Industries working to get in the scrap.

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Published by The Penton Publishing Co., Penton Building, Cleveland, Ohio. E. L. Shaner, President and Treasurer; G. O. Hays, Vice President; F. G. Steinebach, Secretary.

Member, Audit Bureau of Circulations; Associated Business Papers, Inc., and National Publishers' Association.

Published every Monday. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $6; two years $10; all other countries, one year $12. Single copies (current issues) 25c.

Entered as second class matter at the postoffice at Cleveland, under the Act of March 3, 1879. Copyright 1942 by the Penton Publishing Co.

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NEWS

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EVERY lost man-hour of production tends to postpone and *actually jeopardize* final victory. Faulty equipment does the work of saboteurs! . . . by exposing workers to injury and destroying the will to work long hours at top speed. Morgan Rolling Mills promote safety and morale by operating smoothly, efficiently, in spite of all-out pressure . . . because Morgan's 50 years' experience has made it possible to *anticipate* trouble sources . . . and eliminate them in the blueprint stage!

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R-102

HIGHLIGHTING

this issue of STEEL

NEWS Serious thought is being given by Office of Price Administration to a plan for selling durable goods on an installment basis for postwar delivery. It would siphon off some public purchasing power at this time, help finance the war, enable manufacturers to accumulate backlog orders to cushion the return of peace. Another main objective is to keep sales, distribution and finance agencies alive **(p. 32)**.

Demands for wage increases, maintenance of union membership and the checkoff gained last week as a result of the War Labor Board's decision in the "little steel" case. Inland Steel Co. proposes to have a court test of the board's power to impose union security **(p. 27)**.

While subsidies are looked upon as far from an ideal aid in the battle against inflation, belief in growing at Washington that their use is preferable to permitting prices to increase **(p. 34)**.

The automobile industry takes time out to philosophize over the change in the public attitude toward big business and mass production methods **(p.42)**.

PRODUCTION Ingot production last week gained another half point, climbing to 98½ per cent of capacity **(p. 29)**. Under the revised plan of WPB's Iron and Steel Branch ingot capacity is to be increased 9,710,000 tons to 98,279,970 tons by mid-1943. This plan covers additions to open-hearth, bessemer and electric furnace capacity. Parallel expansions in pig iron and coke oven capacity are involved **(p. 24)**.

Four new sets of production figures feature the American Iron and Steel Institute's produc-statistics for 1941 **(p. 47)**. Development of more power is necessary to conduct the war, says Brookings Institution **(p. 39)**. New noise-amplifying instruments are expected to permit increased production of zinc and lead ores **(p. 38)**.

CONSERVATION To conserve on steel, standardization of hand tools has been ordered **(p. 37)**.

PRIORITIES Canadian steel buyers have been placed under the Production Requirements System, the same system under which American manufacturers obtain procurement assistance **(p. 50)**.

Lithium compounds are to go under complete allocations **(p. 36)**. A new order will retard depletion of steel warehouse stocks but does not solve the problem of replenishing these stocks **p. 26)**. Consumers under the PRP are warned to file revised Form PD-25-a with WPB no later than Aug. 15 in order to get fourth quarter protection **(p.34)**.

SALVAGE Industry, in the new scrap reclaimation campaign, is expected to be the largest source of such material—and manufacturers are expected to do their part. Many already have made substantial contributions toward the objective **(p. 48)**.

TECHNICAL Gerald E. Stedman presents one successful solution to the problem of how to upgrade war workers for more difficult jobs as it has been worked out by co-operation of Great Lakes college faculty with industrial managements and labor organizations in Detroit. Condensed training courses are designed specifically to meet the training problem involved **(p. 54)**. in each particular plant, thus greatly increasing the effectiveness and efficiency of the program.

The extremely wide scope of service that welding is performing today includes an amazing number of important jobs that are described **(p. 56)**. by Scott D. Baumer as he highlights the various methods employed. Extremely valuable in keeping up production are the emergency repairs to vital equipment now being made common practice.

Reginald Trautschold credits better materials handling methods and equipment **(p. 64)** as the means of enabling one small foundry to triple its output of magnesium-alloy sand castings—an important method of stepping up war production that could well be more deeply studied by many plants.

Professor Macconochie in Section 14 in the series on forgings, forging methods and forging equipment, describes efficient forging techniques developed by engineers of Buick Motor Division. As in most automobile plants, forgings receive exceptionally detailed study due to their importance and volume.

MARKETS Provision has been made for quick action in delivering new machine tools at above-ceiling prices **(p. 37)**. Permissible transportation charges for scrap metal are announced. **(p. 38)**.

Switch to NE Alloy Steels

to Save Critical Metals

TO HELP conserve nickel, chromium, vanadium and other scarce metals, the War Production Board's ablest metallurgists have developed NE (National Emergency) Alloy Steels. These new steels contain relatively small quantities of alloying elements in such combination as to produce physical properties usually attributed to steels of much higher alloy content. The War Production Board stipulates the use of the new NE Alloys to *replace* the standard SAE and AISI Alloy Steels for a wide range of applications.

Ryerson NE Alloy Steel stocks in six specifications, all fine grain, will be available shortly; and will consist of sizes ranging from ½-inch to 7-inch rounds, in three groups:

Carburizing Grades	*Medium Hardening Grades*	*High Hardening Grades*
NE 4023 and NE 8620. To Replace AISI and SAE Nos. A 2300, A 2500, A 3100, A 4100, A 4600, A 5100, A 6100.	NE 4042 and NE 8744. To Replace AISI and SAE Nos. A 2330-35, A 3130-35, A4130-35, A5130-35, A6130-35.	NE 4047 and NE 8749. To Replace AISI and SAE Nos. A 2300, A 3100, A 3200, A 4100, A 4600, A 6100.

Only limited data on heat-treatment response or physical properties will be available when NE Alloys are first ready for shipment. The WPB is anxious to know how these new steels will function and requests all NE Alloy users to report results in working with these new steels. Ryerson will cooperate fully with users, supplying laboratory test data, and all other available information.

• • •

If you now use Alloy steel, let Ryerson help you in adapting NE Alloys to your requirements wherever possible. Write, wire or phone the nearest of the ten Ryerson plants.

JOSEPH T. RYERSON & SON, *Inc.,* Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City

RYERSON STEEL-SERVICE

STEEL
July 27, 1942

INDUSTRY FACES ANOTHER ORDEAL OF ADJUSTMENT

For some time it has been apparent that scarcities of materials or necessary adjustments in the production schedules of individual items would force the easing of activities in some industrial plants.

This contingency has arrived. Last week the government canceled a contract with a New Orleans shipbuilding company and the early shutdown of a western Pennsylvania tin mill was announced. In both instances, a considerable number of men and important productive facilities will be idle temporarily.

These are the forerunners of other shutdowns and curtailments which may be expected in the near future. Already the government is attempting to prepare the public for the incongruous spectacle of certain plants bending every effort to increase output while others are idle or operating under wraps by government order.

The reasons for these forced curtailments are complex. For instance, when government officials stepped up production after Pearl Harbor, it was not possible to synchronize individual schedules properly. Also, unexpected turns in the fortunes of war imposed violent shifts in the quotas for certain items. As a result of these and many other factors, the production of the individual parts which go to make up a complete assembly sometimes got out of balance. The output of tank treads may have outstripped that of armor for tanks, or the reverse may have happened.

These inequalities in production now have reached the point where, in conjunction with certain problems of material supply, it has become necessary to bring production schedules into better balance. Output in some lines must be eased until that in other lines catches up.

This adjustment is going to be hard on some plants and on some communities. It is unfortunate from many angles. Nevertheless it is difficult to see how it can be avoided.

The ordeal can be made less painful if industrial management, employes and the public thoroughly understand why the shutdowns are necessary and if the government agencies will make every possible effort to minimize the shock of adjustment.

The actual experience of plant conversion a few months ago proved to be less painful than had been expected. Hard work, co-operation and understanding may make the impending adjustment less violent than now is anticipated.

E. L. Shaner
Editor-in-Chief

Steel Ingot Capacity Increase of 9,710,000 Tons Is Recommended

✦

Expansion program curtailed from original estimates to save critical materials . . . Pig iron facilities to be enlarged by 10,945,000 tons . . . Additional coke ovens to be constructed

✦

WASHINGTON

A STEEL ingot capacity for the United States of 98,279,970 tons by mid-1943 was recommended last week by the Iron and Steel Branch, War Production Board.

This is 9,710,000 tons more than the 88,569,970-tons present rated capacity of the industry and represents a 10 per cent reduction from the 10,762,000 tons originally approved following the authorization of the Supply Priorities and Allocations Board, Sept. 30, 1941.

The recommendation was made in a review of the expansion program prepared by W. A. Hauck, head of the steel planning unit of the branch. The review was made by the branch and by representatives of the Army-Navy Munitions Board following an order by WPB Chairman Donald M. Nelson that all expansion programs be reviewed to save as much critical material as possible.

Completion of the recommended program will present this picture of the nation's steelmaking capacity in net tons:

	Dec. 31, 1941	June 30, 1943
Pig Iron	59,406,410	70,351,410
Ingots:		
Electric	3,741,310	5,759,310
Bessemer	6,721,400	6,721,400
Open Hearth	78,107,260	85,799,260
Total Ingots	88,569,970	98,279,970

Not only ingots, but coke and pig iron expansion also have been curtailed in the revised program. Here are the current recommendations as contrasted with the original expansion authorizations, in tons:

	Original expansion	Present program	Per cent of reduction
Coke	9,359,000	7,083,000	24
Pig Iron	13,810,550	10,945,000	21
Ingots:			
Open hearth	8,744,000	7,692,000	12
Electric	2,018,000	2,018,000	None

The increase in open-hearth steel capacity will be obtained by three steps. New furnaces will provide 4,891,000 tons of the 7,692,000-ton increase; hot metal from blast furnaces, instead of cold scrap, will account for 2,163,000 tons, and restoring and enlarging old furnaces will bring in 638,000 tons.

Some Furnaces Completed

Of the total increase in ingot capacity, 5,165,000 tons will be completed in 1942 and the additional 4,545,000 tons brought into production in the first six months of 1943. Many of the projects are well on their way to completion at present and some already are in operation.

No such increase in steel ingot facilities can be undertaken without a corresponding increase in pig iron capacity. In fact, the report calls for an even larger increase in raw materials facilities to make up for the reduced amount of purchased scrap expected next year and thereafter.

Thus the expansion program actually starts with the expansion of iron ore mining in New York, New Jersey, Texas, southern California and Utah.

A further step in this program is the construction of 21 new ore boats for the Great Lakes. These new carriers, in addition to present capacity, are expected to fill ore needs through 1944 and thereafter.

The increase in pig iron capacity is to be brought about by these steps:

	Tons
From 20 new blast furnaces	8,118,000
From 6 abandoned furnaces restored	1,235,000
From enlargement of 9 existing furnaces	853,000
From use of sintered ore	599,000
From use of thinner furnace linings	140,000
	10,945,000

This year will see the completion of 6,349,000 tons of this total, with the remaining 4,596,000 to be completed in 1943. Completion of the pig iron program will make 70,351,410 tons available, with 9,500,000 tons necessary for merchant iron and ferroalloys. This leaves 60,851,410 tons available for steelmaking.

Full use of the entire 98,000,000 tons of steel capacity will require 109,463,223 tons of metallics, made up as follows:

	Tons
Pig iron	60,851,410
Plant scrap	26,828,607
Metal in ore	5,834,406
Purchased scrap	16,000,000

These sources provide surplus metallics of only 51,194 tons, provided purchased scrap is a constant figure. The report recommends additional pig iron capacity to insure against declines in the purchasable scrap supply.

In addition to the steel expansion program, the report also lists a 70 per cent increase in steel foundry facilities to make vital war castings. The program in detail:

	Tons
Sponsored by WPB	223,560
Privately financed	501,024
Sponsored by War Department	628,200
Sponsored by Navy Department	41,700
Total Expansion	1,394,484
Annual capacity, July 1, 1941	1,896,000
Total proposed capacity	3,290,484

Ingot capacity of 98,000,000 tons, the report points out, will provide 68,796,000 tons a year of finished steel products. These may be distributed as the needs of the war determine, as finishing facilities are approximately 30 per cent higher than metallic capacity. Present finished products capacity is approximately 62,098,979 tons. Text of the report, in part, follows:

"This report is in response to the directive of May 15, 1942, from Mr. A. I. Henderson, Director of Materials Division, War Production Board, to prepare an analysis of all projects for securing maximum production from existing capacity and

for further increasing such capacity, which have been sponsored by the Iron and Steel Branch and to submit our opinion as to whether or not each project should be (a) pushed as rapidly as possible, (b) deferred, or (c) abandoned. It is our understanding that this report will be the subject of a review, the purpose of which is to permit the deferment of projects which (a) interfere with the production of military end products during 1942 and the first six months of 1943, or which (b) will not be completed until July 1, 1943.

"As any steel expansion requires plates, structurals, and other materials and accordingly will interfere with the production of military end products during 1942 and the first six months of 1943, this report is limited to that part of the directive which requires that those projects be deferred which will not be completed prior to July 1, 1943, giving consideration to the present status of the projects.

Requirements Not Known

"The steel expansion projects reviewed in this report comprise the expansion program to date, authorized by SPAB on Sept. 30, 1941, for increasing the basic capacity of the steel industry by 10,000,000 ingot tons including all necessary integrating facilities for balancing, together with the extra pig iron capacity needed to offset the present and estimated prospective shortage of scrap.

"This program includes all new ingot capacity originating subsequent to May 31, 1941, with all new facilities for providing raw materials and for balancing production, approved by the Office of Production Management and its successor, the War Production Board. Except as specifically noted herein, it does not include expansion for increasing steel production provided directly by the War and Navy Departments or expansion other than basic provided in programs financed by steel companies.

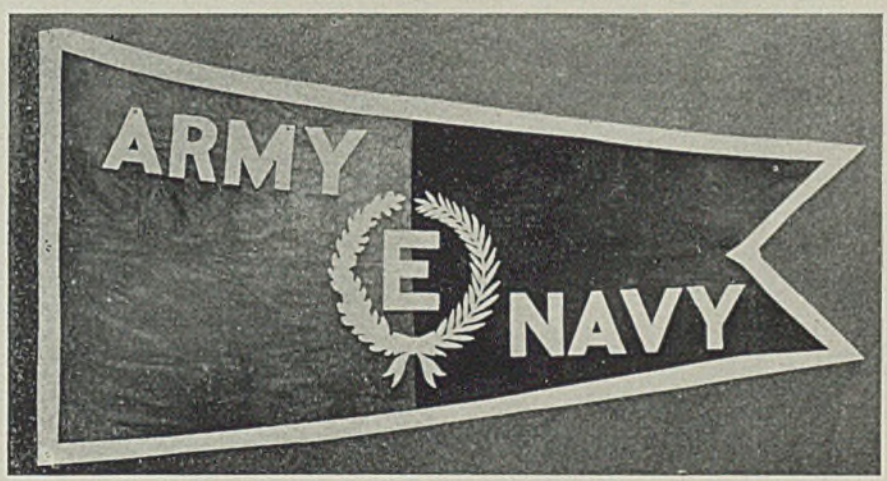
"Included in the above program are 2,200,000 tons of new basic open-hearth ingot capacity sponsored by the Navy Department. This 2,200,000 tons specifically sponsored or installed by the Navy Department is 45 per cent of the 4,891,000 tons of total additional capacity of new open-hearth furnaces included in this expansion program. Also included in this expansion program are 361,000 tons of additional new electric furnace capacity likewise specifically sponsored or installed by the War and Navy Departments, making a total of 2,561,000 tons of the new ingot capacity included in this expansion program specifically sponsored or installed by these departments.

"Definite steel requirements for the entire war program have always been difficult to obtain and for the most part were incomplete and misleading, due to lack of necessary detail and constant revision, mostly upward. Various estimates have been received on overall requirements for steel which could not, however, safely be considered as any more than a partial guide on the necessary ingot capacity. Total steel requirements, present and future, for the entire war program by specific products and tonnages have not been fully established. On certain products, however, such as plates, current and near future requirements have been closely determined but even on this emphasized product, it is not possible to safely predict future requirements as the basis for establishing any further needed plate capacity.

"Basic capacity of the steel industry is measured in terms of ingot tons which include open hearth, electric furnace, and bessemer ingot capacities and is definitely known as of certain dates. Total mill finishing capacity is also known but the capacity of these mills by specific products is flexible and depends on demand and the type of such products.

"In the absence of definite product requirements, it became necessary to establish a plan for increasing basic capacity and providing balancing facilities in a plant where the war demand for its various products was in excess of the capacity of the industry to adequately supply and it appeared clear that this condition would probably continue. To a considerable extent, the projects for increasing capacity included in this expansion program originated under this plan, after exhaustive studies were made on the possibility of providing such capacity in other logical areas from existing facilities. In numerous cases such as the aircraft, ship, and tank programs, it was obvious from the start that additional capacity

Army and Navy Offer Combined Production Awards



New combined Army-Navy production award which will supersede the Navy "E," the Army "A" and the Army-Navy Star award, was announced last week.

It will consist of a flag to be flown by the selected plants and pins to be worn by employes.

The new flag is swallow-tailed, with a white capital "E" in a yellow wreath of oak and laurel leaves on a vertically divided blue and red background in a white border. "Army" will be on the red background and "Navy" on the blue.

The pin (right) has a silver "E" —for Excellence—surrounded by a wreath of oak leaves at its left and laurel leaves at its right. Upper and lower bars are Army red and the center bar is Navy blue.

Procurement officers for the Army and local inspectors or supervisors for the Navy will recommend war plants to receive the awards. They will forward nominations with supporting data to the appropriate Navy bureau chief or Army supply chief in Washington, who, after study, will send the nominations, with their recommendations to the Army or Navy board for production awards.

Some plants already have qualified for the new award and initial recipients will be announced soon.

would be needed to help meet the constantly increasing steel requirements and it was so provided.

"Steel ingots are made from pig iron and iron and steel scrap. Due to the present and prospective acute shortage of iron and steel scrap, it became necessary to build additional blast furnaces for increasing production of pig iron to offset this growing shortage of scrap. This was done in order to secure highest possible production from existing ingot capacity. To service the ingot capacity of 88,569,970 tons as of Dec. 31, 1941, it became necessary on account of this scrap shortage to provide 3,000,000 tons of extra pig iron capacity to ensure so far as possible, full future production from this existing ingot capacity, based on an estimated annual supply of 16,000,000 tons (estimate may be too high) of purchased iron and steel scrap. This 3,000,000 tons of extra pig iron capacity is part of the 10,945,000 tons of new pig iron capacity provided in this curtailed expansion program.

"The plan of providing extra pig iron to offset iron and steel scrap shortage and balance ingot capacity requires coke ovens and blast furnaces much in excess of the number necessary, could dependence be placed on a future normal supply of scrap.

"The requirements and supply of metallics for the expanded capacity are barely in balance. This is a dangerous situation in view of the declining supply of scrap. More pig iron capacity is essential to better ensure maximum production from the existing ingot capacity.

"Included in this expansion program are additional blooming mills, semifinishing mills and finishing mills. These mills not only provide finishing capacity necessary for utilization of new ingot capacity, but also in many cases provide a better balance for existing ingot capacity. In some cases it was also necessary to provide additional ingot capacity for better balancing maximum finishing capacity for certain products.

"Originally the objective of this steel expansion program was to provide adequate steel capacity to meet as needed direct and indirect war requirements for the Army, Navy, Maritime Commission and lend-lease. It was also intended at that time to provide for essential civilian demand.

Little for Civilian Use

"In the earlier days of the defense program there was considerable steel production for civilian consumption. Such production has since been gradually eliminated. At the present time only a small restricted tonnage is provided for so-called civilian use and an analysis of the end products from such tonnage discloses direct connection with the war program.

"In further consideration of the objective for steel expansion, it is as difficult and unsatisfactory as ever to definitely predict future demands for steel for the war program and any additional capacity needed. Steel demands for the war program are now in excess of supply. In the meantime, it is advisable to rush completion on all steel projects herein recommended as most urgent and susceptible to earliest completion and secure the maximum benefit in the shortest possible time.

"In planning the steel expansion program, consideration was first given to installing new capacity in existing plants. This method has the advantages of earlier start of production, less steel and other scarce materials consumed in construction, lower cost, more efficient operation and better economic value after the war. Difficulties experienced in financing expansion under this method with public funds somewhat restricted its general application.

"In certain cases it was necessary to establish entirely new plants in order to decentralize the industry and establish construction near consuming areas as well as to make full use of adequate reserves of suitable raw materials, especially iron ore in areas other than the Great Lakes ore area. Instances of this are the Columbia Steel (U. S. Steel Corp.) project near Provo, Utah, the Sheffield Steel project at Houston, Tex., and the Kaiser project at Fontana in southern California. The Republic Steel project at Chicago is another somewhat similar instance. Plants of this type are known as 'grass root' plants.

"Considerable additional ingot capacity as well as pig iron capacity, coke capacity and mill capacity was secured through the rehabilitation of shut-down and practically abandoned facilities. 1,235,000 tons of additional pig iron capacity have been secured through the restoration of abandoned blast furnaces, 853,000 tons secured through enlargement of existing blast furnaces, 599,000 tons secured to date (more to follow) through the use of sintered ore and 140,000 tons secured by the use of thinner linings. These projects account for 2,827,000 tons of the additional blast furnace capacity included in this expansion program and the critical and scarce materials used were comparatively little and far under such requirements for new blast furnaces.

"638,000 tons additional open-hearth capacity were secured through restoring or enlarging existing furnaces, also using comparatively little critical and scarce materials.

"Of special interest is the 2,163,000 tons of additional open-hearth ingot capacity secured in existing

Warehouses To Be Permitted To Sell Steel Only on A-1-a or Higher Ratings

WASHINGTON

WAR Production Board has ordered that steel warehouses shall not sell on ratings under A-1-a, except for maintenance and repair and with some specific exceptions, after Aug. 1.

The order is designed to permit the warehouses to continue to fill emergency orders for small amounts of steel. Warehouse stocks have been depleted because they have been requird to sell on ratings as low as A-10 and have been able to replenish supplies only on top ratings.

The new order, Amendment No. 6 to M-21-b, also provides that warehouses must operate under all other delivery restrictions applicable to steel producers.

Maintenance and repair parts may be delivered below A-1-a ratings, provided that deliveries in any calendar quarter do not exceed these percentages of the total quarterly quota of a warehouse for such products

Stainless steel	3%
Tool steel	3%
Other alloys	3%
All other steel or iron	5%

Flat-rolled products below prime grade may be delivered down to A-3 ratings and cast iron soil or culvert pipe larger than 4-inch down to A-10. Nails, bale ties, small pipe, fence wire and posts, poultry netting, steel roofing and similar products may continue to be delivered on lower rated or unrated orders.

Deliveries of oil well casing, pipe and tubing are exempted by the action from the general restriction on carload shipments by warehouses. Carload shipments of these products may be made by warehouses without restriction, but this exception does not relieve warehouses from complying with Price Schedule 49.

open-hearth furnaces by the use of hot metal from the additional pig iron capacity being provided in this program. This 2,163,000 tons of additional capacity did not require new open-hearth construction.

"At present every effort is being made to avoid to the greatest extent consistent with practicability, the use of critical and scarce materials in the completion of the construction program now underway, and projects are now 'stripped' of such materials. This conservation of critical and scarce materials is in accordance with the policy adopted by the War and Navy Departments and is the subject of special instructions to the steel industry. This should result in the elimination of much tonnage of critical and scarce materials with a consequent saving of this tonnage.

"The steel expansion program was carefully reviewed six months ago by the subcommittee of the Iron and Steel Industry on Steel Expansion in conjunction with interested members of the Iron and Steel Branch for the purpose of establishing a construction schedule."

CIO Seeks To Extend "Little Steel" Victory Throughout All Industry

DEMANDS for wage increases, maintenance of union membership and the checkoff will be made against all steel companies which have contracts with the United Steelworkers of America-CIO. This was clearly indicated last week when the union, quickly pursuing the victory awarded it by the National War Labor Board in the "Little Steel" case, canceled contracts with leading producers and requested negotiations for new contracts.

Meanwhile Bethlehem Steel Co. and Republic Steel Corp. advised the NWLB they would comply with the board's directive order under protest and solely in the interests of full war production.

Inland Steel Co. told the board it intended to test the board's power to impose union security in the federal courts and asked for an extension of the period in which the company is required to inform the board whether it will comply with the board's order, to allow time to file suit.

Youngstown Sheet & Tube Co. will grant the wage increase but will ask for a court test of the board's power to order union security and the checkoff.

In notifying NWLB of its intention to comply with the order, Bethlehem, through President E. G. Grace, told the board: "It is still our opinion that . . . your orders ignore the basic principles on which our government was founded and the results of them will be harmful to our national economy and to the war effort."

R. J. Wysor, president, Republic Steel Corp., said his company "is unanimous in believing that your decision is unsound and constitutes a serious threat to the whole national economy." Mr. Wysor said that in normal times Republic would appeal to the courts to test the legality of the order, but that to further the war effort the company was complying with the directive.

All three companies have agreed to meet with union representatives.

Protest Coercion

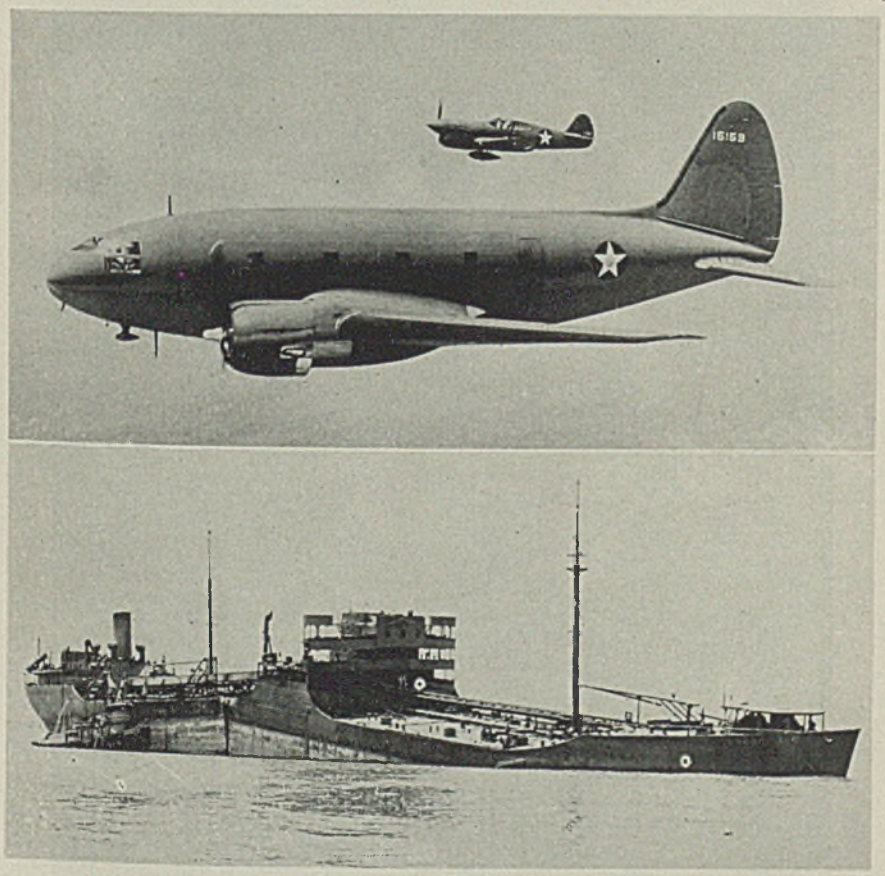
Protest against coercion of nonunion employes was lodged with NWLB by Inland Steel Co.

Wilfred Sykes, Inland president, wired the board that within a few hours after the board's order directing a wage increase, maintenance of union membership and the check-off, large numbers of union pickets obstructed the gates of the company's Indiana Harbor plant. Nonunion members were coerced into joining the union and paying union dues by physical violence and threats.

Inland, in arguing against the imposition of union maintenance during the board's and its panel's hearings of the last four months, stressed the use of coercion by the United Steelworkers of America.

Mr. Sykes informed the board that a parade of about 1500 union men paraded the streets near the Indiana Harbor plant soon after the board's order was announced. Many of the paraders dropped out at the plant gates to form picket lines and permitted no workers without paid-up union cards to enter the plant.

Industrialists sadly paid tribute to clever strategy by the steelworkers' group and its pro-union friends in the administration: The CIO obscured its real victory by grudgingly accepting the 44-cent wage in-



QUESTION OF THE WEEK—Shall the Atlantic be bridged by ships or planes? Continued sinking of United Nations' cargo vessels by Axis submarines prompted Henry J. Kaiser, West coast engineer and industrialist, to propose construction of a huge fleet of super cargo planes to ferry men and materials across the Atlantic. WPB officials are studying his proposal but high officials have indicated they will proceed cautiously. Pictured are: Above, Curtiss Commando, new 25-ton troopship, dwarfing Curtis Warhawk fighter; and, below, large American tanker damaged by mine explosion being towed into port. NEA photos

crease while obtaining the long-sought and highly controversial check-off and union security clauses —all in the name of the war effort.

With equal sadness, business interests and economists concluded that the administration is conducting only a sham battle against inflation —after studying the 79 pages of opinions in which the NWLB granted the 44-cent wages increase, check-off and union maintenance.

Although the board officially took cognizance of the "tragic race between wages and prices" the majority opinion said that if any worker averaged less than a 15 per cent increase in hourly wage rates from Jan. 1, 1941, to May, 1942, that worker was entitled to such an increase. (STEEL, July 20, p. 42).

Thus the board exceeded the facts in the case before it had established a broad pattern for all war workers; that is, for all workers who are organized to demand a wage increase.

The directive, according to opinion in the industry, contradicted the program set forth on April 27 by the President, by whose authority alone the board derives its power. After the board's decision was unofficially announced, the White House allowed vague reports to filter out that the President might do something to stabilize wages. These rumors, however, were not confirmed, nor was the "something" to be done defined.

The board's decision to freeze the ratio between living costs and wages as of Jan. 1, 1941, negated the repeated statements of the President, Donald M. Nelson and Leon Henderson that the people must endure a lower standard of living for the duration of the war.

Employer members of the board —Roger D. Lapham, E. J. McMillan, George H. Mead and Horace B. Horton—voted with the public members, three college professors and a lawyer, although they did so with "mixed feelings." They pointed out that their proposal for no wage increase whatsoever had been voted down 8 to 4.

In a separate opinion, the employer members stated "there should be some central body set up to stabilize all wages, not only in the event of disputes, but also where no disputes exist. Government should define a national wage policy and lay down rules to make its policy really effective. We should prevent voluntary general wage increases which all tend to upset the anti-inflation program.

"No one can deny that any wage stabilization program to be effective must go hand-in-hand with a price fixing program, a price fixing of all commodities, including farm products. Industry has already accepted price ceilings imposed upon it products; labor must likewise accept a wage ceiling."

Mr. Lapham, steamship company executive, who was a member of the National Defense Mediation Board and a member of the industry-labor conference last December which led to the establishment of the NWLB, issued a separate statement setting forth impressions gained through the various disputes which have come before the board and its predecessor:

"As an individual who has no axe to grind and who has been forced to take it (and not on the chin), rather than hand it out, I dare the following observations of a most general character.

"1—Management has plenty to learn in dealing with such spokesmen of labor as they are required to deal with. Management must learn a technique and philosophy now foreign to the great majority in its ranks. A suggested motto for management is 'Get wise and face realities.'

"2—Labor leaders must learn that their high, wide and fancy decade is about over and that the World War we are now engaged in is really going on.

"3—In these days, industry has had taken from it the right to do business as usual. Industry has accepted orders to convert from peace to war production and is doing a grand job complying, but even now, many plants are idle or partially idle because through no fault of management, the government has shut down operations.

"4—Labor leaders still demand privileges and favors because they have given up the right to strike. This is plain bunk, with a capital 'B'. What citizen has a right to strike in a war for his country's existence? Yet stoppages and slow-downs appear to be on the increase and the overworked members of this National War Labor Board are still compelled to take time out because of AFL-CIO jurisdictional disputes. Even now, through no fault of management, production is down or curtailed because so far the top-side leaders of labor have forgotten the pledge given at the management-labor conference last December—

VOLUTE SPRINGS for light and medium tanks, made in American Locomotive Co.'s Chicago Heights, Ill., plant. With the exception of the spring shop the plant was closed down just ten years ago, recently reopened for manufacture of railroad supplies and war materiel

which was that all inter-union quarrels in which the AFL and CIO were involved would be abandoned for the war period. Mr. William Green and Mr. Philip Murray cannot place all blame on locals whether autonomous or not.

"5—As an employer member of this board, I am grateful for the privilege of free speech, one of the things we are at war to retain."

In their dissenting opinion on the maintenance of union membership issue, employer members said the board "had imposed upon . . . these companies and the union conditions to which the companies are unalterably opposed in principle, and has made the companies unwilling collection agencies for the unions."

AFL Strike Affects CIO Steel Operations

Granite City Steel Co.'s open-hearth steel production was affected last week by a strike of 67 American Federation of Labor locomotive engineers on a small railroad delivering hot metal from the Granite City Pig Iron Co.'s plant. Metal was transported by other means, but use of cold pigs retarded production. The steel company has a contract with CIO's United Steelworkers of America. Strike was considered to be "a raid" by AFL on the CIO.

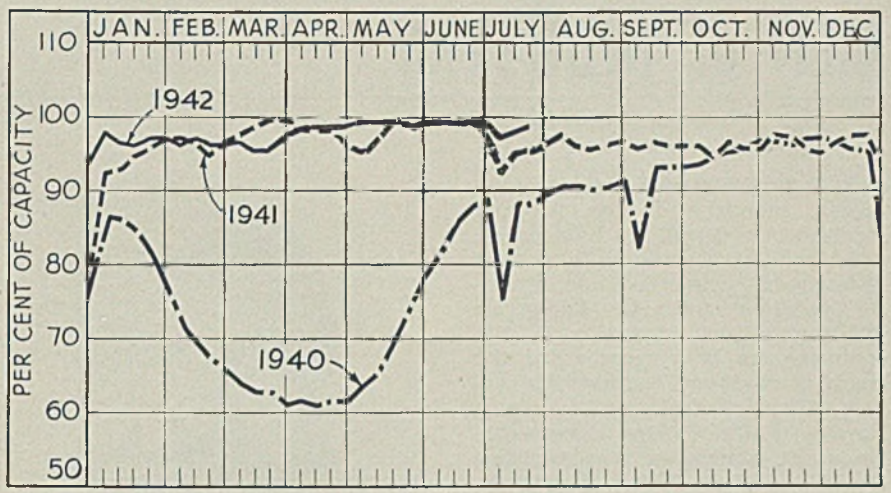
Coking Coal Truck Drivers Resume Work Pending Arbitration

Striking truck drivers who haul coal to independent coke ovens in the Uniontown, Pa., district resumed work last week pending arbitration by Dr. Frank Pearson, professor of economics at Swarthmore University. Drivers have accepted his proposed compromise providing that present 50-cent scale be lifted to 75 cents for trucks up to five tons and 80 cents for heavier types. Increase would be retroactive to June 15.

Settlement will not become effective until OPA rules on request for higher rates asked by operators.

Carnegie To Close Tin Mill at Canonsburg, Pa.

Carnegie-Illinois Steel Corp. last week notified employes of its tin plate plant at Canonsburg, Pa., that production will be discontinued, due to war conditions. The hot mills will close Aug. 7 but the black pickling, annealing and cold-rolling departments will continue until stocks have been processed. The tinning department will continue to operate temporarily on black plate from Irvin Works. Many employes will be placed at other plants.



PRODUCTION . . . . Up

PRODUCTION of open-hearth, bessemer and electric furnace ingots last week increased ½-point to 98½ per cent. Five districts advanced, two declined and five were unchanged. A year ago the rate was 96 per cent; two years ago it was 89½ per cent, based on capacity on those dates.

