86,000,000 tons of ingots . . .

For defense, British and export, the facts at hand, treated most liberally, indicate a total of less than 30,000,000 tons of ingots in 1942. Even as the industry stands today, that would leave more for civilians than they have ever needed in any year so far.

In considering ability to meet those requirements, members of the

industry also take into account that some expansion of capacity is always going on in the steel industry. As a result of the normal policy of repairs and replacements, the figure reported at the end of one year generally is increased in the course of the following year. Thus it is expected that upward of 3,000,000 tons of ingot capacity will be added this year to the 84,000,000 which was reported last December. And next year likewise more can be expected to follow.

Any effort to force the rate of expansion of steelmaking capacity to the extent of even 10,000,000 tons per year probably could not be realized under two years, by which time, it is reasonable to expect, the critical emergency will have been met or passed. Even to do the job within two years would call for diverting labor, materials, equipment from other lines essential to the defense program, in order to provide plant facilities for tonnages of steel, needed, if at all, only for a boom-time spurt of civilian demand for nondefense products.

It just does not make sense to urge such a course when men and materials, money and management are needed for a supreme effort to produce armament . . .

Outside Factors More Important

In the minds of many, the question of steel capacity to meet requirements is less important than the possible hampering effects on production from other directions. Thus, the lack of essential materials or the intrusion of labor difficulties could seriously curtail the output of steel, irrespective of what the available capacity may be. Fortunately, there have been no general nor protracted labor difficulties in the steel industry itself, but we have seen lately the serious threat to the industry's operations from the shutdown of the soft coal mines . . .

For many months the steel industry has stood out conspicuously as an important influence in maintaining a relatively stable condition of prices for industrial commodities in this country. It was a part of the far-sighted wisdom of steelmakers that their prices were not raised, in spite of a record-breaking level of demand, accompanied by clamor for prompt delivery on large tonnages of their products. By following such a policy, members of the steel industry contributed to the general stability of prices in many other lines.

I believe that there is every sympathy in the industry for a national policy which seeks to avoid inflation; that the industry realizes steel is the most widely used material, and that the price of steel affects a wide variety of industrial products. But steel prices do not

Nonferrous Metal Prices

May	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
17	12.00	12.00	12.25	52.25	51.87½	5.85	5.70	7.25	17.00	14.00	35.00
19	12.00	12.00	12.25	52.12½	51.62½	5.85	5.70	7.25	17.00	14.00	35.00
20	12.00	12.00	12.25	52.25	51.75	5.85	5.70	7.25	17.00	14.00	35.00
21	12.00	12.00	12.25	52.25	52.00	5.85	5.70	7.25	17.00	14.00	35.00
22	12.00	12.00	12.25	52.25	52.00	5.85	5.70	7.25	17.00	14.00	35.00
23	12.00	12.00	12.25	52.25	52.00	5.85	5.70	7.25	17.00	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)	19.48
Copper, hot rolled	20.87
Lead, cut to jobbers	9.10
Zinc, 100 lb. base	12.50

Tubes

High yellow brass	22.23
Seamless copper	21.37

Rods

High yellow brass	15.01
Copper, hot rolled	17.37

Anodes

Copper, untrimmed	18.12

Wire

Yellow brass (high)	19.73

OLD METALS

Nom. Dealers' Buying Prices

No. 1 Composition Red Brass

New York	9.25
Cleveland	9.50-10.00
Chicago	9.00-9.25
St. Louis	9.00

Heavy Copper and Wire

New York, No. 1	10.25-10.37½
Cleveland, No. 1	10.00-10.50
Chicago, No. 1	10.00-10.25
St. Louis	10.00

Composition Brass Turnings

New York	9.00

Light Copper

New York	8.25-8.37½
Cleveland	8.00-8.50
Chicago	8.00-8.25
St. Louis	8.00

Light Brass

Cleveland	4.50-5.00
Chicago	6.25-6.50
St. Louis	5.00

Lead

New York	4.85-5.00
Cleveland	4.75-5.00
Chicago	4.75-5.00
St. Louis	4.50

Old Zinc

New York	4.50
Cleveland	4.00-4.12½
St. Louis	5.00

Aluminum

Mis., cast	11.00
Borings, No. 12	9.50
Other than No. 12	10.00
Clips, pure	13.00

SECONDARY METALS

Brass ingot, 85-5-5-5, l. c. l.	13.25
Standard No. 12 aluminum	16.00

exist in a vacuum. Price inflation can not be successfully avoided by putting a ceiling on steel prices alone, while wages, coal prices and other cost factors push steadily upward. Other important elements in the economic scheme must be brought under control, and maladjustments leveled out, if our national economy is to be kept on an even keel.

Profit Margin Slender

It may be that price inflation is an inescapable and ultimate aspect of the sort of experience which we are facing. I do not pretend to know whether the action of any industry or of any public agency can deflect or check the force of such powerful economic currents as those which have been set in motion. But I do know, and all of you know, that the violent upthrust of sharply increased wages can not indefinitely be cushioned in the thin margin of profit . . .

For all practical purposes your industry is already on a war footing . . . With war here, individual rights are likely to be curtailed. More government controls will be imposed on industry. Debts and taxes will continue their ruinous race. It will test your ingenuity to keep costs down. It will try your patience to keep markets orderly, to check hoarding and to hold production at top levels.

Through all these difficulties the defense job is singularly yours. But the record of the industry gives reassuring answer as to the way your part of that job will be done.

