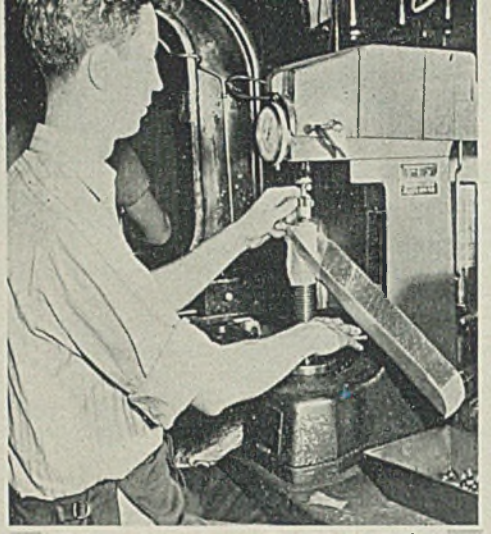

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NEWS

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FOR SHORT OR LONG RUNS

Boring, Turning, Facing, Grooving, Chamfering . . . with Precision!

Tomorrow, just as today, the watchword of industry in this country will be "Production." With the lid lifted high on accumulated peace time needs, the advantage will then definitely be with those who today are installing equipment for war production with thought for the future. The Ex-Cell-O Precision Boring Machine—for boring, turning, facing, grooving, chamfering to "tenth" accuracy—is the preferred type and make of equipment among many manufacturers producing parts for war purposes in large quantities today; its extreme flexibility in application makes it an equally sound investment for the inevitable tomorrow, in shops either small or large.

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EX-CELL-O *Precision* MACHINES AND TOOLS

XLO

EX-CELL-O *means* PRECISION

FOR HIGH PRODUCTION

HIGHLIGHTING

this issue of STEEL

NEWS While some loose talk has been heard at Washington lately about "war profiteering" the profit position of industry becomes less impressive. Profits of the steel industry in the second quarter reflected a shrinkage of about 40 per cent as compared with the corresponding period last year (p. 40). Westinghouse Electric & Mfg. Co., in announcing discontinuance of its employe profit sharing system, attributes its action to high taxes and low profits (p. 41).

A joint United States-British inquiry calls for 500 gantry cranes (p. 121). Semifinished steel allocations for Great Britain have been reduced sharply.

An even higher degree of efficiency must be developed by the railroads if a shortage of motive power is to be avoided, warns Joseph B. Eastman (p. 60).

First production of butadiene is expected in September, with styrene production to start in October (p. 58).

Canada's machine gun barrels are covered with fabric to protect gunner's hands from heat generated by firing (p. 66). More industry advisory committees have been formed (p. 119).

American Standards Association has been assigned the task of developing standards that will reduce consumption of materials; it also is to recommend a means of pegging prices to quality (p. 55).

CONVERSION Large-scale migration of workers to war plant locations is increasingly the cause of "ghost" towns all over the country. Unless something is done to revive industry in such towns grave effects on the national economy are feared. The new Smaller War Plants Corp. is trying to do something about this problem (p. 50).

PRIORITIES An order now in the making is aimed at replenishing and maintaining stocks in steel warehouses (p. 51). Recognition of the importance of these stocks in the war program has increased.

PRODUCTION The Bureau of Mines is about to establish a pilot plant for development of large domestic reserves of zinc ores (p. 54). War Production Board is considering a recommendation involving production of alumina from low-grade domestic bauxite and clay to overcome difficulties in bringing in high-grade bauxite from Dutch Guiana due to the submarine menace.

Ernest C. Kanzler, with a brilliant record in coordinating war plant activities in the Detroit area, now is in Washington to take charge of "program progress" for WPB (p. 57).

Operation of an "Alternating Swing Shift" plan has brought a 75-per cent reduction in week-end absenteeism at a Cleveland manufacturing plant (p. 65). The plan is widely applicable.

R. C. Allen discusses measures needed to increase iron ore production to 100,000,000 tons annually (p. 42).

Though various steel companies continue to set new records (p. 44), ingot production last week declined ½ point to 97½ per cent of capacity (p. 45).

More companies report successful experience with employe suggestion plans (p. 64).

SALVAGE All phases of the iron and steel scrap problem should be placed in the hands of one man, declares Reese Taylor (p. 42). He points out the lack of co-ordination with OPA handling prices, WPB handling allocations and the Conservation Division handling collection.

An inventory of used construction machinery is to be compiled (p. 49). Users of graphite crucibles are requested to accumulate crucible scrap. The new Steel Recovery Corp. is being organized (p. 42).

TECHNICAL Penstocks for Shasta dam are fabricated in a special plant with a straightline setup near the damsite. Henry W. Young describes (p. 72) the procedure employed in this portion of the dam construction. Since this dam is the largest in the world still under construction, a number of unusual problems are involved.

W. W. McCord brings a timely message (p. 85) to everyone in the electroplating industry as he analyzes the effect of war on the electroplater. Shortages in aluminum, rubber, copper, tin, chromium, cadmium and nickel are very real, he emphasizes, leaving only a few metals with which to plate civilian items.

With welding so vital to war production, it is extremely important that every pound of weld metal be made to do the maximum amount of work. Thus an explanation by C. M. Taylor (p. 88) on how avoidance of overwelding fills a vital need. Tables and calculation methods give exact data on bead sizes and lengths to handle known stresses.

Aircraft inspection is a highly specialized and exacting craft as is evidenced from a description (p. 70) of the work of some of the 2000 inspectors at the Glenn L. Martin Co. plant where bombers, each with over 25,000 parts and 300,000 rivets, are being made in large quantities.

Still More Plants Looking For War Work

Contracts or Subcontracts will throw Additional Men and Machines Into the Fight

If you are looking for metal-working plants to handle war contracts or subcontracts, you will be interested in these summaries of plants with available capacity. They are typical of the many firms that have listed their facilities with Inland in an effort to speed all-out war production.

Write, phone, or wire Inland for the names and addresses of any of the companies listed on this page. We urge that you get in touch with us, even if plants with the manufacturing facilities you require are not listed, and we will gladly forward to you our entire list of those companies seeking war work.

IS-69 Wis. structural steel fabricator, 500 ton cap., plant area 25,000 sq. ft., yard area 26,000 sq. ft., emp. nearly 100. Complete equip. incl. saws, shears, punches, drills, reamers, benders, riveters, column facers, elec. and acetylene welding and cutting equip., blacksmith mach. shop. Experienced in Government prime and subcontract war work.

IS-70 Long established N. Y. mfr. of portable lamps, one story brick bldg., over 60,000 sq. ft., own R.R. siding. Full line stamping presses, grinding and polishing machines. Well equip. plating room, sprayroom with baking facilities. Employing over 100.

IS-71 Largest fabricator in U.S. of sheet metal products No. 8 to No. 30 ga. Two factories (Ill.) with approx. 400,000 sq. ft. mfg. sp.; 2,000 emp. Experience since 1940 in prime and subcontracts. National sales and service organization available. Complete engineering and development staffs. Completely equipped, modern tool rooms for all necessary dies and jigs. Record of dependability on prime and sub-contracts handled to date. "Craftsmen on War Production" on request.

IS-72 Mass. mfr. has machinery and facilities for handling all types of stainless steel welded fabrication up to and including $\frac{3}{16}$" plate. Press brake ¼"—12' cap., shears, initial rolls and nibblers with same cap. Mach. shop includes: engine and turret lathes; boring machine—Gisholt 18" chuck 2" spindle; Bullard vertical turret lathe—32" swing; 9 drills—3 bench, No. 2—3 & 4 spindle, No. 3—1 & 3 spindle, No. 4—1 spindle, 5' American Radial; 3 planers and shapers—1 18" x 18" x 6' bed, W & P 30" x 30" x 14' bed, Cinn. 16" crank shaper; hack saw; band saws; 1 Cinn. Model 101 cut-off wheel; 1½" cap. bolt threading mach.; 1 Baker key slotter; 1 rivet spinner—½" dia.; 1—150 ton hyd. wheel press—18'; sheet and plate shop includes 16 ga. 8' leaf brake; ¼" x 12' press brake; 4" x 4' bending roll; 1—10" x 12' initial type bending rolls; 1—¼" x 10' sq. shear; 1—¼" No. 6 nibbler 42" throat; 1—⅝" single end punch 36" throat; 9 welding generator sets; and 2 acetylene torches.