Youngstown, O.—With 75 open hearths and three bessemers in operation the district rate is down 1 point to 95 per cent. Sharon Steel Corp. reached 100 per cent with six open hearths on but Republic Steel Corp. took off a furnace. Carnegie-Illinois Steel Corp. has finished repairs to a blast furnace stack and will relight at once.

Chicago—Advanced ½-point to 102½ per cent, despite a critical scrap situation. Carnegie-Illinois Steel Corp. has relighted its Gary No. 2 blast furnace, out since July 4 for relining, all stacks in the district now being active.

Buffalo—Unchanged at 93 per cent, with 40 of 43 open hearths in operation.

St. Louis—Despite a strike limiting hot metal delivery to one plant production was maintained at 95½ per cent for the seventh week.

Detroit—With 22 of the 26 open hearths in operation the rate held at 85 per cent, four furnaces being under repair.

Central eastern seaboard—Continued at 96 per cent for eighth week, on moderate scrap supply.

Cleveland—Lighting of additional open-hearth capacity caused a rise of 2 points to 96½ per cent.

Pittsburgh—Advanced ½-point to 94½ per cent from slight changes in active equipment.

Wheeling—Declined 3 points to 80½ per cent.

Birmingham—Steady at 95 per cent, with 23 open hearths active. All 21 blast furnace stacks are producing, Tennessee Coal, Iron & Railroad Co. having blown in its relined stack at Ensley, Ala.

Cincinnati—At 92 per cent, a gain of 3½ points.

New England—With two producers at capacity the district rate rose 3 points to 93 per cent.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended July 25	Change	Same week 1941	Same week 1940
Pittsburgh	94.5	+ 0.5	100	86.5
Chicago	102.5	+ 0.5	100	96.5
Eastern Pa.	96	None	95.5	86
Youngstown	95	— 1	98	85
Wheeling	80.5	— 3	93	94
Cleveland	96.5	+ 2	96	65
Buffalo	93	None	93	90.5
Birmingham	95	None	90	92
New England	93	+ 3	85	75
Cincinnati	92	+ 3.5	85.5	85
St. Louis	95.5	None	98	65
Detroit	85	None	88	99
Average	98.5	+ 0.5	*96	*89.5

*Computed on basis of steelmaking capacity as of those dates.

Higgins Cancelation "Only the Beginning"

WPB officials last week said that the Maritime Commission's order halting construction at the Higgins Shipbuilding Co. at New Orleans was only the beginning of many other orders curtailing construction of new war plants.

Cancelation of the Higgins contract, which involved about $65,000,000, was ascribed to insufficient steel for building both shipbuilding plants and the ships themselves.

In the future emphasis will be placed on the finished products—the ships—rather than the facilities to construct them.

Resultant dislocations are expected to be severe, WPB officials admitted.

MEN of INDUSTRY

A. E. R. PETERKA, executive engineer, manager of the Aircraft Products Division, Lamson & Sessions Co., Cleveland, has been ordered to active duty as a major in the Army Air Force. In addition to his duties with the company, he is a member of the board of directors, Dardelet Threadlock Corp., Detroit, and Aircraft Hardware Mfg. Co. Inc., New York. He is also a member, War Advisory Board, American Society for Metals, and chairman of the Cleveland chapter.

♦

Dan C. Hungerford has resigned as vice president and director, Elastic Stop Nut Corp., Union, N. J. He had been associated with the corporation since 1936.

♦

Victor H. Lawrence, since August, 1941, assistant to president, Otis Steel Co., Cleveland, has been named general superintendent of the Otis Works of Jones & Laughlin Steel Corp., at Cleveland.

♦

Howard M. Dawson, formerly with the Detroit office of Jessop Steel Co., Washington, Pa., has been placed in charge of the export department, with headquarters in the New York district office. **Fred Jessop Wood** has taken over Mr. Dawson's former duties in Detroit.

♦

William T. Sanford has been appointed service manager, Railroad Division, Buda Co., Harvey, Ill. Mr. Sanford's previous connections include Hoosick Electric Specialty Co., Hoosick Falls, N. Y.; Chrysler Corp., Detroit, as automotive and diesel field engineer; and field engineer for Sinclair Refining Co. and Socony-Vacuum Co:, Chicago.

♦

A. W. Herrington, president of the Society of Automotive Engineers, technical adviser to Col. Louis A. Johnson on the recent American Economic Mission to India, and president of Marmon-Herrington Co., Indianapolis, has been elected to serve for three years as a director, American Society of Military Engineers.

♦

Worthing H. Stone has been promoted to assistant advertising manager, Timken Roller Bearing Co., Canton, O., and will be in charge of advertising for the Railroad, Farm Implement, Automotive and Rock Bit Divisions. He joined Timken in 1936 as manager of its exhibit at the Great Lakes Exposition in Cleveland, after which he became associated with the company's sales promotion work.

A. E. R. Peterka

S. L. Huffman, a member of the advertising staff several years, has been advanced to manager of the New Bureau. He will continue his present duties of handling advertising of the Steel & Tube Division.

Peter C. Poss continues his present activities of assistant advertising manager, supervising the buying of publication space and printing, and in addition will take over publishing of technical information for the engineering fraternity, an activity which the company plans to expand in co-operation with the war effort.

♦

H. S. Landon, the past eight years, Chicago and western district sales manager, Ohio Ferro-Alloys Corp., has been transferred to the general office at Canton, O., as general manager of sales.

The Chicago district office at 1740 Conway building, will be in charge of **B. A. Patch,** who has been in that territory for some years in connection with pig iron, alloys and fluorspar sales.

♦

William E. Mosher has been elected president, United States Radiator Corp., Detroit, succeeding the late Elwood S. White. **James F. McIntire** has been made first vice president. Mr. McIntire has also been elected president, Pacific Steel Boiler Corp., succeeding the late Mr. White.

♦

Edward F. Moran, since December, 1941, X-ray sales manager, Westinghouse Electric & Mfg. Co., has been appointed assistant to the manager, X-ray division, with headquarters at Baltimore.

Chandler S. Eason, manager of the division's Philadelphia office, succeeds Mr. Moran as X-ray manager. Mr. Eason is succeeded in Philadelphia by **Frank Thomson III,** who will also direct sales activities of the division's newly formed Middle Atlantic district.

♦

George Lowe, the past 11 years distributor for The Stanley Works, New Britain, Conn., for all export and Middle Atlantic states sales, has been appointed supervisor, new business research, Carnegie-Illinois Steel Corp., Pittsburgh.

♦

R. S. Neblett, assistant manager of General Electric Co.'s turbine division, has been appointed to a position with the Bureau of Ships, United States Navy, Washington. Mr. Neblett will be engaged in work expediting the manufacture and delivery of geared-turbine propulsion sets for Navy ships.

♦

John W. Livingston has resigned as vice president and a director, Monsanto Chemical Co., St. Louis, and as general manager of the company's organic chemicals division, to join the Rubber Reserve Co., Washington, as consulting engineer.

♦

Walter Hochschild, secretary, and **Norman Hickman,** manager of sales, American Metal Co. Ltd., New York, have been elected vice presidents. Both have been members of the board of directors a number of years.

♦

R. B. Smith, commercial agent, Illinois Central system, Peoria, Ill., has been named assistant coal traffic manager, with headquarters in Chicago. He has been succeeded in Peoria by **Charles H. Campbell,** heretofore commercial agent in Minneapolis.

♦

Paul F. McLaughlin, Buffalo district chief of the automobile graveyard section of WPB, has been appointed to supervise movement of scrap material from dealers' yards.

♦

Henry Fishbeck has been transferred from the inspection department to the manufacturing department, Pratt & Whitney Aircraft Division of United Aircraft Corp., East Hartford, Conn. He will be responsible for materials processing.

♦

Benjamin F. Parlett Jr. has been appointed to the sales staff of Hanson-Van Winkle-Munning Co., Matawan, N. J. The past several months he has been associated with **Glenn**

M. Herring, who for many years has represented the company in the Pittsburgh territory. Mr. Herring is now on duty with the Army as an officer in the Air Corps.

♦

Dr. Andrey A. Potter, dean of engineering, Purdue University, Lafayette, Ind., has been named executive director, National Patent Planning Commission, Washington.

♦

J. D. Nicholson has been appointed general manager, Mine & Smelter Supply Co., Denver. **Oscar H. Johnson** will continue as vice president in charge of manufacturing.

♦

A. A. Wilson has been appointed assistant general freight agent, Chicago, Milwaukee, St. Paul & Pacific railroad, with offices in Chicago.

♦

Harold P. Banks, New York representative for Frank Samuel & Co. Inc., Philadelphia, has been granted leave of absence to become associated with Metals Reserve Co., Washington.

♦

W. H. Cameron, managing director, National Safety Council, Chicago, retired July 21 after serving 30 years in that capacity. He is succeeded by **Ned H. Dearborn,** since 1934 dean of the division of general education, New York University, New York.

♦

Howard E. Eagleston has been elected vice president in charge of governmental relation department, Essex Wire Corp., Detroit, with headquarters in the Shoreham building, Washington. He will also represent Paranite Wire & Cable Corp., Jonesboro, Ind., and R-B-M Mfg. Co., Logansport, Ind.

♦

H. D. Payne has retired as advertising manager, Chicago Molded Products Corp., Chicago, a post he has held 14 years. He is a former president, Chicago Industrial Advertisers Association.

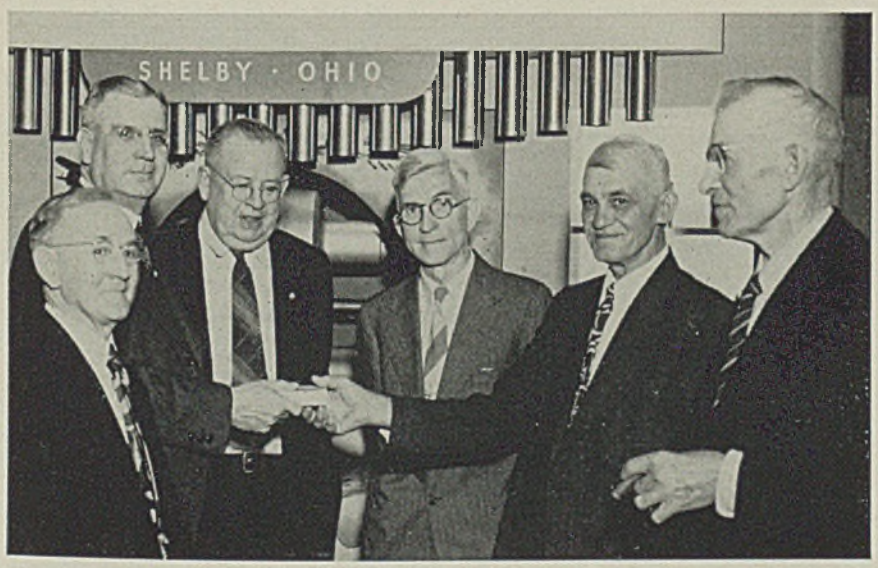
♦

L. E. Newell, formerly chief experimental engineer, Jeffery Mfg. Co., Columbus, O., has been made manager of engineering in charge of new designs, Railway Equipment Manufacturing Division, Buda Co., Harvey, Ill.

♦

New members of the Society of Automotive Engineers war engineering command announced by **J. C. Zeder,** chairman and chief engineer of Chrysler Corp., include **L. R. Buckendale,** vice president and chief engineer, Timken-Detroit Axle Co.; **Arthur Nutt,** vice president of engineering, Wright Aeronautical Corp.; **Don Berlin,** aircraft engineer, General Motors Corp.; **C. G. A. Rosen,** research director, Caterpillar Tractor Co.; **Ralph R. Teetor,** vice president, Perfect Circle Co., and **Earl H. Smith,** executive engineer, Packard Aircraft Engine Division.

Group Serves Seamless Tube Industry Half Century



FIFTY years ago these five men started to work for Ohio Seamless Tube Co., Shelby, O., manufacturing seamless steel tubing from pierced billets imported from Sweden. This was the pioneer stage of the seamless tube industry in the United States. The plant then employed 75, now has 1000. At first bicycle manufacturers took practically the entire output, now continuous production is for war purposes. On the golden anniversary, W. C. Connelly, president, presented a gold watch to the five veterans: Frank Mayer, Cloyd Gates, Tom Dillon, Walter Ohman and Phil Keller

DIED:

Robert E. Brooke, 70, president of the E. & G. Brooke Iron Co., Birdsboro, Pa., and a member of one of Pennsylvania's oldest families of ironmasters, in Williamsport, Pa., July 21.

Furnaces which were the forerunners of the present Brooke plants at Birdsboro provided guns and ammunition for Washington's army during the Revolution.

Mr. Brooke was chairman of the board of directors of the Birdsboro Steel Foundry & Machine Co., treasurer of the E. & G. Brooke Land Co. and president of the Birdsboro Water Co.

Upon graduation from Yale, where he attended Sheffield Scientific School, he began work as a blast furnace clerk at the E. & G. Brooke Iron Co. He became treasurer in 1899 and had been president since 1933. He was made vice president of the Birdsboro Steel Foundry & Machine Co. in 1898 and president in 1912 and had been chairman of the board since 1934.

♦

Charles L. Cornell, 80, electrical engineer and former executive vice president, Niles-Bement-Pond Co. and Pratt & Whitney Co., Hartford, Conn., July 18, at Plainfield, N. J.

♦

Harvey A. Higgins, 76, president, Standard Tool Co., Cleveland, at his summer home in East Aurora, N. Y., July 19. He had been associated with the company 42 years.

♦

W. W. Anderson, sales manager, Nicholson File Co., Providence, R. I., July 18. Mr. Anderson also served as treasurer, American Supply and Machinery Manufacturers' Association Inc., Pittsburgh.

♦

Raymond E. Camp, 60, superintendent of the Scott street works, American Steel & Wire Co., Joliet, Ill., in that city, July 17. He had been associated with the company since 1899.

♦

William W. Fullagar, 57, assistant manager, Chicago branch, Crane Co., in Evanston, Ill., July 11.

♦

Martin S. Paine, 80, chairman of the board, Magnus Metal Corp., New York, July 14, in Queens, N. Y.

♦

S. Adelbert Ellicson, 80, president, Chicago Pulley & Shafting Co., Chicago, in that city, July 11.

♦

Chauncey O. Frisbie, 75, who retired in September, 1941, after serving 14 years as vice president, North American Car Corp., Chicago, July 16, in Philadelphia.

"Pay Now for Goods To Be Delivered After the War"; Plan Studied by OPA

WASHINGTON

CONSIDERABLE serious attention is being given here to the subject of serious study by the Office of Price Administration. The aim is to encourage the consumer to pay now for automobiles, electric refrigerators, radios and many other consumer goods during the present scarcity.

The plan, as described by Robert Nugent, of the OPA Consumer Relationships Division, has a number of objectives.

The primary one is to stratify the desire of the average citizen to spend a portion of his income on goods that will improve his or her mode of living. By siphoning off some of this purchasing power during the war period, there would be that much less money to spend on scarce products during the war, so that the economy would fit into the effort to fight inflation.

Transfers of Savings

Studies reveal that savings in cash only be insane increases. Hence the effort to encourage saving through the purchase of war bonds and stamps has had only a limited result to date. A large portion of the money that has been invested in war bonds merely has been taken out of saving deposits, building and loan funds and investments, and represents transfers of savings rather than new savings.

There is another reason for giving serious thought to the projected plan of installment buying in reverse. That is that it is proving difficult to formulate devices for collecting inside purchasing power. Almost every plan so far considered has some defect. Serious attention was given to a payroll deduction plan but this would not give results on the desired scale since a vast amount of income does not come all or payroll. For example, doctors, dentists and lawyers and many others derive their income in the aggregate without being on payrolls.

Because of the prevailing psychology in regard to saving and spending, the contemplated installment buying plan would be earmarked as a spending plan, not a saving plan. At the same time, it actually would be a saving plan because it would place money at the disposal of the government that otherwise would be spent in various ways. Thus this money would be available to finance the war and would not be used in any way that might encourage the inflationary trend.

The plan has not been worked out in all the fine details but has been broken down in a rough way and it seems to be practical. Say, for example, that a consumer decided to buy a new automobile for delivery after the war or at such time as production of automobiles was resumed. He would arrange with a dealer to pay monthly installments and at the end of a determined period would receive a certificate representing the approximate sales price of the car he elected to buy. The dealer would get a 6 per cent commission, of which 4 per cent would come out of the down payment while the remaining 2 per cent would be collected by him after the payments had been completed.

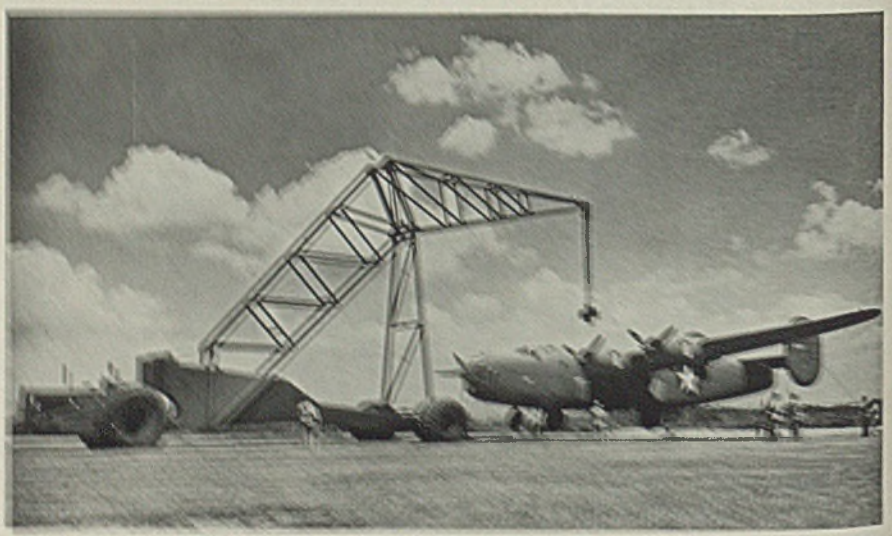
The Treasury Department would receive the money and in compensation would allow a 10 per cent discount to the buyer. That is, a buyer would pay only $900 for a $1000 certificate. Mr. Nugent points out that this would be somewhat of a gamble on the part of the Treasury Department since the Treasury would lose in the event that the war comes to a quick end. On the other hand, the Treasury would be the gainer in the event of a long war. At any rate, the Treasury Department would have the use of this money during the war.

The plan provides for utilization of agencies that normally are used in financing purchases of automobiles and other durable consumer goods, the commission to the financing company to be, say, around 2 per cent. This would not bring any great profit to such companies. At the same time it would prevent them from being forced out of business, a prospect that faces many of them in view of the sharply reduced amount of consumer business that no longer is being offered from financing.

The plan, it is said, would be beneficial in various ways. It would prevent a complete dismemberment of organized endeavor that will be vitally important. It would give automobile manufacturers and other durable consumer goods manufacturers some incentive to continue advertising their products, in the knowledge that through advertising and sales effort they might emerge from the war with a well-filled order book that would simplify their readjustment to peacetime economy. It would give sales organizations and financing organizations an incentive to stay in existence and carry on their normal functions and thus be in a position to help cushion the shock of the war's end.

The plan, as contemplated in a preliminary way, allows certain flexibilities for consumers. Say a consumer arranged with his dealer to buy a certain make and model automobile and that later on, after cars became available, he decided he would rather have another make or model. In that event he would have the privilege of changing over to the car of his choice, without any

Huge Crane Lifts Damaged War Birds



THIS photograph, passed by Army censors, shows a crane developed recently by the Army at Wright Field, Dayton, O., for clearing an air field of damaged craft while the field is under attack, so that other planes may take off and land without delay. It can carry a load of 80,000 pounds at a speed of 18 miles an hour. Here it is lifting a Consolidated B-24, four-motored bomber. NEA photo

loss of the money he paid for his certificate. Such a stipulation, it is thought, would be highly desirable from the standpoint of competition among the various manufacturers.

The customer would have the right to cancel the deal at any time should he so desire. In that event he would get all the money he has paid in with the exception of the commissions absorbed by the dealer and finance company. The plan, however, would stress the fact that a deal of this kind would automatically give the consumer a priority delivery after the product became available, and that by cancelling the deal the customer would lose this priority at a time when such a priority was an important factor in obtaining delivery.

It is felt by those who are formulating the plan that it would bring many benefits. The possibilities in reference to television, as an example, are considered by Mr. Nugent. Television has great possibilities but they cannot be developed under present conditions. However, if manufacturers now could promote the sale of television sets for delivery after the war, or after their production is resumed, we could emerge from the war with a real television industry with all that that entails in reference to our national economy.

In short, it is felt that the adoption of this plan would not only serve effectively in checking the trend towards inflation during the emergency period, but that it would contribute in an important way toward easing the problem of converting from a wartime to a peacetime economy.

PRIORITIES—ALLOCATIONS—PRICES

Weekly summary of orders and regulations issued by WPB and OPA, supplementary to Priorities-Allocations-Prices Guide as published in Section II of STEEL, July 6, 1942.

M ORDERS

M-63-a (Amendment): Imports of Strategic Materials, effective July 15. Provides goods on List 111 may move without restriction if shipped overland or by air from Canada or Mexico. Inland waterways included by amendment, affecting principally traffic movements on Great Lakes and Puget Sound.

M-150 (Amendment): Xylol and Xylol Range Aromatic Materials derived from coal tar included in materials under control of order.

M-191: Lithium Compounds, effective Sept. 1. Will be placed under complete allocation. Requests to be filed on Form PD-585; producers' reports on Form PD-586. Deliveries of 25 pounds or less per month exempted.

L ORDERS

L-26: Farm Machinery and Repair Parts, effective July 14. Original order reissued with only minor changes in language. Supplementary orders L-26-a, b, c, and d and all amendments remain in force.

L-52 (Amendment): Bicycles and Parts, effective July 17. Permits manufacture of approximately 100,000 Victory model bicycles between July 1 and Aug. 31.

L-54-e (Amendment): Office Machinery, effective July 18. Exempts specially designed machine in process at time of original order from production quotas.

L-131: Officer's Insignia. Prohibits use of critical materials in military insignia, but permits limited use of copper in "gold color" insignia.

L-157: Hand Tools Simplification, effective Aug. 9. Prohibits use of alloy steels in any shovels except those used in direct mining operations, and simplifies sizes and standards of shovels, spades, scoops and telegraph spoons.

P ORDERS

P-58 (Amendment): Supplies for South American Mines, effective July 14. Grants higher preference ratings to South American copper mines for maintenance and operating supplies, as follows: A-1-a for 25 per cent of dollar value of material ordered; A-1-d for 35 per cent and A-3 for remainder.

PRICE SCHEDULES REGULATIONS

No. 3 (Amendment): Zinc Scrap Materials and Secondary Slab Zinc, effective July 21. Establishes transportation charge scale to be applied by seller delivering material in own vehicle or private carrier.

No. 2 (Amendment): Aluminum Scrap and Secondary Ingot, effective July 21. Establishes transportation charge scale to be applied by seller delivering material in own or private carrier.

No. 8 (Amendment): Nickel Scrap, effective July 21. Establishes transportation charge scale to be applied by seller delivering material in own or private carrier.

No. 12 (Amendment): Brass Mill Scrap, effective July 21. Establishes transportation charge scale to be applied by seller delivering material by own or private carrier.

No. 70 (Amendment): Lead Scrap Materials, effective July 21. Establishes transportation charge scale to be applied by seller delivering material by own or private carrier.

No. 20 (Amendment): Copper Scrap and Copper Alloy Scrap. Establishes transportation charge scale to be applied by seller delivering material in own or private carrier.

No. 138 (Amendment): Ferromanganese, effective July 25. Establishes maximum prices for ferromanganese briquettes.

Price Regulation No 159, fabricated reinforcing bars, has been amended to exempt fabricator from filing reports on inventories and transactions. Amendment also simplified procedure for determining prices for mill and random stock.

FINANCIAL

Allegheny Ludlum Steel Corp.

Allegheny Ludlum Steel Corp., Brackenridge, Pa., reports consolidated net profit in second quarter 1942 as $1,205,565, compared with $1,449,183 in second quarter 1941. Net earnings in first six months of 1942 totaled $2,436,991, against $4,169,347 in the period last year. Provision for normal taxes in first half 1942 was $1,536,600, excess profits tax reserve amounted to $5,038,300, and reserve for anticipated tax increases totaled $750,000.

Continental Steel Corp.

Continental Steel Corp., Kokomo, Ind., reports second quarter net profit of $234,410, compared with $169,337 in preceding period and $324,435 in the period last year. Six months net totaled $403,747, against $637,558 in comparable period of 1941.

Sharon Steel Corp.

Sharon Steel Corp., Sharon, Pa., reports net profit in second quarter amounted to $386,900, compared with $285,988 in the period last year.

Interlake Iron Corp.

Interlake Iron Corp., Chicago, and subsidiaries report a net profit of $247,840 for the quarter ended June 30, after depreciation, amortization and tax provisions. Earnings are equal to 12 cents a share on 2,000,000 shares of stock.

In the June quarter of 1941, income was $524,469, equal to 26 cents a share; earnings during the first quarter this year were $444,762, or 22 cents a share.

M. A. Hanna Co.

M. A. Hanna Co., Cleveland, reports first half net income of $1,834,730, compared with $1,572,543 in same period of 1941. Provision for federal taxes, estimated on the basis of rates proposed by Congressional Ways and Means Committee, was $790,578; excess profits taxes, estimated on same basis, were $335,000. Second quarter net profit totaled $1,029,870, against $825,333 in comparable period of prior year.

A. M. Castle & Co.

A. M. Castle & Co., Chicago, earned net profit of $212,418 in first six months of this year, compared with $409,555 in first half a year ago. June quarter net profit amounted to $105,185, against $107,233 in same 1941 quarter.

WINDOWS of WASHINGTON

By L. M. LAMM *Washington Editor, STEEL*

Revised PRP forms must be filed by Aug. 10. Allocation classification symbols not required . . . Sentiment in favor of subsidies as price control measure gaining

WASHINGTON

MANUFACTURERS who are required to obtain priority assistance under the Production Requirements Plan must file the revised Form PD-25-a with WPB not later than Aug. 10 to obtain assistance for the fourth quarter, Amory Houghton, Director General for Operations announced last week in releasing the new forms.

Return of the forms by Aug. 10 will mean that for the first time WPB will be able to process the individual applications with a full knowledge of the overall supplies and requirements picture. In addition, elimination of Form PD-275 and simplification of PD-25-a will make it easier for the manufacturer to meet the deadline.

Forms To Be Mailed

"The direction of the flow of critical materials throughout the American industrial system has become our most critical industrial problem," Mr. Hougton said in a letter to applicants under PRP. "Successful administration rests entirely upon the accumulation of factual information relative to your consumption of and requirements for these materials, the demand for which is so far in excess of their supply. The effective implementation of the war effort depends in large part, therefore, on your prompt filing of a properly completed PD-25-A."

Mr. Houghton also pointed out that the fourth quarter application forms have been designed in accordance with the definitely established policy of WPB to make the Production Requirements Plan the primary instrument of the priorities system. "Recent rumors that PRP is going to be 'scrapped' for the fourth quarter are completely without foundation," he said.

With few exceptions, all users of metals in certain forms in excess of $5000 a quarter must operate under PRP.

The Office of Operations emphasized that manufacturers now operating under PRP will receive Form PD-25-a through the mails, and will not have to go to their WPB field office or write to Washington.

The office also warned that because of the time necessary to determine total requirements and make allotments to industries, processing of individual PD-25-a applications will not be completed until September. Those who file the form are therefore asked not to write to WPB inquiring about the return of their applications.

The new PD-25-a, changed in a number of important respects, serves as the basis on which the Requirements Committee will determine total requirements for critical metals for the fourth quarter by industries.

It is also the manufacturer's application to WPB for preference rating assistance in buying authorized quantities of critical materials.

Questions which might arise before Aug. 10 in connection with the definition of a manufacturer's products should be addressed to the Bureau of the Census, Reference CMR, Washington.

Applicants will not be required to submit the information called for by the Allocation Classification System.

J. W. O'Leary Leaves U. S. Chamber of Commerce

John W. O'Leary, chairman of the board, Arthur J. O'Leary & Son Co., Chicago, steel products manufacturers, has resigned as chairman of the executive committee, United States Chamber of Commerce, to devote full time to production.

E. L. Resler, Jones & Laughlin Steel Corp., Pittsburgh, has joined the WPB Iron and Steel Branch as assistant to Reese Taylor, chief. He succeeds R. L. Houston of the International Machine Co.

6-Month Supply of Functional Replacement Parts Permitted

Inventories representing a six-month supply of functional replacement parts for machinery and equipment may now be carried by those wholesalers and distributors subject to the terms of Suppliers Inventory Limitation Order L-63.

This change, and others which exempt entirely machinery and equipment costing in excess of $500, and any material subject to rationing by the OPA, from the restrictions of the inventory limitation order, is effected by Exemption No. 6 to L-63.

Reason for the exemptions is the fact that the items covered are inherently slow-moving, but nevertheless must be carried in stock if a dealer is to perform his function in the distribution system. Other inventory restrictions contained in various "L" and "M" orders are not affected by the action.

Exemption No. 6 permits a distributor, in calculating his inventory, to exclude the exempted items if he also excludes their value in determining total sales on which his permissible inventory is based.

Restrict Use of Copper in Building Construction

Use of copper and copper base alloy is forbidden in building construction by Conservation Order M-9-c-4, issued by the Director General for Operations. The order does not, however, affect wiring.

To conserve copper urgently needed in the war production, the order forbids delivery, acceptance of deivery, or use, installation or connection, of any copper or copper base alloy pipe, tubing or building material containing 5 per cent or more copper except by specific authorization by the Director General. Exceptions are uses of 25 pounds or less to repair a building where the metal so used is to replace copper building material previously installed, and use by the armed services within the terms of the regulation entitled "Prohibited Items for Construction Work."

Subsidies as Price Control Measure Gaining Favor

Sentiment in favor of subsidies to prevent prices from going up appears to be gaining here. This certainly is true as far as officials of the Office of Price Administration is concerned. They feel it will be cheaper in the end to pay out subsidies and thus prevent price increases that would hasten the inflationary trend. Hence it is expected that the $40,000,000 subsidy on coal shipments to New England, due to increased freight rates, will be followed by other government expenditures of this kind to absorb higher production and transportation costs.

At the same time, subsidies are not popular, even among those who favor them. This is because of a number of reasons. In the first place, subsidies are subject to abuse of various types. When government money is handed out, politics and pressule blocks become factors. Another factor is that when business men have to ask the government for subsidies in order to keep from going into bankruptcy there is a certain amount of degradation on their

part, and this has a bad effect on morale. Another factor is that government subsidies automatically serve to restrict freedom of the individual. Still another is that widespread use of subsidies would lead to more government bureaucracy.

Hence the use of subsidies now is coming to be looked upon as far from an ideal aid in the battle against inflation. It is seen merely as the best choice between two evils.

Stovemakers To Figure Steel Consumption on Quarterly Basis

The limited number of manufacturers permitted to produce domestic cooking appliances and heating stoves after July 31 may figure their allowed consumption of iron and steel, subsequent to June 30, on a quarterly, rather than a monthly, basis.

Amendment No. 2 to Limitation Order L-23-c makes this change, as the original provisions made it difficult to fill large orders and did not take into account seasonal patterns of the industry.

Only those manufacturers whose sales for the year ended June 30, 1941, totaled less than $2,000,000 and who are located outside the "labor shortage areas" as listed in L-23-c may continue production after the end of this month.

Permitted consumption of iron and steel during any calendar quarter is three times 70 per cent of a manufacturer's average monthly use for cooking appliances during the base period, and three times 50 per cent of the average amount which went monthly into heating stoves, during the same time.

Many Investigations for War Agencies Completed by FTC

Federal Trade Commission last week announced it has undertaken and completed many investigations for the WPB, OPA, War and Navy Departments, Office of Censorship and other agencies.

For the WPB, the commission has made the following investigations of priorities compliance: Steel, 31 companies; copper and copper scrap, 88 companies; copper ingots, 83 companies; jewel bearings, 172 companies; silverware, 19 companies; and metal working machines, 406 companies.

Investigation of the processors and users of chromium and nickel, 717 companies, is nearly completed, and an investigation of aluminum foundries, covering approximately 947 companies, recently was initiated.

Studies recently undertaken for the OPA and now in progress relate to costs, prices and profits covering a large number of products made by 31 steel producing companies, including all of the larger organizations.

Financial data concerning corporations operating in 84 of the principal strategic materials industries are being compiled in a broad survey of corporation financial reports. This project includes about 4500 corporations from which the commission obtained consolidated financial reports covering the operations of approximately 7000 corporations.

More Industry Advisory Committees Appointed

Additional industry advisory committees in the metalworking field were announced last week by T. Spencer Shore, chief of the Division of Industry Advisory Committees.

Steam Surface Condenser

R. M. Hatfield, consultant, WPB Power Branch, government presiding officer.

Committee members: J. W. Anne, Elliott Co., Jeannette, Pa.; M. L. Carson, Allis-Chalmers Mfg. Co., Milwaukee; Fred W. Chipman, International Engineering Inc., Framingham, Mass.; William M. Kennedy, Condenser Service & Engineering Co., Hoboken, N. J.; Frank Schubert, Schubert-Christy Corp., St. Louis.

Lead Pigment

Erwin Vogelsang, chief, Tin and Lead Branch, government presiding officer.

Committee members: John Allegaert, United Color & Pigment Co., Newark, N. J.; J. M. Bowlby, The Eagle-Picher Lead Co., Cincinnati; Arthur F. Brown, Imperial Paper & Color Corp., Glens Falls, N. Y.; F. O. Case, Anaconda Copper Mining Co., Chicago; S. B. Coolidge Jr., The Sherwin-Williams Co., Cleveland; John R. MacGregor, John R. MacGregor Lead Co., Chicago; C. H. Ruprecht, E. I. duPont de Nemours & Co., Wilmington, Del.; Fletcher W. Rockwell, National Lead Co., New York; P. E. Sprague, The Glidden Co., Cleveland; William Wilke Jr., Hammond Lead Products Inc., Hammond, Ind.

Primary Lead Producers

Erwin Vogelsang, chief, Tin and Lead Branch, government presiding officer.

Committee members: F. H. Brownell, American Smelting & Refining Co., New York; F. F. Colcord, U. S. Smelting Refining & Mining Co. Inc., New York; C. H. Crane, St. Joseph Lead Co., New York; R. E. Dwyer, Anaconda Copper Mining Co., New York; S. A. Easton, Bunker Hill & Sullivan Mining & Concentrating Co., Kellogg, Idaho; Norman Hickman, The American Metal Co. Ltd., New York; A. G. Mackenzie, Utah Metal Mine Operators Association, Salt Lake City, Utah; F. E. Wormser, Lead Industries Association, New York.

Radio Replacement Parts

Frank H. McIntosh, chief, Radio Section Communications Branch, government presiding officer.

Committee members: James P. Quam, Quam-Nichols Co., Chicago; T. A. White, Jensen Radio Mfg. Co., Chicago; Ray F. Sparrow, P. R. Mallory & Co., Indianapolis; Octave Blake, Cornell-Dubilier Electric Corp., South Plainfield, N. J.; I. A. Mitchell, United Transformer Corp., New York; Victor Mucher, Clarostat Mfg. Co., Brooklyn, N. Y.; Ernest Searing, International Resistance Co., Philadelphia; Jerome J. Kahn, Standard Transformer Corp., Chicago; R. C. Sprague, Sprague Specialties Co., North Adams, Mass.; F. R. Hopkins, Girard-Hopkins Co., Oakland, Calif.; F. P. Kenyon, Kenyon Transformer Co. Inc., New York; W. M. Kohring, Continental Carbon Inc., Cleveland; Edwin I. Guthman, E. I. Guthman & Co. Inc., Chicago.