Nonferrous Metals

New York—All nonferrous metal producers are straining to increase production but have been unable to meet demand fully. An upward revision in some prices may be necessary to stimulate output.

Copper—Marginal miners, especially in Arizona and Michigan, are advocating a higher price in order to bring out larger supplies. Domestic production is at the annual rate of 1,000,000 tons while 500,000 tons of Latin American metal is available. This compares with the present annual consumption rate of 1,620,000 tons. Official priority on shipments appears likely.

Lead—Refined stocks dropped 3097 tons during April to a total of 59,169 tons as the daily average rate eased to 1870 tons for output and 1972 for shipments. The United States is obtaining 42 per cent of its lead requirements from foreign sources, either in the form of refined lead or ore.

Tin—Imports of tin continue heavy, tending to reduce premiums on metal for future delivery. Straits spot held steady last week at about 52.25c.

Zinc—Supply situation continues tight with most consumers unable to cover immediate requirements.

Galvanizers have been forced to hold operations at about 59 per mills still get needed supplies. OPM is expected to require about 15,000 tons for June distribution.

Steel in Europe

Foreign Steel Prices, Page 101

London — (*By Cable*) — Increased steel output by mills in Great Britain and American imports are sufficient to meet the present war effort, with some reserve stocks. All ordinary requirements are strictly limited to essentials. The domestic ore situation is adequate for essential purposes. Little steel is available for export. The tin plate market is quiet, with output restricted.

1940 Tungsten Output 42 Per Cent Over 1939

■ Production of tungsten ore and concentrates in 1940 increased 42 per cent over 1939, according to the Bureau of Mines, Department of Interior. Shipments from domestic mines, 5319 net tons, were 24 per cent larger than 4287 tons shipped in 1939 and were the largest since 1916 and were exceeded in only one other year, 1916.

General imports of tungsten ore and concentrates (tungsten content) in 1940 increased 211 per cent over 1939 and totaled 9,666,228 pounds. In addition to ore and concentrates imported for consumption, 1,348,495 pounds were imported for smelting, refining and export in 1940, compared with 589,828 pounds in 1939.

Imports of tungsten metal and carbide in 1940 were 36,652 pounds (metallic content) compared with 39,498 pounds in 1939. Exports of tungsten metal, wire, shapes and alloys, other than ferrotungsten, increased to 237,940 pounds in 1940 from 195,002 pounds in 1939.

Equipment

Cleveland — One of the largest tooling jobs in this district recently involved equipment for forging aluminum for an airplane products manufacturer who has been building a new plant here. Demand for machine tools is perhaps not quite as insistent as in earlier phases of defense. The fact that this is not a heavy ordnance district, but rather an area for subcontracting means fewer large orders than in many districts. Boring mills, turret lathes, automatic screw machines, milling machines and jig borers are most difficult to obtain promptly. Drill presses, hack saws and some sizes of punch presses are available fairly promptly. Though there has been no official order from Washington, prices of tools are regarded as "frozen," though costs of production are rising because of wage increases and greater spoilages due to less skilled workmen.

Philadelphia — Expansion in capacity at four large shipyards in this district continues to provide an important outlet for various types of machinery. A large number of tools is also moving to other plants engaged in defense work, including both government and private plants.

Seattle—The market is strong and steady with continued demand for all items, heavy construction and automotive in particular. Machinery and equipment for new shipyards are reaching a high volume. Allis-Chalmers Mfg. Co., Milwaukee, is low at $19,590, to Bonneville project for furnishing four circuit breakers, General Electric and Graybar, each $15,569, to same office for cross arm fixtures, Phoenix Iron Works, low $1,465, for furnishing hold-down weights and Westinghouse Electric Supply Co. for furnishing cable bar terminals. Bids are called May 29 for 170,000 feet of overhead ground wire for Ampere, Wash. General Electric Co. is low at $294,126 government specifications, and $266,521, standard specifications, for electric distribution system at Puget Sound navy yard. Interior department has awarded the following for Coulee project: Westinghouse, two 230 kw circuit breakers, $143,565; General Electric two, 115 kw, $50,970; Railway & Industrial Engineering Co., Greensburg, Pa., seven disconnecting switches, $22,815. Puget Sound navy yard will open bids June 9 for a 45-ton diesel electric locomotive.

Construction and Enterprise

Ohio

AKRON, O.—Goodyear Tire & Rubber Co. will expand defense participation by building $400,000 plant for production of aircraft parts, 100 x 700 feet, financed from own funds. Hunkin-Conkey Construction Co., 1740 East Twelfth street, Cleveland, has general contract.

CLEVELAND—Elmer C. Breuer Inc., 11730 Harvard avenue, is expanding facilities on new site recently purchased, including one-story shop 70 x 115 feet and tractor storage section 50 x 190 feet. Bids are being considered by Byron Dalton, architect, 2928 Falmouth road.

CLEVELAND—Gillmore Carmichael Olson Co., 1873 East Fifty-fifth street, has contract for design and construction of $450,000 plant for Allegheny Ludlum Steel Co. at Dunkirk, N. Y.

CLEVELAND—Amalgamated Steel Co., 7835 Broadway avenue, steel distributor, will build one-story addition 50 x 80 feet.

CLEVELAND — National Bronze & Aluminum Foundry Co., 8810 Lalsy avenue, will build its fifth extension in the past few months, to enlarge foundry and machine shop facilities, 20 x 151 feet, two stories. H. L. Vokes Co., 5300 Chester avenue, has contract. John H. Schmeller is president-treasurer.