IS-73 Ill. heating, ventilating and air conditioning mfr. with complete equip. for stamping and perforating work, desires war contracts. 125 empl., over 50,000 sq. ft. fl. sp. Equip. includes presses from 30 to 500 ton cap.; power brakes up to ¼"—10' cap. Handling perforated material 30 ga. to ¾"; also light, heavy stamping and forming.

IS-74 Steel fabricator (Wis.) with comp. facilities for handling subcontract war work. Equip. includes bar shear, comb. punch and shear, double and single end plate punches 1" cap., alligator shear 1¼" cap., rotary plate shear 10 ga. cap., power sq. shear, 4' and 5' radial drills, upright drills, 14" and 24"—12' to 8' eng. lathes, 16" crank shaper, 30" x 30" x 8' iron planer, No. 5 milling machine, 4 to 12" pipe threading machines, power hack saws 6" to 15", rotary cold saws, riveting machines—50 ton, 2" bolt threading machines, air compressors, pneumatic hammers, air and electric drills, and welders.

IS-75 Wis. oven & equip. mfr. desires war subcontract work. Equip. incl.: Stanley Code shown in (), boring mill (ACA), drill presses (BGG, BHH, BOA, BOE) Radial drill (BSK) engine lathes (CBH, CBI, CBJ), turret lathe (CLA), milling machines (DAD, DBC), planer (EAA), keyseater (ICB), gear cutter (JAE), tool grinders (KWD, KXA) buffer & grinder (NBB), hacksaws (PJE, PJF), angle & bar cutter (RBA), cope & punch (RIB) shears (RLA, RVK), unishears (RVP), punches (SBE, SBF), punch press (SBE), angle roller (UAA), brakes (UEG, UIA), welders (XAD, XGC), spot welder (XJC) foundry (YZB) assembly benches (YZM), spray booth & equip. Fl. sp. for assembly, own R.R. siding.

IS-76 Wis. mfr. steel cabinets and vending mach. approx. 50 emp., desires war work sub-contracts. Equip. incl. 3 engine lathes—9", 10" and 18" swing; 4 reclinable punch presses—No. 4—16 & 36 ton cap., No. 5—25 & 36 ton cap.; No. 1½B milling mach.; No. 1—18" surface grinder; 2 shears—16 ga. 36" & 26 ga. 22"; 6'—18 ga. and 21"—26 ga. brakes; shapers; single spindle; bench type and high speed drill presses; tappers; 4 welders; cut saws; riveting mach.; hand drills; sanders; gas drying enamel bake ovens; paint spray tank and booth; degreasing tanks; blacksmith forge and hardening furnace.

IS-77 Sheet steel fabricating plant. (7 to 28 ga.) Ill. 100,000 sq. ft. Arc-gas welding and flame cutting equip. Shears and brakes up to $\frac{3}{16}$", automatic hack saws, plate roller to $\frac{3}{16}$". Complete mach. shop, assembly, woodworking and paint dept. Rail siding, 4 large cranes, 5 to 35 ton. Exp. engr. staff.

IS-78 Wis. steel prod. fab.; 300 ton per mo. cap.; over 30,000 sq. ft. fl. sp.; on R.R. siding; 40 yrs. exp. Specializing in elec. arc welding, cap. 1" thick; tractograph metal flame cutting; metal forming; power rolling and breaking, cap. ⅜" thick; pipe and tube bending; power hammer forge; punching; drilling; riveting; grinding; and cleaning. Complete assembly plate & structural shape work.

IS-79 Wis. steel & wire mfr. angle, flat & tube wire parts; 40 yrs. exp., desires war work, brick const. plt., emergency utility pwr., over 90,000 sq. ft. fl. sp., 350 emp. Equip. incl. 22 punch presses—Marshall & Huschart, Bliss, Wells, Toledo and Consolidated; 10 Wells rivet presses; 10 Wells spring coilers; 9 Wells coil spring knotters; 13 Wells wire straight & cut; arc welders; gang drill; drill presses; Sidney lathe; Cinn. & Milw. shapers; and Racine power hack saw.

IS-80 Wis. mfr. radiators, cooling & heating units, heat transfer equipment, 200,000 sq. ft. fl. sp., emp. over 500. Govt. prime & sub-war work wanted. Three R.R., own siding & trucking service. Comp. metal-working equip. research & experimental labs., tech. experts, draftsmen, engrs., prod. designers. Equip. incl.: lathes; milling mach.; planers; shapers; grinders; punch, drill & arbor presses; tapping mach.; automatic screw mach.; saws; heat treating furnaces; power sq. shears; forming rolls; power brake presses; rotary shears; nibbling mach.; bumping hammers; beading welders and other misc. equip. incl. shears; folders; brakes; slide rolls; crimping mach.; jigs; dry ovens and spray booths.

Dedicated to Victory

INLAND STEEL CO.

38 S. Dearborn Street, Chicago • Sales Offices: Milwaukee, Detroit, St. Paul, St. Louis, Kansas City

AS THE EDITOR VIEWS THE NEWS

STEEL

August 10, 1942

SOME NEWS IS GOOD

Reports are currently in circulation about alleged careless planning of our war production, curtailment of production at war plants due to lack of materials, backing up of war materiel because of shortage of ocean shipping and about other phases of the war production program.

There is no basis whatever for such rumors. Actually, production of all items of armament in which steel is used is up to or well ahead of the program called for by President Roosevelt. It also is a fact that the schedule of delivering these various items to the theaters of war all over the world has been and continues to be met and will continue to be met.

Plenty of mistakes have been made in planning and executing the war program. Original conceptions in many cases have had to be altered. Despite all the fumbling great progress has been made and the effort as a whole is ahead of expectations.

One of the mistakes was in failing to make full allowance for the productive genius of American industry. That resulted in construction of more new war plants than since have proven necessary. Many new plants have capacity for producing 30 to 40 per cent more of certain key items of ordnance than was expected of them. Hence it is only to be expected that occasional shutdowns will occur here and there in the war industries for the simple reason that fully effective means for getting steel and other materials of the right kind, in the right quantities, to the right place at the right time, have not yet been devised.

It is true that there are many things to worry about seriously, things both at home and abroad. Despite all the bad news, the picture is not all black. Unquestionably the most significant factor on the favorable side is the performance which has been turned in by industry to date. Despite all rumors to the contrary, the President's program is up to schedule on all items of ordnance and in many of them production actually is far ahead of the program.

Those are the facts -- and nobody is warranted in giving consideration to any intriguing rumors to the contrary.

E C Kreutzberg

Editor

Leading Steel Producers' First-Half Net Earnings Decline 40 Per Cent

✦

Seventeen leading firms show aggregate profit for period of $89,220,098, while sixteen of group report tax load totaling $306,037,194

✦

DESPITE record output, net profit for each of 17 leading steel producers in the first six months this year shows a sharp decline compared with a year ago.

The group's aggregate profit was $89,220,098, or 40 per cent less than $150,268,403 in the corresponding period of 1941.

The income for the second quarter totaled $32,439,838, about half of the $64,574,719 for second quarter last year. During the first quarter of 1942 they had an income of $56,780,258, also well above second quarter earnings. In the second quarter, however, additional allowances were made for taxes applicable to first quarter business.

Indicative of the sharp increase in taxes, 16 in the group set aside $306,037,194 for the first half, an increase of 116.4 per cent over $141,404,726 for the period in 1941.

The same general trend is noted among steel companies having finishing capacity only, and pig iron producers, as indicated in the accompanying table.