Metallic Lead Products

Erwin Vogelsang, chief, Tin and Lead Branch, government presiding officer.

Committee members: J. M. Bowlby, The Eagle-Picher Lead Co., Cincinnati; Norman Hickman, The American Metal Co. Ltd., New York; W. M. Brooks, E. J. Brooks Co., Newark, N. J.; David N. Burruss Jr., The Glidden Co., Hammond, Ind.; Roger H. Cutting, Northwest Lead Co., Seattle; B. F. Ewell, Rochester Lead Works Inc., Rochester, N. Y.; R. A. Gardiner, Gardiner Metal Co., Chicago; Wilson S. Yerger, Imperial Type Metal Co., Philadelphia; S. N. Hightower, Evans Metal Co., Atlanta, Ga.; Alfred P. Knapp, American Smelting & Refining Co., New York; L. Muscat, United American Metals Corp., Brooklyn, N. Y.; Oscar E. Planteroth, Marks Lissberger & Son Inc., Long Island City, N. Y.; Fletcher W. Rockwell, National Lead Co., New York; Damon Wack, National Bearing Metals Corp., St. Louis.

Advisory Committee On Chemical Processes Named

Appointment of a committee of distinguished chemists to advise the government on technical processes has been announced by Dr. Ernest W. Reid, chief, Chemicals Branch, WPB. The committee will pass upon the relative merits of competing chemical processes in the war effort.

It will be headed by Dr. Donald B. Keyes, chief consultant to the Branch and professor of chemical engineering, University of Illinois. Members are:

Dr. Marston T. Bogart, Belgrade Lakes, Me., emeritus professor of organic chemistry, Columbia University; Dr. Joel H. Hildebrand, Berkeley, Calif., dean, College of Chemistry, University of California; Dr. S. C. Lind, Minneapolis, dean, Institute of Technology, University of Minnesota; Dr. Frank C. Whitmore, State College, Pa., dean, School of Chemistry and Physics, Pennsylvania State College; Dr. Gustavus J. Esselen, Boston, president, Gustavus J. Esselen Inc.; Carl S. Miner, Chicago, director, Miner Laboratories; Dr. Foster D. Snell, New York, president, Foster D. Snell Inc.; Charles O. Brown, New York, consulting chemical engineer; Dr. Charles R. Downs, New York, vice president, Weiss & Downs Inc.; Sidney D. Kirkpatrick, editor, *Chemical and Metallurgical Engineering;* and Dr. Fred R. Rhodes, Ithaca, N. Y., director, School of Chemical Engineering, Cornell University.

Lithium Compounds To Be Placed Under Allocation

A complete allocation system for lithium compounds will be instituted, starting Sep. 1. Order M-191 provides for monthly requests for lithium compounds on Form PD-585 and reports from producers on PD-586.

Deliveries of 25 pounds or less in any one month are exempted from the restrictions of the order.

Standardization of All Hand Tools Ordered by War Production Board

WASHINGTON

TO CONSERVE iron, steel and other critical materials, simplification of sizes and standards of all hand tools has been ordered in Limitation Order L-157.

First tools to be covered by the order will be hand shovels, spades, scoops and telegraph spoons.

A schedule which accompanies the order provides for simplification of these tools in the next few weeks. After Aug. 9, no material for their manufacture may be supplied to any producer unless it conforms to the standards set forth under the schedule. After the end of August, tools which do not conform to the schedule may not be manufactured or delivered by any producer, or accepted by anyone from any producer.

Among other things, the schedule prohibits the use of alloy steel in any shovels except those used in direct mining operations. It is also designed to reduce inventories in the hands of manufacturers and distributors, since they will not carry so many grades. In addition, it will make possible a more orderly purchasing policy on the part of manufacturers, thereby facilitating rolling mill schedules.

Concentration of production on fewer lines will release forging presses and other productive facilities for the manufacture of such items as tank tracks, special tools for the Army, and forgings of various kinds, and will add to the industry's capacity for heat treating armor plates.

Order L-157 authorizes the issuance from time to time of more schedules, establishing simplified practices with respect to types, sizes, forms, specifications, or other qualifications for any hand tools.

Authorize Above-Ceiling Prices For Tools, Pending OPA Rulings

To speed the war effort, makers of new machine tools have been authorized to enter into contracts and make deliveries at prices above established maximum levels while awaiting formal rulings from the OPA on the petitions they must file when they seek increased prices.

The authority was granted in Amendment No. 12 to Revised Price Schedule No. 67, which provides maximum prices for new machine tools.

The purpose of the amendment, OPA announced, is "to eliminate possible delays in entering into the production of critically needed machine tools and extras."

Special Industrial Machinery Branch of WPB Dissolved

The Special Industrial Machinery Branch of WPB has been dissolved and work of the branch will be assigned to other WPB branches.

Operations of the Special Industrial Machinery Branch have been tied in closely with other WPB branches, and it is believed that more efficient administration can be achieved if this work is delegated to the branches most concerned with it.

Six sections were continued within the branch. These were: Food processing machinery; pulp and paper, printing and publishing machinery; petroleum machinery; chemical and allied machinery; textile and shoe machinery; and general industrial machinery, such as woodworking, lumber, saw mill machinery, plastics and tire molding machinery, cement, stone and ceramics machinery.

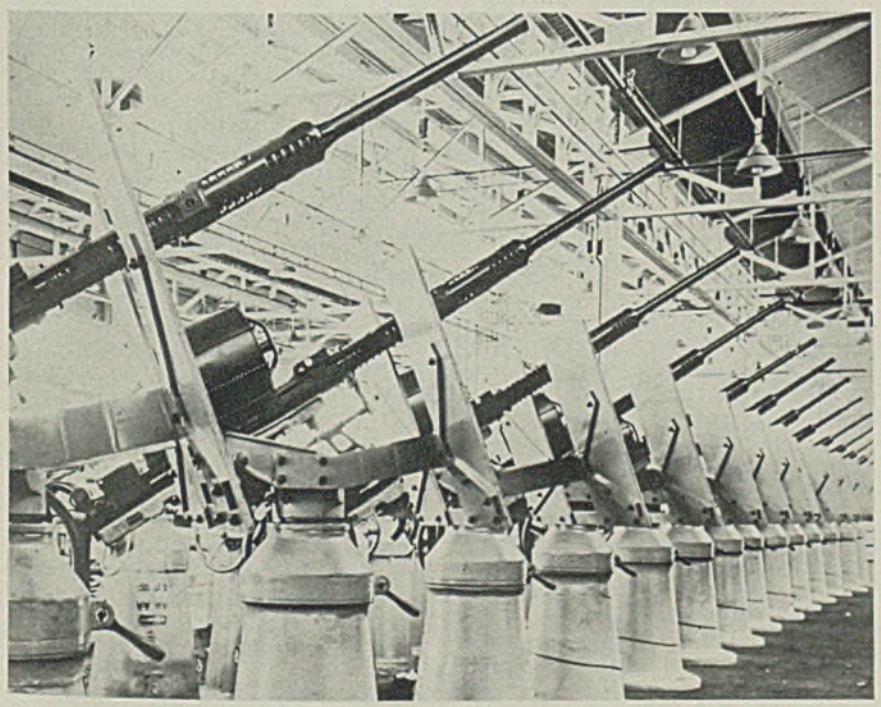
Under the realignment, the food processing machinery section, which has jurisdiction over machinery such as bakery, dairy, ice-cream manufacturing, grain mill, oil mill, canning, etc., as well as packaging machinery of all kinds, will be transferred complete to the General Industrial Equipment Branch.

Pulp and paper machinery will be transferred to the Pulp and Paper Branch and printing and publishing machinery to the Printing and Publishing Branch. Petroleum machinery will be removed from WPB operations and assigned to the Office of Petroleum Co-ordinator.

Both textile and shoe machinery will be transferred to the Textile, Clothing and Leather Branch. The Chemicals Branch will have supervision over plastics machinery and the Rubber Branch will have charge of tire molding machinery. All other general industrial machinery formerly handled by the Special Industrial Machinery Branch will be assigned, for the present, to the General Industrial Equipment Branch.

Iron mines near Capaya, state of Miranda, Venezuela, will start operations soon with production estimated at 10,000,000 tons of ore annually, according to reports to Washington.

Part of One Day's Production at Hudson Plant



THIS completed line of antiaircraft guns represents only a part of one day's production at the U. S. Naval Ordnance plant operated by Hudson Motor Car Co. in Detroit. The 20-millimeter Oerlikem guns are leaving the plant daily in large numbers. They are mounted on American ships for protection against dive bombers. NEA photo

Scale of Permissible Transportation Charges for Scrap Metal Established

WASHINGTON

SIMPLIFIED procedure for determining permissible transportation charges of zinc, lead, copper, brass mill, aluminum and nickel scrap when delivered from point of shipment to the purchaser in seller's own conveyance was announced last week by OPA.

Previously, certain nonferrous metal scrap price schedules provided that when delivery was made in the seller's conveyance, the transportation charge should not exceed the charge which would be applicable on an identical shipment by the lowest available commercial transportation rate.

Amendments to the six nonferrous metal scrap schedules now provide that when transportation to the buyer's receiving point is by a vehicle owned or controlled by the seller, or is by private carrier not owned or controlled by the buyer, the following maximum transportation charges are authorized.

Distance in miles		Dollars per ton	
Over—	But not over—	Aluminum	Other nonferrous metal
0	10	1.60	1.10
10	15	1.80	1.25
15	20	1.95	1.35
20	25	2.10	1.45
25	30	2.25	1.55
30	35	2.40	1.65
35	40	2.55	1.75
40	50	2.80	1.90
50	60	3.00	2.05
60	70	3.20	2.20
70	80	3.40	2.35
80	90	3.60	2.50
90	100	3.80	2.65
100	110	3.95	2.75
110	120	4.10	2.85
120	130	4.25	2.95
130	140	4.40	3.05
140	150	4.55	3.15
150	160	4.70	3.25
160	170	4.85	3.35
170	180	5.00	3.45
180	190	5.15	3.55
190	200	5.30	3.65
200	210	5.45	3.75
210	220	5.60	3.85
220	230	5.75	3.95
230	240	5.90	4.05
240	240	6.05	4.15
250	260	6.20	4.25
260	270	6.35	4.35
270	280	6.50	4.45
280	290	6.65	4.55
290	300	6.80	4.65

For distances of more than 300 miles, the maximum charge is based on the lowest railroad carload rate applicable to shipments of the same commodity.

Any bridge, tunnel or ferry tolls incurred in connection with deliveries of less than 300 miles may be added to the amount set forth in the scale. The distance is determined by the shortest public highway route available to the shipper.

The point of shipment is defined as the place where the commodity is loaded on the truck. In the event of partial loading at two or more pickup points, the charge for each portion is based on the distance from the point of loading to the delivery point.

One purpose of the amendment, Price Administrator Henderson said, is to remove any possible inducement to unnecessarily long hauls of materials and thereby to conserve supplies of rubber, gasoline and transportation equipment.

The new scale of transportation charges is authorized for the scrap metals in the following amendments to revised price schedules:

Amendment No. 2 to Revised Price Schedule No. 3 on zinc scrap materials and secondary slab zinc.

Amendment No. 4 to Revised Price Schedule No. 70 on lead materials; secondary lead, including calking lead; battery lead scrap, and primary and secondary antimonial lead.

Amendment No. 4 to Revised Price Schedule No. 2 on aluminum scrap and secondary ingot.

Amendment No. 5 to Revised Price Schedule No. 2 on aluminum scrap and secondary ingot.

Amendment No. 5 to Revised Price Schedule No. 8 on pure nickel scrap, monel metal scrap, stainless steel scrap, and other scrap materials containing nickel; secondary monel ingot, secondary monel shot, and secondary copper-nickel shot.

Similar amendments incorporating the scale for copper and brass scrap also have been issued.

Bureau of Mines Develops Instruments To Aid in Reclaiming Zinc, Lead Ores

THOUSANDS of tons of zinc and lead ore will be brought into production with the aid of sensitive instruments developed by the Bureau of Mines, Dr. R. R. Sayers, director, announced last week.

These instruments, by amplifying and recording subaudible noises that indicate pressure zones in rock and warn of impending falls of ground in workings, make it possible to recover with relative safety zinc and lead ore now tied up in old mine pillars that have been left standing to support the roof during earlier mining operations, Dr. Sayers stated.

Within the past two months, bureau engineers under direction of C. F. Jackson, head mining engineer, and McHenry Mosier, principal mining engineer, have tested their equipment in large zinc-lead mines of the tri-state district of Missouri, Kansas and Oklahoma. These tests proved that many pillars can be removed, thus providing much-needed ore, while protecting miners' lives and leaving surface buildings and terrain undamaged.

In one mine several large pillars of ore recently were taken out while Bureau engineers listened through their "geophones" and instruments for subaudible warning noises, amplified electrically up to 10 million times. Plans have been made for immediate removal of 13 pillars, estimated to contain 30,000 tons of ore of a grade two and a half times higher than the previous average from this mine. There are many other pillars in the same mine that probably will yield similar quantities of ore.

"It may now be stated with considerable confidence that in this district a large part of the ore tied up in pillars and previously thought to be unrecoverable can be removed safely under the methods developed by the bureau," Dr. Sayers said.

Exact amount of ore which may be reclaimed from tri-state district pillars and converted into metal in industry's smelters, cannot be determined, Dr. Sayers said, but the quantity will be large. The method can be applied to pillar robbing in other mines producing iron, copper or other ores where open-stope mining methods are employed.

It was emphasized that much of this potential ore could be brought to the smelters within a comparatively short time because it is in developed mines that already have mining equipment and transportation facilities. Mines that have been closed down and others that are nearing the end of their resources could be made to yield large quantities of ore with very little preparation or new equipment, it was said.

Zinc deposits believed to be important have been found near the Labrador border and a zinc refinery is under consideration with government aid of $1,000,000, according to the Department of Commerce.

Large Power Development Program Advocated by Brookings Institution

WASHINGTON

SHORTAGE of power sufficient to impede the war production effort eventually will occur unless a comprehensive program of expansion, conservation and more effective power utilization is undertaken in the immediate future. This is the conclusion of a survey of power productive capacity in relation to prospective demand by the Brookings Institution. The report was prepared by Dr. Louis Marlio, French economist and engineer, now a member of the institution's regular staff.

The war economy, including both civilian and military production, will require tremendous quantities of power in the manufacturing industries, and especially in the electrometallurgical and electrochemical industries.

Total requirements for 1944—if the war lasts that long—are estimated to be nearly 50 per cent in excess of those for 1941. In spite of all the efforts that may be put forth in the technical and administrative field, and with curtailment of domestic consumption, the existing generating capacity will not be able to meet the added requirements, Dr. Marlio estimates.

The increase in power demand in the present year has been moderate due to the fact that the country is in a period of transition from peace to war production. However, many of the plants which will require large quantities of electric power are not yet completed, and as they come into production power demands will steadily mount. As against a 1941 production of 212 billion kilowatt hours, the author estimates an ascending scale of requirements for subsequent years roughly as follows:

1942...249 billion kilowatt hours
1943...285 billion kilowatt hours
1944...305 billion kilowatt hours
1945...326 billion kilowatt hours

For the purpose of calculating power requirements, the report divides industry into two groups, general manufacturing and electrometallurgical and electrochemical:

In the case of general manufacturing, a method different from that commonly employed is used. Instead of relating requirements to a contemplated level of government expenditures, the author bases his study on the nation's manpower potential and the electrical power involved in the full employment of this potential with allowance for different requirements in different types of industry. By this method of calculation, the shifting of industry from peace to war production is automatically taken into account.

The survey assumes an increase of about 20 per cent in the number of wage earners in the general manufacturing industries as compared with January, 1942; an increase of an hour a day in the length of their work; and an increase of 7.5 per cent in the degree of mechanization of factories.

In the case of electrometallurgical and electrochemical industries, the estimates are based on power requirements per unit of scheduled production.

To meet the power deficiency, the survey estimates that 7 billion kilowatt hours could be saved by curtailment of non-industrial consumption, and 20 billion supplementary kilowatt hours could be produced and utilized from existing generating capacity. This leaves a deficiency of some 80 billion kilowatt hours, which can be supplied only by a large program of power development.

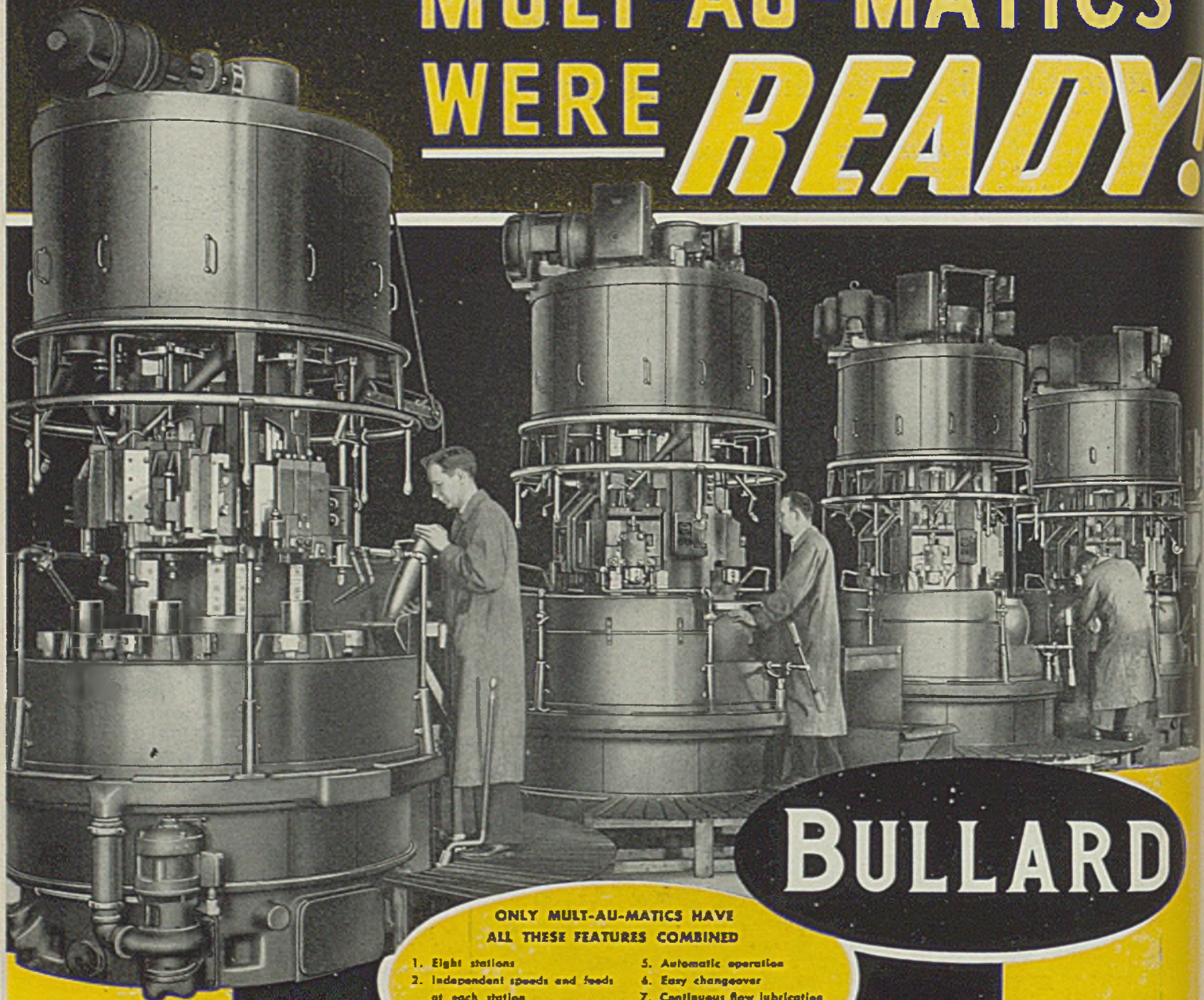
Some of this program, being already under way, can be completed in one and one-half years, but the remainder will require about two and one-half years. Despite the length of time required, uncertainties as to the war's duration make the expansion essential if enough power for the war effort is to be assured.

Production of aluminum on a large scale is to be undertaken in Brazil by the Cia Brasileira de Alumino, a new company formed in Sao Paulo, according to an unofficial report to the Department of Commerce.

Aircraft War Production Council

Exchanging information on methods to speed production of warplanes is the Aircraft War Production Council, composed of engineers from eight southern California airplane plants. Front row, left to right: Jack Pierson, Douglas; John Demarce, Consoliated; H. Virgil Gaudette, Lockheed; H. Bowling, Consolidated; E. Malloy, Ryan; C. Sharpe, Vultee; J. J. Fluck, North American; C. C. Hilliard, Douglas. Standing, left to right: R. A. Lawson, Vultee; Harris MacIntosh, Vega; George Pruden, Vega; R. R. Nolan and Paul Buckner, Northrop; L. H. Provost, Douglas; T. O. Heydenfeldt, North American; G. E. Barton, Ryan; and J. E. Young, Douglas. Other members, not shown in photo, are: Karl Grube, E. Engelbert, T. E. Springer, H. D. Houghton and Ray Steinbauer, all of Douglas; Harold Raynor, North American; E. Ezard and Jim Kelly, Consolidated; H. Ryker, Vega; and E. Penn Holter, Lockheed. Photo courtesy of Douglas Aircraft Co.

MULT-AU-MATICS WERE READY!



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ONLY MULT-AU-MATICS HAVE ALL THESE FEATURES COMBINED

1. Eight stations
2. Independent speeds and feeds at each station
3. Horizontal Chucks
4. Minimum floor space
5. Automatic operation
6. Easy changeover
7. Continuous flow lubrication
8. Interlocking safety devices
9. Easy Tooling

When the call came to change over from peacetime to wartime production, Mult-Au-Matics were *ready*. They were ready because they are Standard machines. The only things about them that are "special" are the fixtures and tooling for the job in hand — plus of course the very special inbuilt speed, accuracy and reliability that come from years of experience in machine tool building.

Bullard is everlastingly proud that the Automotive Industry is finding Mult-Au-Matics just as valuable in 1942 as they were in 1940 — which is a pretty good sign they will still be just as valuable when the pleasure car assembly lines start up again!

THE BULLARD COMPANY

BRIDGEPORT, CONNECTICUT

By A. H. ALLEN *Detroit Editor, STEEL*

MIRRORS of MOTORDOM

Forty-two years in retrospect . . . Changing conditions, new controls may mark end of Golden Era . . . All production in past only one-fourth of present war load on industry . . . Do you recall—?

DETROIT

FOR the automotive industry, 1941 marked the end of an era—a golden era of something over four decades dating back to 1900—during which time motor plants in the U. S. rolled out a mighty tide of 85,554,000 cars and trucks with wholesale value approximating 58 billion dollars. For the first time in its fruitful history, the industry has seen its output of passenger cars terminated by government order in the interests of turning to manufacture of war products, so its statisticians can be pardoned for a nostalgic look at an era now drawn to a close.

Forty-two years of production by this great industry still is equivalent to only about one-fourth of the appropriations already projected to finance production for war, which gives some measure of the gigantic load being shouldered by the nation's productive machine.

It begins to appear more and more certain that these lush years of the motor industry may never be renewed. Changing conditions, changing markets and changing controls may now be marking a distinct turning point in the history of the motor industry, so while these remarks should not be construed in the light of an obituary at least they can be taken as signaling the approach of a new and vastly different day for all manufacturing. You can take your choice as to whether it will be better or worse than the "good old days."

Rate Double Peak Year

Sizing up the record, the twenty-fourth edition of Automobile Facts and Figures, issued annually by the Automobile Manufacturers Association, points out that the latest compilation "covers a period when all utilizable facilities in the industry have been called to the service of the nation for the duration of the war," and that the "annual rate of war production attained by midyear of 1942, measured in dollars, equals the best previous year of normal automotive output, while rapid expansion of operations in old and new facilities is expected to reach by the year-end a rate double that of the previous highest year."

As of the end of 1941, there were 34,764,996 cars and trucks registered in the U. S., exclusive of military vehicles of which there were perhaps 350,000. So, out of 86 million vehicles produced in 42 years, there remain 35 million, indicating 51 million have gone to the scrap heap.

Figuring 2 tons per car, consumption of steel by the automotive industry since its inception totals around 172,000,000 tons, or roughly twice the present annual production of steel ingots.

Some new figures on the average consumption of copper, iron and steel in automobiles are presented in the above-mentioned statistical compilation, source being the Automotive Branch of the War Production Board, which seems to have been able to ferret out figures which private inquirers have not had much success in obtaining. Weighted by respective production of various makes of passenger cars in November, 1941, copper consumption is as follows:

	Pounds
Radiator	20.8
Electrical system	13.6
Heater	4.8
Plating	2.4
Other copper and alloys	8.7
All other copper	1.8
Total	52.1

Weighted by respective production of various makes of passenger cars in the calendar year of 1941, average iron and steel use is as follows:

	Pounds
Iron	641.5
Steel	
Carbon	2863.4
Stainless	14.6
Alloy	287.3
Total steel	3165.3

Interesting figures have been assembled on the vital character of automobile transportation to workmen in war plants. Seven individual surveys show the trend. In one aircraft plant 92 per cent of 50,000 workers reach the plant by private automobile. Average one-way trip is 10.8 miles. Buses and street cars carry only 3.4 per cent of the employes.

In another aircraft plant during January of this year, almost all employes were driving to work in 10,400 passenger cars. A total of 350 was using six buses. Since that date, employment has increased to more than 40,000.

In an aircraft engine plant, 84 per cent of all employes commute by automobile; 40 per cent could get there no other way.

In a second aircraft engine plant, 78 per cent of the workmen arrive by automobile.

In a tank plant, access to which is solely by passenger car, 1800 workers now drive an average of 20 miles a day to and from their jobs, and 3500 more will be doing so shortly.

At a naval ordnance plant, 95 per cent of 7000 employes are brought to work by highway transportation.

At a navy yard, 3000 workmen travel by automobile between 60 and 85 miles round trip daily.

Comparing use of cars and trucks in 1941 with the year 1917 during the first World war, statistics show there were nearly seven times as many passenger cars in service, and 15 times as many trucks in operation.

Throughout the country, 2314 cities, with population of 12,525,000, depend solely on private cars for transportation, in the absence of any form of mass transportation system.

43.3% Must Use Cars

Furthermore, 54,453 communities, out of a total of 125,617, or 43.3 per cent, are not served by rail transportation, and must depend entirely on motor vehicles.

Fuel consumption by motor vehicles in the U. S. for 1941 reached a total of 24,366,267,000 gallons, or nearly 2½ billion gallons more than for 1940.

Motor vehicle taxes in 1941 crossed the two-billion mark for the first time in history, and exceeded the 1940 impost by $350,000,000.

Average employment for the year in automobile, body and parts plants, excluding those facilities engaged mostly on war production, was 513,000, weekly earnings being at an all-time high of $39.69, and total payrolls crossing the billion-dollar mark for the first time.

The 1942 edition of Motor Truck Facts also has been released by the Automobile Manufacturers Association (now the Automotive Council for War Production) and throws interesting light on the essential char-

acter of the motor truck in the national economy. Registrations of trucks in 1941 jumped 7 per cent to the record total of 4,911,500. Factory sales for the year crossed the million-mark for the first time, and wholesale value was in excess of a billion dollars. Other interesting findings include the facts that trucks consume 21 per cent of the motor fuel of the country, and one-fourth of all motor trucks are used on farms.

Industry Out of "Doghouse"

Pointing out that the automotive industry now is delivering for use by the armed forces $12,000,000 worth of military equipment a day, Paul Garrett, vice president of General Motors and director of this corporation's public relations department, in a recent speech analyzed the industry's position in public opinion. He concluded that the good relations the industry now enjoys in the public mind came partly from its success in doing a real job on war production and partly from the better understanding people were given of how this feat was accomplished.

"In some respects it is an anomalous position in which we now find ourselves," he continued. "The formula which industry relied upon to save democracy stems from the very elements recently suspect.

"Do you recall the charge that mechanization of industry had gone too far?

"Do you recall the charge that mass production as developed by industry in this country was a dehumanizing influence not in the public interest?

"Do you recall the charge that industry was spending too much of the stockholder's money on scientific research?

"Do you recall the charge that bigness in industry was destroying the democratic way of life so much cherished in this country?

"Where would the world have been in this war to make individuals free if it had not been for these 'suspect' ingredients of American industry?"

The record would not be complete without inclusion of excerpts from remarks made by Alvan Macauley, president of the Automotive War Council, at its recent annual meeting. He said, in part:

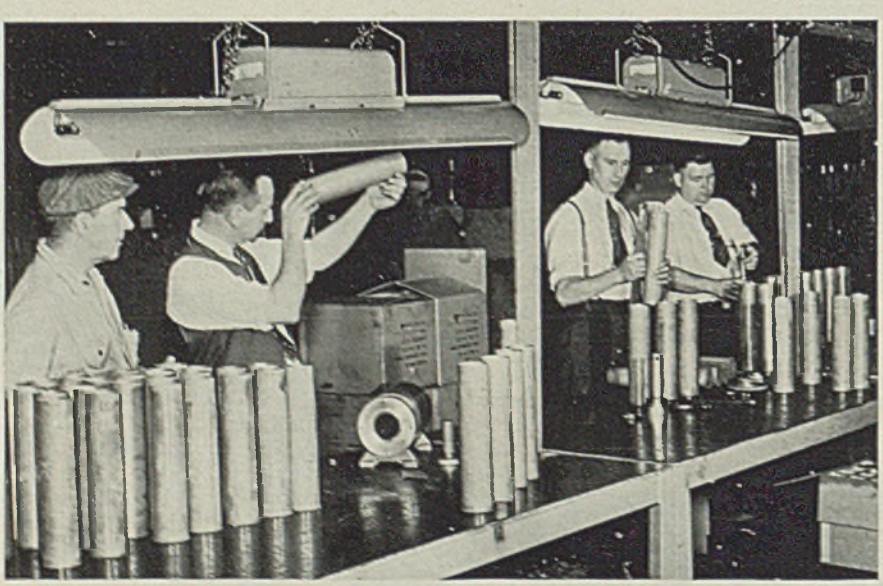
"We are operating now in what may be termed an industrial substratosphere. We have moved above our previous ceilings in value of output, in employment, in manhours and machine hours of accomplished work. Peacetime standards are behind us, despite the fact that it was only six months ago that wholesale conversion became possible.

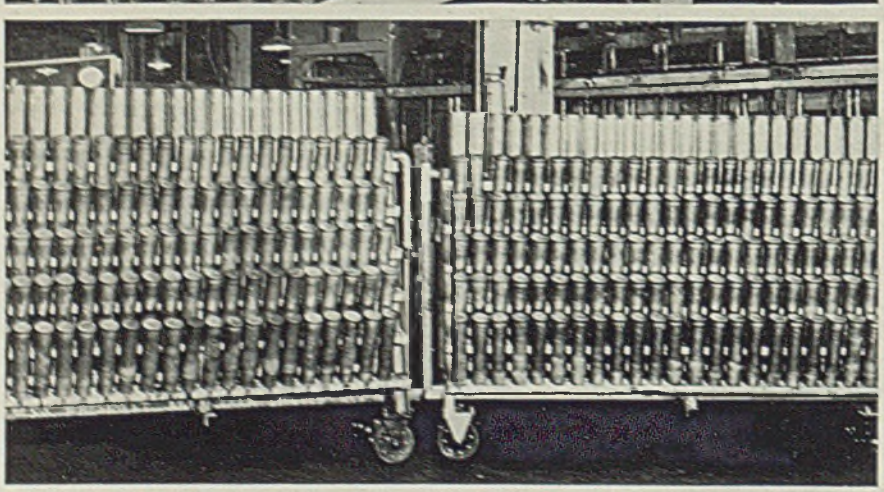
"The record demonstrates now that we are technically equipped to climb tremendous distances into the industrial stratosphere. Industrial plants, particularly those set up for specific war products, have already accomplished this, clearly charting the way for the industry as a whole.

"The real problems that will close around us and imperil attainment of the utmost output are those of supply. This industry unquestionably faces difficulties in finding the necessary manpower; greater still is the question of raw materials. We may definitely expect to be equipped for consumption of metals in greater quantities than there will be available. The fundamental responsibility in this field will continue to rest on government, which has in its hands the controls over production and distribution of materials."

John S. Sayre, Detroit, has been named head commodity specialist in charge of the Automotive and Trailer Equipment Section, WPB Purchases Division. His duties will be to serve as consultant to the procurement officers of the Army, Navy, Treasury, Maritime Commission and other government agencies, and to co-ordinate the purchasing program of the several procuring agencies for the commodities on which he is specialist.

He formerly was with the Fruehauf Trailer Co.





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Buick's Steel Shell Cases

MASS production of steel artillery shell cases, after nearly a year of development, is now an accomplished fact, more than 30 manufacturers now making them. (STEEL, July 20, p. 52.) Buick Motor Co. reports its engineers have worked out a formula for production of a case capable of withstanding high-pressure gun fire, easy to load and eject, meeting the requirements of operation in both hot and cold guns. Company's experiencce in deep drawing steel made possible development of a method to utilize readily available steels and production equipment. Photos show, above, steel shell cases under inspection at Buick plant; below, racks of shell cases awaiting shipment to the Army.

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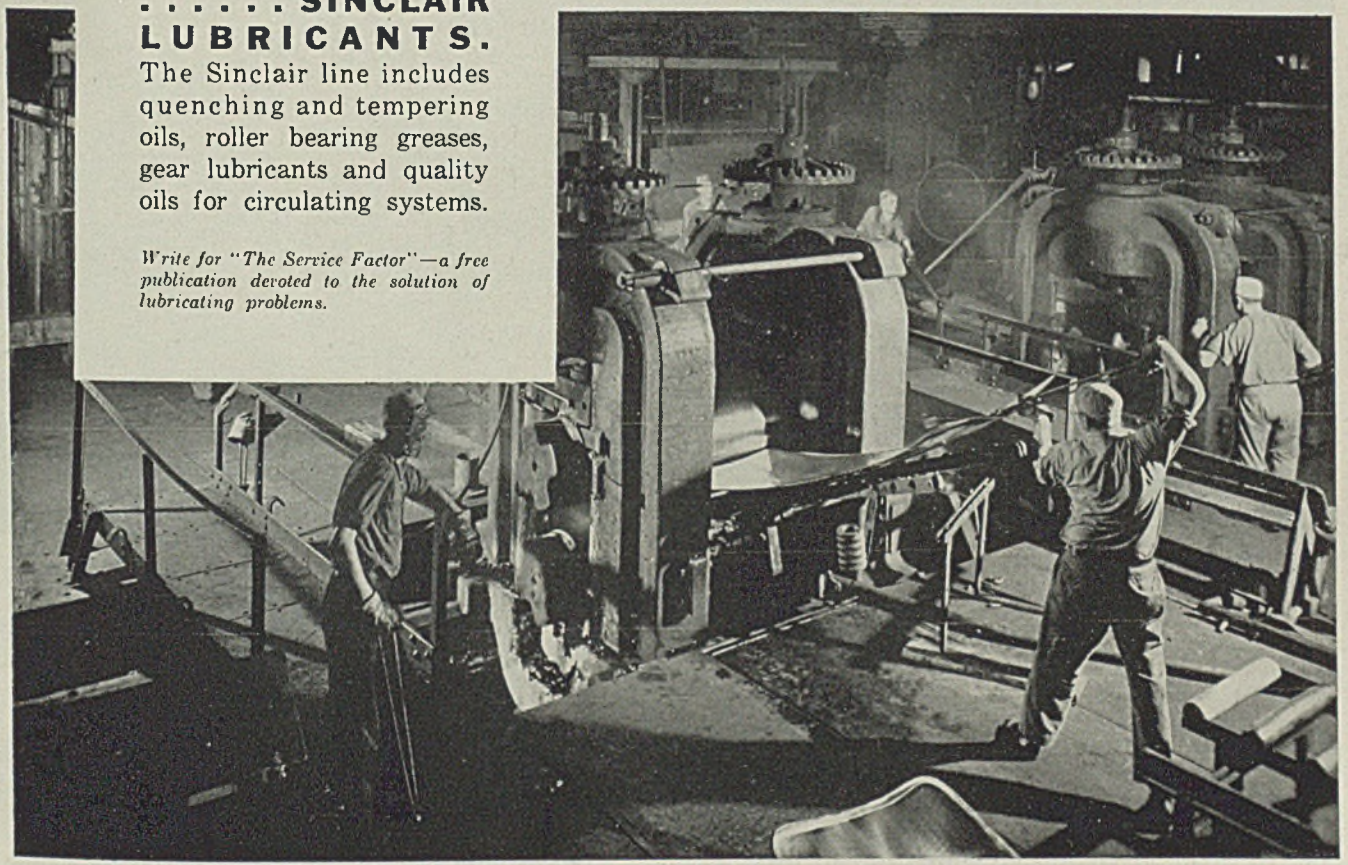

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THROUGHOUT THE NIGHT DETERMINED

Like commandos on attack, stalwart steel men come in the dead of night to work till dawn, grim in their determination to produce speedily the fighting steels to arm your sons and brothers on the battle fronts. On the night-turn, thousands strong, come men like the metallurgist who added the final touch in perfecting a new armor steel; like the melter who now makes that steel two-hundred tons at a time.