CUYAHOGA FALLS, O.—Cuyahoga Machine & Welding Co., 1743 Second street, Jack Casey, president, has been organized to manufacture mechanical rubber molds and do a general welding business.

Additional Construction and Enterprise leads may be found in the list of Shapes Pending on page 108 and Reinforcing Bars Pending on page 109 in this issue.

DEFIANCE, O. — Lectrolite Corp., Harold L. Schlosser, president, will build an addition 75 x 225 feet and install metalworking equipment, cranes and other materials handling devices. General contract has been given to Baker-Shindler Contracting Co., Defiance.

KENT, O.—Gougler Machine Co., Stow street, has bought L. N. Gross plant on North River street, about 15,000 square feet floor space, which will be used to expand production of gun mountings for Firestone and transmissions for British tanks.

MANSFIELD, O.—Mansfield Plating Co., 153 East Fifth street, is rebuilding its plant, damaged by fire early this month.

MASSILLON, O.—Griscom-Russell Co., Fourth street, is building a three-bay addition to its plant for added facilities for defense work. B. & H. Construction Co., 11 Thorne avenue, is contractor.

Connecticut

DANBURY, CONN.—Plaskon Co., Danbury, will let contract soon for a three-story plant costing $1,000,000. Lockwood Greene Engineers Inc., 10 Rockefeller Plaza, New York, is engineer.

FAIRFIELD, CONN. — Bridgeport Moulded Products Co., 300 Myrtle avenue, Bridgeport, Conn., will build a one-story 100 x 122-foot plant at Kings Highway and Meadow street, costing $45,000.

STRATFORD, CONN.—Vought-Sikorsky division United Aircraft Corp. has given general contract to E. & F. Construction Co., 94 Wells street, Bridgeport, Conn., for maintenance-tool unit costing $50,000.

Massachusetts

FITCHBURG, MASS.—Fitchburg Grinding Machine Corp., Walnut street, will build a one-story plant, general contract to B. A. Stephens Co., 47 Nockege street, costing $40,000. (Noted March 3.)

INDIAN ORCHARD, MASS.—Chapman Valve & Mfg. Co., 203 Hampshire street, will build a one-story foundry addition on Pinevale street, general contract to Stone & Webster, 49 Federal street, Boston, at about $45,000.

SALEM, MASS.—Atwood & Morrill Co., 48 Loring avenue, will build a one-story 72 x 170-foot and 18 x 48-foot factory and boiler plant, general contract to Walsh Construction Co., 119 Webb street, at about $60,000.

SPRINGFIELD, MASS. — Production Tool & Die Co. Inc., 562 St. James avenue, will build a one-story 54 x 104-foot machine shop, general contract to L. B. DeBlois, 103 Pleasant View avenue, Longmeadow, at about $70,000.

Rhode Island

PROVIDENCE, R. I.—American Insulated Wire Corp., 610 Manton avenue,

will build a one-story 35 x 72 and 75 x 80-foot plant addition costing $40,000. Barker & Turoff, 1022 Grosvenor building, are engineers.

New York

BUFFALO—American Car & Foundry Co., Babcock street, is having plans made for a plant addition costing over $40,000.

BUFFALO—Bliss & Laughlin Inc., 110 Hopkins street, will build a plant addition costing over $40,000, with equipment.

BUFFALO—Acme Steel & Malleable Iron Works, Military road, A. Crone, vice president, will build a foundry addition costing over $40,000.

CHEEKTOWAGA, N. Y.—City has awarded general contract for a sewage disposal plant to C. E. Knowles, Maltbie road, Gowanda, N. Y., to cost about $253,000.

YONKERS, N. Y.—Phelps Dodge Copper Products Corp., Wylie Brown, president, is building a one-story warehouse with 35,000 square feet floor space at its Habirshaw Cable & Wire division plant at Yonkers and will utilize present warehouse and storage space in main plant for additional production. Brown & Matthews, New York, are engineers and architects.

Pennsylvania

BRADFORD, PA.—Sloan & Zook Co., Main street, Bradford, is developing crude oil properties, including new wells, pressure plants, connecting and gathering lines, steel storage tanks, near Bolivar, Allegany county, at cost of $40,000 to $50,000.

CORRY, PA.—Aero Supply Mfg. Corp., has let general contract to J. M. Benzinger Inc., 121 West Fourth street, Jamestown, N. Y., for a boilerhouse and power plant unit. Meyers & Johnson, Commerce building, Erie, Pa., are architects.

CORRY, PA.—City, G. P. Porter, city clerk, will build a sewage disposal plant costing over $25,000. Havens & Emerson, Leader building, Cleveland, are engineers. D. D. Williams is city engineer.

CORRY, PA.—Precision Products Co. Inc., Main street, is taking bids on an 80 x 125-foot plant costing $400,000, with equipment. Meyers & Johnson, Commercial building, Erie, Pa., are architects. (Noted May 12.)

MEADVILLE, PA.—A bond election will be held in November on the proposition of building a municipal incinerator costing $65,000. R. L. Phillips is city engineer.

Michigan

MARQUETTE, MICH.—City has approved plans for a sewage disposal plant to cost $300,000. Hoad, Decker, Shoecraft & Drury, Savings Bank building, Ann Arbor, Mich., are engineers.

PORT HURON, MICH.—Mueller Brass Co. will build a one-story foundry addition costing $50,000. H. E. Beyster Corp. 3-125 General Motors building, is engineer.