In the first six months this year steel ingot production amountetd to 42,570,247 net tons, or at 96.9 per cent of ca-

Steelmakers' Earnings and Taxes in First Six Months

	First Quarter	Second Quarter		First Half		Taxes First Half	
	1942	1942	1941	1942	1941	1942	1941
United States Steel Corp.	$27,921,534	$5,945,373†	$24,814,751	$33,866,907	$61,374,746	$117,000,000	$44,600,000
Bethlehem Steel Corp.	6,140,688	6,070,913	5,651,457	12,211,601	16,087,485	49,400,000	24,900,000
Republic Steel Corp.	4,716,962	3,355,158	5,428,749	8,072,121	13,618,716	35,800,000	18,000,000
Jones & Laughlin Steel Corp.	2,491,718	2,438,752	3,937,720	4,930,470	8,098,227	11,800,000	5,414,350
National Steel Corp.	2,675,837	2,750,445	4,291,430	5,426,282	9,721,819	12,750,000	7,929,342
Youngstown Sheet & Tube Co.	2,576,579	2,291,119	4,765,997	4,867,698	9,342,194	16,377,000	6,847,000
Inland Steel Co.	2,528,090	2,367,391	4,102,572	4,895,481‡‡	7,571,618	14,521,000	11,238,605
American Rolling Mill Co.	1,731,635	1,602,688	3,068,735	3,334,323	6,667,976	7,131,459	4,902,320
Wheeling Steel Corp.	1,200,090	795,558	2,708,187	1,995,648	4,689,196	5,346,000	2,068,813
Pittsburgh Steel Co.	645,334	731,840	789,159	1,377,175	1,678,859	2,198,900‡	870,000‡
Crucible Steel Co. of America	1,148,123	1,457,162	1,554,463	2,605,285	3,051,899	19,159,875	6,498,875
Sharon Steel Corp.	250,302	386,900	285,988	637,202	813,241	1,550,000‡	1,300,000‡
Allegheny Ludlum Steel Corp.	1,331,426	1,205,565	1,449,183	2,536,991	4,169,347	7,324,900	3,212,746
Continental Steel Corp.	169,337	234,410	324,435	403,747	637,558	605,060	530,675
Keystone Steel & Wire Co.	364,083	665,536	638,864	1,029,619	1,049,001	.....	.....
Alan Wood Steel Co.	217,041	171,813	180,267	388,854	532,061	981,000	755,000
Rustless Iron & Steel Corp.	671,479	§30,785°	582,762	640,694	1,164,460	4,092,000	2,337,000
Totals	$56,780,258	$32,439,838	$64,574,719	$89,220,098	$150,268,403	$306,037,194	$141,404,726
FINISHING CAPACITY ONLY							
Superior Steel Corp.	$121,786	$122,071	$243,689	$243,857	$472,053	$922,000	$489,000
Acme Steel Co.	639,517	380,285	900,302	1,019,802	1,642,355	2,821,251	2,795,639
Eastern Rolling Mill Co.	190,331	36,478	74,365	175,405	116,242	.....	.....
PIG IRON CAPACITY ONLY							
Interlake Iron Corp.	$444,762	$247,840	$524,469	$692,602	$1,299,324	$1,070,000	$810,900
Sloss Sheffield Steel & Iron Co.	277,741	§266,229	351,105	543,970	863,464	506,152	441,236
Woodward Iron Co.	397,337	§66,553°	368,121	330,784	920,018	.....	.....

†Includes tax adjustment for March quarter on basis of Bill recently passed by House.
‡Federal and state. §Based on first quarter and six-month statements.
°Loss. ‡‡Does not reflect $600,000 back wages, payable as result of recent WLB ruling.

pacity. During the comparable 1941 period output totaled 40,868,204 net tons, representing 97.9 per cent of capacity.

In appraising the effect of higher taxes on corporate profits, government experts believe the net income will be reduced $6,500,000,000 to $6,900,000,000 this year, well under the 1941 level, but somewhat higher than that recorded in 1939. The Treasury Department anticipates the 1942 net, after taxes, will be about $6,700,000,000. It estimates profits subject to federal taxes in 1942 at $17,000,000,000 and places the income tax load at $10,300,000,000.

In addition to higher taxes, other factors curtailing profits include wage increases, higher prices for many materials, necessity of financing a greater volume of receivables, providing adequate reserves; plus ceilings on prices of materials and products, and limitations of profits on war contracts.

National Steel Corp.

National Steel Corp., Pittsburgh, earned $2,750,445 net profit in second quarter, after all charges including provision of $1,250,000 for retroactive wage increase and $7,925,000 for federal income taxes. Provision for federal taxes was made at rates of 90 per cent for excess profits and 45 per cent for normal and surtax. This compares with second quarter 1941 net of $4,291,430.15 and with $2,675,837.48 in first quarter this year. Net income for the half year was $5,426,282.33, in contrast with $9,721,819.04 in 1941.

Gross income for second quarter was more than $5,000,000 higher than gross income in preceding quarter and over $3,400,000 above gross in same 1941 period, E. T. Weir, chairman, pointed out. He also emphasized the fact that provision for depletion and depreciation second quarter exceeded the amount allowed for this purpose in comparable quarter last year by $1,300,000.

Keystone Steel & Wire Co.

Preliminary report of Keystone Steel & Wire Co., Peoria, Ill., for fiscal year ended June 30, 1942, subject to audit now in process, shows net profit of $1,796,032, after all charges and federal income and excess profits taxes. This equals $2.37 a share on 757,632 shares of capital stock and compares with net profit for preceding year of $1,618,375, when dividend of $2.13 was paid.

Youngstown Sheet & Tube Co.

Second quarter net income of Youngstown Sheet & Tube Co., Youngstown, O., was $2,291,119, against $4,765,997 in comparable 1941 quarter. Net profit was reduced by total federal taxes of $8,677,000, and by charges for maintenance and repairs and provision for additional wage payments conforming with War Labor Board's order totaling $14,099,277. Deductions for depreciation and interest on funded debt amounted to $3,131,158.

Crucible Steel Co.

Six months net profit of Crucible Steel Co., New York, totaled $2,605,285, equal to $4.01 a common share. This compares with $3,051,899, or $4.98 a share, earned in like 1941 period.

First half tax provisions amounted to $19,159,875, against $6,498,875 during comparable period last year. No reserve was set aside or other provision made out of earnings for possible retroactive re-negotiation of government contracts and subcontracts which the war and navy departments have the power to initiate under law.

June quarter net was $1,457,162, against $1,148,123 in the initial three months this year and $1,554,463 in the second 1941 quarter.

Republic Steel Corp.

Republic Steel Corp., Cleveland, reports consolidated net profit for the second quarter of 1942 as $3,355,158 after all charges, including estimated income and excess profits taxes of $17,800,000 based on the present tax law, plus allowance for possible changes. This compares with net of $5,428,749 in same period of 1941. Profit from operations, after maintenance and repair charges, was $25,980,393.

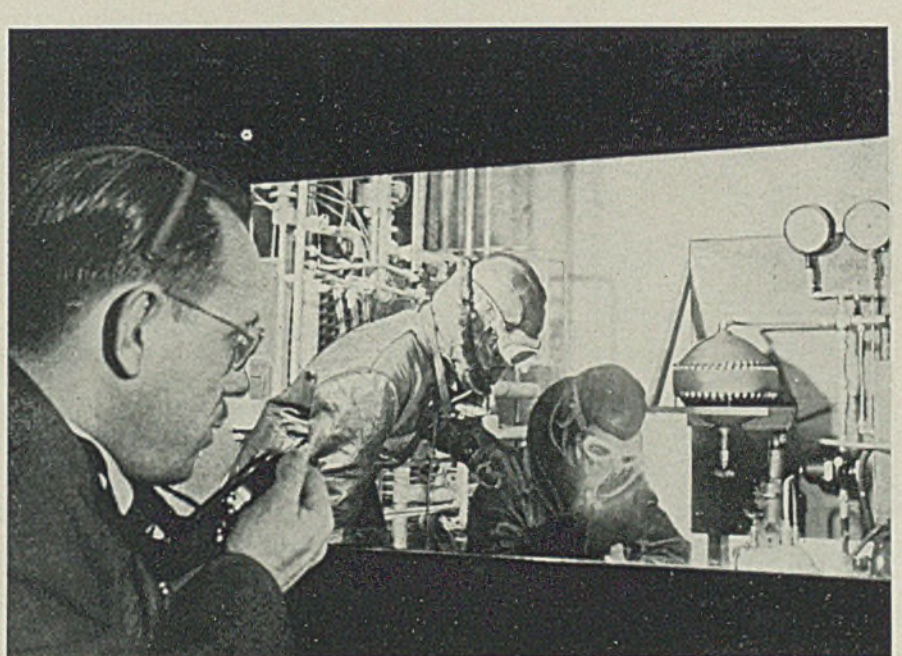
For the six months net earnings were $8,072,121, compared with $13,618,716 in the prior year. Tax provision approximated $35,800,000, against $18,000,000 in the 1941 half. First half operating profit was $53,423,886.