There come men who roll wide steel plates for ships and miles of tubes for bombs and those who forge and machine glistening shells from steel made by their fellow workers. There are the coke workers, the blast furnace men, the melters, blowers, heaters, rollers, finishers—

G. W's WEST POINT

Geo. Washington started a World War and learned his military art between his 21st and 26th years, as an officer in four small military expeditions into the Upper Ohio Valley. The task was to oust the French and clear the way for a project of settling English farmers on wilderness lands which he and his Virginia associates of the Ohio Company had obtained by grant from George II.

Washington's first expedition (1753) was to warn French against encroachment on English-claimed territory. He was but 21 when he crossed the Appalachians in dead of winter, with guide, interpreters and pack train. His mission was to uncover just how strong had become French occupation of rich Ohio Valley (present Pittsburgh district). He reported back that French officers "told me it was their absolute design to take possession of the Ohio."

Washington came out again in 1754 in command of small force of militia to chase out French. He got into a fight with them and their Indians. Ensign de Jumonville, young French marine officer of noble descent was killed. Later Washington found himself besieged in temporary stockade (Fort Necessity, in mountains near Uniontown, Pa.). He surrendered July 4. His little force was disarmed, but marched out with drums beating. They straggled back to Virginia, harassed by Indians and pretty well battered up. "The strife that armed all the civilized world began here" (in America) wrote Parkman, and Hugh Walpole said, "It was the volley fired by a young Virginian in the backwoods of America that set the whole world on fire."

These small skirmishes in "the woods and bushes" of the New World (French and Indian War) spread to war in the Old (Seven Years War, 1756-63) during which England wrested from France all of India, of Canada, of America (to the Mississippi) and compelled recognition of British sea supremacy. Washington's next military trips westward were with expeditions related to this early world conflict. He was "guest" aide with ill-starred Braddock (1755) who rejected the young Colonial officer's advice on how to fight Indians. As colonel of a regiment of bucktails (Colonials) he served under victorious General John Forbes (1758).

Washington's last trip to Pittsburgh was made in his 53rd year (1784) to promote a canal connecting the Potomac and Ohio — begun, but never completed. He also looked after his 50,000 acre holdings in Western Pennsylvania, valued at close to half million dollars. Over these now waved the Stars and Stripes of the young Republic his military genius had fathered, and of which he was shortly to be First President. Western Pennsylvania was young George Washington's West Point that fitted him for his career as a soldier and leader of a nation.

Activities of Steel Users and Makers

SEIBERLING Metal Products Co., Wooster, O., formed last week, has leased a plant in that vicinity for manufacturing metal casings for munitions, and is now procuring machinery and equipment, according to Wooster Board of Trade. Company is headed by J. P. Seiberling, president of Seiberling Rubber Co., Akron, O. Other officers are T. K. Seiberling, vice president, and J. W. Dessecker, secretary-treasurer.

♦

Clark Tructractor, Battle Creek, Mich., reports it has inaugurated a mass production system in manufacturing industrial haulage vehicles, which has entirely eliminated intricate work ordinarily requiring many hours of labor.

♦

W. K. Millholland Machinery Co., Indianapolis, now has exclusive rights to manufacture Millholland automatic drilling, boring, milling and tapping units and special machinery under Millholland patents.

♦

Meehanite Metal Corp., Pittsburgh, announces that E. W. Bliss Co., Brooklyn, N. Y., has been granted manufacturing rights for Meehanite castings at its foundry in Hastings, Mich.

♦

First edition of "Win on Work," newspaper published by Caterpillar Tractor Co., Peoria, Ill., for circulation in its plants to support the work of company's joint labor-management committees, was released recently.

♦

School to give plant and office employes greater knowledge of temperature measurement and control instruments, their construction and use by war industries, has been established by Wheelco Instrument Co. Officials noted marked improvement in attitude toward work after the first lecture.

♦

Spriesch Tool & Mfg. Co., Buffalo, Joseph J. Cheney, president, is working 24 hours per day, seven days a week, on production of an airplane bomb rack. The rack holds five fragmentation or chemical bombs, which can be released singly or all at the same time, by electrical or mechanical means. The assembly includes 353 parts, chiefly alloy steel.

♦

General Electric Co., Schenectady, N. Y., is hiring 150 college women for work formerly done by male engineers. Twenty-two of the group are taking a "test" engineering course as an experiment. Others will report each week until the quota is obtained. Applicants selected for the course must have majored in either mathematics or physics, with some of both required, in addition to calculus. Training is on fundamentals of engineering and company organization.

♦

Republic Steel Corp.'s bessemer converting mill at Youngstown, O., operated 655 consecutive days, from July 24, 1940, to date, or over 1,000,000 man-hours, without a lost-time accident. Its prior record was 626 days.

♦

Anker-Holth Mfg. Co., Chicago, last week received the Army's "A" banner for supplying engineering service and producing air-operated shell-holding devices.

♦

Entire manufacturing plant of the X-ray division of Westinghouse Electric & Mfg. Co. has been moved from Long Island City, N. Y., to Baltimore. Administrative offices were transferred in January.

♦

Anheuser-Busch Inc., St. Louis, one of the largest breweries in the United States, has entered the field of war production by converting a section of its machine shop to production of glider parts, under subcontracts from Laister-Kauffman and Robertson Aircraft Corp., makers of army gliders.

Woman Operator Spotwelds Steel Helmets

SPOTWELDING headband loops to the inside surface of steel helmets for use by civilian defense workers. Thousands are being manufactured for air raid wardens, police, firemen and Red Cross volunteers who form the "home front". Wide World

MEETINGS

Automotive Engineers Plan Series of Meetings

A series of technical meetings relating to mechanized war equipment has been scheduled by the Society of Automotive Engineers. One to be held at the Biltmore Hotel, Los Angeles, Aug. 20-22, will be concerned mainly with maintenance.

The society's national aircraft and production meeting and aircraft engineering display will be held Oct. 1-3 at the same hotel.

Changes Date and Place of Chicago Chemical Meeting

Announcement is made by the Chicago section of the American Chemical Society that its second National Chemical Exposition and Conference will be held in Sherman Hotel, instead of the Stevens Hotel, and Nov. 24-29, instead of a week earlier as originally planned. This change was necessary due to the acquisition of the Stevens by the United States Army.

Seven Contractors Share In 550-Mile Oil Line

Petroleum Co-ordinator Harold L. Ickes last week announced contract awards for construction of the 24-inch, 550-mile crude-oil pipeline from Texas to Illinois. Seven builders have been assigned the job of laying the main line between Longview, Tex., and Norris City, Ill., and two smaller branch lines from Norris City to river barge and pipeline terminals at Mt. Vernon, Ind., and Enfield, Ill.

Contracts were awarded on a cost plus fixed fee basis. Fixed fees vary as between contractors, but average about $1000 per mile of pipe to be laid. Total cost of the line, which is being financed by the government through the Defense Plant Corp., is estimated at $35,000,000. Each contractor will build a single section of the line as follows:

From Longview, Tex., to Arkansas-Texas state line, awarded to Williams Bros., Tulsa, Okla.

From Arkansas-Texas state line to Gurdon, Ark., O. E. Dempsey Construction Co., Tulsa.

Gurdon, Ark., to Little Rock, Ark (Arkansas river), Anderson Bros., Tulsa.

Little Rock to Missouri-Arkansas state line (St. Francis river), Oklahoma Contracting Co., Dallas, Tex.

Section from St. Francis river to Illmo, Mo. (Mississippi river), C. S. Foreman Co., Kansas City, Mo.

Mississippi river to Harrisburg, Ill., Ray E. Smith Construction Co., El Dorado, Kans.

Harrisburg, Ill., to Norris City, Ill., Sheehan Pipe Line Construction Co., Tulsa. Sheehan also was awarded the contract for 14-inch branch line from Norris City to Mt. Vernon, Ind., and for the 10-inch branch line from Norris City to Enfield, Ill.

Contracts for eight river crossings were awarded to Williams Bros.

First trainload of the pipe was shipped from National Tube Co.'s Lorain, O., works July 17. The line will require more than 300,000 tons. Mr. Ickes stated over a national radio hookup from Lorain that some time in December it will be carrying oil to the southern Illinois terminus, from which point the oil will be trans-shipped by tank cars, river barges and lake tankers to the East.

Welded Pipe Statistics Added to Institute Report

Four new sets of figures are included in the 1941 annual statistical report of the American Iron and Steel Institute, its thirtieth issue, now being distributed. One new table shows production of gas-weld and spiral-weld pipe; a second gives annual coke capacity of iron and steel producers; a third, consumption of materials in steelmaking furnaces and the fourth, an inventory analysis of pig iron and steelmaking scrap.

The report covers the iron and steel industry of the United States for 1941, and Canada and other foreign countries for 1940. Most of the tables include comparable data for at least four or five prior years.

Statistics of United States imports for 1941 are not available but data for 1936 to 1940, inclusive, are presented. Shipments of products to principal consuming industries in 1941 are shown, continuing the practice instituted a year earlier, taking over the annual study inaugurated by STEEL in 1922.

"BIG BOY" IN LORAIN, O.: When National Tube shipped the first carload of pipe for the Texas-Illinois crude-oil line, the Secretary of the Interior and Petroleum Co-ordinator, Harold L. Ickes, was present to congratulate the men, which was near "tops" so far in national wartime congratulations. Also, the secretary in a broadcast urged everyone to conserve oil, told what the administration is doing to distribute it. Left to right: W. Alton Jones, president, War Emergency Pipelines Inc., which will operate the line (see story above); B. F. Fairless, president, U. S. Steel Corp.; a workman whose sons are in the Service; Mr. Ickes; another worker; B. F. Harris, president, National Tube Co., and unidentified guests

British Steel Controller Knighted for War Work

LONDON (By Mail)

J. M. Duncanson, deputy controller in charge of iron and steel supplies at the British Iron and Steel Control, has been knighted by the King. Sir John is the author and organizer of the iron and steel supplies distribution plan, which forms the basis on which the entire armaments program rests. At the outbreak of the war he was given the key post of director of heavy steel, shell steel and semifinished steel. He was appointed controller in charge of iron and steel supplies in September 1940. He is a director of the Steel Co. of Scotland, R. Y. Pickering & Co., manufacturers of railroad rolling stock and other engineering products, and of the Glasgow Railway Engineering Co.

James Watt International Medal

The Council of the Institution of Mechanical Engineers has unanimously awarded the James Watt International Medal to A. G. M. Michell, F. R. S., Melbourne, Australia, on nomination by the Institution of Engineers, Australia; South African Institution of Engineers, and the Engineering Institute of Canada.

The medal was founded in 1936 to commemorate the bicentenary of the birth of James Watt. It is awarded every two years to an engineer of any nationality deemed worthy of the highest award the institution can bestow and that mechanical engineer can receive. In making the award it has had the co-operation of the leading mechanical engineering societies in all parts of the world. The recipient must have achieved international recognition for work as a mechanical engineer and ability to apply science to progress of mechanical engineering.

Mr. Michell is best known for his work with thrust and journal bearings, but he also has made a number of valuable contributions in centrifugal pumps and crankless engines. The last prior award was made to a continental engineer, Prof. Aurel Stodola, who was associated with development of steam turbines.

SALVAGE administrative committee, left to right: Oliver E. Mount, representing Steel Founders' Society of America; R. S. Wilson, Rubber Manufacturers' Association; Robert W. Wolcott, president, Lukens Steel Co., chairman; Charles R. Hook, president, American Rolling Mill Co., vice chairman

National Scrap Reclamation Campaign Starts; "Industry Must Do Its Utmost"

JUNK is being glorified in the national scrap materials collection campaign now in progress under auspices of the American Industries Salvage Committee in co-operation with the WPB Conservation Division.

Main feature of the campaign is a $2,000,000 advertising campaign, sponsored largely by the iron and steel industry. It is intended to draw out 6,000,000 tons of iron and steel scrap, as well as large quantities of old rubber, nonferrous metals, rags and burlap. Advertisements appeared in daily newspapers, business magazines and farm journals last week.

Robert W. Wolcott, president, Lukens Steel Co., Coatesville, Pa., is chairman of the American Industries Salvage Committee. Other administrative members of the committee are: Charles R. Hook, president, American Rolling Mill Co.; O. E. Mount, president, Steel Founders' Society of America; and R. S. Wilson, vice president, Goodyear Tire & Rubber Co.

Every plant and every industry has been asked to appoint a salvage committee. Plant operators have been requested to appoint a ranking executive with full authority to direct the scrap collection campaign. The campaign is designed to bring out not only production and dormant scrap, but also worn-out and obsolete equipment.

Mr. Wolcott in outlining the objectives of the campaign last week estimated there is between 7,500,000 and 10,000,000 tons of dormant iron and steel scrap in the country—scrap that would not be returned to steelmaking companies under normal conditions. Minimum goal of the drive, he said, is to have 50 pounds of scrap collected by every man, woman and child in the country.

Industry itself is expected to be the largest scrap source of best quality iron and steel scrap, he said.

Mr. Hook pointed out that steel operations currently are under capacity due to a shortage of scrap. He said that a reduction of 1 per cent in steel operations means a loss of enough steel to build 260 cargo ships of 10,000-ton capacity annually.

Backed by Advertising

The work of the committee, backing up a broad advertising program, will be two-fold: First, to reach every manufacturing and business firm in the nation to impress upon them the absolute necessity of getting their scrap on the way to the production line; second, to get business men co-operating with the local salvage committees of WPB already set up in 12,000 communities.

Activities of the committee will be closely co-ordinated with the present intensified scrap collection drive of WPB, according to Mr. Wolcott. The committee is underwriting the cost of an extensive national advertising campaign approved by the War Production Board, with a number of major industries providing the funds.

The advertising in newspapers, magazines, farm and trade papers and on the air, focuses the spotlight of public attention upon the need for iron and steel scrap, nonferrous metals, rags, burlap, rubber, tin cans (in some localities), and waste cooking fats.

Supplementing contacts with industry already established by the Industrial Salvage Division of WPB, the American Industries Salvage Committee is making a direct approach to individual industrial concerns, working through industry chairmen who are now being appointed. Leaders in 50 industries are being asked to serve as chairmen for their respective trades in a broad effort to see that every company appoints a salvage manager with authority not only to clean out production scrap, but also to junk obsolescent equipment and similar material.

The great task faced by American industry in meeting the expanding war production program, Mr. Wolcott said, makes it necessary for each company to intensify its scrap collection efforts.

"Production of war equipment," Mr. Wolcott said, "is limited by the amount of raw materials which are available. Industry must do its utmost to increase its collection of scrap. We believe the efforts of WPB in organizing and carrying out scrap collections have thus far produced excellent results. But the increasing demands of war call for still more scrap materials. The intensified campaign of WPB deserves the whole-hearted support of every industrial company.

"Our committee, through the leaders which it is appointing in each trade, intends to obtain assistance for WPB's drive in as many companies as we can reach. We hope to release for war use unusual

sources of scrap which may have been largely untapped, such as obsolescent machinery, unused dies and jigs, and other types of idle plant equipment. By carrying out this campaign on an industry-by-industry and company-by-company basis, we feel that we can gear the effort to the individual trade's scrap possibilities."

Novelty Works Gathers Nearly Enough for Ship

Mills Novelty Co., Chicago, has collected 800 to 1000 tons of iron and steel scrap from its plant, idle machinery, tools and parts, sufficient to make most of the steel plates for a Liberty ship. This resulted from a cleanup drive in compliance with WPB's public appeal. Peacetime value of the material would be about $500,000. It is being sold at established scrap prices.

Scrap Stocks Increased 6 Per Cent in Month

Domestic stocks of steel and iron scrap at consumers', suppliers' and producers' plants May 31 approximated 4,602,000 gross tons, an increase of 6 per cent over 4,324,000 tons April 30, according to the Bureau of Mines. Consumers' stocks showed about 8 per cent increase and suppliers' and producers' stocks, 2 per cent. Most of the increase was in purchased scrap at consumers' plants, which gained 12 per cent.

Consumption in May totaled 4,665,000 tons, consisting of 2,047,000 tons of purchased and 2,618,000 tons of home scrap. Open hearths in May consumed 60 per cent of the purchased scrap and 72 per cent of the home scrap.

War Department Asks Relics of Past Wars Be Used

Appeal to towns and villages to turn over old cannon, cannon balls, and other metallic relics of past wars for use as scrap has been issued by the War Department.

Secretary of War Henry L. Stimson also has ordered a round-up of obsolete weapons and vehicles.

Carnegie-Illinois Mines Slag Dumps for Material

In a move to help relieve the scrap shortage, blast furnace and open-hearth slag dumps in the Pittsburgh district of Carnegie-Illinois Steel Corp. are being searched for cast-off metals that are being salvaged for war production at a rate of 50,000 tons annually.

Reclaiming operations are in progress at the Gascola, East Side, Risher and Brown slag dumps in the immediate Monongahela Valley district, and also at Vandergrift, Youngstown, Farrell and Mingo Junction.

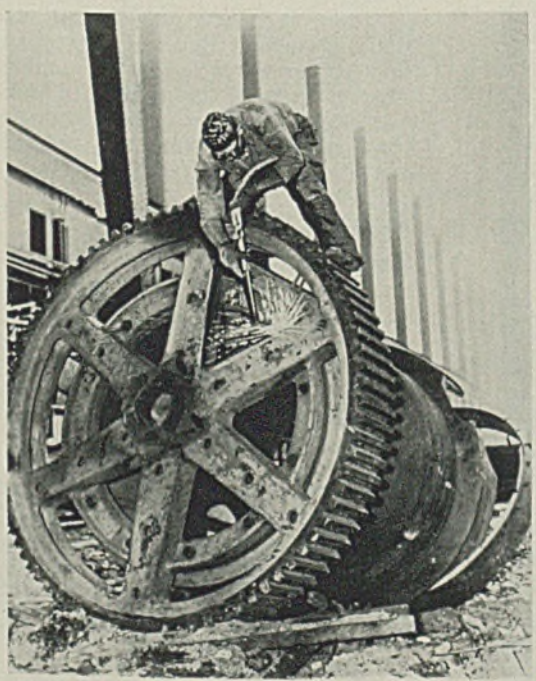
In every instance, the work is done by outside contractors who recover, prepare and ship the scrap to Carnegie-Illinois open-hearth furnaces. It is required to meet specification standards and is paid for on the basis of a flat rate per ton. In June, 4825 tons were recovered.

Automotive Plant Drives Yield 10 Per Cent Increase

Intensive drives for scrap have resulted in about 10 per cent increase over normal tonnage in the automotive industry. Reports to the Automotive Council for War Production, Detroit, show that in June 9600 tons of steel and iron and 275 tons of nonferrous metals were shipped as scrap in addition to 97,500 tons produced as a result of manufacturing operations on war materials. The added tonnage consisted of obsolete tools, dies, flasks, machinery, equipment and old buildings.

General Motors Corp. in June shipped from its 90 plants. 4200 tons of iron and steel and 258 tons of nonferrous scrap as a result of its salvage drive, in addition to 34,570 tons of normal scrap from manufacturing processes.

Steel Producers Aid in Salvage Campaign



STEEL companies promote scrap drive: Inland Steel Co. workman, left, cut up an old mine hoist for scrap. Right, 10-ton section of suspension cable from the San Francisco-Oakland Bay bridge, scrapped by Columbia Steel Co., United States Steel Corp. subsidiary. For the past six years this cable section has been on exhibit at Golden Gate bridge

Canadian Steel Buyers Now Under PRP Regulations

TORONTO, ONT.

JULY 31 has been set as the time limit for filing quarterly quota applications under the Production Requirements Plan. After that date any Canadian manufacturer using $5000 worth of metal or more in three months will be unable to purchase his requirements in the United States until his quarterly application is on file with the priorities officer at Ottawa. The ruling applies to war industries as well as those making civilian articles.

Metal may no longer be used in Canada in the manufacture of furniture parts except under permit from the Controller of Supplies. Stamped pulls for doors and drawers, casters and small joining and fastening hardware are exempt. No metal may be used for bases for tables and stools and similar articles. Among items affected are chairs, desks, flower stands, stools, tables, garden furniture, display stands and benches. The order does not extend to parts for spring-filled mattresses, upholstered and living-room furniture or studio couches where metal is used for springs or frames, and other articles which have been on a quota list since Dec. 15, 1941.

Department of Munitions and Supply will place contracts immediately for enlargement of the airport at Fort William, Ont., which will be used in Canadian Car & Foundry Co.'s production program. This company has been given a contract for construction of more than 1000 dive bombers at the Fort William plant, to cost about $60,000,000. The order will keep the plant operating at capacity until late in 1944.

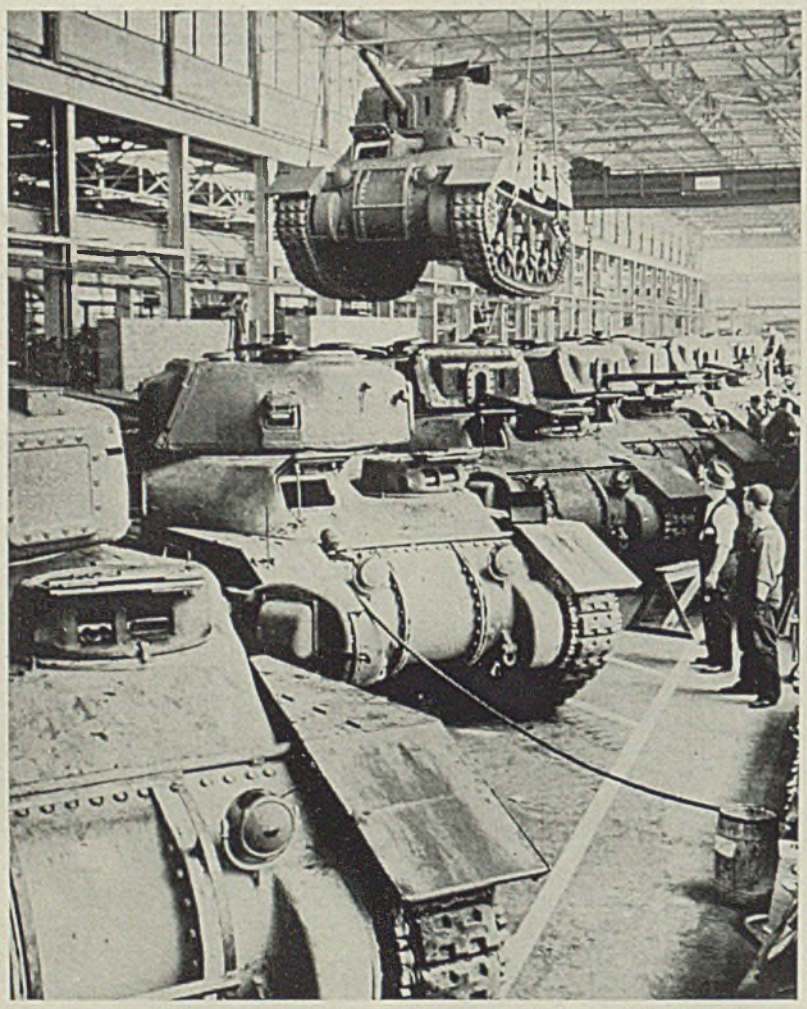
United States capital will be provided to assist in development of marginal and submarginal deposits of essential war materials in Canada, under an agreement awaiting signature. The Canadian Metals Controller may initiate agreements for disposal of metals and minerals to the Metals Reserve Corp. in the United States at prices that will permit production from a certain number of deposits. In some cases where there is an assured tonnage of ore and the property can be put into production in a short period with a small amount of equipment requiring United States priority, capital assistance will be given. The plan is intended to increase production of copper, zinc, lead and other strategic metals.

Granby Consolidated Mining, Smelting & Power Co. Ltd., Toronto, has been granted a permit by the Canadian government to produce 10 per cent more copper, to about 3,700,000 pounds annually, from its property in British Columbia. The government will advance $200,000 for equipment to produce the additional metal.

Canadian metals controller has issued an order designed to conserve machinery and mine supplies, which forbids opening of new mines except by permit. It also provides that monthly tonnage removed from any mine may not exceed the average monthly production during the first four months of this year. Because of shortage of manpower in the Dominion any excess ores or metals which cannot be processed there will be turned over to the Metals Reserve Corp. in the United States.

Increased demand for lead as a substitute for more essential war metals in many industrial processes has resulted in regulation in its supply. An order forbids selling or buying of any virgin or secondary lead or lead-base alloy containing more than 50 per cent lead by weight except on written approval by the metals controller. Type metal, babbitt and solder are excepted.

Elliott M. Little, director of National Selective Services, states it may be necessary to close a number of non-essential industries to supply 250,000 workers estimated to be required for war industries and the armed forces this year.



TEN 31-ton tanks now are being built each day at Canada's largest tank plant, "somewhere in Quebec"—significant of the Dominion's war effort. NEA photo

Nonferrous Metals Exports Reach All-Time High in May

Exports of nonferrous metals from Canada in May, excluding gold, reached the all-time high monthly record of $29,227,000, compared with $24,868,000 in April and $25,747,000 in May, 1941. For first five months this year the total was $121,923,000, an increase of about 25 per cent over $97,377,000 for the corresponding period a year ago.

Total exports of all commodities from Canada, excluding gold, for five months ending May 31, totaled $895,051,000, against $567,008,000 in five months last year. Of this total $477,856,000 were for Empire countries and $417,195,000 to foreign destinations. Shipments to the United States were valued at $299,726,000, compared with $203,490,000 in the similar 1941 period.

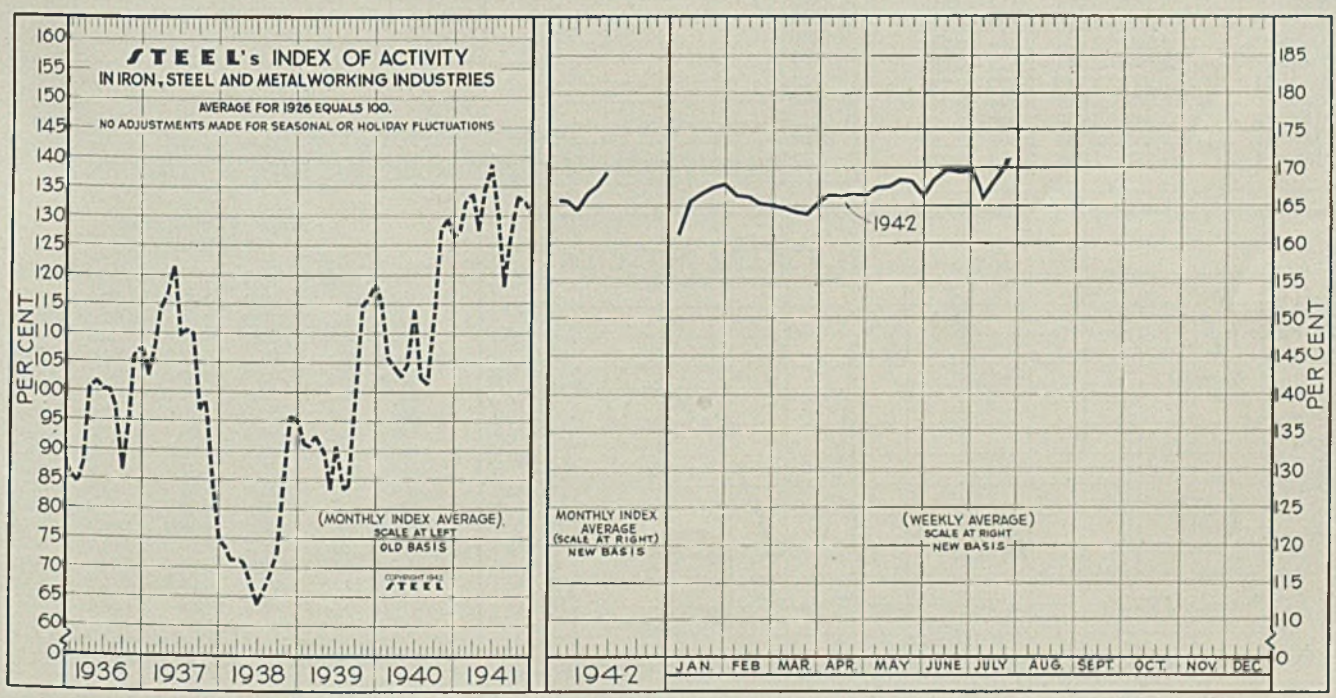
Output of War Goods Expanding Steadily

PRODUCTION of war materials continues to increase, with expansion in heavy durable lines rapidly reaching completion. Steady conversion of many civilian goods plants is adding measurably to war production facilities. About half of the nation's factory output now is for war materials. Among the durable goods industries the war share is estimated at 70 per cent of output. The effects of the war production program is expected to become increasingly evident over the coming months as accumulated stocks are used up.

During the week ended July 18, STEEL's index of activity rose to a new peak of 171.2. This represents a gain of 2.9 points over the preceding week's index figure. Upturn in the index for the latest period reflected a sharp advance in electric power consumption and a slight improvement in steel ingot production. Gains in these industrial indicators offset a moderate decline in revenue freight carloadings.

The national steel rate edged upward slightly to 98 per cent in the week of July 18. Movement of steel scrap to mill's yards is sufficient to maintain present rate of operations. However, in most instances open-hearth departments still are operating on a hand-to-mouth basis, despite the nation-wide effort to stimulate scrap collections.

Electric power consumption during the latest period rose to a new all-time peak of 3,565,367,000 kilowatts. This compares with the former record of 3,474,638,000 kilowatts registered in the week ended Feb. 7 last, and also represents an increase of 11.4 per cent over the corresponding week last year.



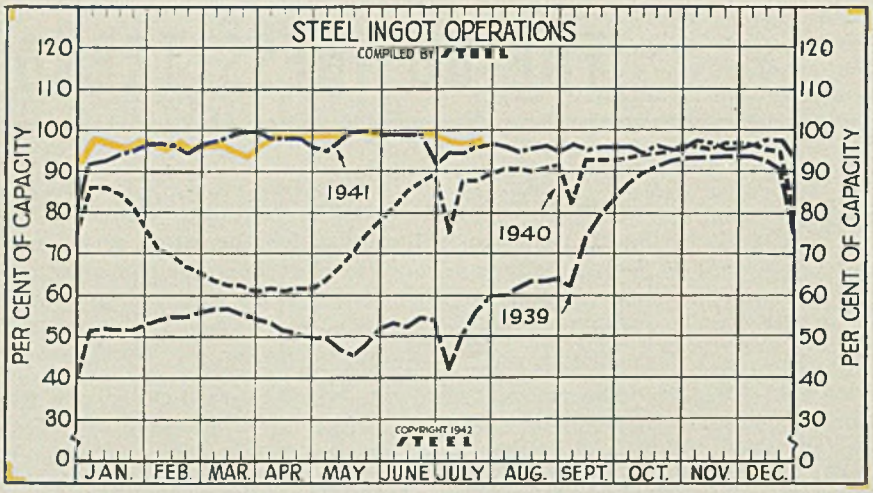
STEEL's index of activity gained 2.9 points to 171.2 in the week ending July 18

Week Ended	1942	1941
May 16	168.4	136.1
May 23	168.3	138.6
May 30	166.2	128.4
June 6	168.6	138.4
June 13	169.8	138.7
June 20	169.5	138.7
June 27	169.8	138.8
July 4	165.9	120.9
July 11	168.3	133.4
July 18	171.2†	133.2

†Preliminary.

Mo. Data	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931
Jan.	165.7	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1
Feb.	165.6	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5
March	164.6	133.9	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2	80.4
April	166.7	127.2	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0
May	167.7	134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6
June	169.4	138.7	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1
July	.....	128.7	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3
Aug.	.....	118.1	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4
Sept.	.....	126.4	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3
Oct.	.....	133.1	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2
Nov.	.....	132.2	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4
Dec.	.	130.2	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3

Note: Weekly and monthly indexes for 1942 have been adjusted to offset the forced curtailment in automobile production and to more accurately reflect expanding steel production.