Illinois

AURORA, ILL.—Western United Gas & Electric Co., 50 Fox street, will receive bids about June 1 on installation of boilers and turbines costing about $500,000. Sargent & Lundy Inc., 140 South Dearborn street, Chicago, are consulting engineers. (Noted May 5.)

CHICAGO—Eddy Stoker Corp., 4717 West North avenue, has revised plans by Engineering Systems Inc., 221 North LaSalle street, for a one and two-story 65 x 85-foot plant addition costing about $40,000.

CHICAGO—Chicago Transformer Co., 3501 Addison street, has let general contract for a one-story 120 x 235-foot plant addition to J. Emil Anderson & Son, 3659 Belle Plaine avenue, costing about $50,000.

CHICAGO—Continental Can Co., 4633 West Grand avenue, has let general contract to the Austin Co., 510 North Dearborn street, for a one-story 100 x 230-foot addition on West Sixty-fifth street, costing about $50,000.

CHICAGO—Sheldon Machine Co., 1624 North Kilbourn avenue, will build a one-story plant at 4705 West Montrose avenue, general contract to Clearing Industrial District, 6455 South Central avenue, costing over $50,000.

FLORA, ILL.—Clay Electric Co-operative Inc., L. F. Brissenden, president, Oil Exchange building, 116 North Main street, Flora will take bids June 4 on 289 miles of rural electric lines. Michael Drazen & Associates, 4903 Delmar boulevard, St. Louis, are consulting engineers.

HANOVER, ILL.—City will build sewage disposal plant costing about $50,000. Cauldwell Engineering Co., Jacksonville, Ill., is engineer.

MOLINE, ILL.—Deere & Co. will build five-story factory and experimental department at its John Deere spreader works, to cost about $124,000, exclusive of equipment. New building will be extension of present plant and will cover 64,000 square feet floor space.

PROPHETSTOWN, ILL. — Eclipse Mower Co. has let contract for a factory

and machine shop addition costing about $40,000 with equipment, to Sjostrom & Sons Inc., 1617 Crosby street, Rockford, Ill.

District of Columbia

WASHINGTON—Bureau of supplies and accounts, navy department, will receive bids as follows: May 29, schedule 6848, steam-platen hydraulic press for Mare Island, Calif.; schedule 6850, three motor-driven hack saws for Mare Island, Calif.; schedule 6852, five motor-driven universal vertical shapers for various deliveries; schedule 6824, four motor-driven eccentric valve grinding machines for various deliveries; schedule 6934, sixty motor-driven precision bench lathes for Newport, R. I.; June 3, schedule 6915, six motor-driven heavy-duty plain shapers for various deliveries; schedule 6891, twenty-three motor-driven pedestal grinders for Mare Island, Calif.; schedule 6894, 493 electric arc welding sets and panels for Mare Island, Calif.; schedule 6900, four motor-driven heavy-duty vertical slotters for various deliveries; schedule 6860, electric arc rocking furnaces for Mare Island, Calif.; schedule 6864, seven hand-operated tube bending machines for various deliveries; schedule 6872, twelve motor-driven combination metal sawing, filing and polishing machines for various deliveries; schedule 6879, thirteen motor-driven grinder and drill point thinning machines for various deliveries; schedule 6885, nine motor-driven metal-cutting band saws, for Charleston, S. C., and Mare Island, Calif.

Missouri

ROBERTSON, MO.—War department, U. S. Property and disbursing office, capitol building, Jefferson City, Mo., will take bids June 5 for hangar addition 100 x 130 feet at Robertson airport.

ST. LOUIS—Midwest Piping & Supply Co., Second and Miller streets, has given general contract to Fruin-Colnon Construction Co., 502 Merchants Laclede building, for an office and plant addition 79 x 101 feet, costing about $25,000.

Wisconsin

COLBY, WIS.—City, Carl Holtzhausen, clerk, is taking bids on water softening and iron removal plant. Plans by Frank J. Davy & Son, 502 Main street, La Crosse, Wis., consulting engineers.

STODDARD, WIS.—Village, William Manesworth, clerk, is taking bids on pump and electric equipment for waterworks system. Frank J. Davey & Son, 502 Main street, La Crosse, Wis., consulting engineers.

Texas

DALLAS, TEX.—Lone Star Gas Co., Dallas, will build a 10-inch gas pipe line from Gregg county to Ophelia, Henderson county, to cost about $125,000.

FORT STOCKTON, TEX.—Stanolind Oil & Gas Co. will build 42 miles of 8-inch welded crude oil pipe line in north Pecos county, costing over $40,000.

WICHITA FALLS, TEX.—Magnolia Petroleum Co. will build 53 miles of 8-inch welded cast iron crude oil pipe line from Pecos county to Halley, Tex., costing $100,000.

Kansas

COUNCIL GROVE, KANS.—City at special election approved $80,000 bond issue to finance waterworks improvements.

Iowa

AGENCY, IOWA — City, Harry L. Creamer, clerk, will hold election soon on bond issue to finance waterworks system costing about $30,000. Ralph W. Gearhart, Cedar Rapids, Iowa, is engineer.

FORT DODGE, IOWA—City, H. R. Sittig, clerk, is taking bids to May 28 for sewage treatment plant addition, including sludge pump house, chlorine handling equipment, etc. Buell & Winter, 508 Insurance Exchange building, Sioux City, Iowa, are engineers. (Noted May 5.)