"Lower Profit, Higher Taxes" Cancel Westinghouse Bonus Plan

Lower profits and higher taxes have forced abandonment of the profit sharing plan in effect for six years at Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., A. W. Robertson, chairman, said last week. He pointed out that increasing federal taxes have continually reduced the amount of employes' bonus since the start of the war, and that renegotiation of war contracts makes it virtually impossible to calculate profits on a monthly basis, which is the main feature of the plan.

Participation of employes in company profits reached a high of 16 per cent in 1940, but it has dropped sharply since that time. Last month's payment was 1 per cent.

Work at 60 to 100 Degrees Below Zero in Strato-lab



Unless he is supplied with oxygen, man cannot live more than a few seconds at 35,000 feet above the earth. Nor does machinery "live" at those altitudes unless properly "insulated". Two aircraft pilots here are working inside the Boeing Aircraft Co.'s cold room, reported by Boeing to be the first laboratory in the world wherein temperature conditions of an altitude of 35,000 feet are produced. Observer outside is in telephonic communication with the men

Senate Committee Investigating Steel Situation; Taylor Advocates Centering Responsibility for Scrap

WASHINGTON

HEARINGS by the Truman (Senate) committee appointed to investigate the iron and steel industry in its relation to the war effort were started here last Thursday. Senator Truman of Missouri, presided, and showed by his questions that he is hostile to the industry.

Reese Taylor, chief of the War Production Board's Iron and Steel Section, and R. C. Allen, deputy chief, were among the first witnesses.

Answering persistent questions by members of the committee and its counsel, Mr. Taylor stated that the scrap situation should be handled by one person, but refused to say that the person should be named by the War Production Board. He explained that the OPA handles scrap prices, the Conservation Division, the collection of scrap, and WPB, the allocation of scrap. He opposed any new set-up, and committee members could not make him say that WPB should take charge of the whole problem.

In the course of this line of questioning, Senator Truman remarked that in his opinion "big steel companies" had made every effort possible to keep the steel expansion program among themselves.

Mr. Taylor said the worst steel shortage now is in bars, and that there is excess of platemaking capacity in relationship to production of other steel products. He stated war needs for steel vary from month to month; that WPB is going to have to "tighten up" to know where every shipment of steel is going. He discussed in detail the allocation and priority systems as they affect steel.

Steel shipments in June, he said, were approximately 5,700,000 tons, while unfilled orders for the month were 11,074,000.

Mr. Allen discussed the iron ore situation, with particular reference to the Great Lakes. He told the committee that this year the Lake Superior district will ship about 90,000,000 tons of iron ore. With the aid of a map he traced the flow of ore from mines to consuming points.

Answering questions, he said that Birmingham ore is of lower grade than that of Lake Superior. Utah ore is high grade, and Wyoming same as the lake ore. He explained details of open-pit and underground mining.

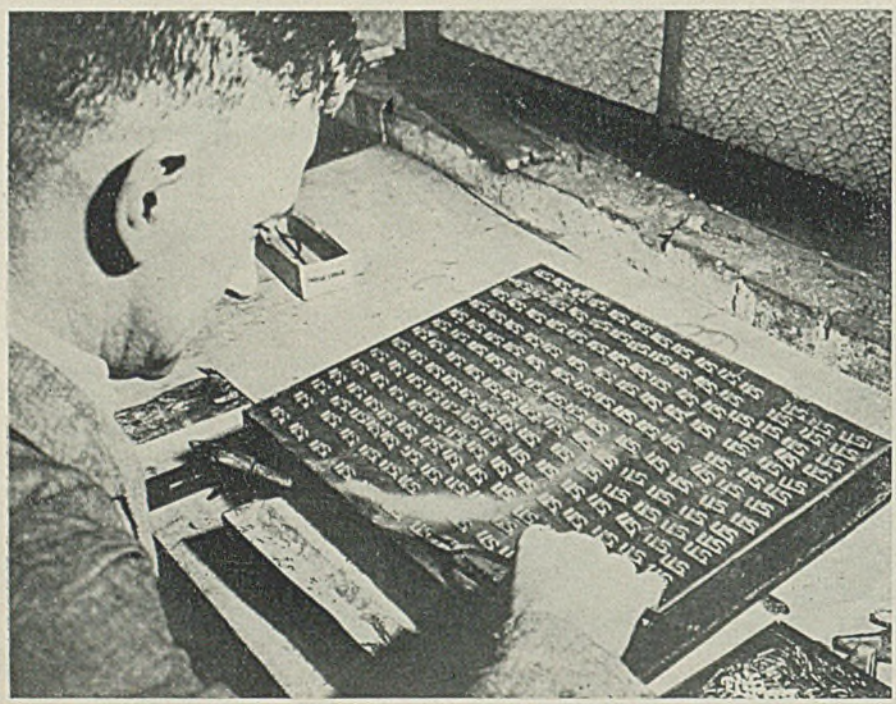
If the present steel plant expansion program is followed, Mr. Allen said the country will need 100,000,000 tons of ore per year. The country will get 60,000,000 tons of ore from open pit mines this year. It is hard to increase the production from underground mines, he said.

There probably is a billion tons underground for future use, with 500,000,000 in open pits, he testified.

Questioned about the "slowness" of steel plant development on the West coast, Mr. Allen said that in the past it had been due to the slim markets there. Now, it is bound to grow, and has plenty of ore for the future.

Among others who were asked to be on hand for the hearings were representatives from Canonsburg, Pa., to tell why the mill of the Standard Tin Plate Co. there is being closed.

From Australian Corsets to U.S. Insignia



Fitzroy, Australia: A corset factory has been converted to manufacturing equipment for use by American troops. Products include battle jackets, gas capes, United States flags; military insignia, army shoes, rifle slings, and nurses' uniforms. Here an Australian workman finishes insignia for use on uniforms

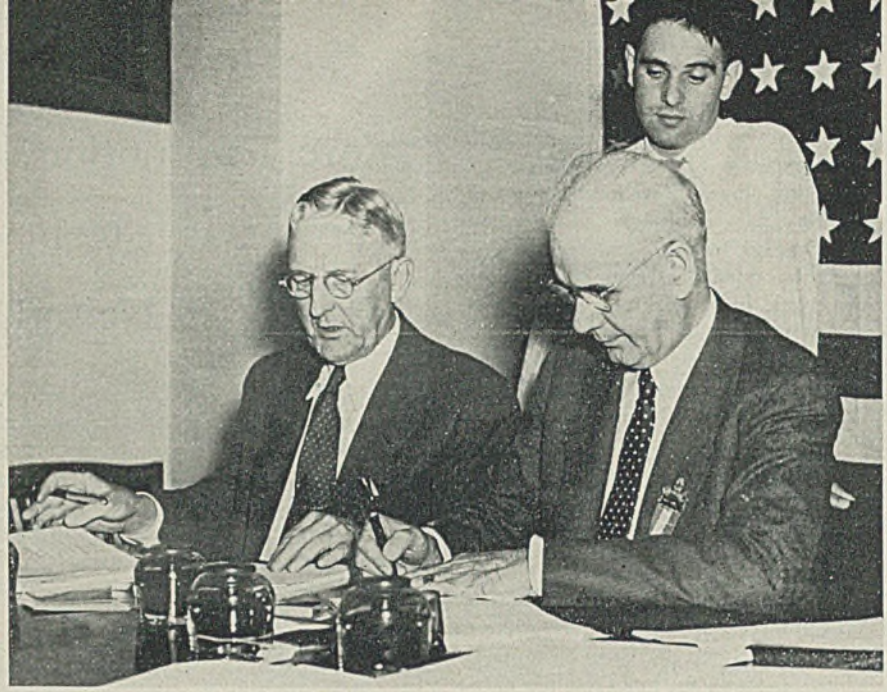
Steel Recovery Corp. To Thaw Frozen Stocks

Formal organization meeting of the Steel Recovery Corp. was to be held in Washington late last week. It is understood headquarters of the corporation will be in Pittsburgh and that regional offices will be located at strategic points throughout the country.

Chief objective of the corporation will be to release stocks of steel frozen in consumers' inventories by WPB conservation orders. The corporation will act as agent for the Metals Reserve Co. of RFC in its operations.