Steel Ingot Operations

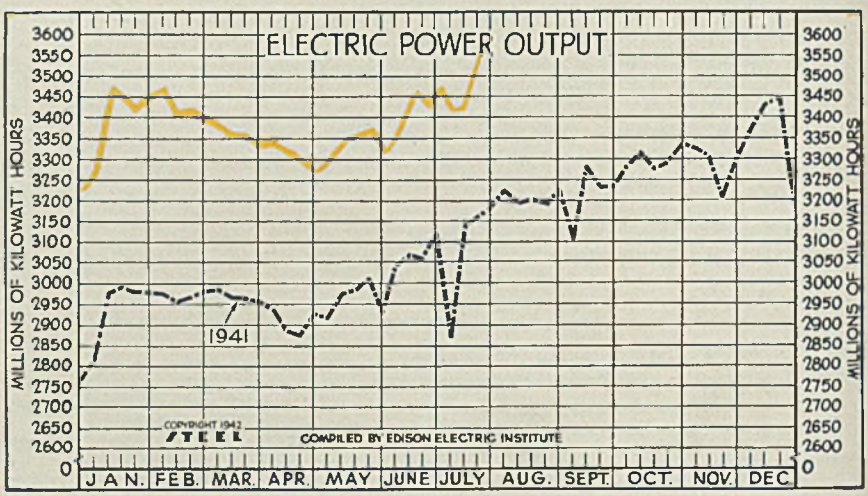
(Per Cent)

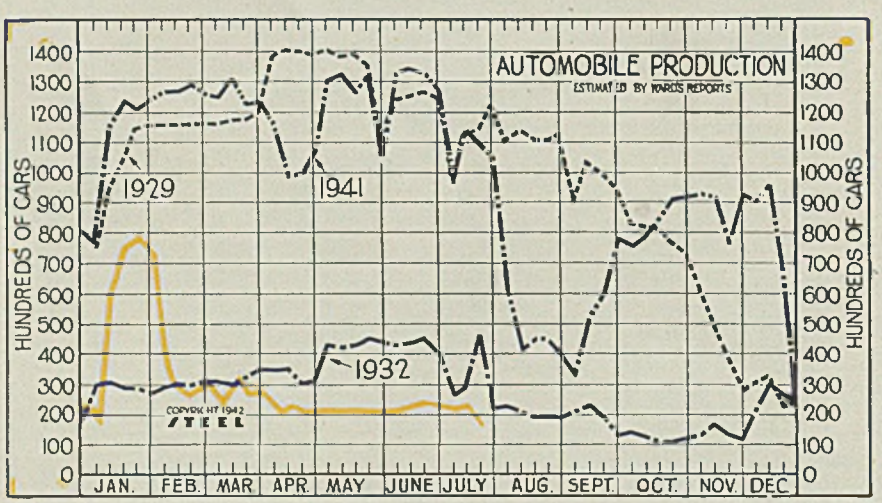
Week ended	1942	1941	1940	1939
July 18....	98.0	95.0	88.0	56.5
July 11....	97.5	95.0	88.0	50.5
July 4....	97.5	92.0	75.0	42.0
June 27....	98.5	99.5	89.0	54.0
June 20....	99.0	99.0	88.0	54.5
June 13....	99.0	99.0	86.0	52.5
June 6....	99.0	99.0	81.5	53.5
May 30....	99.0	99.0	78.5	52.0
May 23....	99.0	100.0	75.0	48.0
May 16....	99.5	99.5	70.0	45.5
May 9....	99.0	97.5	66.5	47.0
May 2....	99.0	95.0	63.5	49.0
April 25...	98.5	96.0	61.5	49.0
April 18...	98.5	98.0	61.5	50.5
April 11...	98.5	98.0	61.0	51.5
April 4....	98.0	98.0	61.5	53.5
Mar. 28....	97.5	99.5	61.0	54.5
Mar. 21....	95.5	99.5	62.5	55.5

Electric Power Output

(Million KWH)

Week ended	1942	1941	1940	1939
July 18.....	3,565	3,163	2,681	2,378
July 11.....	3,429	3,141	2,652	2,403
July 4.....	3,424	2,867	2,425	2,145
June 27.....	3,457	3,121	2,660	2,396
June 20.....	3,434	3,056	2,654	2,362
June 13.....	3,464	3,066	2,665	2,341
June 6.....	3,372	3,042	2,599	2,329
May 30.....	3,323	2,924	2,478	2,186
May 23.....	3,380	3,012	2,589	2,778
May 16.....	3,357	2,983	2,550	2,235
May 9.....	3,351	2,975	2,516	2,239
May 2.....	3,305	2,915	2,504	2,225
April 25.....	3,299	2,926	2,499	2,244
April 18.....	3,308	2,874	2,529	2,265
April 11.....	3,321	2,882	2,530	2,235
April 4	3,349	2,938	2,494	2,244
Mar. 28.....	3,346	2,956	2,524	2,272
Mar. 21.....	3,357	2,964	2,508	2,258
Mar. 14.....	3,357	2,965	2,550	2,276





Auto Production

(1000 Units)

Week ended	1942	1941	1940	1939
July 18....	17.9	109.9	53.0	47.7
July 11....	23.0	114.3	65.2	61.6
July 4....	22.7	96.5	52.0	42.8
June 27....	22.9	127.9	87.6	70.7
June 20....	23.2	133.6	90.1	81.1
June 13....	22.3	134.7	93.6	78.3
June 6....	22.0	133.6	95.6	65.3
May 30....	21.5	106.4	61.3	32.4
May 23....	21.6	133.6	96.8	67.7
May 16....	21.8	127.3	99.0	80.1
May 9....	21.5	132.6	98.5	72.4
May 2....	22.0	130.6	99.3	71.4
April 25...	21.9	108.2	101.4	86.6
April 18...	21.7	99.9	103.7	90.3
April 11...	23.0	99.3	101.9	88.1
April 4....	22.3	116.3	101.7	87.0
Mar. 28....	28.9	124.2	103.4	86.0

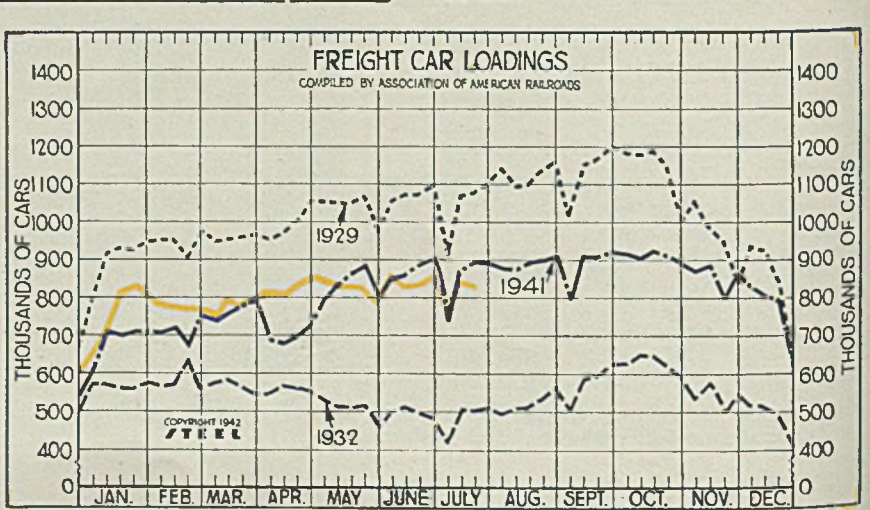
†Canadian trucks and automobiles and United States trucks, since week of Feb. 21 last.

Freight Car Loadings

(1000 Cars)

Week ended	1942	1941	1940	1939
July 18.....	845†	899	730	656
July 11.....	855	876	740	674
July 4.....	759	741	637	559
June 27.....	853	909	752	66[illegible]
June 20.....	840	886	728	643
June 13.....	833	863	712	638
June 6.....	855	853	703	635
May 30.....	796	802	639	568
May 23.....	838	866	687	628
May 16.....	839	861	679	616
May 9.....	839	837	681	555
May 2.....	859	794	666	573
April 25.....	855	722	645	586
April 18.....	847	709	628	559
April 11.....	814	680	619	548
April 4.....	829	683	603	535

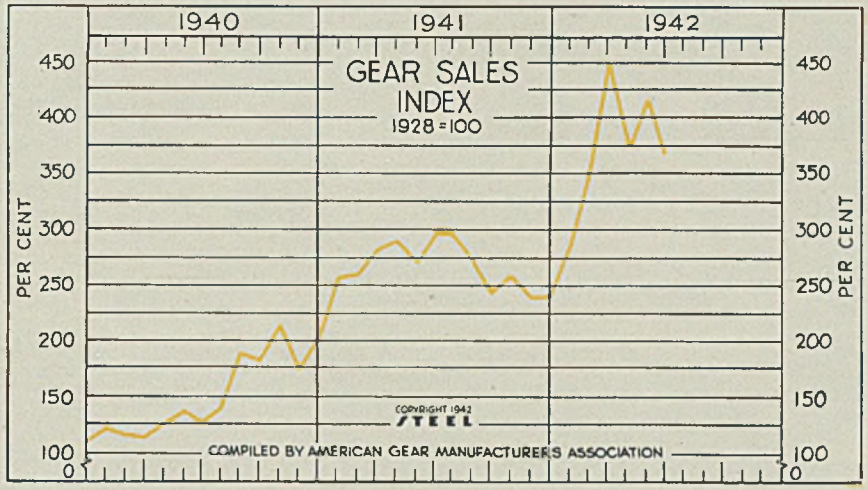
†Preliminary.

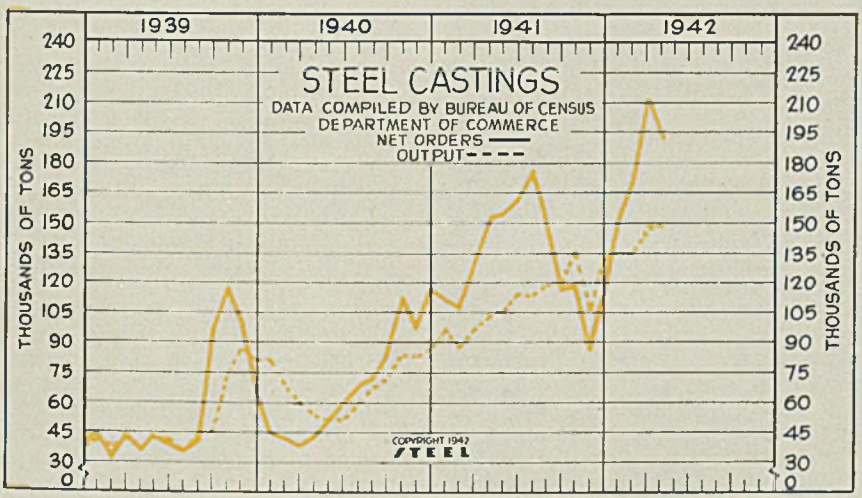


Gear Sales Index

(1928 = 100)

	1942	1941	1940	1939	1938
Jan.	288	259	123	91.0	93.0
Feb.	353	262	116	86.0	77.0
Mar.	455	288	114	104.0	91.0
April	378	292	128	88.0	74.0
May	421	273	133	93.0	70.0
June	373	299	129	90.0	58.0
July	...	298	141	89.0	67.0
Aug.	...	276	191	96.0	76.5
Sept.	...	243	183	126.0	80.5
Oct.	...	261	216	141.0	72.5
Nov.	...	241	173	126.0	72.0
Dec.	...	243	208	111.0	81.0
Ave.	...	269.6	155.0	103.0	76.0





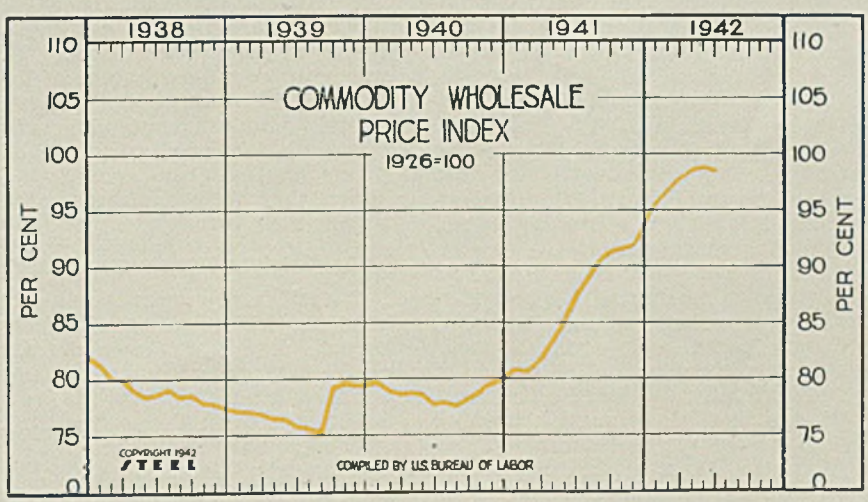
Steel Castings

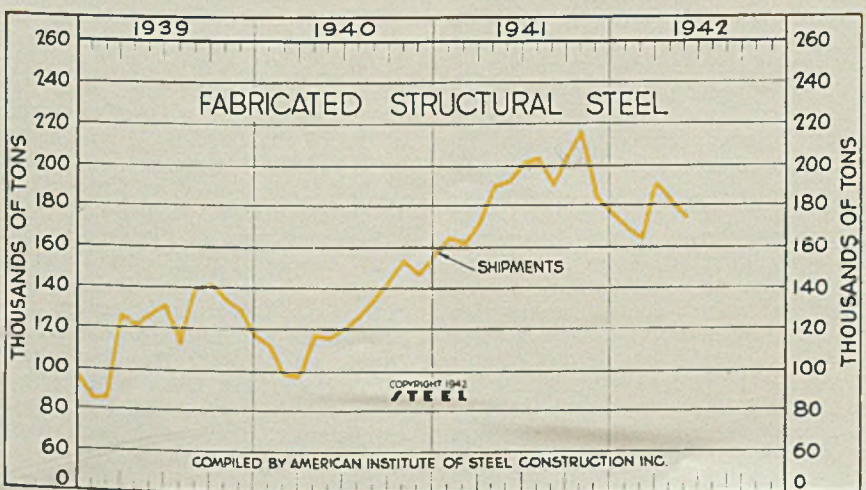
	—Net Orders—		—Production—	
	1942	1941	1942	1941
Jan.	150,551	110,579	134,778	94,409
Feb.	179,880	105,125	133,726	84,492
Mar.	211,081	126,140	146,507	95,185
Apr.	191,195	152,007	149,625	101,977
May	.....	153,143	.....	104,971
June	.....	161,512	.....	113,988
July	.....	175,892	.....	112,364
Aug.	.....	147,316	.....	117,703
Sept.	.....	115,066	.....	118,543
Oct.	.....	117,516	.....	135,272
Nov.	.....	84,534	.....	104,605
Dec.	.....	113,034	.....	131,518
Total	.....	1,561,864	.....	1,316,027

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

(1926 = 100)

	1942	1941	1940	1939	1938
Jan.	96.0	80.8	79.4	76.9	80.9
Feb.	96.7	80.6	78.7	76.9	79.8
March	97.6	81.5	78.4	76.7	79.7
April	98.3	83.2	78.6	76.2	78.7
April	98.7	83.2	78.6	76,2	78.7
May	98.8	84.9	78.4	76.2	78.1
June	98.4	87.1	77.5	75.6	78.3
July	....	88.8	77.7	75.4	78.8
Aug.	....	90.3	77.4	75.0	78.1
Sept.	....	91.8	78.0	79.1	78.3
Oct.	....	92.4	78.7	79.4	77.6
Nov.	....	92.5	79.6	79.2	77.5
Dec.	....	93.6	80.0	79.2	77.0
Ave.	....	87.3	78.5	77.1	78.8





Fabricated Structural Steel

(1000 tons)

	—Shipments—			—Bookings—		
	1942	1941	1940	1942	1941	1940
Jan.	167.8	164.6	110.9	183.4	281.2	81.7
Feb.	164.6	161.4	97.2	228.7	173.6	98.9
Mar.	191.3	170.2	95.9	248.3	206.1	128.3
Apr.	180.9	189.8	116.3	310.3	218.0	73.8
May	173.3	191.9	115.6	192.8	179.9	126.8
June	....	200.5	119.1	....	246.9	109.7
July	....	203.0	127.1	....	214.8	194.9
Aug.	....	189.3	134.9	....	158.7	122.5
Sept.	....	204.1	142.8	....	158.8	225.5
Oct.	....	217.7	153.2	....	128.7	233.1
Nov.	....	182.6	147.0	....	184.0	141.9
Dec.	....	176.1	155.5	....	146.4	203.1
Tot.	....	2251.1	1515.5	....	2297.0	1748.1

A War-Training Formula THAT

THE PROBLEM of training and upgrading war workers is so utterly complicated from every angle that to some it appears impossible of being unravelled. Yet solved it must be—and quickly.

War demands are all totally unnatural. They do not permit countenancing the gradualness of natural processes. They do not work themselves out. They cannot be muddled through. War requires its solutions now—not later. As the "arsenal of democracy," we must supply the machines of war not alone for ourselves but for half of the globe's population. Detroit, center of machinedom, is one of the most important sources of this essential war production. Thus there can be no victory for us if the problem of "'human conversion" to war production is not solved in Detroit.

Prime contractors such as Ford, Chrysler, Hudson and General Motors have training facilities of ample and continuous nature. But the Detroit area is full of subcontractors whose operations are not sufficiently large to include a training school. What is the answer?

A simple boiled-down solution was revealed to me recently in an observation of classroom activities at Great Lakes college in Detroit's suburban Ferndale. The principles and formulas are there. They can be extended to solve the training problem for any subcontractor.

I visited three typical classrooms on a recent Monday evening. Class A was oganized by individual initiative — folks who had never known factory work but who were voluntarily inspired to begin war production training as a patriotic duty, more useful even than civilian defense activities.

There were 14 in this class, evenly split between men and women. Previous occupations? An industrial caterer, auto trimmer, draftsman, accountant, bank clerk, indentured apprentice, salesman, furrier, practical nurse, bookkeeper, comptometer operator, teacher, housewife. This was the first night of a 15-hour 7-week course, and had to do with the use of measuring tools—micrometer, vernier scale, protractor.

Class B was of a group of 16 war workers of a plant that has already made history, having achieved the highest production per square foot of factory space. These men were being given individual opportunity to upgrade themselves by a management sponsored hook-up with the college. They were deep in the heart of right-angle triangulation with sines, tangents, secants and cosecants performing their trigonometric functions on the blackboard.

Class C was a group of 14 war workers of another subcontractor plant, organized and promoted by the labor union of that plant, the students paying their own tuition but enjoying the plus benefits of upgrading training as a group interest of their own local. They were studying the alphabet of lines, methods of projection, relationship of views and understanding of dimensions in the reading of blueprints that defined operations on which they were aspiring to work within their own plant.

Instructors Highly Competent

These three groups of people with the widest variations of experience, age, previous education, sex and occupation, were here learning new trades or gaining greater knowledge to fit themselves for upgrading. They were being taught by competent instructors . . . journeymen in highly skilled trades with years of industrial experience who were also tops in daytime educational fields and who were giving this instruction time to win further scientific degrees for themselves from this accredited college. So theory and practice, the academic and pragmatic, are being combined and custom-selected, essential war training is being effectively carried on in streamlined fashion with no waste of time or attention on anything irrevelant or that cannot be quickly applied.

Before getting into details of this Great Lakes college solution, let us see why it is so important now.

Selective service is demanding more and more men from the shops, and this rate must accelerate fast if the United States is to have its predicted 10,000,000 fighting men. The same skill is required to repair and maintain war machines on the fighting fronts as in their production at home. Thus, no matter what the candidate's industrial skill, the draft board is already reluctant to defer any able-bodied man.

Maj. Gen. Lewis B. Hershey, national director of selective service, warned 1000 Detroit industrial leaders at a recent meeting that personnel security could be guaranteed to *no* producer; that every able-bodied man, however many his dependents, might be called into service; that industry must prepare for the replacement of heavier manpower calls from shop to service by training older age groups and women; that children 14 to 16 years old eventually may be required.

Warning that the United States labor market will be practically exhausted in 1943, deputy director of labor supply, WPB Gen. Frank J. McSherry, addressing a vocational conference at the University of Michigan in late April, said there would be a severe shortage of labor in the Detroit area, even after the now-potential labor supply of women, nonessential industry workers and older-age groups had been inducted into war work. He stated, "Educators cannot continue to conduct classes as usual. All their efforts must be directed to winning the war . . . drastic measures to speed the training of skilled workers . . . industry itself will now have to assume an ever increasing share of the burden . . . programs for training engineers, scientists, skilled trades, must be tremendously enlarged and speeded up."

The acuteness of the problem has been concealed until now by many ephemeral conditions. It has taken time to convert machinery to war production and this has delayed the taking on of workers. Some have pirated workers from other plants with the bait of better wages or conditions. There has been some

By GERALD E. STEDMAN

WORKS

unnatural unemployment caused by delays of conversion that has kept labor drawing unemployed compensations because to take a job in some other plant would mean the loss of seniority ratings.

But now every factory faces the need of more and more workers to expand war production and to replace the constant outflow of selective service demands. The majority of those being hired are already of the totally green type, never before employed in a factory. And the pressure is upon them to upgrade themselves fast because the outward march to uniforms is no respecter of skills.

These green workers must be taught on the job, but they must likewise acquire outside the shop an essential knowledge of mathematics, measurement, drawing, blueprint reading, tool and die design, shop theory, understanding of shop

(*Please turn to Page* 69)

Fig. 1. (Top right)—Leading personnel directors, supervisors and foremen with the college planning committee in foremanship round-table discussion. Left to right: Roy E. Bolles, Great Lakes committeeman; Charles J. McCarthy, foreman, Bohn Aluminum (Capitol Brass Division); B. E. Larson, personnel director, N. A. Woodworth Co.; Edward Kantarian, supervisor, Miller Selden Electric Co.; Carl Sjolander, foreman, Suprez Gauge Co.; Nick Lupu, supervisor, Detroit Tap & Tool Co.; V. E. Blue, personnel director, Chrysler Corp. (Dodge Division); Jason L. Russell, assistant general manager, C. E. Jamieson Co.; J. F. Votrobeck, co-ordinator and discussion leader; D. V. Duryee and James L. Turner of the college planning committee

Fig. 2. (Center)—Advanced class in drafting with instructor Harry Serwin in background

Fig. 3. (Bottom)—When required, Great Lakes students receive individual instruction. Here J. L. Turner, second from left, directs special group consultation and gives personal help in studies of inspection methods

Welding Aids

MILL MAINTENANCE

By SCOTT D. BAUMER
Steel Mill Representative
Air Reduction Sales Co.
New York

MAINTENANCE of steel mill equipment once depended almost exclusively upon considerations of economy and safety. Whether to restore a worn roll neck with a weld deposit or to patch up a broken gear casting were decisions resting upon the savings effected and

Fig. 1—A crack which developed in the center of this 48-inch blooming-mill housing was repaired by arc welding. Although this housing was removed for the welding, such repairs can frequently be made in place, saving even further delays

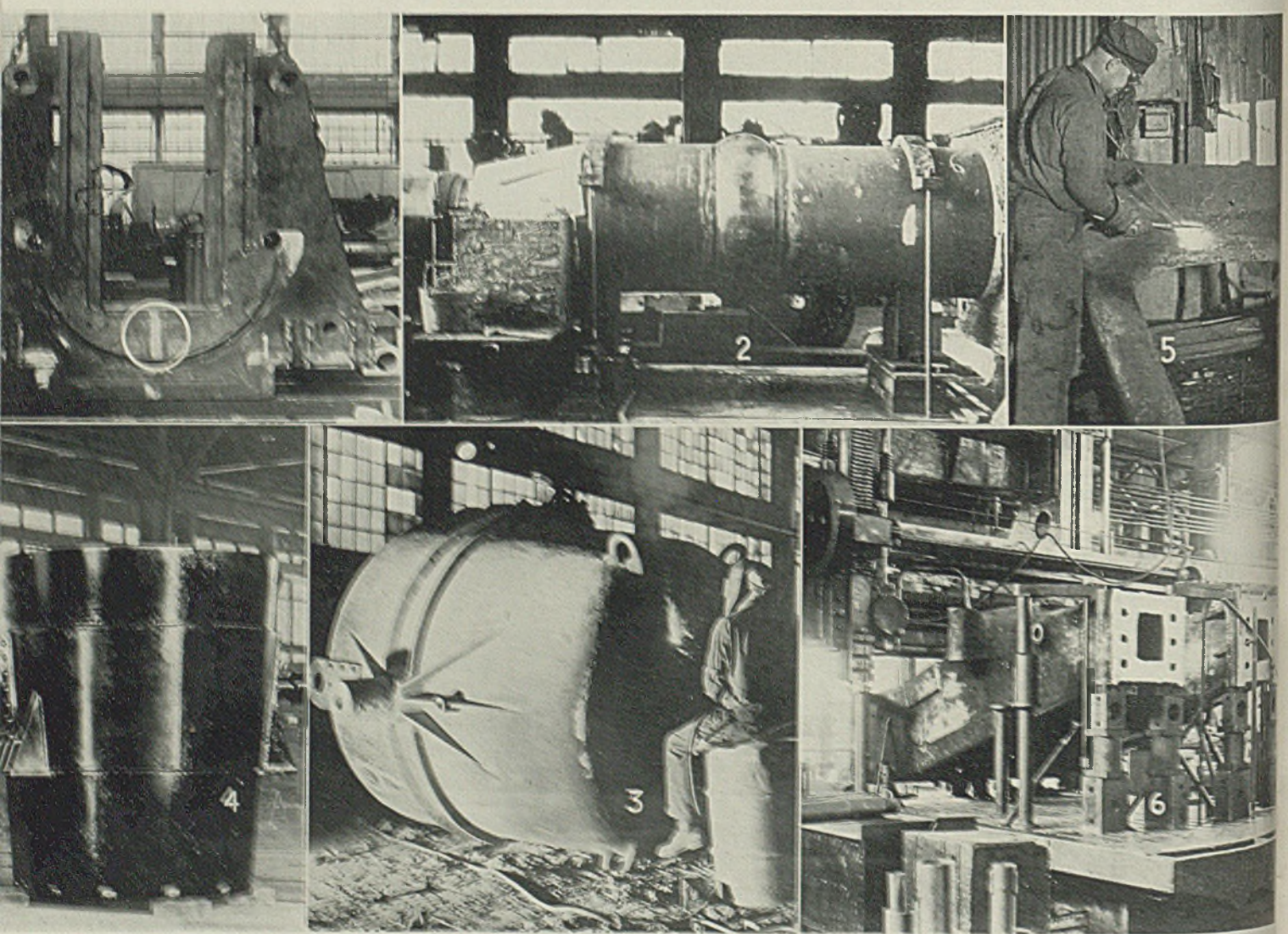
Fig. 2—A 36-inch diameter bending roll 40 feet long was broken in service. Here the break is filled with wax prior to thermit welding. Entire job was completed in two weeks at comparatively little cost, enabling early resumption of operations

Fig. 3—Repairing burnouts and heat cracks in pouring and cinder ladles by arc welding is a typical maintenance operation. Old ladles normally destined for scrapping can be given extra useful life by thorough preparation and welding

Fig. 4—This 85-ton welded open-hearth ladle was fabricated of parts shaped by standard flame cutting and bending equipment. Lighter than riveted construction, it enables already overloaded pit cranes to carry additional molten metal

Fig. 5—Door frame from an open-hearth furnace, worn thin and damaged in normal service, has the damaged spots cut away with a hand torch and replaced by patches welded into place. This operation can be done with either gas or arc welding

Fig. 6—Pedestal faces of this hammer housing have been built up by welding. Note welded patches on side of frame. Housing is in position for machining built-up ends. Completely reconditioned, the hammer frame was restored to useful service



length of dependable service obtained, as against the purchase or fabrication of a new part.

Now, of course, the problem is entirely different. New equipment and new replacement parts are often virtually unobtainable, or at best, they may be secured only after endless months of delay. This emphasizes the necessity of making present equipment last as long as humanly possible. Equipment will become worn and breakdowns will occur with increasing frequency as old equipment continues in service long beyond its normal life. This means master mechanics and their organizations must be prepared to restore mechanical equipment to working order quickly. It will often be necessary to raid junk piles to obtain parts or even reclaim entire machines once discarded for reasons of economy.

Fortunately, the means and methods for making the variety of repairs and restorations which will be encountered have been developed, tried proved in past years. Undoubtedly, necessity will mother many an ingenious adaptation, but they will be based upon proved practices and experiences. Fewer welded repairs will be made simply because they are the most economical methods. More and more will be made because there is no other practical method of putting the equipment back in service quickly. The experience accumulated in perfecting the numerous welding and brazing processes as they apply to steel mill problems is indeed welcome now.

This article presents briefly an overall summary of the various applications of welding procedures on mill equipment. These processes, used singly or in combination, provide the solution, to by far the greater majority of such problems that are encountered. Moreover, the important factor of time can usually be held down

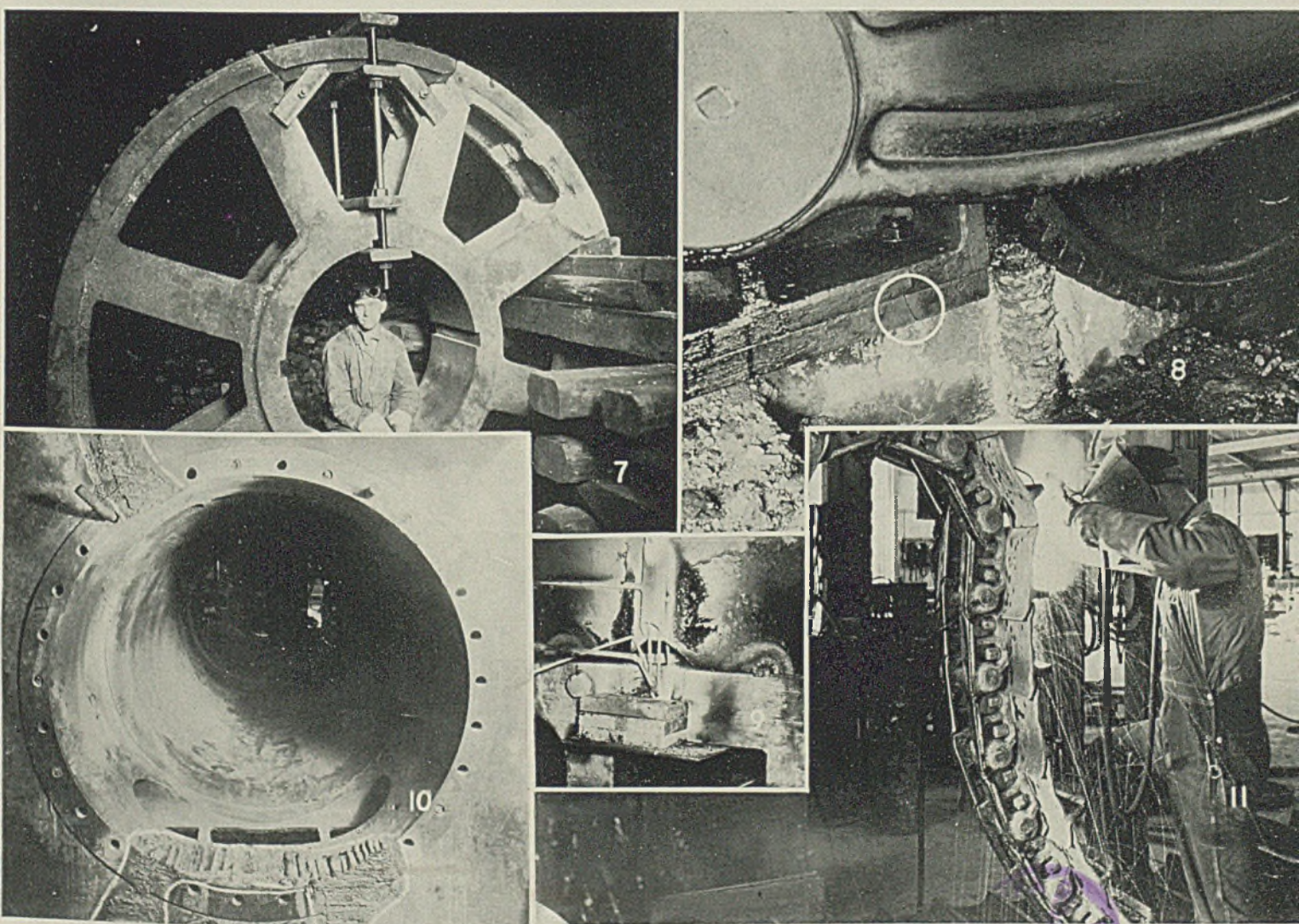
Fig. 7—Broken in two places, this large gear had to be restored or replaced. Today such heavy castings are unobtainable on short notice, but repair by welding restored this gear in a few days' time

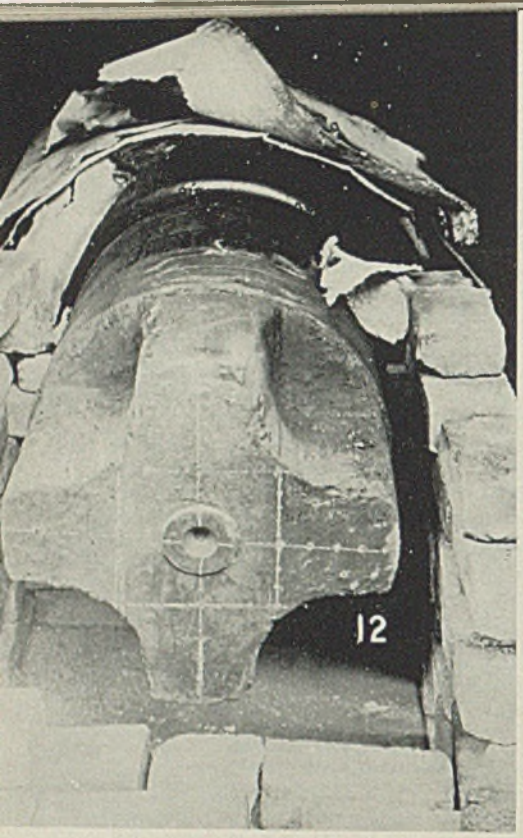
Fig. 8—A break in the base frame of this bulldozer was veed out and welded. Steel mill welding crews must be prepared to make such emergency repairs promptly, to minimize interruption of production operations as old machines are overworked on war production

Fig. 9—This bronze weld in a broken locomotive frame will be as strong as the base metal itself. Fire brick, rod holder and baffle plate shown are part of a standardized technique used to repair such breaks at a total cost of about $18

Fig. 10—Low-pressure engine cylinder after welding several serious fractures, at a saving of over $13,000. Today's need for every ounce of production is resulting in salvaging of discarded equipment from junk piles, much of which can be restored by welding

Fig. 11—Caterpillar crane track with lugs worn to half their original height is restored as shown by tacking on bars of pick steel, then welding them securely in place





to a minimum so as to avoid lengthly departmental shutdowns which would severely hamper production.