GRAETTINGER, IOWA—Village, C. E. Norris, clerk, is taking bids to June 10 on construction of power plant building, two diesel engines, switchboard and station wiring and electric distribution system. Buell & Winter, 508 Insurance Exchange building, Sioux City, Iowa, are consulting engineers. (Noted May 5.)

LE CLAIRE, IOWA—E. H. Suiter, town clerk, will take bids June 9 for construction of waterworks system costing $30,000. R. W. Gearhart, 349 Twenty-first street, Cedar Rapids, Iowa, is consulting engineer.

MELCHER, IOWA—Village, Dale Merriman, mayor, takes bids to June 18 for waterworks construction, including well, water storage facilities, pump house and distribution system. Ralph W. Gearhart, Cedar Rapids, Iowa, is engineer.

MUSCATINE, IOWA—City will make preliminary survey on sewage disposal plant and sewerage system. Stanley Engineering Co., Muscatine, Iowa, is consulting engineer.

ORIENT, IOWA—Voters have approved $16,000 bond issue to finance waterworks plant and system.

TIPTON, IOWA—City, Kathleen Boling, clerk, will hold special election June 12 on erection of building for stand-by unit, to be maintained by Iowa Power & Light Co.

California

EL MONTE, CALIF.—Littlefuse Corp., Chicago, will build a plant here east of Tyler avenue, with about 20,000 square feet floor space.

FRESNO, CALIF.—Moore Motor-Brake Inc. has been organized with 200 shares no par value, represented by D. E. Peckinpah, 431 Brix building, Fresno.

LOS ANGELES—D. & F. Tool & Machine Co., 3809 Avalon boulevard, has been organized by William P. Draper and J. W. Fitts.

LOS ANGELES—American Precision Products Co., 2853 East Eleventh street, has been organized by Wilbur E. Ellmore.

LOS ANGELES—J. G. Brandenburg, 2187 Riverside drive will build a forging plant at 8022 South Compton avenue, costing about $2000.

SAN DIEGO, CALIF.—Shelton Aircraft Corp. has been organized with $1,000,000 capital, represented by H. W. Muir, 320 Bank of America building, San Diego.

SAN FRANCISCO—Pacific Foundry Co. Ltd., 3160 Nineteenth street, will build a foundry addition costing over $40,000.

SAN LEANDRO, CALIF.—United Engineering & Machine Co., 310 Preda street, will build plant additions costing about $40,000.

Oregon

HERMISTON, OREG.—A. Terteling & Sons, contractors, are considering bids for materials and waterproofing of 749 underground magazine igloos at the Umatilla, Oreg., ordnance depot.

PORTLAND, OREG.—E. C. Gerber, Portland, is low at $253,222 to United States engineer for improvements at Pendleton, Oreg., airport. Same office will receive bids May 29 for sewage disposal plant and appurtenances at same project.

Washington

GRAYLAND, WASH.—Grayland Cannery Association will build a 32 x 65-foot cannery, with stainless steel equipment.

PORT ANGELES, WASH. — Olympic Shipyards has been incorporated with $75,500 capital by Clifford Cowling and associates, 1204 South Cedar street, to build and repair ships.

SEATTLE—Seattle Boiler Works is planning craneway extension at its plant, 5237 East Marginal Way.

Canada

TORONTO, ONT.—National Steel Car Corp. will manufacture two-engined Martin B-26 bombing planes at its Malton plant.

WINDSOR, ONT.—A plant to manufacture automatic guns for airplanes will be built by Border Cities Industries, Windsor, at cost of $8,000,000.

USED and REBUILT EQUIPMENT MATERIALS

FOR SALE

NEW AND USED EQUIPMENT

Quantity		Regular	SALE
1—	Audubon Flexible metalwove conveyor belt (Quench Tank Belt) 24" wide x 46 ft. long, chainweave type, 3 mesh, No. 14 W & M Ga. (.080" dia.) Audubon plain steel. Chain: One strand No. 660 chain mounted each side of the belt. Chain provided with special boss attachments for insertion of 3/16" dia. Cross rod support through the belt. (NEW)	$550.00	$473.62
5—	No. 45-A Oil Burners. (Mahr Triple Atomizing) . . each	61.00	31.50
1—	No. 385 Rivet Forge self-contained, complete with blower. (NEW)	373.50	373.50
4—	No. 385 Rivet Forges less blower . . . . . each	200.00	200.00
1—	G. E. Vertical Ball Brg. motor, 5 H.p., 220 V. 3 PH. 60 CY. 1735 R.P.M., Frame 254 V. (NEW—A REAL BARGAIN)	92.00	70.00
6—	No. 12 D. Forge Stands . . . . . each	20.00	20.00
1—	North American Turbo Blower No. 312-E-110, 12-ounce pressure, 1750 CFM, Direct connected to 10 HP, 3 PH, 60 CY, 220 V, 3470 R.P.M. Motor	386.00	386.00

MAHR MANUFACTURING COMPANY — Div. Diamond Iron Works, Inc.
MINNEAPOLIS MINNESOTA

For Sale

COLD DRAWN SEAMLESS STEEL TUBING

•

LOW CARBON

3000 Feet—½" O.D. x 20 BWG
2000 Feet—⅝" O.D. x 17 BWG
3500 Feet—¾" O.D. x 12 BWG
1400 Feet—⅞" O.D. x 22 BWG
10000 Feet—⅞" O.D. x 20 BWG
3000 Feet—1" O.D. x 18 BWG
2000 Feet—1" O.D. x 17 BWG
1200 Feet—1⅛" O.D. x ⅛" wall
2000 Feet—1⅛" O.D. x ¼" wall

35/45 CARBON

1600 Feet—2⅛" O.D. x 14 BWG
1300 Feet—2⅜" O.D. x 14 BWG
4200 Feet—2⅞" O.D. x 14 BWG
5300 Feet—2½" O.D. x 14 BWG

All in first class condition and in random mill lengths.