No official word has come as to the officers of the Steel Recovery Corp. but it is understood that George L. Stewart of Edgar T. Ward's Sons Co., Pittsburgh, will head the organization. He will be assisted by a board made up of representatives of the steel industry and the warehouse industry.

Membership on this board is said to consist of Walter S. Tower, president, American Iron and Steel Institute; N. J. Clarke, vice president in charge of sales for Republic Steel Corp., Cleveland; B. E. Kibbee, executive vice president, Sharon Steel Corp., Sharon, Pa.; John May, vice president in charge of sales for American Steel & Wire Co., Cleveland; Everett Graff, president, Joseph T. Ryerson & Sons, Chicago; Lester Brion, president, Peter A. Frasse & Co., New York; Richmond Lewis, president, the Charles C. Lewis Co., Springfield, Mass.; and Walter S. Doxsey, president, American Steel Warehouse Association, Cleveland.



James H. Walsh (left), vice president in charge of Inland Steel operations at Indiana Harbor, Ind., and Philip Murray, CIO president, sign collective bargaining contract. John Sargent, president, Local 1010, standing. Photo at right: Fred M. Gillies, superintendent at Indiana Harbor, and Sargent shake hands. These two and 13 members of a negotiation committee worked toward a contract from last September to January when disputed clauses were taken before the labor board

Inland Steel Signs Contract With CIO

Agreement in line with Labor Board's directives applied to 14,000 workers . . . "I am confident it will work," says Mr. Gillies . . . Harmony for war effort

REPRESENTATIVES of Inland Steel Co. and of the United Steelworkers of America met in Inland's office in Indiana Harbor, Ind., Aug. 5 and signed a contract incorporating the directives from the National War Labor Board, and an agreement covering working conditions for 14,000 workers at Indiana Harbor and Chicago Heights.

This is Inland's first contract with the steelworkers' union and the first signed by the four steel companies in the "Little Steel" hearings before the board. The other companies are Republic, Bethlehem, and Youngstown Sheet & Tube.

J. H. Walsh, Inland vice president in charge at Indiana Harbor, signed for the company. In addition to John Sargent, president of Local 1010 of the union, Philip Murray, CIO president, was in attendance, as were John Dougherty, regional representative, and Joe Germano, district representative of the steelworkers.

Clarence B. Randall, Inland vice president, declared: "No decision has been reached by the company, as yet, as to whether judicial review will be sought with respect to the board's authority to impose union security."

Fred M. Gillies, Inland's superintendent at Indiana Harbor who conducted the negotiations with the union, said:

"I am very much gratified that the bargaining committee for the union and ourselves have been able to complete this contract and have it signed so promptly. It is only a little over two weeks since the order was issued.

"There are several things about the contract that impress me favorably. The first is the fact that it has been worked out right here in our own plant. The bargaining committee has been ably assisted by Mr. Dougherty, Mr. Germano and Mr. Lebrum of the district staff of the steelworkers, but has included continuously 13 of our own employes, and those men have made a direct contribution to almost every paragraph in the contract. There are probably a good many steel plants in the country for which the contract would not be suited, but it does fit the circumstances of this plant. I don't claim that it is perfect, but I do believe that it suits our conditions, and that it represents a very fine example of practical collective bargaining.

"I am very confident that it will work, and that it will make for better relationships between the company and its employes."

Meanwhile, negotiations were in progress between United Steelworkers of America and other steel companies, including subsidiaries of the United States Steel Corp.

In Pottstown, Pa., F. T. Cadmus, works manager for Bethlehem Steel

Co.'s plant, declared: "A virtual shutdown of the Pottstown plant was forced by the United Steelworkers in a dispute attempting to force employes into joining the union."

"Some 400 pickets gathered at the gates at 6 o'clock on the morning of Aug. 5 preventing more than 650 men from going to work, and crippling production in all departments.

"The shops are engaged 100 per cent for Army, Navy and other war units.

"A local union official called the men off work because they claimed certain employes were not members of their union. This action is in violation of the directive order issued by the National War Labor Board in the 'Little Steel' case, where the union specifically agreed that 'neither it nor any of its officers or members would intimidate or coerce employes into membership into the union.'

"The United Steelworkers of America is recognized by the company as the exclusive bargaining agent at the Pottstown works, yet the union has brought in a jurisdictional dispute protesting because some members of an AFL union have notified the company and the CIO that they do not wish to be represented by the CIO union. They accordingly would not be subject to the CIO check-off arrangements granted by the labor board.

"The strike started on Saturday, Aug. 1, when 20 men in the receiving yard walked off the job because they would not work with a man who they claimed refused to join the CIO union. On Monday, 24 men in the receiving yard refused to report for duty. On Tuesday, the president of the CIO local, a craneman, refused to make a lift of a piece of equipment, which was to be worked on by a man who he claimed was not a CIO union member. He then walked off the job taking other cranemen with him, and causing a partial shutdown of operations. On Tuesday evening the local union agent informed the company that the men would be at work at 7 o'clock Wednesday morning, but instead a picket line of several hundred was placed at the gates before the morning shift was due. The pickets included many men who are not employes of the plant."

Steel Employment Reaches New Peak at 659,000

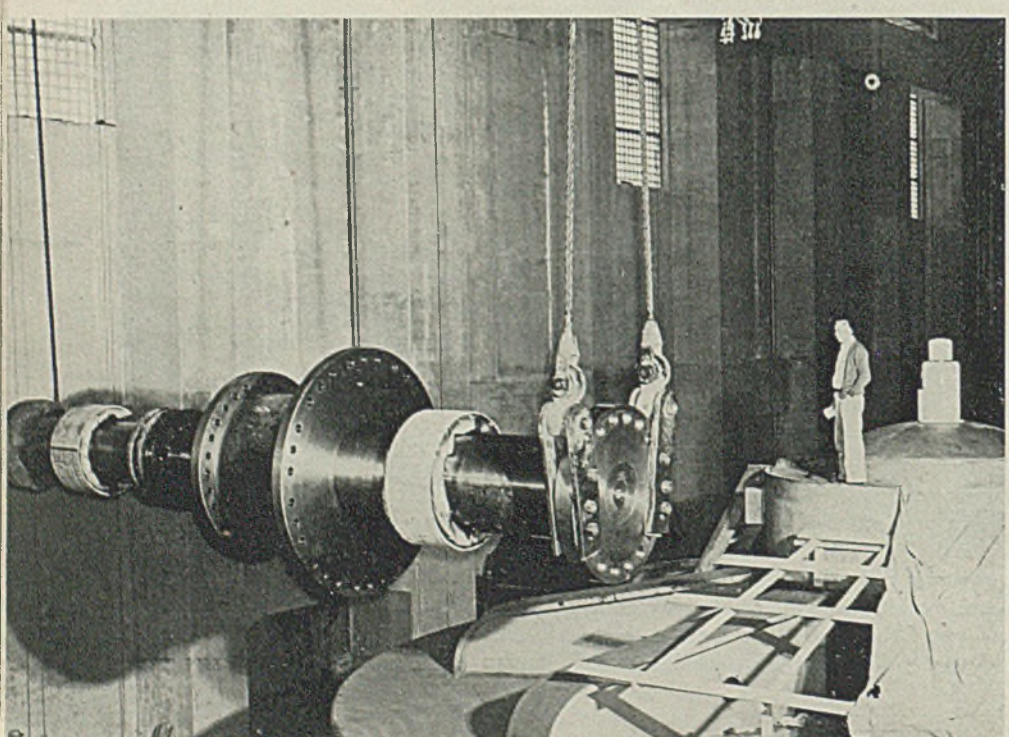
Employment in the steel industry reached a new peak in June when 659,000 employes were at work, according to the American Iron and Steel Institute.

Steel payrolls in June totaled $118,067,000, compared with $117,403,000 in May and with $110,504,000 in June a

Employes earned an average of 102.0 cents per hour in June, against an average of 101.1 cents per hour in May and 99.2 cents in June, 1941.