Most valuable in maintaining efficient operation of heavy equipment subject to severe service is the process of building up and hardfacing wearing surfaces. This is commonly applied to wabblers, coupling boxes, shafts, piston heads and mill guides, to name only a few examples. Building up with bronze is sometimes preferable on parts not subjected to abrasion, or where the wearing

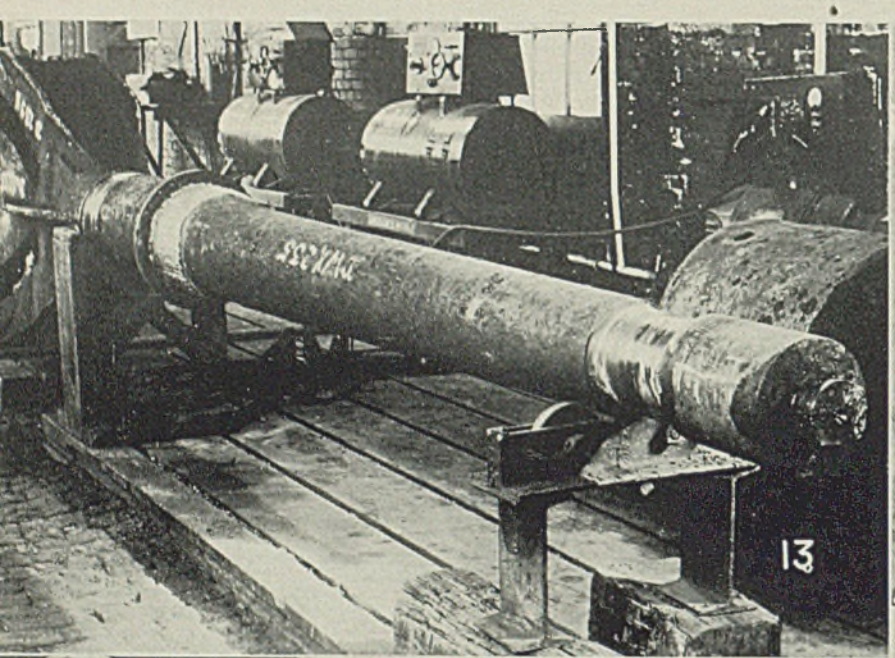
Fig. 12—Cast iron blooming-mill roll prepared for preheating to 1000 degrees Fah.. Molybdenum-nickel cast iron rod was then used to build up worn areas

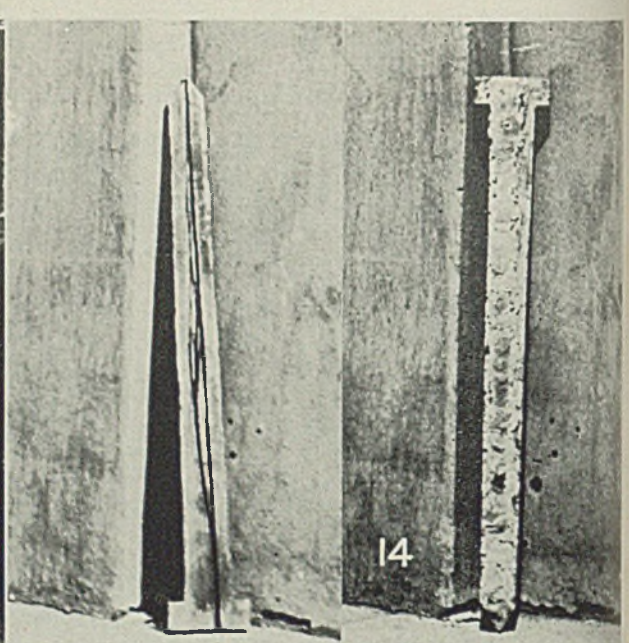
Fig. 13—Worn bearing surface of this ingot stripper part has been built up by welding

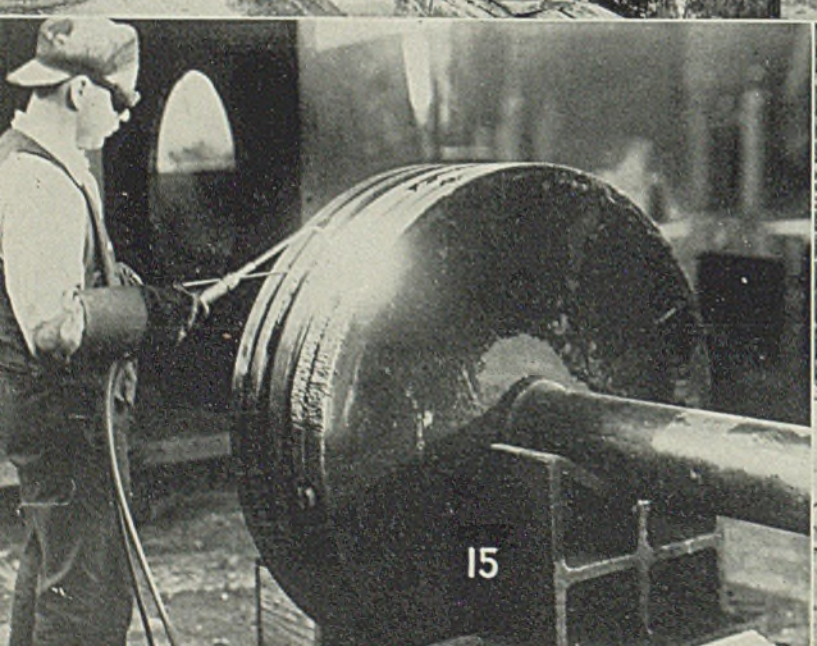
Fig. 14—The alloy bronze guide at left is deeply scored. At right, restored by building up with carbon arc and Phos-Copper. New guides cost $28 a pair but can be reclaimed four times at a cost of $8 a pair

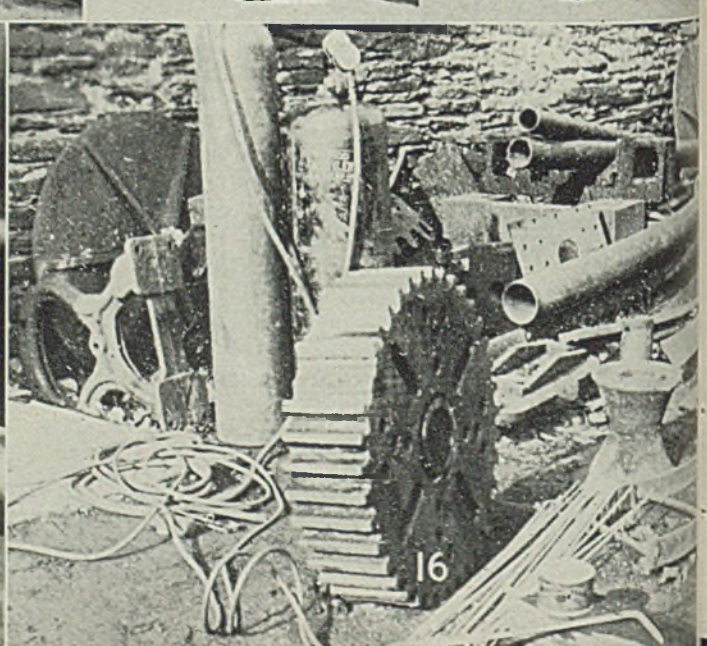
Fig. 15—Cast iron piston head from blooming mill steam engine, being brazed with Airco No. 22 manganese-bronze rods. Entire outer surface was built up, then machined to size. Object was to transfer the wear from the cylinder to the less costly piston head. This operation trebles the life of mill cylinders before reboring is required

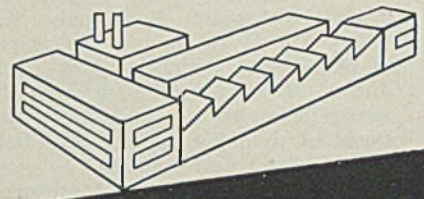
Fig. 16—Broken teeth on small gears having thin rims such as this are best repaired by building up new teeth with bronze or cast iron, rather than by studding and arc welding around the studs. This gear was out of service only 5 hours











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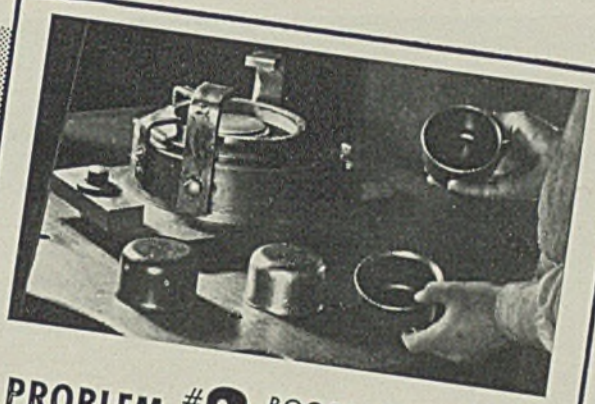

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If you would like to know how to boost your machine and press output, send for "Tool Steel Simplified." It tells *how* to select the best tool steel for each job, and *how* to heat treat it for best results. Let this handbook answer many of the questions that come up in your plant. It is available at cost to tool steel users in the U. S. A.—$1.00 ($3.50 elsewhere). After you have read it, you will want more men in your plant to have copies.

This handbook is the foundation of many plant programs for *more production from every man and each machine.* It is written in shop language so your men will be able to apply it to their work. Available *at cost* to tool steel users in the U.S.A. —$1 ($3.50 elsewhere). Order your copy today.

Trouble Shooting in tool rooms and production shops is the big job your nearby Carpenter representative has to do right now. His diversified experience with tool steel problems may enable you to find new short-cuts to *more production.* Get in touch with him now.

THE CARPENTER STEEL COMPANY
Dept 51, Reading, Pa.

Carpenter MATCHED TOOL STEELS

surfaces are lubricated. The choice of surfacing material may be influenced by the desirability of transferring the greater part of the wear to the part which is easiest to resurface, or less costly to replace.

Where the wearing effect is very pronounced and must be corrected repeatedly, as with wabblers, it is more economical to build up with weld metal before the part becomes badly worn since less build-up will be required. Further savings can be effected by restoring the worn areas with the part in place, where this is feasible, as this eliminates the time and cost involved in dismantling the equipment.

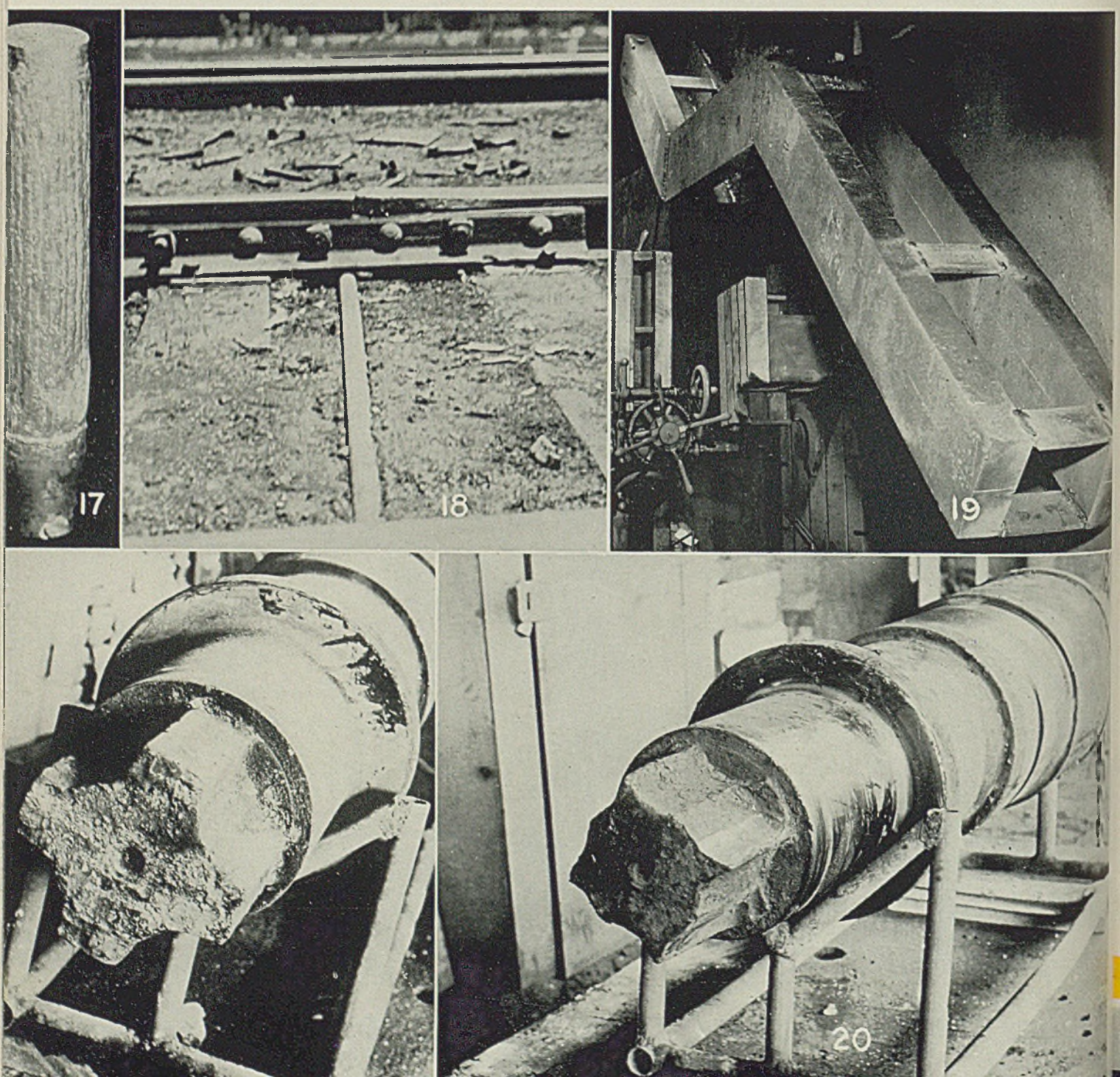
Another life-prolonged process capable of broad application is flame hardening. Extremely flexible both as to degree and depth of hardness which can be produced, it is particularly advantageous in hardening the bearing surfaces of machine parts where only the localized areas subject to wear need be hardened. The flame process provides the desired degree of hardness on these areas, leaving

Fig. 17—Pump sleeves, subject to both abrasion and corrosion, are renewed by hardfacing. When machined and finish ground, they are completely restored for a long span of usefulness

Fig. 18—Rails from the scrap pile have the low rail-end built up by welding, then finished with a flatter and sledge hammer. Keeping rail ends, frogs and switch points built up reduces frequency of yard derailments and damage to motive power

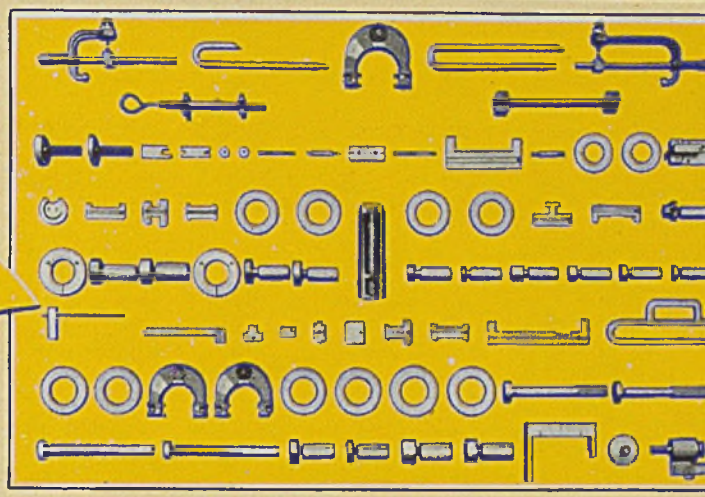
Fig. 19—When restoration of the old part is impossible, a replacement part can be quickly fabricated by flame cutting and welding. This buck stay for an open-hearth furnace was fabricated to replace a burned-out stay

Fig. 20—A badly worn 14-inch mill roll wabbler before building up and hardfacing with the carbon arc. At right, the same wabbler restored. This operation is more economical when wear is less severe and less building-up required



YOU CAN INSPECT PROJECTILES AND SHELL CASES THIS WAY

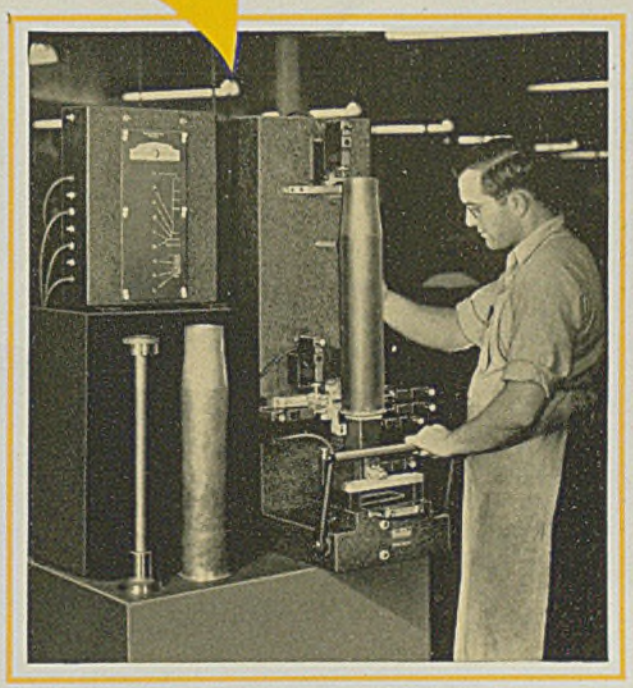
Checking each dimension separately and laboriously with its own fixed size gage requires many inspectors and lots of time. This set of gages was used in checking the critical dimensions of a 75 mm. shrapnel body.



But HERE'S A BETTER And A FASTER METHOD

This Multichek gage checks both tolerance limits on eight critical shell dimensions simultaneously—at just one pass and far more accurately than with fixed size gages.

In just one operation this gage checks the overall length of a cartridge case, two body diameters, one flange diameter, one shoulder height, one flange thickness, one counterbore diameter, one counterbore depth, and the primer hole diameter.



Write for a Descriptive Bulletin on the SHEFFIELD MULTICHEK GAGE

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the ductility of the core metal unimpaired. A typical application of flame hardening is the reclamation of worn mill rolls, which are turned down to smaller diameter and then flame hardened for use as tension rolls. This conservation procedure was developed at a tin plate mill to avoid costly scrapping of worn rolls.

Cracked or broken castings such as gears and machine frames usually mean no more than a temporary shutdown while the break is repaired by arc welding or bronze welding. Steel mill welding departments are proficient at making such repairs. The long service given by the welded castings found in every shop is evidence of their effectiveness. Occasionally, however, it may be speedier or more economical to fabricate a replacement part. Standard plate thickness can be flame cut to shape, formed and welded to provide such parts quickly and with all the advantages of strength and lightness characteristic of welded fabrications.

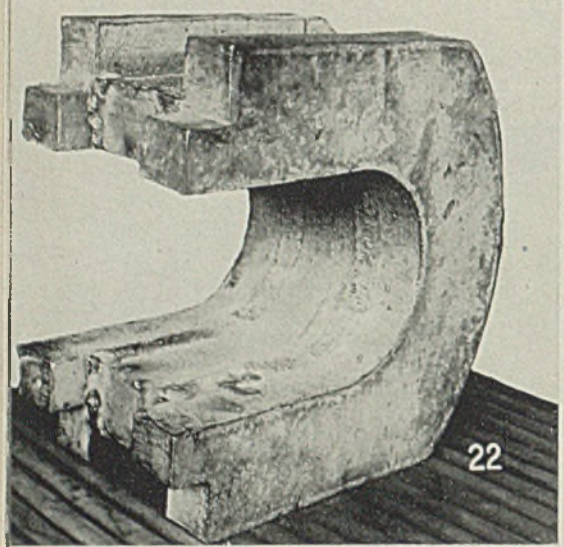


Fig. 21—Here a worn 18-inch work roll, once discarded, has been turned down to 16 inches diameter and is being flame hardened on the surface for use as a tension roll

Fig. 22—Locomotive driving box fabricated from three flame-cut parts. This is typical of many parts now difficult to obtain but which can readily be fabricated from stock plate and billet forgings

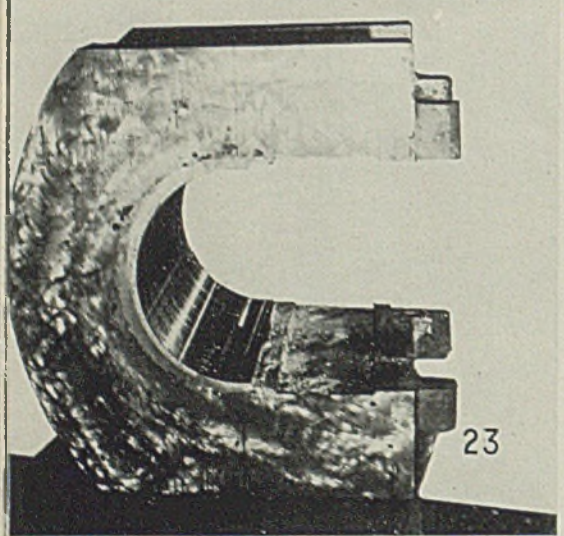


Fig. 23—The driving box with crown brass welded in, machined and serrated, and with bearing metal poured. Over 150 pounds of brass were saved in this fabricated design

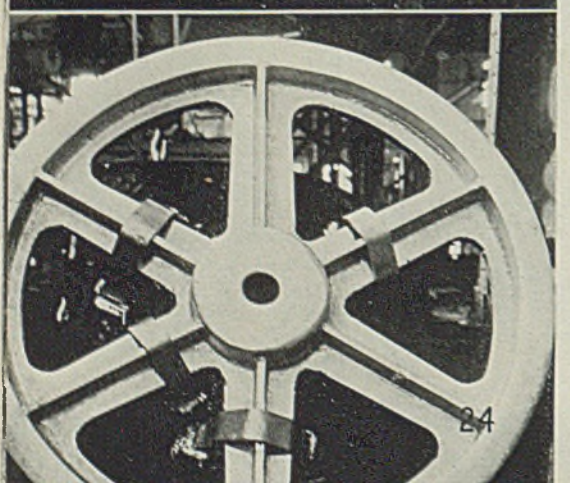
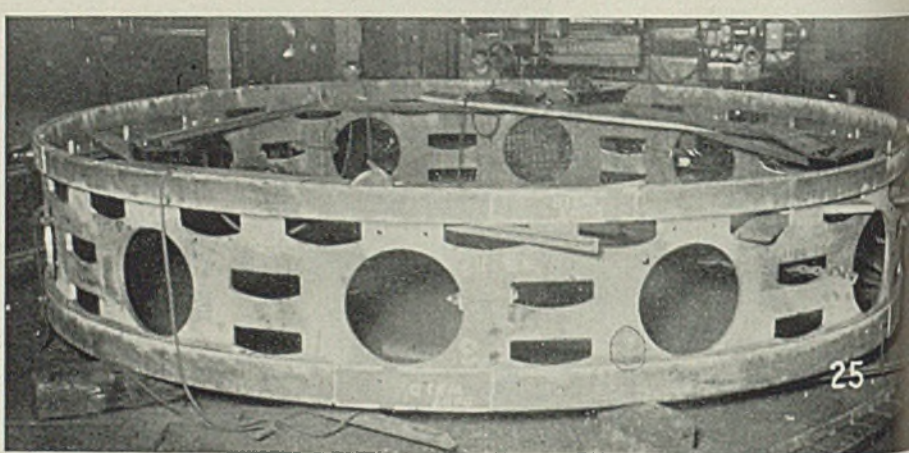
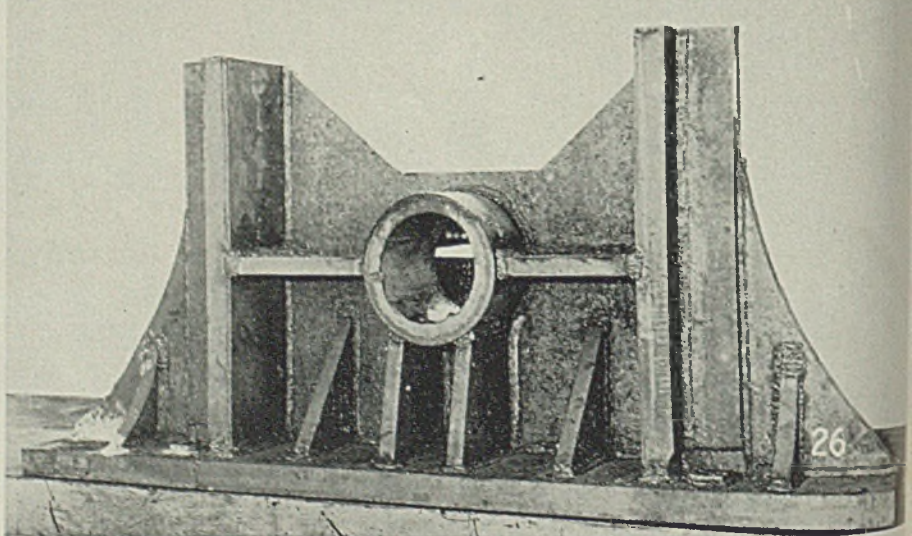


Fig. 24—A large gear wheel completely fabricated by welding to replace a cast gear broken in service. Such fabrications eliminate dependence upon indefinitely delayed delivery schedules for new parts

Fig. 25—The parts for this tuyere jacket were entirely flame cut to shape with a standard Airco No. 4 Radiagraph, then formed for fabrication by welding

Fig. 26—Often when obsolete equipment breaks down, new cast parts are virtually impossible to get because patterns and drawings may have been discarded. This welded draw head for a locomotive was fabricated to replace worn casting





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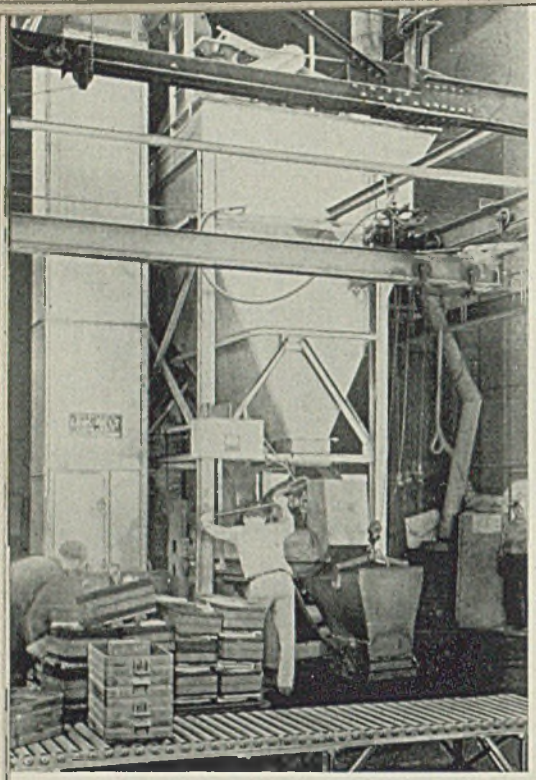


This Link-Belt shakeout and sand reclamation unit is one of the most important sections of the new facilities that tripled production in this magnesium foundry. The lifting elevator is just behind the shakeout. Reconditioned sand is being discharged into a hopper bucket by the operator at the right. Note overhead monorail hoists and transfers, gravity roller conveyor in foreground. Link-Belt Co. photo

Better Materials Handling . . . .

TRIPLES CASTING OUTPUT

By REGINALD TRAUTSCHOLD
Engineering Consultant

"KNOWING its stuff" has enabled one small foundry to go all-out-for Uncle Sam in the matter of essential sand-molded magnesium-alloy castings—castings that weigh a good third less than if made of aluminum and are quite a bit stronger. Output has been tripled, as compared with pre-war activity, when both magnesium and bronze castings were turned out for an exacting market—tripled without adding a single foot of floor space.

This noteworthy feat has been accomplished not by any radical innovations in sand foundry practice, but rather by improvements in foundry facilities that mark the changes as a worthy achievement in wartime plant conversion of a permanent nature. That is, the foundry improvements will constitute decided assets in post-war resumption of business affairs, the chief improvements being the addition of advanced sand handling equipment and overhead storage—improvements made necessary in attaining full-time production by the peculiarities of casting magnesium alloys.

Casting Complications: The extremely lightweight metals such as magnesium alloys oxidize seriously at temperatures between 1100 and 1200 degrees Fahr., depending upon the percentages of alloying elements—aluminum, manganese, zinc and silicon. Too, they shrink some 10 per cent more than do aluminum castings. The oxidation, high shrinkage and light weight of the molten metal are offset by the experienced molder by somewhat special methods of gating, venting and risering the molds—the oxidation difficulty controlled by the use of special fluxes during the melting operation and the conditioning of the molding sand by the addition of suitable inhibiting agents.

Sand Reconditioning Essential

Reconditioning the sand each time it is used is most essential. It was chiefly to avoid the customary delays imposed on foundry output by sand conditioning that a highly efficient system of materials handling with overhead storage and reconditioning equipment was installed late in 1940. A centralized floor shakedown, a griddled hopper, was provided on which the flasks are dumped. It discharges the used sand to an underground conveyor-belt type feeder that serves a steel-encased belt-and-bucket elevator feeding a Link-Belt sand reclamation unit erected in one corner of the foundry.

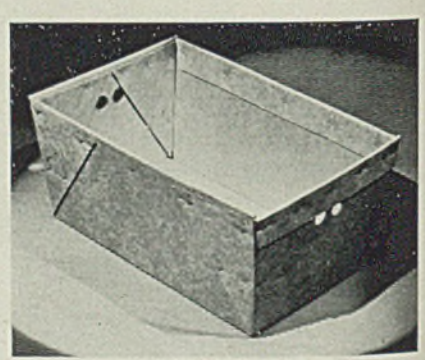
Sand Reclamation Unit: From the elevator, the used sand first passes onto a vibrating screen mounted above a 29-ton capacity hopper fitted with duplex-discharge gates into which the screened sand falls. The screenings—metallic refuse and core lumps—pass over the end of the screen, down through a closed chute and into a barrel container on the foundry floor.

The reconditioning of the screened sand—the addition of inhibiting agents, etc.—is performed in a muller-type mixer immediately below the hopper storage bin, from which receptacle the prepared sand is distributed to the various molding machines by bottom-discharge buckets running on an overhead monorail track. Completing the compact, continuous sand-handling system are gravity roller conveyors for moving and distributing the empty flasks. Customary overhead cranes serve the workmen in the heavy lifting and moving tasks.

An investment of some $15,000 or $20,000 was entailed in effecting this foundry transformation, but it made possible a full 200 per cent increase in output of vital war work. This sum covered the full cost of new equipment, bins, pits, foundations, electric wiring and all erection expenses. Obviously it was liquidated in short order under the pressing call for more and more magnesium castings. The foundry is now prepared at any time to resume its normal activities with facilities that will effect quite substantial reductions in operating costs, no matter what kind of foundry work may be undertaken.

Paper Tote Boxes Conserve Metals

Hinde & Dauch Paper Co., Sandusky, O., is offering new large size corrugated tote boxes to war manufacturers for handling small parts on the assembly line, between departments and in storage. Besides taking some of the pressure off vital



materials, the paper boxes are ideal for women workers in war production. Injuries to worker's fingers, caused by sharp edges and splinters, are entirely eliminated. Because the corrugated board may be adapted to so many shapes and styles, it readily lends itself to the making of tote boxes for a wide variety of uses in industry.

America is now thoroughly awake to the seriousness of what lies ahead. There is a definite realization that we can lose this war if we do not take advantage of every one of our national resources.

The sources of virgin raw materials, -- ore mines, coal mines, mines from which alloying materials are produced -- are being drawn upon to their limit. But now the steel industry, in order to produce the necessary steel for tanks, guns, planes, ships, shells, bombs, machines and other vital war material, needs 6,000,000 tons of scrap in addition to the regularly available supply to achieve its goal.

The extra supply of iron and steel scrap is largely beyond the control of our industry -- it is in the hands of more than a hundred million Americans. In order that ultimate Victory may be assured, every individual must adopt an objective, fact-facing attitude and pledge himself to help in the mobilization of every pound of iron and steel scrap and make it available, through regular channels, in order that it can be converted into prime steel.

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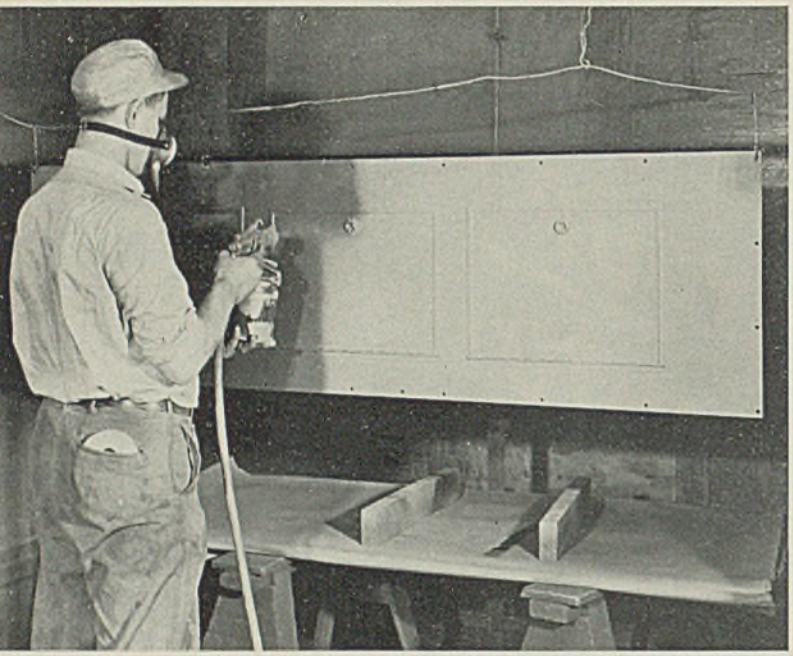

Pre-assembly painting of the rear panel of the transformer housing of a Tocco induction heating machine. Note access doors are already mounted on panel. "Streamlining" finishing methods of painting before assembly saves 16 manhours per machine formerly required for masking operations

PRE-ASSEMBLY PAINTING

. . . . eliminates need for masking, saves 16 manhours in finishing induction heating machines

By ARTHUR PITTAWAY
Assembly Foreman
Tocco Division
Ohio Crankshaft Co.
Cleveland

BY DEVELOPING a pre-assembly technique for painting exterior surfaces of its Tocco process induction heating and hardening machines, the Ohio Crankshaft Co., Cleveland, achieves a saving of 16 vital man-hours in the manufacture of each unit.

Formerly, the machines, weighing from 4 to 8 tons, were completed on the assembly line and then moved to the paint shop. Here dials, gages, transformer panels, fixture and electrical outlets, chromium and nickel plated trim, door catches and other hardware, as well as the water pan with its rubber molding, which had to be painted a different color, were all masked against the spray gun's lacquer. This masking was a tedious task. It took four men some 4 hours to complete the job. Then spraying required another 2 hours.

An experiment in pre-assembly painting of exterior surfaces was tried by the assembly crew and found to work satisfactorily—the parts went down the line without being marred.

Now each exterior surface, which includes the base, the generator housing skirt, the penthouse or transformer control housing, and the top, is given a priming coat, rubbed down and then sprayed with finish lacquer in the paint department. Because of the more convenient size of these parts and their moderate weight, handling in the paint shop is not difficult.

Masking is completely eliminated, thereby releasing the four men for other, more important work. Rate of production is thus stepped up by 16 man hours.

The pieces are painted well in advance of assembly schedule. This prevents delay in delivering respective parts to their stations, and insures sufficient time for complete drying of the lacquer before it is subjected to handling.

Special Training: The perfection of this painting technique has not been achieved without some personnel training. Because the assembly of Tocco induction machines is handled by a comparatively small and closely knit organization, it was not hard to inform the men and to win their co-operation in furthering the new plan. Every painted part receives careful handling. Pride has proved to date a sufficient incentive; for when inspection reveals a body scratch, it is brought to the attention of the assembly section, after which the machine is torn down and the part repainted.

There are no bonuses and no penalties for handling these prepainted parts. As assemblymen on this work have to be above average, personal satisfaction in a job well done is a strong motivating force. Pre-painting provides a cleaner part with which to work.

Additional efforts to reduce marring are found in the use of masonite in vise jaws and the driving of escutcheon pins with a brass hammer. Upon completion of painting, a part is safely wrapped in heavy paper and taken to its assembly storage section. An outstanding example of careful treatment is evidenced by the fact that drill press operators can drill and tap finished work without repainting.

Preservative Methods: A four-step method of preparing parts against corrosion is practiced in this plant. The steps are: First, a protective Korrosol wash is applied to minimize rust. Second, the rough cast base receives a filler to smooth the exterior surfaces. Third, primer coat is applied and rubbed down. Fourth, finished coat is sprayed on.

All interior surfaces and metal parts subject to rust are painted prior to assembly as well as the exterior surfaces.

Project Book for Lathe Learners Available

To acquaint the learner with basic metal turning operations, South Bend Lathe Works, South Bend, Ind., is offering a project book entitled *The South Bend Machine Shop Course Book.* It contains 12 practical projects for lathe apprentice courses.

Complete assembly and detail drawings of each project with all bench and lathe operations are outlined in correct sequence in the publication. It is available for 50 cents. Sample copies, however, are being offered by the company to shop superintendents and apprentice supervisors without charge.

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No straight mineral oil will provide the accelerated rate of quenching required. A specially compounded oil is necessary, and this company—a leader in heat treating materials since before World War I—has perfected such an oil, made solely for quenching.

With alloying elements scarce . . . with yield strength limits higher . . . with speedy production vital for Victory—you can't afford to take chances on material that can make or handicap munition manufacturing success.

But why is **HOUGHTO-QUENCH** rated by experts as the best quenching medium for war-time steels? Many reasons may be cited:

1. It's speedier—contains a wetting-out agent which lowers surface tension, spreads oil faster over hot surfaces. (See chart below.)

2. It's high in heat absorption, enabling transfer of heat more rapidly from the metal.

3. It's stable—contains a patented stabilizing agent which minimizes oxidationor fractional distillation of the oil in service.

4. It gives a greater *depth* of hardness. (See chart at lower right.)

5. It is serviced by men who *know* heat treating procedure and products . . . who are helping war production plants continually.

6. It's *right* on physical "specs" required —fire, flash and viscosity. And it stays that way indefinitely, because it's stable.

These are some of the reasons why leading munitions makers are using **HOUGHTO-QUENCH**. You . . . who need a war-time quenching oil that serves longer, quenches faster . . . should specify **HOUGHTO-QUENCH**.