If interested contact

BOX No. 489

STEEL, PENTON BUILDING, CLEVELAND

WANTED

2—5-Ton Cranes; 97' Span,
220 Volts D.C.

FRANK B. FOSTER
729 Oliver Bldg. Pittsburgh, Pa.

WANTED—TRANSFORMERS

Of all descriptions and sizes
Burned Out or Good
Also Interested in purchasing
Empty Transformer Cases
Will pay cash—send full description

PHILADELPHIA TRANSFORMER CO.
2829 Cedar St. Philadelphia, Pa.

OPPORTUNITY TO SAVE MONEY

MOTOR GENERATOR SET

125 KW General Elec type CD. 125 volt DC generator driven by Gen. Elec. KT 559, 3 phase 60 cycle 1200 RPM motor. Late type unit for immediate shipment.

6,000 performance tested and guaranteed motors, generators, etc. in stock. Send inquiries.

THE MOTOR REPAIR & MFG. CO.
1558 HAMILTON AVE. • CLEVELAND, O.

For Sale

POLLARD MULTIPLEX GRINDER

Table 76" wide, 12'6" long. Complete with 60 H.P. motor and 3 H.P. Transverse motor. Machine could easily be made into combination planer and grinder to finish heavy steel plates. For further information write **W. J. Holliday & Company**, Indianapolis, Indiana.

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 SALE

One ten-ton GANTRY CRANE, 100 ft. between legs and 20 ft. cantilever on each end. Vertical working distance approx. 30 ft. Equipped with five 25 h.p. D.C. motors 220 volts. May be seen in Chicago. Address Box 484, STEEL, Penton Bldg., Cleveland.

AIR COMPRESSOR
676 CFM, Ingersoll-Rand "XRE", 100 lbs. Syn. Motor 3/60/440 V. Complete near new.

PUNCH
No. 5 Hilles & Jones, Sgl. End, 48" throat, 2"x 1-1/8". Wt. about 35,000 lbs. Good. Immediate shipments.

GALBREATH MACHINERY COMPANY
306 Empire Building Pittsburgh, Pa.

Meer voor Uw Dollar!

IRON & STEEL PRODUCTS, INC.
36 Years' Experience
13462 S. Brainard Ave., Chicago, Illinois
"Anything containing IRON or STEEL"
SELLERS — BUYERS — TRADERS

CONTINUOUS ANNEALING FURNACE

Rockwell furnace five years old, built for continuous bright annealing and normalizing of strip steel in a protective atmosphere. Handles one or more strips up to a total width of thirty inches. Has annealed 1200 lbs. of steel per hour. Equipment consists of furnace with cast alloy steel retort, water cooled cooling chamber, pull out rolls, and seven block winder.

Write

THOMPSON WIRE COMPANY
41 Mildred Ave., Mattapan, Mass.

HORIZ. MILL, 3-3/8" bar Detrick & Harvey
POST MILL, 5-1/2" bar Niles, R.P.T., M.D.
DIE SINKER, E-3 Keller, M.D.
GEAR CUTTER, Spur 84" Newark, M.D.
GEAR PLANERS, 37" and 54" Gleason Bevel, M.D.
TURRET LATHE, 26" Libby, 8" H.S., S.P.D.
PLATE SHEAR, No. 6 H & J, 92"x7/8", M.D.

Write

LANG MACHINERY COMPANY
28th St. & A. V. R. R. Pittsburgh, Pa.

LOOKING FOR USED OR SURplus machinery? STEEL readers may have the equipment you want. Place an advertisement in this section. Rates are moderate. Write today.

FOR SALE

No. 1 Standard Forging Hammer, 100 lbs.
500 Ton Bethlehem Steel Shell Presses
No. 3 Williams, White Bulldozer
18" Canton Portable Alligator Shears
No. 3 Canton Alligator Shears

Address Box 490
STEEL, Penton Bldg., Cleveland

We have in our plant

TWO USED STEEL FUEL OIL TANKS

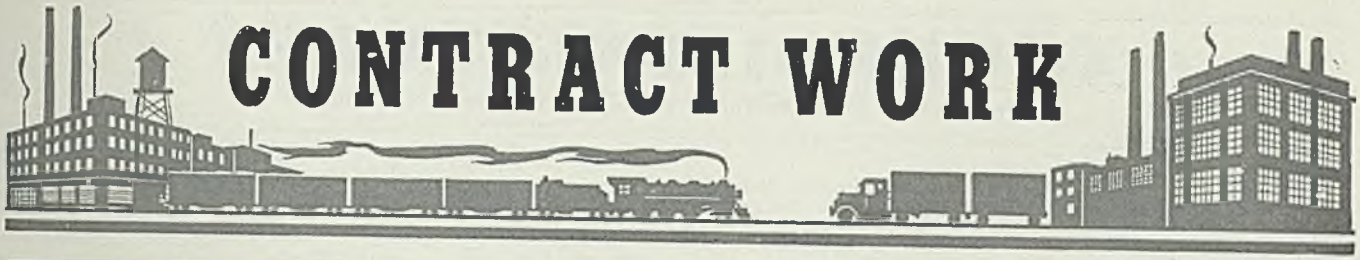
in good condition, each 5000 gallon capacity, 7' 0" in diameter by 17' 6" long. If you are interested in these we would appreciate having your price. These tanks are in the Pittsburgh District and can be inspected. Reply Box 491, STEEL, Penton Bldg., Cleveland.