✦

A new electrical giant is being assembled in Grand Coulee Dam's large west powerhouse to help increase production in the war industries of Washington and Oregon. Here a 75-ton section of the 120-ton steel shaft for one of the two 75,000 kilowatt Shasta Dam units, which the Bureau of Reclamation moved to Grand Coulee as a means of quickly increasing essential power deliveries, is being transported to an erection platform by means of an overhead crane. The completed shaft is 51 feet long and 41 inches in diameter widest point



More Production? Here It Is, Steel Men Wire Nelson

AMERICAN Rolling Mill Co. reports its Hamilton, O. plant in July established its fifth consecutive record for production of pig iron. Output topped the June figure by 1852 tons. Leo F. Reinartz, manager of the Middletown, O. division considers the accomplishment as "one of the finest demonstrations of skill and teamwork" he ever witnessed.

Numerous obstacles were overcome. In April the Hamilton workmen repaired a furnace while in blast, to prevent a shutdown. Replying to a commendation, the plant's production drive committee telegraphed Donald M. Nelson, WPB chairman, that the record would not "last long." Blast furnace experts declared the furnace had been pushed to its limit in April but in May more iron was made.

A large V was painted on a gas container at the plant in June, with three chevrons to indicate the March, April and May records. June performance added a fourth and July a fifth. The men promise another increase for August. They have telegraphed Mr. Nelson:

"You have asked for more production, Mr. Nelson. We have given it to you and will continue to give it to you until this war is won."

Republic Reports 421 High Production Marks

Republic Steel Corp. in July set 25 new departmental production marks, for a total of 421 records in 170 departments. Pig iron output exceeded the all-time record of March; electric steel ingot tonnage broke the previous mark set in May; more armor plate was rolled than in any prior month; one mill made a new high in shell steel; two Steel & Tubes divisions exceeded all prior figures; Union Drawn Steel division set two new records, including shot steel and other wartime necessities. Republic also exceeded all earlier iron ore output at two of its northern mines.

Carnegie—Illinois Sets New Records at Chicago

Ten new monthly peaks were reached by the three Chicago district plants of Carnegie-Illinois Steel Corp. in July. No. 12 blast furnace at Gary works produced 42,145 tons of pig iron, 1000 tons more than its best prior record, made in May, highest for all stacks of this company.

No. 8 blast furnace at the Gary works also made a new high mark. The 160-inch plate mill and the 20-inch merchant mills at Gary made more steel than in any previous month.

At South Chicago Works the blast furnace and electric furnace departments attained new highs in July. The blast furnaces produced nearly 5000 tons more pig iron than in any earlier month. No. 1 furnace broke its own tonnage record, which had stood since 1928. Electric furnaces bettered output by more than 700 tons. The 80-inch hot strip mill at Gary works, converted early this year to plate production, topped its June high mark by almost 20,000 tons.

Carnegie-Illinois blast furnaces in July produced 1,458,728 tons of pig iron, an all-time high, exceeding the prior record tonnage made in May.

Inland Plate Mill Ships Record Tonnage for Day

Steel plate approximately sufficient for two Liberty ship hulls was shipped from the 76-inch continuous strip mill of Inland Steel Co. at Indiana Harbor, Ind., July 30. Three crews, 664 men, participated in this new record, 25 per cent higher than the prior mark set less than a month ago. Each crew made a new high mark. It required 75 gondola cars to contain the tonnage for the one day's output.

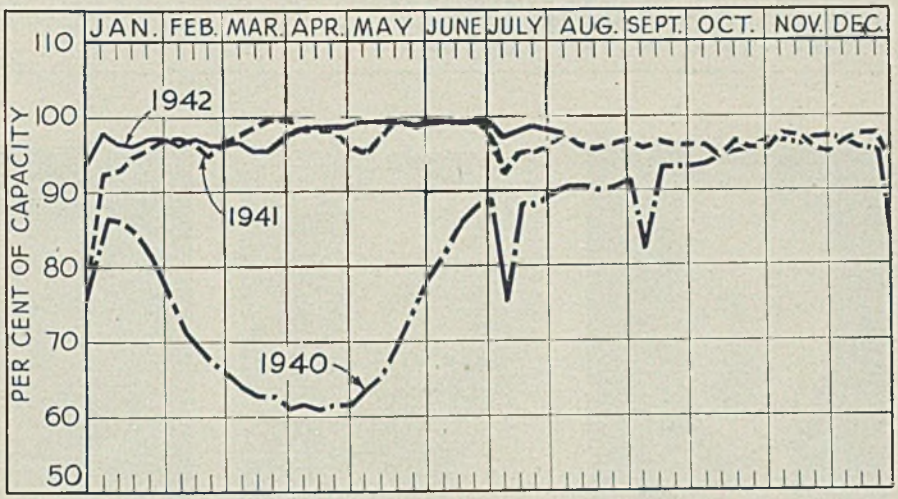
The 14-inch merchant mill at the same plant also set a new record for production of steel particularly valuable to the war effort.

14 New Monthly Achievements For Jones & Laughlin Steel Corp.

Jones & Laughlin Steel Corp. established 14 new monthly production records in July for its Pittsburgh and Cleveland district plants. These included plate output by the Otis division in Cleveland. Total tonnages of coke, pig iron, steel ingots, billets and rolled steel products in the Pittsburgh and Aliquippa works in the first seven months this year were higher by "many thousands of tons," company reports, than in the corresponding period last year.

Adding Bessemer, Electric Capacity at Hamilton, Ont.

Steel Co. of Canada Ltd., Hamilton, Ont., has completed arrangements with the Canadian government for addition of a large electric furnace and a bessemer converter at its Hamilton works. These will add 250,000 tons per year to ingot capacity. The electric furnace is scheduled for completion in December and the bessemer plant in April, 1943.



PRODUCTION . . . . Down

PRODUCTION of open-hearth, bessemer and electric furnace ingots last week declined ½-point to 97½ per cent. Four districts advanced, four declined and four were unchanged. A year ago the rate was 96 per cent; two years ago it was 90½ per cent, both computed on the basis of capacity as of those dates.

St. Louis—Addition of an open hearth by Granite City Steel Co. increased production 2½ points to 98 per cent, the highest rate since the first week in June.

Detroit—Declined 1 point to 88 per cent, with 23 open hearths active.

Central eastern seaboard—Unchanged at 95 per cent, though supply of scrap is decreasing. The smaller Swedeland, Pa., blast furnace is scheduled to resume this week, after repairs.

Cleveland—Slightly higher production at two plants caused a rise of 3 points to 96 per cent.

New England—Furnace repairs cut production 5 points to 95 per cent.

Cincinnati—Advanced 3½ points to 92 per cent. Two open hearths are idle for repairs.

Chicago—Continued at 100½ per cent, several open hearths being under repair. No furnace was idle for lack of scrap.

Buffalo—Withdrawal of two open hearths for repairs caused production to drop 5 points to 90½ per cent.

Pittsburgh—Held steady at 93½ per cent, idle furnaces being under repair, none out because of scrap shortage.

Wheeling—Gained ½-point on slight adjustments of equipment, to 84½ per cent.

Birmingham, Ala. — Maintained its steady rate of 95 per cent, which has prevailed for several months.

Youngstown, O. — Removal of two open hearths caused a drop of 2 points to 94 per cent, 74 open hearths and three bessemers being in production. Indications are for the same rate this week.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Aug. 8	Change	Same week 1941	Same week 1940
Pittsburgh	93.5	None	100	86
Chicago	100.5	None	100.5	96.5
Eastern Pa.	95	None	95.5	89
Youngstown	94	— 2	98	82
Wheeling	84.5	+ 0.5	93	99
Cleveland	96	+ 3	92.5	85
Buffalo	90.5	— 5	90.5	88.5
Birmingham	95	None	90	88
New England	95	— 5	87	80
Cincinnati	92	+ 3.5	87	78
St. Louis	98	+ 2.5	98	62.5
Detroit	88	— 1	83	93
Average	97.5	— 0.5	°96.0	°90.5

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

Kaiser Steel Plant Built in Fast Time

Construction of the steel plant in California designed to supply Henry J. Kaiser's shipyards with steel plates is proceeding rapidly and plate production is scheduled to start in January, 1943. Plans were drawn in February, ground broken in April and construction has been ahead of schedule. Kaiser borrowed $50,000,000 from the RFC to finance the plant.

The plant will include a blast furnace, open-hearth furnaces, plate mill and 90 coke ovens in two batteries of 45 each. Production of 2500 tons of plates per day at full operation is anticipated.