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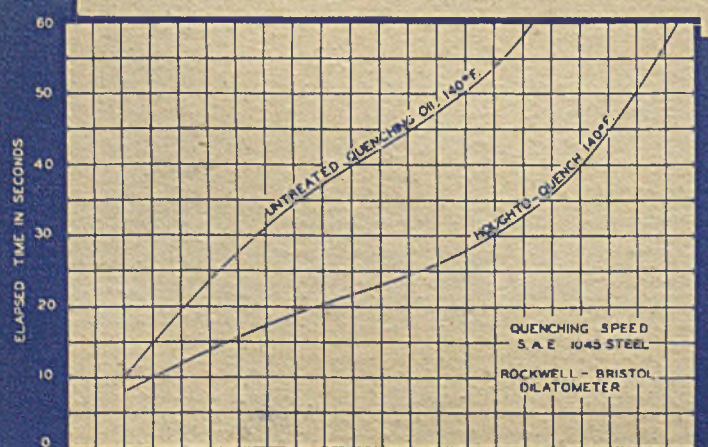
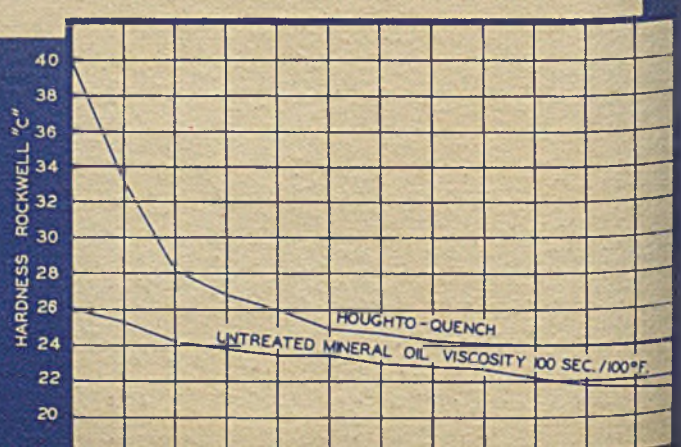




War-Training Formula

(*Continued from Page* 55)

terms. Too, there must be much supervisory training to provide proper handling of the emotional unbalances which may result from so compressed a working routine. This is forcing a close, swift correlation between the academic and shop practice, between management and labor, with that community of understanding that is required to eliminate all waste time and motion in the training procedure.

The complications of the human conversion problem thus briefly defined find their solution in the strategy, technique and procedure being used by Great Lakes college. Since its methods are capable of swift expansion, details are particularly important at this time.

Great Lakes college was founded by Clayton James Ettinger, B. S., A. M., M. D., Ph. D., in 1937, with divisions and courses leading to the academic degrees usually conferred by standard colleges and universities. An outstanding psychiatrist, Dr. Ettinger had devoted much study to psychology in industry. He is something of an academic rebel in that he has always felt there was too much lost time and effort in usual academic practice. He purposed a college that would provide close union between academic teachings and their application so as to stimulate self-reliance, life adjustment and talent leadership.

Dr. Ettinger was convinced that the usual institutional courses in engineering were unwieldly and out of touch with industrial demands. He wished to work closely with industry and create an educational plan that would arm students with all essential factual knowledge and technique for *immediate use.* A kindly fate brought him together with two other men with similar concepts in the fall of 1941, and from that union, the Great Lakes war training formula has developed.

D. V. Duryee, B. S., after nine years' journeymanship in the tool and gage skills, transferred his life interest to the vocational education field, became supervisor of trade and industrial education for the State Board of Control for vocational education, did much work in safety and in creation of work manuals on machine shop operations. He is now acting head of the machine shop at Detroit's Wilbur Wright high school.

J. L. Turner, LL. B., B. S., after years of journeymanship as a die sinker and toolmaker, became interested in labor unionism, holds membership in AFL as well as Local 157, UAW-CIO, and his desire to devote his life to vocational education brought him into association with Mr. Duryee. He is now a teacher at Wilbur Wright high school. Both wanted to add to their training, working toward M. S. degrees. Their concept was the development of a streamlined war training course, custom-selected from the regular engineering course, fitted to the individual requirements reflected in the operations of each plant and designed to be taught in such manner as to be immediately applicable to job practice. The concept was predicated upon unification of theory and practice, faster training, avoidance of unnecessary academic and designing of studies to fit the particular training job. As a graduate assignment to obtain their M. S. degrees, they freely offered their years of industry and academic experience to Dr. Ettinger.

A vitalized war training program was first inaugurated with management-labor approval by N. A. Woodworth Co., prominent Detroit producer of aircraft engine parts. Mr. Duryee planned this training course, its organization and correlation with the vocational aspects of the conventional engineering curriculum. Mr. Turner concentrated upon the industrial promotion of the concept, class organization, diagnosis of occupational needs and employer-employe relations. The success of the venture was unique.

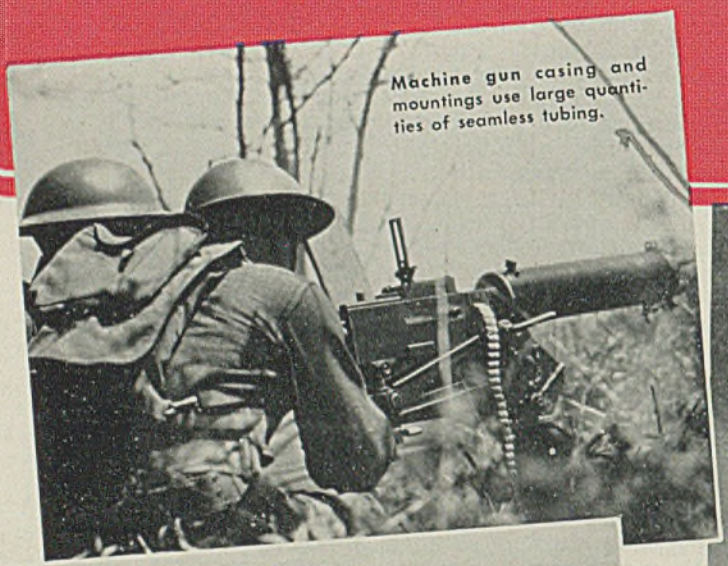
At present, groups from Bohn Aluminum & Brass Corp., Motor Products Corp., Vickers Inc., Suprex Gage Co., Thompson Products Inc., Ex-Cell-O Corp., Chrysler Corp. and other firms have availed themselves of this job training opportunity.

Upon request from any company, experts from the Great Lakes engineering faculty make a situation study of specific training needs. Courses are then built into the regular engineering curricula in such manner that professional goals may ultimately be achieved. In other words, this war training becomes accredited degree work for those who can pass entrance requirements and continue their training at Great Lakes college at war's end. These courses are presented so that immediate job values are attained. In the procedure, varied maturity levels are given the opportunity for higher education with

Fig. 4. (Left, below)—Class A of 14 members studies measuring tools and systems at Great Lakes college with D. V. Duryee as instructor. Women form half of class

Fig. 5. (Right)—Class B consists of a group of advanced mathematics students from the N. A. Woodworth plant. They are studying right-angle triangulation with Roy S. Bolles as instructor

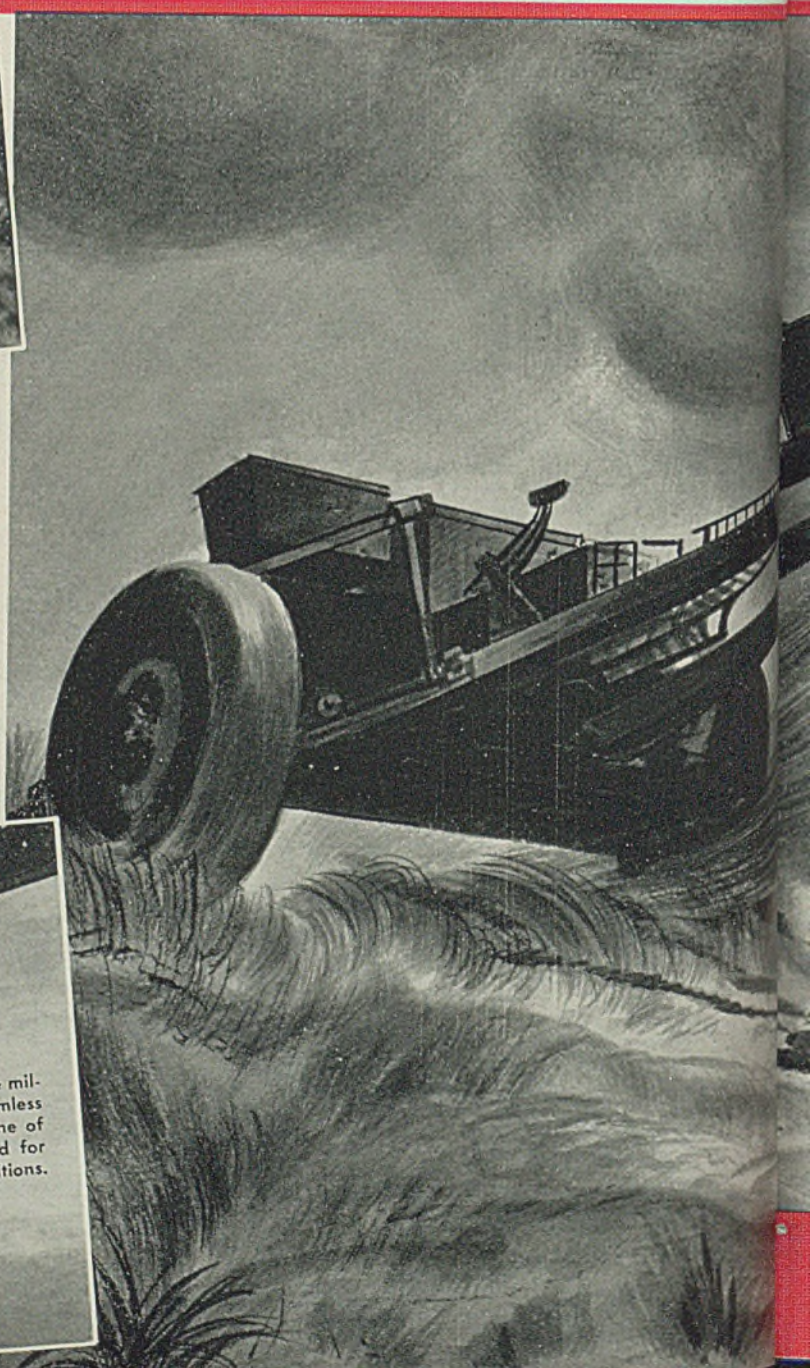
How many *Jumps* in a jeep?



Machine gun casing and mountings use large quantities of seamless tubing.

The modern battleship is a maze of pipe and tubing from stem to stern.

Shells and bombs by the millions are made of seamless tubes. This process is one of the fastest ever devised for mass production of munitions.



THAT'S what the Army wanted to know. These little cars must take terrific punishment—jumping ditches, striking rocks, and crashing through underbrush.

Army engineers wanted to make sure that the jeeps wouldn't make their last jumps in the middle of a critical battle. So they put them through a series of field tests in the roughest country they could find.

The jeeps were driven to destruction—the only true test of stamina. When stronger parts were needed, improvements were promptly made. Design engineers solved this problem by using stronger steels.

Seamless steel tubing plays an important role in vital parts of jeeps. For its weight, tubing is the strongest structural shape known. It enables the jeep to absorb shocks that would wreck an ordinary car.

Seamless tubing is being used in tanks, gun mountings, airplane landing gear and many other parts used in war equipment.

We are glad to be able to contribute manufacturing facilities and metallurgical experience that is helping to make American equipment the most reliable in the world.

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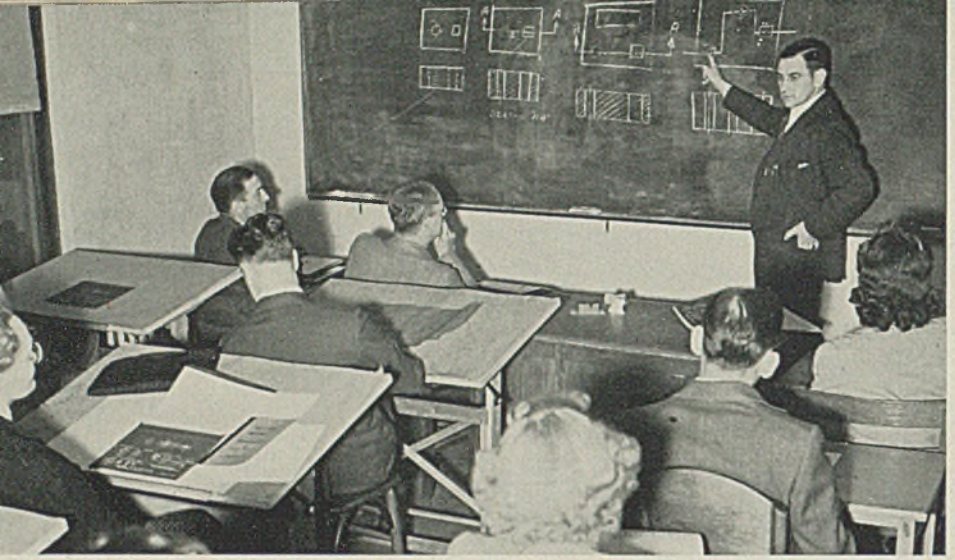

Fig. 6—Group of students from Bohn Aluminum & Brass Corp. hear George Petzer explain some points in their studies of blue print reading. This is Class C

immediate utility. Thus the academic becomes streamlined through evaluation of specific abilities and occupational needs.

Joseph F. Votrobeck, B. S., M. E., after graduation in 1925 from the University of Michigan, had spent seven years in industry and had then gravitated toward the teaching profession, becoming professor of engineering at the University of Detroit and dean of Lawrence Institute of Technology. Mr. Votrobeck was instrumental in organizing and teaching free courses to minor industrial executives, both at University of Detroit and Lawrence Institute of Technology, during the depression period. More than 1200 men from 200 plants were thus assisted by him, and it is said that he is directly responsible for providing technical education to over 1000 young men during the depression period who have become graduate engineers and are now playing an important part in the national war effort.

Mr. Votrobeck joined the Great Lakes college faculty as co-ordinator in 1940. Likewise, Harry Serwin, B. S., M. E., now on leave of absence from Wilbur Wright high school to teach electrical engineering at Detroit's Naval Armory, Roy Bolles, B. S., and George Petzer, B. S., LL.D., both with histories as outstanding and with a richness of journeymanship in industry, are members of the planning committee under the direction of President Ettinger.

The big point is that these earnest academicians with journeymanship in industry have worked out a simple formula for applied theory in war training which is stripped of all nonessentials, is adjusted to regular engineering courses, is oriented to the particular operation, can be digested and applied by anyone with the ambition to learn or to upgrade himself or herself . . . and the training period requires only 15 hours in seven and one-half weeks.

The Great Lakes college engineering curriculum includes courses in general engineering drafting, machine detailing, tool and die design, electrical engineering, heat engines, refrigeration, air conditioning, turbines, diesel engines. Its vocational courses include bench and metal shop, machine shop theory and practice, manufacturing survey, inspection, shop mathematics, labor laws, time and motion study.

The war training courses that are co-ordinated for degree credit in engineering consist of such practical shop classes as shop mathematics, shop theory, metallurgy, drawing and blueprint reading, tool and die design, time and motion study and foremanship training.

Great Lakes college not only fits students to shop work by this streamlined program, but it is developing leaders through its round-table conferences in foremanship development and human relations. These conferences are led by experienced teachers who have been directly connected with Detroit industry for years and who are now actively engaged in war production. Material used in such discussions has been compiled from experience in Detroit plants over many years and has demonstrated its merit by application. Thus, both instructors and methods taught at Great Lakes college can be said to have been "in the grease." They represent the application of actual conditions to academics and vice versa.

The special course of compressed war training most popular for beginners comprises the essentials of shop theory, micrometer and gage reading, shop mathematics and blueprint reading. This covers 15 sessions, two each week. Classes are held near the limit of 15 students to permit personal instruction. The "tell-show-do" method of instruction is used. Classroom atmosphere simulates that of the shop.

A happy correlative value of such war training comes from the tone of industrial psychological understanding induced by Dr. Ettinger's authoritative leadership in this field. The formula provides students with the answer to their individual desires for recognition, response, new experience, security. Perhaps the most important benefit of the application of psychology to industry comes from the alleviation of monotonies. The chance for upgrading to higher skills in war production is, in itself, a great incentive. Too, it offers sublimation and escape from the dread of disagreeable repetition of unitary impressions. Efficiency improves, emotional balance is better, fatigue is less, accidents are fewer among those who have such facilities to upgrade their skills.

From the standpoint of the beginner not yet in industry, this training largely dispells the stresses and strains of shop consciousness at the start. A familiarity with shop terms is acquired. So, although beginners get over-the-shoulder training from a job leader, they are enabled to adjust themselves more quickly and fall into shop rhythm more easily because of the initial training received.

Case examples of the manner in which such war training originates are these:

Union leaders at N. A. Woodworth Co., seeing the necessity of training in the upgrading opportunity provided in that concern's rapid expansion, contracted the college. A faculty committee was permitted to study the Woodworth operation, from which there was recommended a series of courses directly applicable to the Woodworth setup.

Since the union felt it could not use its general funds to benefit individual upgrading aspirations, and because legalities prevented a co-sponsorship between management and labor, the union presented the problem to Woodworth management, who agreed to sponsor the war training program and also agreed to pay one-half the tuition of each student enrolled in each course. So far, nearly 200 employes have taken one or another of these war training courses, which have become an established upgrading method.

Three points are noteworthy in the Woodworth case: First, the courses were custom-selected to fit the particular manufacturing operations. All theory that did not apply was thrown aside. Second, the close purposes of management-labor were revealed and a community of interest established that have ramified benefits for both. Third, a faculty was set up, subject to any expansion required and tailored to the shifting work requirements, that was capable of continuous and competent training in a manner that would be difficult for the com-

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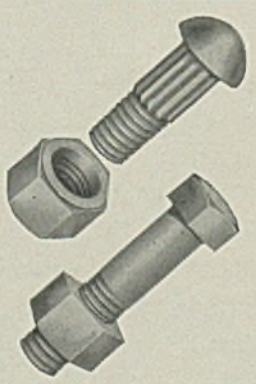

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We can offer immediate shipment of both Dardelet "RIVET-BOLTS" and Dardelet Machine Bolts. These bolts save valuable time and labor and assure permanently tight joints.

The Dardelet "RIVET-BOLT" is a ribbed bolt with Dardelet self-locking thread, and is widely used for field erection of structural steel. Has recessed nut. Bolt is driven in and nut is applied with wrench. Economical and strong.

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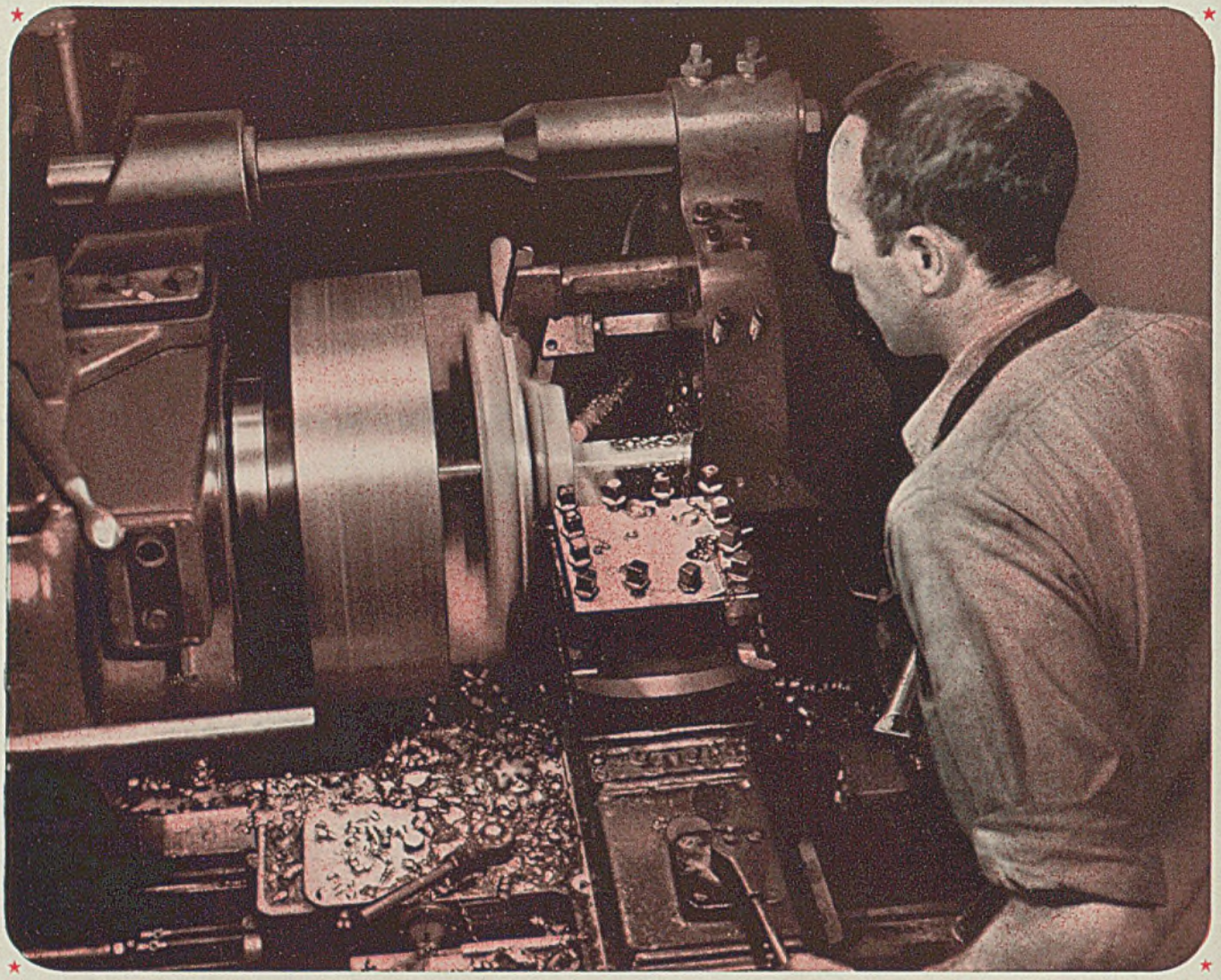

Two TOOL STEELS CAN CUT AS CHEAPLY AS ONE

WHAT'S more important, two tool steels can cut twice as *fast* as one, and speed is the prime urgency in war production.

But there are ways of increasing production beside installing more modern types of machine tools. A better tool steel, or one better suited to an individual job, can materially speed up the work your existing equipment is capable of doing.

Take the case of a big Detroit plant, using DBL High Speed Tool Bits instead of a high-tungsten variety, machining castings of X-1340 steel with a surface hardness of 33 Rockwell C, and a subsurface hardness of 26-28C. The DBL Tool Bits showed 30% increase in work done between grinds, running at 166 RPM against a previous speed of 100 RPM.

Our Service Staff is ready to help you team up tool steels with your production jobs, for more work done per machine. They'll show you the best *alternate* steels, too, as a precaution in keeping the lines moving.

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pany itself to set up or maintain.

The second case is that of Capitol Brass Co., a division of Bohn Aluminum Co. The chief steward of the shop union became enthusiastic over the Great Lakes college training setup. After arrangements had been made which included a custom-selected set of courses fitted to that operation, he undertook to promote the activity through union meetings and bulletins throughout the plant. At present some 70 students are enrolled in varied classes. A fraternity of spirit is fostered by each class and in each course, all of which are focussed on Capitol Brass conditions.

The third case is of the type that is occurring all the while and is destined to swell enormously—group of students who of their own volition start studying shop technique. The co-ordinator of the college endeavors to place them in industry after the course. However, so great is the demand that no placement problem is involved These students return, as soon as they become oriented on their jobs, to prepare for some upgrading opportunity, having had the chance to observe in the shop some skilled operation which appealed to them. All have a sense of the need for shop mathematics. Some select metallurgy, blueprint reading, drafting, inspection.

When the instructor of a class opens his box of measuring tools and shows an array of keyseat rules, the combination square, and pitch, radius, snap, pin, plug, center, tooth gages for the varied operations and begins to demonstrate the use of these measuring tools in laying out work in such as the drill press, shaper, boring mills, lathe, planer, slotter, milling machine, bench work and floor work, one would expect a class would have to spend a year on that subject alone. But the lecture is tailored to the situation studied, and a year's training seems to be accomplished in a single session.

I saw Mr. Turner introduce four women and two men to the intricacies of the micrometer and vernier scale early in a session. I returned three hours later. All were still at it, although the class period was over—indicating student interest in the course. Five of them had the theory well in hand and were developing instrument feel. It was interesting to observe the suddenly acquired skill of one woman, a housewife. She held the mike frame perfectly with her little finger, neatly turned the ratchet stop and, to adjust the sleeve swiftly to a larger test block for measurment, rubbed the ratchet along her forearm like an old timer.

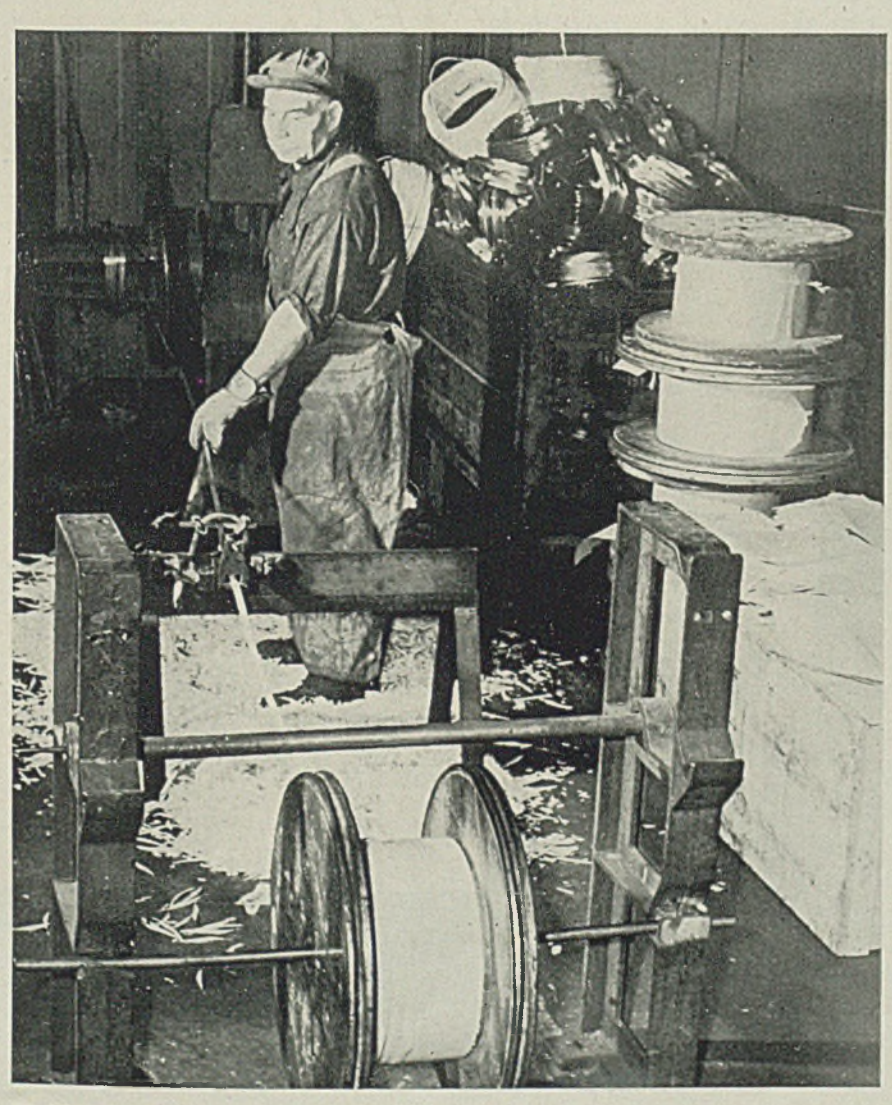
Mathematics are basic and need no custom-selection. So, unless the class is a group from the same union, it can be made up of any combination of students with upgrading desires, irrespective of where they work. The mathematics course takes up digits, figures, addition, subtraction, multiplication, division, factoring, fractions, decimals, angular measurment, plane figures, simple formulas, square root, board measure, tapers and percentage. There is also a higher course in geometry and trigonometry. I was surprised to find how quickly women absorbed decimals and, wonder of wonders, I noticed one bank clerk who was having a devil of a time with them.

Noteworthy is the personal instruction used in the intimate group classes. At one desk a woman might be plotting some problem in trigonometry while a man at the next would be exploring the intricacies of a slide rule, and a beginner at the next with only a sixth grade education learning multiplication.

After a couple of sessions, beginners become fluent shop talkers—they attack a glossary of shop terms as if it were a dictionary of slang. Anneal, weld, bore, boss, chip, drill, tap, counterbore, face, punch, ream, relief, knurling, chamfer . . . they get a kick out of uncorking the terms that are used in their particular operations. Such a blueprint definition as "coarse knurl with ⅛-inch chamfer at 45 degrees" is a delightful adventure in learning to these earnest folks. The tendency is to explain the applicable glossary concerned with the particular session's subject and let everyone become skilled in

(*Please turn to Page* 84)

"Skinning" Operation



IN RECLAIMING wire in the salvage department of an eastern General Electric plant, even paper insulation is saved through the above operation which "skins" the paper covering from the wire. Paper thus salvaged is disposed of as high-grade paper scrap

Efficient Forging Technique

By ARTHUR F. MACCONOCHIE
Head, Department of Mechanical Engineering
University of Virginia
University Station, Va.
And
Contributing Editor, STEEL

HERE are illustrations showing two forging sequences as developed by engineers of the Buick Motor Division. As in most automobile plants, forging is a highly developed technique at Buick. The two sets of views reveal efficient methods employed to make connecting rod caps and counter gears.

Figs. 1, 2, 3 and 4 show the sequence of operations involved in forging the connecting rod caps. These are made from steel bar stock of square cross section, 31/32-inch on the side. Stock is cut into pieces each 25½ inches long. These are stacked on a heavy steel table which is rolled up to the charging slot of a batch type Buick-designed heating furnace as shown in **Fig. 1.** Note the covers which are slid across the slot opening except for that portion of the slot at which the operator is loading or unloading bar stock. As all the bars are used from the table, another table fully loaded is rolled into position quickly so no time is lost getting another batch of work ready.

Forge Three Caps at Once

After a bar has been in the furnace a sufficient length of time to reach a forging temperature of 2250 degrees Fahr., the operator picks up the bar with his tongs and places it between the forging dies shown in **Fig. 2.** It will be noted that three caps only are forged at a time, these three being forged from material comprising approximately half the total bar length. The first three caps shown in **Fig. 2** are formed in the single set of die cavities in one stroke of the press. Then the bar is turned end for end and the other three formed in the remainder of the bar.

Fig. 3 shows the bar after forging with the set of six connecting rod caps completed. Guides on the dies assure that second set of three caps is forged in alignment with the first set. This allows much of the finish machining to be done in tandem, since the bottom and both sides of all caps can be machined in a single setup while still connected. After machining, the individual caps are separated.

Fig. 4 shows the completed set of six caps resting on a pile of bars ready for forging. This view clearly shows the considerable amount of flash between individual caps as well as at the sides. Proper amount of flash, of course, is most essential in controlling grain flow, internal pressures during the forging operation and rate of wear on the dies.

Second set of illustrations, **Figs. 5, 6, 7, 8 and 9,** show sequence of operations involved in making a counter gear for a transmission set. As shown in **Fig. 9,** this gear is really three gears cut on different diameters corresponding to the three largest diameters of the piece in **Fig. 9,** which of course shows the rough forging before any machining has been done.

In **Fig. 5** can be seen the ends of a large number of rod lengths already placed in the slot type forging furnace. Note the slot is practically full of bar stock being heated.

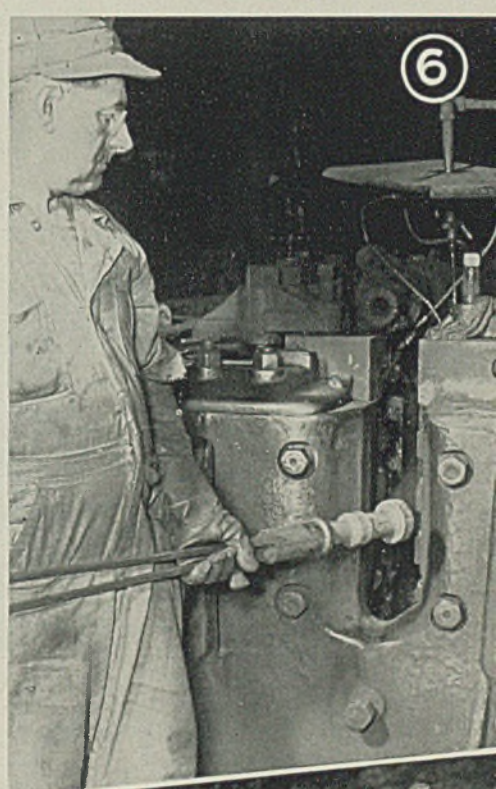
The operator is removing a rod length which will be forged. Stock consists of 15¾-inch lengths of manganese steel bars, 1 9/16-inch in diameter. They are allowed to remain in the furnace until they reach a temperature of 2250 degrees Fahr., although the entire length of the bar is not heated to this value at one time since the forging is done in two operations instead of a single operation as with the connecting rod caps above.

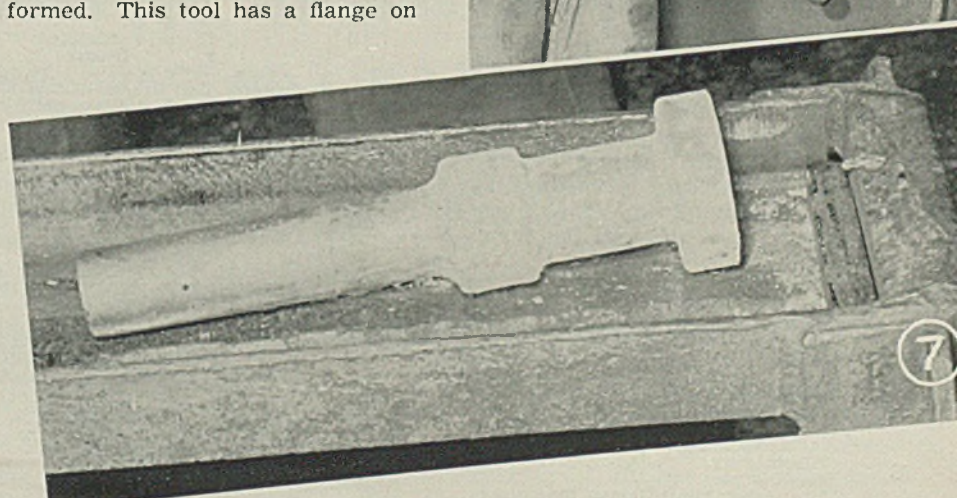
A 3-inch upsetter is employed for the first operation. It is shown in **Fig. 6** with a piece which has just passed through the various stages in this first machine. An upsetter, as is well known, does its work in a series of stages, not attempting to produce the required form in a single step. This assures adequate control of grain flow and permits gathering considerable quantities of metal into sections as required. A hole 1-inch in diameter is pierced during this first set of operations.

Fig. 7 shows what the work looks like after completion of the first series of operations. The tongs used in **Fig. 6** are of a type that encloses the end of the bar. Note in **Fig. 7** that the length of the piece has been reduced considerably and the metal so gathered has been forced radially to form the center shoulder, and the flange at the right hand end.