—REBUILT—

BLOWERS - FANS - EXHAUSTERS

Connersville-Roots positive blowers.
Centrifugals for gas and oil burning.
Sand blast, grinder and dust exhausters.
Ventilating fans and roof ventilators.

GENERAL BLOWER CO.
424 North Peoria St. Chicago, Ill.



CONTRACT WORK

CLASSIFIED

Positions Wanted

EXPERIENCED STRUCTURAL AND plate shop superintendent, now employed. Exceptionally successful in handling men. Experienced in both estimating and sales. Available on short notice. Address Box 470, STEEL, Penton Bldg., Cleveland.

PURCHASING AGENT—FIFTEEN YEARS' experience in heavy machinery equipment. Would consider change. Address Box 479, STEEL, Penton Bldg., Cleveland.

WORKS MANAGER: SEVERAL YEARS' experience in planning, construction and operation of steel mills and shop equipment, making, hot and cold rolling steel; low carbon and alloy grades. Address Box 480, STEEL, Penton Bldg., Cleveland.

INDUSTRIAL TRAINING SUPERVISOR with complete experience organizing and installing apprenticeship and other training courses in several industries desires position supervising present training program or installing training department for expanding industry. Available at once. Address Box 485, STEEL, Penton Bldg., Cleveland.

SALES OR COMMERCIAL EXECUTIVE— Several years' experience as General Manager of Division of one of largest steel companies. Particularly qualified in developing and marketing new or specialized products. Desires connection with steel company that recognizes the necessity of market research and cultivation now to provide for the time when defense orders cease. Age, 42. Health, excellent. Reply Box 492, STEEL, Penton Bldg., Cleveland.

IF YOU HAVE AN OPPORTUNITY TO OFFER

Use the "Help Wanted" columns of STEEL. Your advertisement in STEEL will put you in touch with qualified, high-calibre men who have had wide training in the various branches of the Metal Producing and Metalworking Industries.

Employment Service

SALARIED POSITIONS
$2,500 to $25,000

This thoroughly organized advertising service of 31 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.

Accounts Wanted

SALES SUPERVISOR—ENGINEER

with 18 years' sales experience and 6 years' engineering experience is setting up office in Cleveland to act as Manufacturers' Agent. Have handled sales in excess of $1,500,000 annually. Thoroughly familiar with manufacturing processes and have handled sales to dealers and industrials. Address Box 486, 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.

Help Wanted

YOUNG GRADUATE METALLURGIST with practical knowledge of the processing of stainless steels. Should be experienced in the investigation of metallurgical problems of stainless steels in production and development. State training, experience and salary. Address Box 475, STEEL, Penton Bldg., Cleveland.

WANTED: MARINE ESTIMATOR FAMIL- iar with designing and estimating piping. The Ingalls Shipbuilding Corporation, Birmingham, Alabama.

YOUNG METALLURGICAL OR MECHAN- ical engineer graduate qualified for general and research machinability work on stainless steels. Some knowledge in operation of machine tools desired. State training, experience and salary. Address Box 476, STEEL, Penton Bldg., Cleveland.

WELDING SUPERVISOR—THOROUGHLY competent man to take charge of welding department well established Canadian Company—Pressure and General Plate Work—Permanent position for qualified man. Address Box 477, STEEL, Penton Bldg., Cleveland.

ASSISTANT ROLLING MILL SUPERIN- tendent for finishing mills. Medium size plant in Pittsburgh District making alloy steel bars and other products. Permanent position with opportunity for advancement. State age, education, experience and salary expected. Address Box 487, STEEL, Penton Bldg., Cleveland.

MAN QUALIFIED TO HANDLE JOB AS works manager for wire mill producing all sizes of steel wire, including tinning and galvanizing. State experience, age and nationality. Address Box 482, STEEL, Penton Bldg., Cleveland.

The cost of an advertisement in this section is moderate. Write STEEL, Penton Bldg., Cleveland.

ADVERTISING INDEX

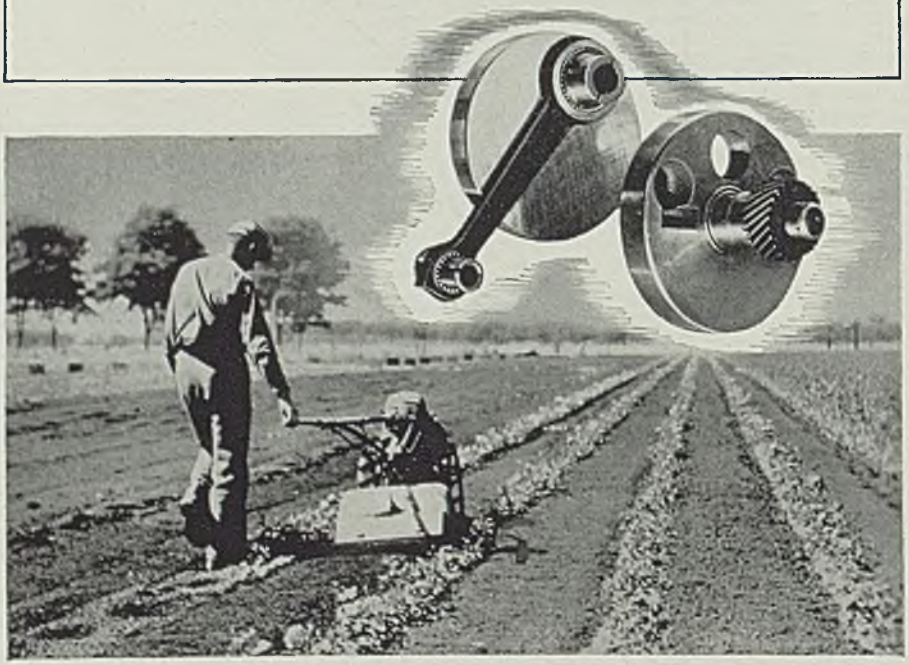
Where-to-Buy Products Index carried in first issue of month.