American Rolling Mill Co., Middletown, O., has purchased the yard and facilities of Butler Iron & Steel Co., a scrap dealer doing business in Butler, Pa. This is the first venture of the steel company into direct preparation of scrap. Company's Butler plant had previously been taking the yard's entire output.

MEN of INDUSTRY

F. W. Ochsenshirt Jr.

Paul H. Shaeffer

P. C. Sowersby

Paul L. Hexter

F. W. OCHSENHIRT JR., heretofore purchasing agent, has been appointed general purchasing agent, Jones & Laughlin Steel Corp., Pittsburgh, and subsidiary companies. Mr. Ochsenhirt has been associated with Jones & Laughlin practically all of his business career. **W. A. Morris Jr.**, assistant, has been advanced to purchasing agent, succeeding Mr. Ochsenhirt.

♦

Paul H. Shaeffer has resigned as assistant general manager of sales, Ohio Ferro-Alloys Corp., Canton, O., to accept a similar position with Pittsburgh Metallurgical Co. Inc., Niagara Falls, N. Y.

♦

Don I. Carroll has resigned as vice president in charge of production, Vultee Aircraft Inc., Downey, Calif.

♦

L. L. Lessig, contracting engineer, fabricated steel division, Bethlehem Steel Co., Philadelphia, has reported for active service as a major in the United States Army Engineers office, Philadelphia.

♦

George W. Sweeny, since 1940 auditor, H. C. Frick Coke Co. and associated companies, Pittsburgh, has been elected comptroller and vice president in charge of finance of these United States Steel Corp. subsidiaries.

♦

Stewart Tame, since 1926 production manager, National Malleable & Steel Castings Co., Cleveland, has been appointed works manager. He succeeds **Charles H. McCrea**, who has been elected a vice president.

♦

F. H. Lindus, who has been handling various advertising assignments for Timken Roller Bearing Co., Canton, O., the past year, has returned to the sales department of the company's service division and is now located in the San Francisco branch.

♦

P. C. Sowersby, assistant advertising manager, General Electric Lamp Department, Nela Park, Cleveland, has been transferred to the company's Michigan division in Detroit, where he will specialize in the advancement of wartime lighting designed to increase production of war goods in the Michigan area.

♦

Edward L. Carter has been appointed manager, export division, W. C. Norris Manufacturer Inc., Tulsa, Okla., with offices at room 1809 R. C. A. building, 30 Rockefeller Plaza, New York.

♦

Leo F. Heller has been appointed director of labor relations, American Shipbuilding Co., Cleveland. He formerly was secretary, Youngstown Builders' Association, Youngstown, O.

♦

Frank M. Stephens Jr. has been named a research engineer, Battelle Memorial Institute, Columbus, O., and has been assigned to the materials beneficiation division. Mr. Stephens is a recent graduate, Colorado School of Mines, and a member, American Institute of Mining and Metallurgical Engineers.

♦

Ralph B. Meisenhelder, assistant to the president, York Ice Machinery Corp., York, Pa., has been appointed director of war contract progress. Duties will consist of co-ordination and liaison responsibilities within the sales, engineering, manufacturing, administrative and war material divisions.

W. H. Long, a member of York's sales promotion and advertising department, has been commissioned an ensign in the United States Naval Reserve. He reported Aug. 1 to Cornell University for a training period prior to being assigned to active duty.

♦

Paul L. Hexter, vice president, Arco Co., Cleveland, has received a commission as a captain in the Army Air Forces. He will be attached to the proving grounds at Eglin Field, Florida, in the section devoted to development of camouflage techniques and photography, and takes up his duties there Aug. 14.

♦

Robert H. Morse Jr., who has been branch manager successively of Fairbanks, Morse & Co.'s offices at Cincinnati, Dallas, Tex., and Boston, has recently been transferred to Chicago as assistant sales manager. **John Elmburg**, formerly manager of the diesel engine department at St. Paul, has been made manager at Boston, succeeding Mr. Morse.

♦

W. N. Wood has been named plant manager, American Propeller Corp., Toledo, O., succeeding **Wayne Eddy**, resigned. Mr. Wood formerly was factory manager, propeller division, Curtiss-Wright Corp., and prior to that was general superintendent, Spicer Mfg. Co., Toledo, and Nordyke & Marmon Co., Indianapolis; and factory manager, New Britain Machine Co., New Britain, Conn.

♦

Capt. R. W. England has retired as marine manager, Interstate Steamship Co., Cleveland, ore carrying subsidiary of Jones & Laughlin Steel Corp. An expert on ships, lake and ocean, engineering and navigation, Capt. England has been an active figure in the Lake Carriers Association and the shipping indus-

try many years. He was assistant and later manager of District No. 9 (Great Lakes) of the Emergency Fleet Corp. during the first World war.

Paul L. Tietjen, heretofore marine superintendent, succeeds Capt. England as marine manager. Before joining Jones & Laughlin early in 1941, he was identified with the construction department of Pittsburgh Steamship Co. He is a graduate in naval architecture and marine engineering from the University of Michigan.

♦

S. J. Storm has resigned as secretary-treasurer, Chicago Transformer Corp., Chicago, to become comptroller, Collins Radio Co., Cedar Rapids, Iowa.

♦

Charles O. Voigt, the past three years general manager, General Iron Works Co., Englewood, Colo., has been elected president to succeed **R. W. Gordon,** retired. Mr. Voight is also general manager and vice president, Stearns-Rogers Mfg. Co., which operates the iron works.

♦

O. L. Gray, assistant general manager of coast lines, Atchison, Topeka & Santa Fe railroad, Los Angeles, has been appointed assistant to the vice president, headquarters in Chicago. **H. H. Tisdale** assumes Mr. Gray's former post in Los Angeles.

♦

W. H. Hillis, assistant chief operating officer, Chicago, Rock Island & Pacific railroad, Chicago, has been named operating officer. **Frank W. Thompson** has been promoted to chief engineer, and **G. W. Raney,** general superintendent, has been made general manager.

♦

Robert M. Kalb, assistant chief engineer, Kellogg Switchboard & Supply Co., Chicago, has become chief engineer. **B. A. Wallace** has been advanced to the post vacated by Mr. Kalb.

♦

R. J. Hearn has been appointed assistant manager, Boston district office, Crocker-Wheeler Electric Mfg. Co., Ampere, N. J. Prior to joining the company two and one-half years ago as a field engineer, he was identified with Allis Chalmers Mfg. Co. as sales and service engineer in Milwaukee, Cleveland and Boston.

♦

Alvin P. Adams, president, Duramold Aircraft Corp., and **Harold H. Budds,** general manager, Ranger Aircraft Engine Division, have been elected directors, Fairchild Engine & Airplane Corp., New York.

♦

John D. Farrington, since May 1,1936, chief operating officer, Chicago, Rock Island & Pacific railroad, Chicago, has been made chief executive officer, succeeding **E. M. Durham Jr.,** resigned.

♦

Clarence E. Stevens has been elected vice president in charge of plant operations, Norma-Hoffmann Bearings Corp., Stamford, Conn., effective Aug. 15. He succeeds **Charles B. Malone,** who has resigned to become associated with another industrial business in Stamford. Mr. Stevens was, until April 1 this year, vice president in charge of manufacturing, Electrolux Inc., Old Greenwich, Conn.

♦

John G. Hill, assistant freight traffic manager in Chicago for the Erie railroad, has been named freight traffic manager. **Joseph A. Russell** has been transferred to Chicago from New York and promoted to western freight traffic manager.

♦

Richard T. Purdy, for nine years affiliated with the First of Michigan Corp., Detroit, has joined the staff of the managing director of the Automotive Council for War Production at Detroit.

♦

Charles R. Rall has been elected chairman of the board and treasurer, Pittsburgh Piping & Equipment Co., Pittsburgh. Other officers elected are: President, **L. K. Hamilton;** vice president, **Karl F. Tiegel;** secretary, **J. G. Gardner;** chief engineer, **G. S. Larsen;** assistant treasurer, **F. J. Hays.**

♦

W. D. James, president, James Mfg. Co., Ft. Atkinson, Wis., has been awarded the Cyrus Hall McCormick medal for "exceptional and meritorious engineering achievement in agriculture."