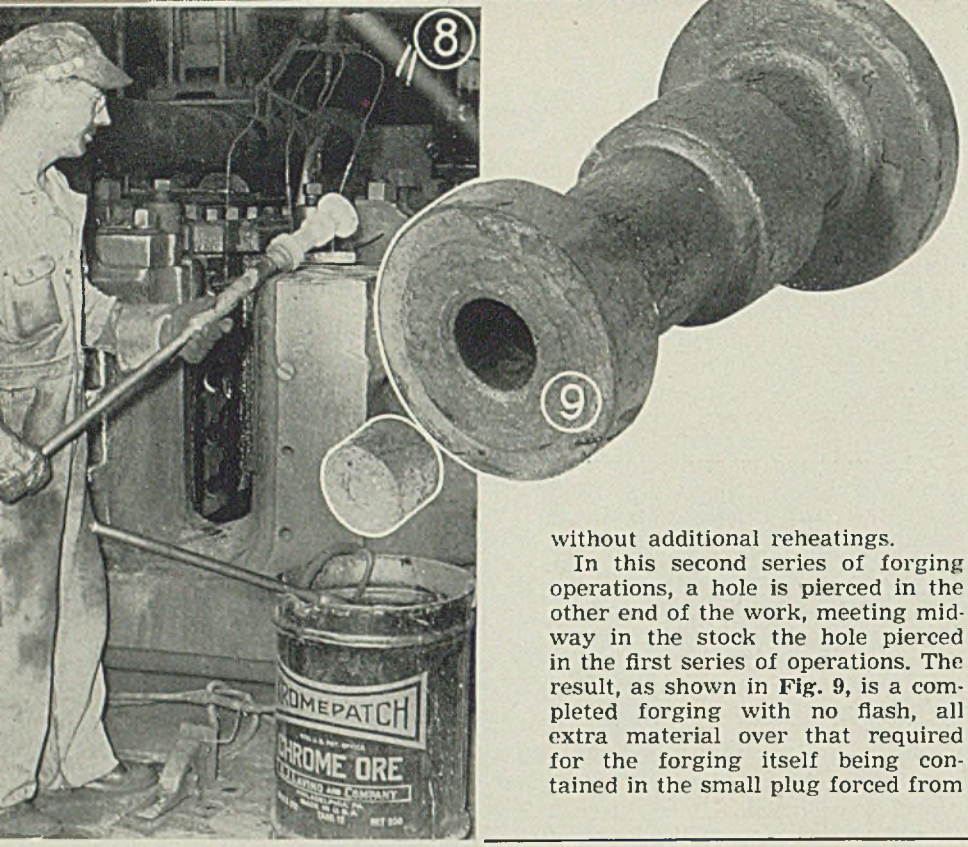
Now the piece is placed in a second heating furnace where the opposite end is raised to forging temperature. The work at this stage is handled on a tool that is inserted into the hole in the end already formed. This tool has a flange on it that prevents putting pressure on the closed and heated end during the second series of forging operations handled on the second upsetter which is shown in **Fig. 8.** Here, also, can be seen this tool for handling the partially forged piece.

This second upsetter is a larger unit than the first because it must do a heavier job—gather and upset the large flange shown on the right hand end of the piece in **Fig. 9.** It, too, has a series of dies which does the work in a number of separate stages, the work being passed rapidly from stage to stage so the entire series of operations can be handled





Section 14 in a Series on Forgings, Forging Methods and Forging Equipment.



without additional reheatings.

In this second series of forging operations, a hole is pierced in the other end of the work, meeting midway in the stock the hole pierced in the first series of operations. The result, as shown in **Fig. 9**, is a completed forging with no flash, all extra material over that required for the forging itself being contained in the small plug forced from the inside of the piece where the two holes meet in the final operation. This is made possible by having the hole completed as the last stage in the second series of operations. Since all hot metal in the work at this point is confined in dies, excess stock must flow into the first hole where it is expelled as the hole is completed from the opposite end.

Issues Specifications For Steel Welding Rods

Two pamphlets, one embodying tentative specifications for iron and steel arc welding electrodes and the other containing those for iron and steel gas welding rods were issued jointly recently by American Welding Society, New York, and American Society for Testing Materials, Philadelphia.

Both publications contain data on manufacture, size, length and chemical compositions, etc., of the rods.

A.S.T.M. Alternates for Sand Casting Alloys in

Tin-Bronze—Leaded Tin-Bronze—High-Leaded Tin-Bronze

Emergency Alternate Provisions have been issued by the American Society for Testing Materials, Philadelphia, for tin bronze, leaded tin bronze, and high-leaded tin bronze sand castings. These have been issued in the interest of expediting procurement or conservation of materials during the period of national emergency and were originally drawn up by the Conservation and Substitution Branch, WPB.

They are intended for use where they may be considered by the purchaser of the material as a permissible alternate for the specific application or use desired. The recommendations are made on the basis that the alternate or substitute alloys conform to the requirements as to chemical composition and tensile properties prescribed in the accompanying table.

The Society says:

Alloy 2A, or Navy "M" bronze, may be used as a substitute for alloys 1A, known as "G" bronze, and for 1B, known as modified "G" bronze, in the case of castings for pressure parts. In the case of castings for pressure parts, the Standard Specifications for Steam for Valve Bronze Castings (A.S.T.M. Designation: B 61) of the Society may be used as a substitute for alloys 1A and 1B;

Alloys 2X, (87-8-1-4) which is suitable for large bearings and structural parts, and 2Y (88-8-0-4) which is suitable particularly for small bearings and bushings such as used in internal combustion engines and in torpedo tubes for the United States Navy may be used as substitutes for alloys 1A and 1B in the case of castings for bearings and structural parts;

Alloy 2X may be used as a substitute for alloy 2B, known as commercial 88-10-2;

Alloy 2Z (86½-8-1½-4) may be used as a substitute for alloy 1B in the case of castings for bearings and structural parts;

Alloy 3B (83-7-7-3) is recommended as an alternate or substitute for alloy 3A (80-10-10);

Alloys 3X (80-7-10-3) and 3Y (84-8-8-0) may be used as a substitute for Alloy 3A (80-10-10);

Alloy 3Z (78-6-15-1) may be used as a substitute for alloy 3D (78-7-15);

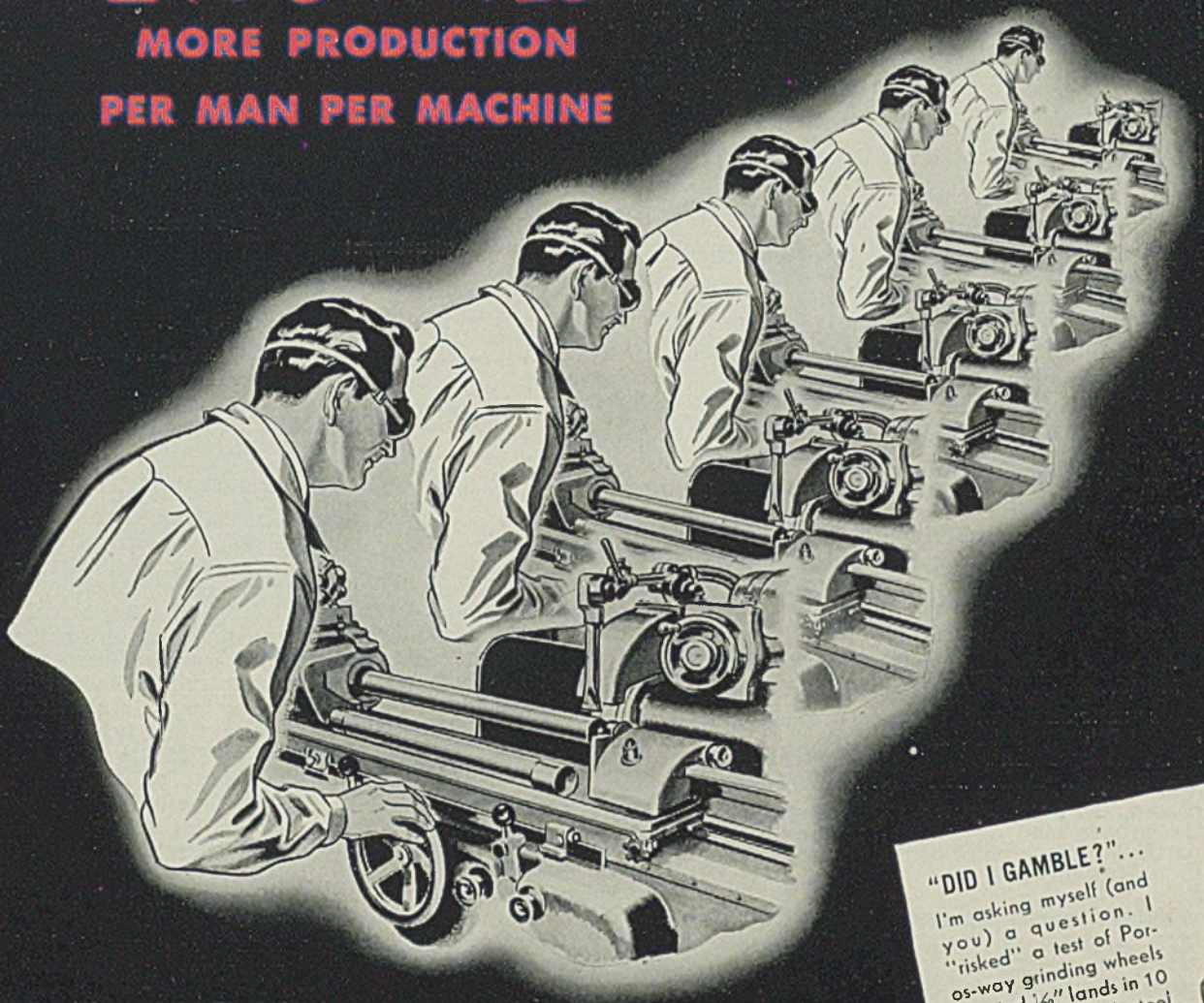
Alloy 3W may be used as a substitute for alloy 3E (70-5-25).

A.S.T.M. DESIGNATION B 143-41 T			
Numerical Designation	Commercial Designation	EMERGENCY ALTERNATES	
	Tin Bronze	Alloys	Nominal Composition
1A	88-10- 2 ("G" Bronze)	2A	88 - 6- 2 - 4
1B	88- 8- 4	2X	87 - 8- 1 - 4
1B	88- 8- 4 (Modified "G" Bronze)	2Y	88 - 8- 0 - 4
		2Z	86½ - 8- 1½ - 4
	Leaded Tin Bronze		
2A	88- 6- 2- 4 (Navy "M")		
2B	Commercial 88-10- 2 (87-10-1-2)	2X	87- 8 -14
A.S.T.M. DESIGNATION B 144-41 T		EMERGENCY ALTERNATES	
	High-Leaded Tin Bronze		
3A	80-10-10	3X	80 - 7-10 - 3
		3Y	84 - 8- 8 - 0
3B	83- 7- 7- 3	3B	83 - 7- 7 - 3
3C	85- 5- 9- 1		
3D	78- 7-15		
3E	70- 5-25	3Z	78 - 6-15 - 1
		3W	70 - 5-25 - 0

CHEMICAL AND TENSILE REQUIREMENTS

Chemical (Per Cent)	2X	2Y	2Z	3X	3Y	3Z	3W
Copper	86.00-89.00	86.00-89.00	85.00-88.00	77.00-81.00	82.00-85.00	75.00-79.00	67.00-71.00
Tin	7.50- 9.00	7.50-11.00	7.50- 9.00	6.00- 7.50	7.00- 9.00	5.50- 7.00	4.00- 5.50
Lead	1.00 max.	0.60 max.	1.00- 2.50	8.00-11.00	7.00- 9.00	13.00-16.00	23.00-27.00
Zinc	3.00- 5.00	1.00- 5.00	3.00- 5.00	2.00- 4.00	0.75 max.	1.25 max.	0.25 max.
Nickel, max.	1.00	1.00	1.00	0.50	1.00	0.75	1.00
Iron, max.	0.25	0.25	0.25	0.20	0.15	0.15	0.15
Aluminum	none	none	none	none	none	none	none
Antimony, max.	.....	.....	.....	0.75	.....	0.75	0.75
Silicon, max.	0.005	0.005	0.005	0.003	0.003	0.003	0.003
Phosphorus	0.05 max.	0.02 max.	0.05 max.	0.05 max.	0.20- 0.50	0.08 max.	0.05 max.
Total other constituents, max.	0.35	.....	0.35	0.35	0.50	0.35	0.35
Tensile							
Tensile Strength, min., psi.	36,000	40,000	36,000	25,000	25,000	25,000	21,000
Yield Strength, min., psi.	16,000	18,000	16,000	12,000	12,000	14,000	11,000
Elongation in 2 in., min., %	18	20	15	8	8	10	7

2 TO 5 TIMES
MORE PRODUCTION
PER MAN PER MACHINE



"DID I GAMBLE?"...

I'm asking myself (and you) a question. I "risked" a test of Por-os-way grinding wheels to grind ½" lands in 10 D.P. high speed steel milling cutters for herringbone gears. Unlike previous wheel, found that Por-os-way required dressing only between rough and finish cuts, held its corners, cut freely. Installed Por-os-way with much faster results—and better. **Did I Gamble?**

Now! Grind hard tool steels with ease; also soft materials with less loading. Speed up 2 to 5 times!

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Properly used Por-os-way takes deeper cuts. It breezes through .010" or more. It grinds 100% to 400% faster. It increases production per man, per machine, 2 to 5 times, practically ends "burning." Por-os-way's unique structure makes possible these results. Air cells surround and cool each grinding point between contacts.

Use Por-os-way on hard steels and alloys. Use it also on softer materials: copper, aluminum, tin, wood, plastics. Por-os-way holds the corner with very little dressing, due to the new vitrified bond. On softer materials, loading is reduced surprisingly. Por-os-way is more free cutting.

See this wheel. Try it. Prove on your own machines the new grinding speed now possible. Ask for a "proof test" demonstration! A. P. DE SANNO & SON, INC., 436 Wheatland St., PHOENIXVILLE, PA.

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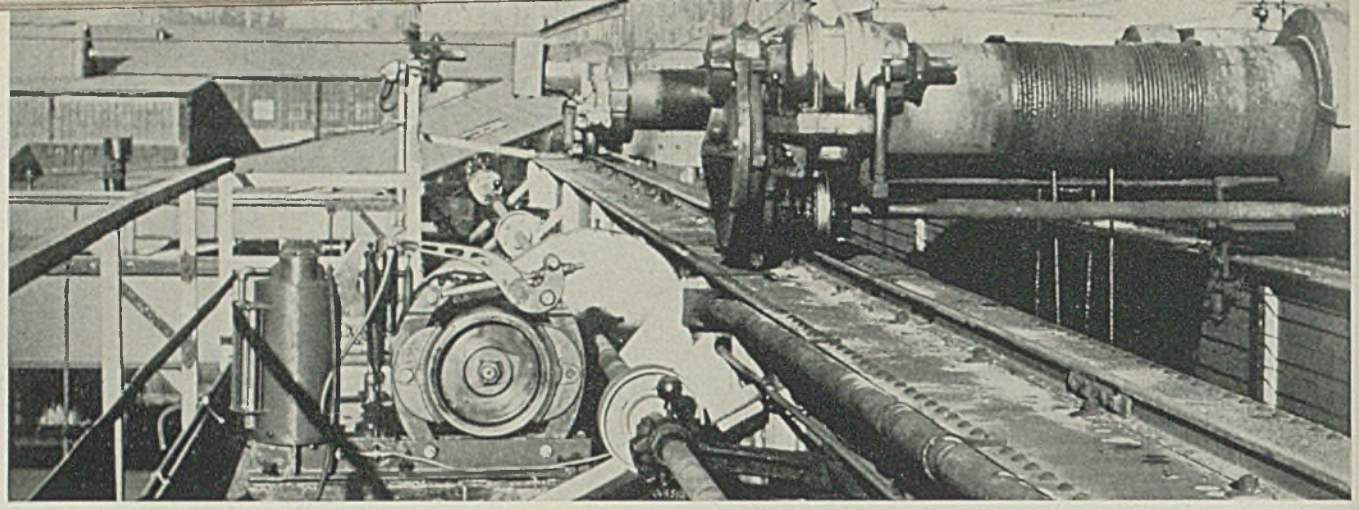


Fig. 1—Outside overhead traveling crane equipped with a hydraulic bridge brake with an automatic parking brake attachment

HYDRAULIC BRAKING SYSTEMS

For Overhead Traveling Cranes

By J. S. SMITH

Industrial Sales
Wagner Electric Corp.
St. Louis

BECAUSE of high-grade production, it has become necessary to give the problem of crane bridge braking more careful consideration in order to insure safe crane operation. Crane operators are confronted with either of two problems:

1. If the cranes are old, they must be equipped with brakes that have adequate braking torque to meet the demands of faster service and safe operation.

2. If new cranes are being purchased, the purchaser must specify the proper kind of brakes for the particular crane on which they are to be installed.

Hydraulic braking systems have been adopted as standard equipment on automotive vehicles because they provide equalized 4-wheel braking which was not possible in mechanically-linked brake systems. While equalization is not a matter of concern on cranes equipped with single-bridge drives, the loss of efficiency, due to sloppy bearings and twist in the cross-shaft of mechanical linkage systems, must be considered. On cranes equipped with double-bridge drives, equalization of the brakes does become an important factor. Also, mechanical brakes are difficult to install on double-bridge drives because of the impracticability of running a mechanical linkage system around the end of the crane.

Foot pedal pressure and travel must stay within the physical limitations of the operator and it, therefore, is important that the brake system, which transmits the actuating force from the pedal to the brake mechanism, have as little lost motion as possible. This problem can be handled easily by installing hydraulic braking systems in which the brake mechanism is actuated by an incompressible column of fluid.

The hydraulic fluid is forced by foot pedal pressure through a 5/16-inch copper tube line which is far easier and more economical to install than a mechanical linkage system. The problem of "slop" in the bearings, shaft deflections, linkage friction and stretch, etc., are eliminated completely in hydraulic systems.

The following application details must be considered when equipping overhead traveling cranes, coke oven machinery, transfer cars, etc., with bridge brakes:

1. Minimum possible stopping distance.
2. Coefficient of friction between wheels and rail.
3. Load per wheel.
4. Number of driven wheels.
5. Diameter of driven wheels.
6. Gear ratio between wheels and shaft on which brake is mounted.

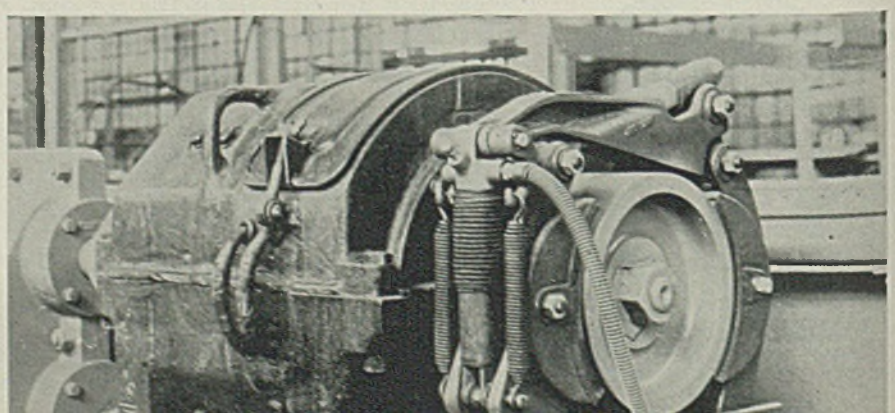
Minimum Stopping Distances

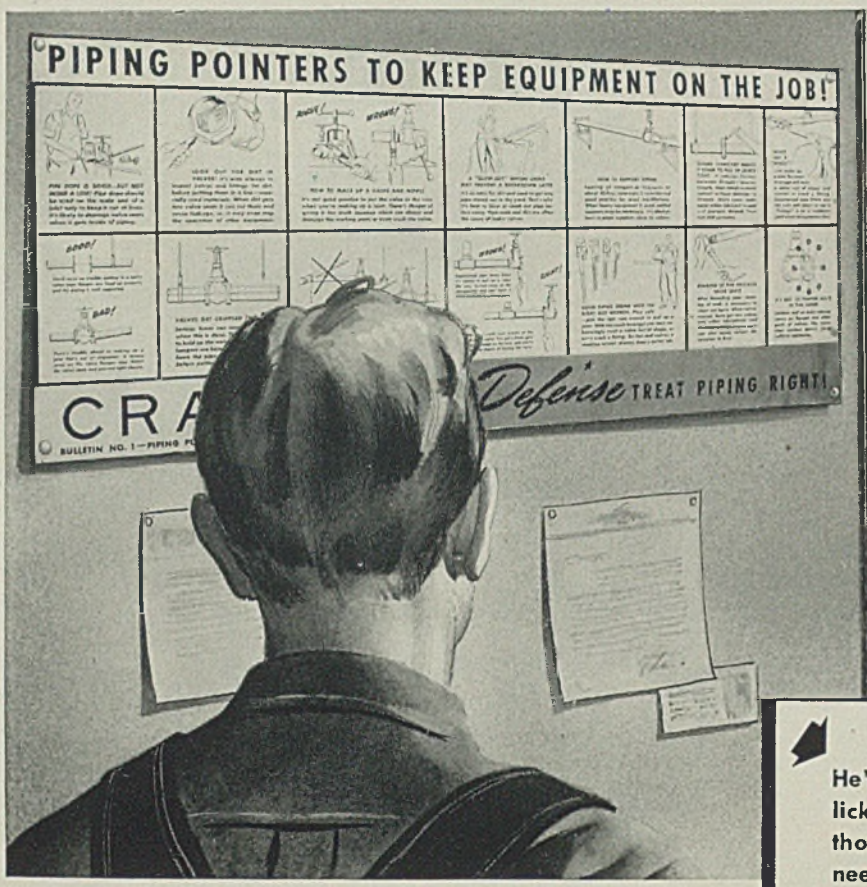
The coefficient of friction between the braked wheels and the rails determines the amount of useful braking force that can be applied without slipping or sliding the wheels.

Obviously, the actual retarding force must occur at the point of contact between the braked wheels and the rails. Since it is not practical to install brakes on the track wheels of the bridge, they usually are applied to the bridge-drive motorshaft or, in some instances, to the lineshaft. With the brake mounted on the bridge-drive motorshaft, the retardation of the bridge is accomplished by braking the driving wheels. In other words, the driven wheels are the only wheels which can be braked.

Therefore, the minimum stopping distance of a crane moving at a given speed will depend upon the coefficient of friction between the rails and the bridge wheels and the number of driven or braked wheels. The chart in Fig. 3 shows minimum stopping distances for cranes traveling at various speeds. These stopping distances are based on the assumption that proper brakes capable of exerting the maximum allowable braking torque are used.

Fig. 2—Typical method of applying hydraulic bridge brakes to motor shaft on an inside overhead traveling crane





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WRENCHES CAN BE DEADLY enemies of production if wrongly used. Because piping equipment must *stay* on the job today—because replacements waste time—waste critical metals—these Crane shop bulletins are showing maintenance crews in thousands of plants how to care for valves.

TRAINING NEW MEN for piping maintenance—helping veterans to *"brush up"* on modern methods—is one of the jobs Crane "Piping Pointers" are doing. Subjects range from how to open and close valves to how to prevent water hammer—all adding up to better piping, more production!

★ OFFERED FREE AS AN AID TO VICTORY—"Piping Pointers" are available *free*—on request—from your local Crane Representative—or by writing to the address given here.

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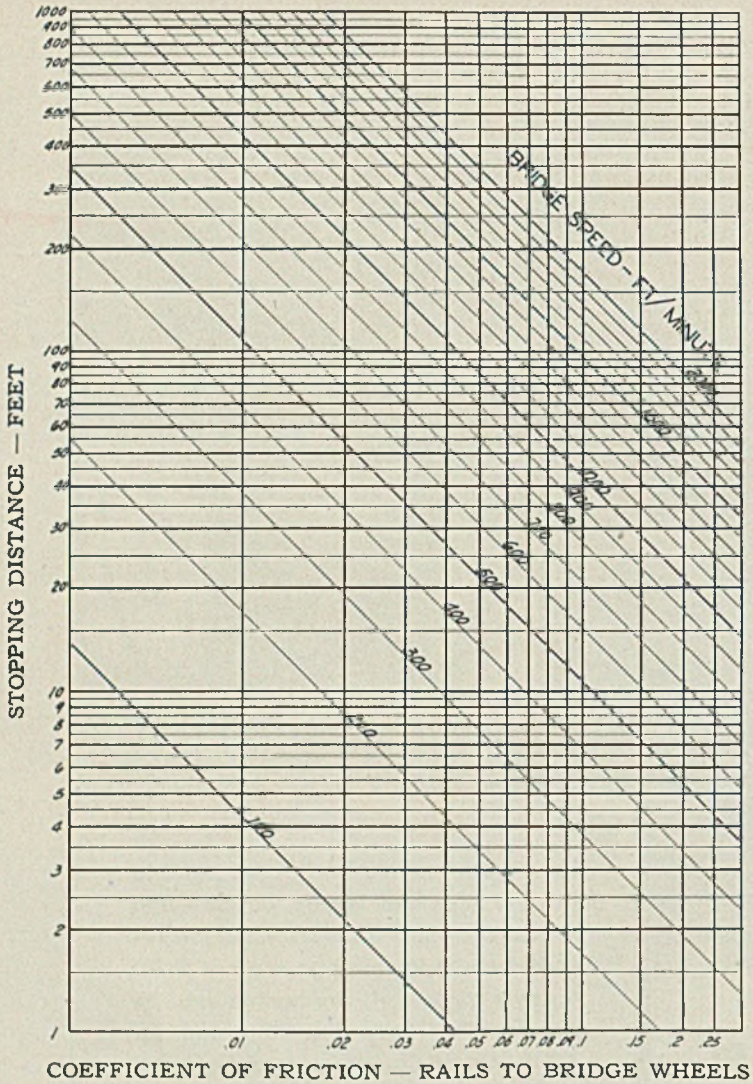

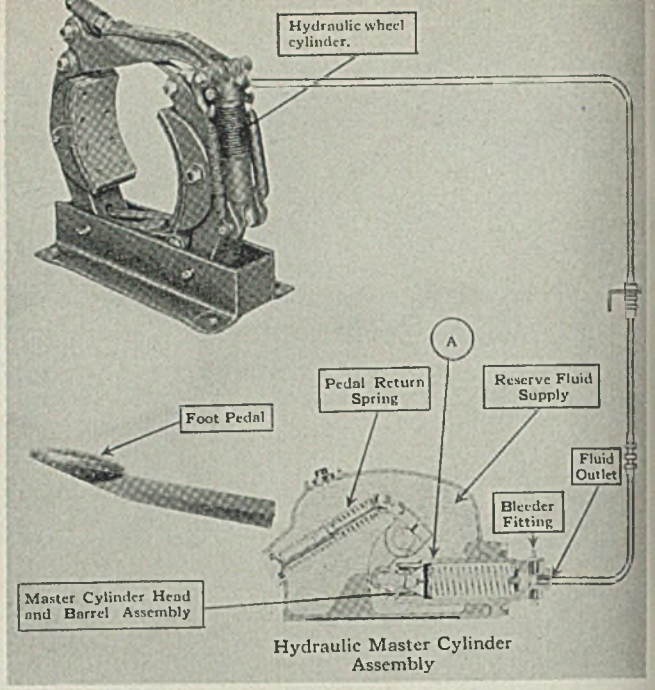

Hydraulic Master Cylinder Assembly

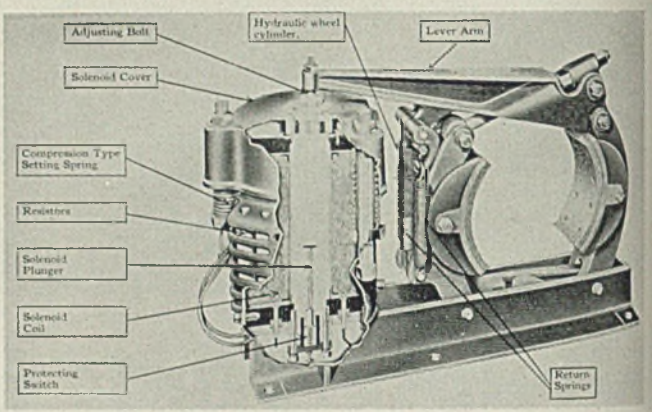

Fig. 3. (Left)—Chart showing stopping distances under various conditions. Where all wheels are braked, minimum stopping distances can be estimated if the coefficient of friction between wheels and rails is known. It is reasonable to assume the value of the coefficient of friction to be between 0.1 and 0.2 in the absence of actual data. Where brakes are not applied to all wheels, the coefficient of friction should be multiplied by the per cent of driven wheels

Fig. 4. (Upper right)—Typical hookup for hydraulic brake on crane bridge

Fig. 5. (Lower right)—Type HM brake, 10 x 4 inches, showing cut-away section of selenoid coil

The maximum amount of useful braking torque in foot pounds that can be applied to the bridge motor-shaft is determined as follows, where:

K = coefficient of friction.
W = load on each driven wheel.
R = radius of driven wheel.
N = number of driven wheels.
G = gear ratio between wheel axle and motor shaft.

$$\text{Braking torque} = \frac{W \times K \times R \times N}{G}$$

Two types of brakes are required for overhead traveling cranes. A hydraulic bridge brake for application to inside cranes is not entirely satisfactory for outside cranes because of the need for some method of automatically applying a parking brake when the crane is not in service. The two types of brakes which are used widely on overhead traveling cranes are illustrated in Figs. 4 and 5.

The principle of hydraulic actuation used in hydraulic bridge-braking systems is exactly the same as that applied to passenger cars and commercial vehicles. A typical system consists of a hydraulic master-cylinder in which the hydraulic pressure is originated, a hydraulic wheel-cylinder of the telescopic type, and the necessary fluid lines and flexible hoses. See Fig. 4.

The hydraulic master-cylinder is mounted in the cab in a convenient location for the operator. Hydraulic pressure, built up in the master cylinder by foot pressure on the pedal, is transmitted through the hydraulic fluid-line to the hydraulic wheel-cylinder which is mounted between the brake arm and the brake lever. Fluid displaced from the master cylinder operates the wheel cylinder which moves the end of the brake lever-arm upward with a force approximately three times as great as the foot pressure exerted, thereby bringing the brake shoe into contact with the brake wheel. The amount of braking torque varies directly with foot pedal pressure.

Obviously the entire system must be kept full of fluid at all times, if maximum efficiency is to be expected. This is accomplished by providing a bleed hole, "A" (Fig. 4), which is closed as soon as the master cylinder piston has traveled but a small distance, but is otherwise open to permit expansion and contraction of the liquid due to temperature changes.

A 2-way outlet valve is located at the end of the master cylinder, which functions to retain a residual pressure of 8 to 12 pounds in the lines, preventing the column of liquid from draining back into the master cylinder.

When pressure on the foot pedal is released, the brake assembly is returned to its full-release position by a tension-type spring hooked between the brake arm and lever.

When two brakes are used on the same bridge, both can be operated simultaneously through the master cylinder the same as 4-wheel hydraulic brakes on an automobile.

Figs. 1 and 2 are two typical installations, one of an inside crane and the other of a crane operating on an outside runway.

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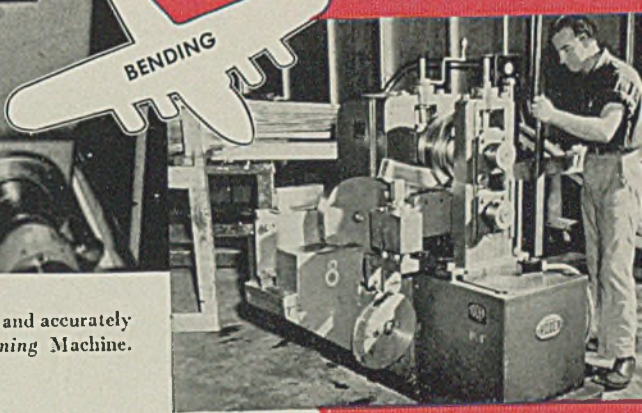

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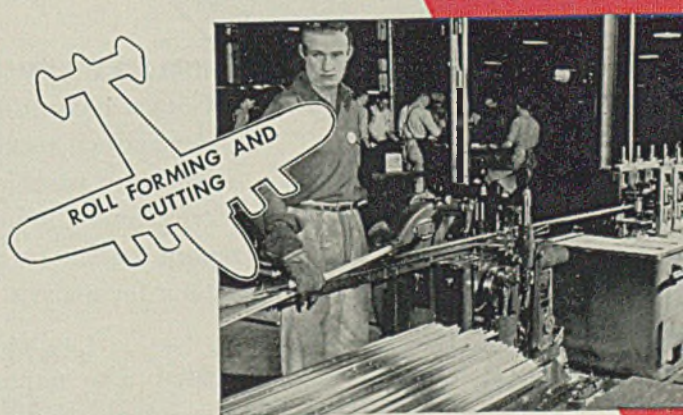

ROLL FORMING AND CUTTING to length [illegible] *line* in this Yoder installation at "Consolid[illegible]

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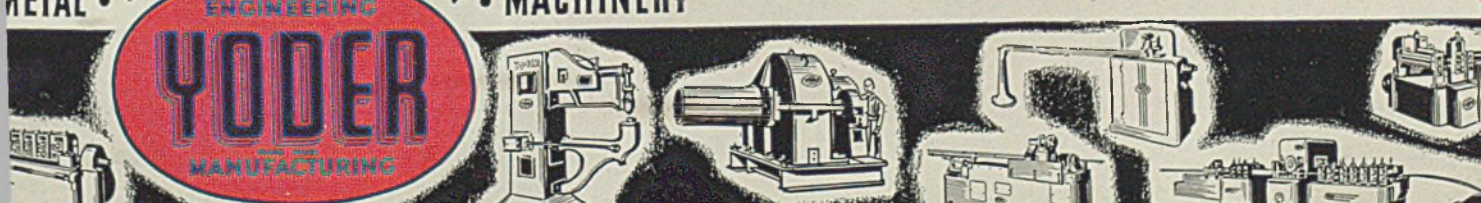

War-Training Formula

(*Continued from Page 75*)

talking such terms.

Machine shop practice and theory have everything to do in a similar streamlined manner with such standard machine tools as lathe, drill press, shaper, planer, milling machine, grinding machine, boring mill, while such special machines as turret lathe, slotter, gear-cutter, can be studied under accredited academic instructors who have had journeyman experience in their operation. Machine shop theory is custom-selected to the plant operation as indicated in the situation study.

The course in time and motion study includes such interesting considerations as class movements, accuracy of sense organs, the three important abilities of reaction speed, manipulative ability and vigilance; all adapted to the individual from the angle of maturity and physio-psychological background and condition.

It was somewhat of a shock to learn there is a deficiency of well organized texts. This is perhaps due to the lack of apprenticeship training during the depression period. There is some justifiable criticism among subcontractors that government vocational courses are too elementary, rambling and incapable of being scissored so a class at times has to take training that does not apply to its operation in order to get the part that does.

At Great Lakes college, great dependence is placed upon current educational literature by manufacturers. For example, catalogs of Brown & Sharpe Mfg. Co. and L. S. Starrett Co. and the excellent book *Dimensional Control* by Sheffield Corp. were much in evidence in the session on measuring tools and their use which I attended.

Some days before my visit to Great Lakes college I had watched a supervisor teaching a worker on the job the use of the hermaphrodite calipers. He was showing the technique of scribing a line a given distance from the shoulder of an I-bar. The noise, shop traffic and interruptions were such that it took too long—far too long. This sort of thing can more quickly be done in a class.

In connection with this work, I have had unusual opportunity to observe women in war industry and must say that they seem to have better dexterity, to grasp certain training faster and to be more careful in their operations of certain types of equipment than are men.

The custom-selection of material taught as developed by Great Lakes college bears watching. The breadth of engineering knowledge