ADVERTISING INDEX

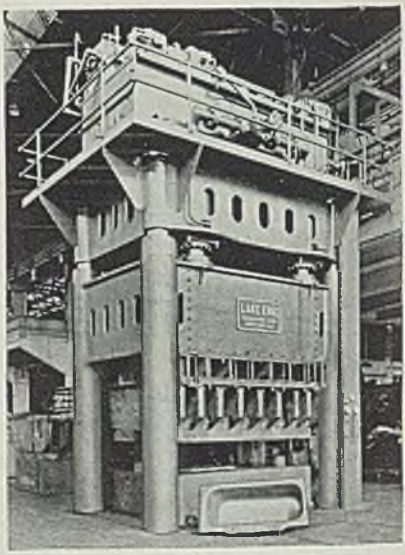
Where-to-Buy Products Index carried in first issue of month.

IN THE NEWS

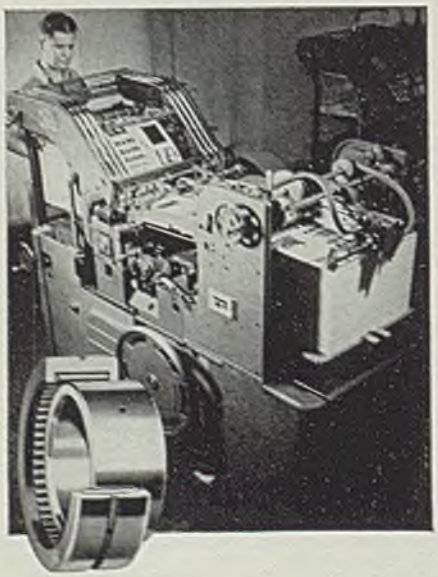
WITH BANTAM BEARINGS



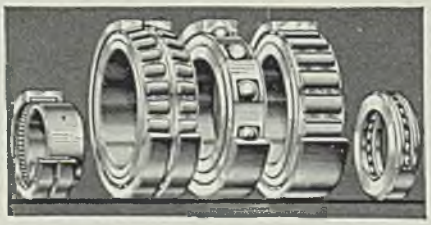
PROGRESSIVE ENGINEERING in farm and garden equipment is exemplified in the heavy-duty Model B1-2, built by Rototiller, Inc., for preparing seed beds in a single economical operation. Among its many interesting design features, the Rototiller illustrates an unusual application of Bantam Needle Rollers on the connecting rod. Rollers at the wrist pin end project beyond the connecting rod, and are constantly lubricated by a fog of oil from the crankcase. Oil catches are utilized to assure efficient lubrication at the lower end.



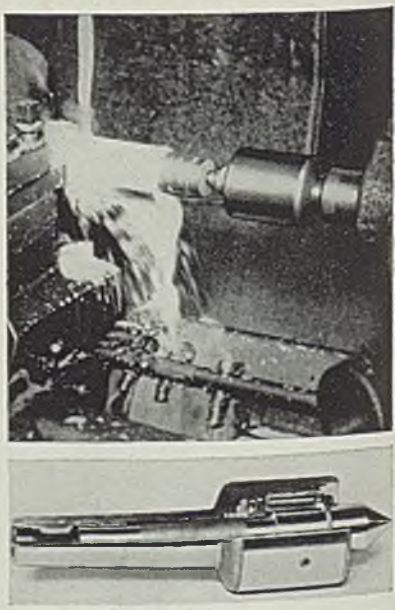
THIS 1700-TON FORMING PRESS is powered by two variable displacement pumps manufactured by The Oilgear Company and equipped with large-size Bantam Radial Roller Bearings, 12.5984" and 16.5354" O.D. Here is a typical instance of the ways in which heavy-duty Bantam Bearings are serving industry in exceptionally severe applications.



NEW PRODUCTION RECORDS are being set by the Kelly Clipper Printing Presses manufactured by American Type Founders. Bantam Quill Bearings are used on planetary gear and crosshead crank pin of the bed motion of these up-to-the-minute presses. Bantam also serves the builders and users of printing presses with other types of bearings specially designed for high-speed rotation.



EVERY MAJOR TYPE OF ANTI-FRICTION BEARING is included in Bantam's line—straight roller, tapered roller, needle, and ball. Bantam engineers, with their broad background of experience in bearing design and application, recommend the type that best suits *your* needs—or design special bearings to meet unusual conditions. If you have a difficult bearing problem, TURN TO BANTAM.



HIGH CAPACITY IN A SMALL SPACE is secured in the live centers built by Motor Tool Manufacturing Company through the use of Bantam Quill Bearings. For additional information on this compact anti-friction bearing, write for Bulletin H-104.