♦

Howard M. Davidson has been appointed plant engineer of the Bell Aircraft Corp., Buffalo. He succeeds **Robert L. Stevens,** who will report directly to **Lester L. Benson,** works manager.

Awarded Fifty-Year Gary Service Medal

A. E. Briscoe, assistant manager of the order division, Pittsburgh district, Carnegie-Illinois Steel Corp., was awarded a 50-year Gary Service Medal Aug. 1 by J. L. Perry, president. Mr. Briscoe is in front center of this group of his associates, and Mr. Perry is at Mr. Briscoe's right. He was born on Feb. 11, 1875, in Warren, O., began his working career with Falcon Iron & Nail Co., Niles, O., as a clerk, Aug. 1, 1892. On April 1, 1900, when the company became a part of American Sheet Steel Co. he was transferred to the New York general offices to assist in the organization of the order department. In January, 1904, at the time of the consolidation of American Sheet Steel Co. with American Sheet & Tin Plate Co., he was transferred to Pittsburgh as assistant to manager of the order department. In 1937 when American Sheet & Tin Plate became a part of Carnegie-Illinois he was made assistant manager of the order division.

BIBLIOTEKA POLITECHNIKI ŚLĄSKIEJ

DIED:

Edward R. Carnell, Pittsburgh manager, A. Milne & Co., New York, July 28, in Pittsburgh. Born in Newfoundland, he was graduated from St. Bonaventure's College, St. John, Newfoundland. He came to this country about 1902 and worked for the export and import department of United States Express Co. He then joined the sales staff of Edgar Allen Steel Co., later purchased by A. Milne & Co. in 1928. Prior to opening the Pittsburgh branch on Jan. 1, 1939, he was identified with the company's Chicago office.

♦

Verdon T. Renner, 52, for many years sales manager, Parkersburg Iron & Steel Co., Parkersburg, W. Va., until his resignation last October, in that city, Aug. 2. Associated with the company 23 years, Mr. Renner had been administration officer for the West Virginia Ordnance Ports, Point Pleasant, W. Va., since March 1.

♦

George Christopher Lloyd, 82, from 1909 to 1933 secretary, Iron and Steel Institute (Great Britain), July 10.

♦

Harry J. Leschen, 63, president, A. Leschen & Sons Rope Co., St. Louis, Aug. 2, at his summer home at House Springs, Mo. He joined the company, founded by his grandfather, in 1897, and in 1914 was named president. Mr. Leschen was president, National Wire Rope & Strand Manufacturers Association from 1933 to 1941.

♦

Hewlett Scudder, 66, attorney in charge of General Electric Co.'s foreign patents for more than 30 years, July 31, in Schenectady, N. Y.

♦

Daniel M. Todd, 71, president, Elgin Sweeper Co., Elgin, Ill., in that city, July 28.

♦

Charles Katchem, 59, shop superintendent, Schwab Boiler & Machine Co., Milwaukee, in that city, July 29.

♦

E. J. Hardtke, 75, retired designing engineer, July 26, at his home in Milwaukee. He was the first designing engineer to work on automobile bodies at the Seaman Body Corp., now Seaman Body plant, Milwaukee.

♦

Alfred Hibbs, 79, superintendent, United States Cast Iron Pipe Co., Cleveland, until his retirement four years ago, in that city, July 30.

♦

George J. Murdock, 84, retired electrical and mechanical engineer, July 25, at his home in Newark, N. J. Among his inventions were a self-sealing fuel tank for airplanes, bolt machine, electric surface gage, magnetic drill holder and railway signal indicator.

♦

William Peterson, 55, associated with Kelly Reamer Co., Cleveland, 30 years, and Detroit representative for that company since 1924, in Detroit, July 24. He was well known in automotive circles and a charter member of the Detroit chapter, American Society of Tool Engineers.

♦

Walter Henry Kurz, chief engineer, Sheffield Steel Corp., Kansas City, Mo., July 26, in that city. He had been associated with Sheffield 15 years.

♦

Charles K. Traber, chief engineer, A. Leschen & Sons Rope Co., St. Louis, July 24, in that city.

♦

William N. Matthews, president, W. N. Matthews Corp., electrical equipment manufacturer, St. Louis, July 19, at his home in that city.

♦

Lieut. Col. Edward P. Reed, 44, chief of the inspection division, Chicago Ordnance District, in Fort Sheridan hospital, Aug. 3. Chief of the inspection service the past three and one-half years, Col. Reed was responsible for employing, training and supervising the 2600 men and women inspectors of the district. He joined the staff of the ordnance district in 1937.

Merge Army Services To End Duplicate Buying

Transfer of the Army Motor Transport Service from the Quartermaster Corps to the Ordnance Department, effective Aug. 1, is bringing employes of Motor Transport and Ordnance District at Detroit under one command, federal officials stated last week. Purpose is to end duplication of orders where procurement services of these branches overlap, and to encourage efficient use of raw materials by consolidation of production facilities.

Procurement of military trucks, together with repair and replacement parts, formerly a function of the Quartermaster Corps, is now absorbed by Ordnance.

"Golden Spike" Track Wrecked to Make Scrap

The historic "golden spike" stretch of track that completed the first transcontinental railroad in 1869 is being wrecked to provide steel scrap. Scene of the race between the Central Pacific and Union Pacific to reach Promontory Point, Utah, a cutoff superseded it about three years ago and it has been used as a standby. Usable rail will be relaid in war plants and the remainder melted. The golden spike, driven by Leland Stanford, who was president of the Central Pacific, the last one uniting the two ends of the line, was removed immediately after the ceremony and now is in a San Francisco vault.

Defense Plant Corp. Buys Chicago Plant

Defense Plant Corp. has purchased for $525,000 the plant of the former Pines Winterfront Co., Chicago, and will lease it to the Minneapolis-Honeywell Regulator Co., Minneapolis, for production of war goods. Operation will get under way this fall.

The building is two-story, 425 x 447 feet, and contains 210,000 square feet of space. It was built by Pines Winterfront, maker of radiator shutters, and was considered one of the most modern manufacturing plants in the city. Business of this company was purchased in July, 1940, by Sheller Mfg. Corp., Portland, Ind.

MEETINGS

Metal Congress To Feature Lectures on Tool Steels

Forty-four papers were approved by the publications committee of the American Society for Metals to be presented at the five-day National Metal Congress in Cleveland, the week of Oct. 12. One of the features will be a series of lectures dealing with various phases of tool steels by J. P. Gill, chief metallurgist, Vanadium-Alloys Steel Co., Latrobe, Pa.

In addition to the regular technical sessions of the four participating societies the National Metal Congress will present additional meetings on substitutes, salvage, employe training and maintenance. Government and War Production Board officials will participate.

Safety Council Reduces Time

National Safety Council, which had scheduled its thirty-first annual convention at the Stevens hotel, Chicago, Oct. 5-9, has transferred it to the Sherman hotel, same city, Oct. 27-29. Change was necessitated by the Army having commandeered the Stevens for training purposes. The council reduced the convention from five to three days because of the war. Ned H. Dearborn, 20 North Wacker drive, is the council's new managing director, having succeeded W. H. Cameron who retired July 21 after 30 years' service in that capacity.

WPB Calls for Construction Machinery; Organizing for Nationwide Inventory

WASHINGTON

NATIONWIDE inventory of used construction machinery will be conducted by the Used Construction Machinery Section of the Construction Machinery Branch, WPB.

A construction machinery specialist in each of the WPB regional offices will be in charge of the inventory in that region. Inventory cards will be mailed to each owner of such equipment for a complete listing. Information sought will be the kind, type, size, condition, manufacturer, serial number, model number, year manufactured, year purchased, type of power, attachments, estimated cost of repairs, sales price (as is) and other pertinent data for each piece of equipment owned.

It is estimated that there are more than 500,000 pieces of vitally needed construction equipment throughout the country, many not now in use, or used but little. Tracklaying tractors, cranes, shovels, draglines, pavers, mixers, scrapers, motor graders, pile drivers, compressors, and auxiliary mounted equipment are in urgent demand. Many of these tools in the hands of townships, counties and municipalities are used for only a few days a year and could be kept busy all the time for war construction.

Because the productive capacity of construction machinery is in direct ratio to its condition of repair, the section recently has completed a comprehensive survey of repair and service facilities throughout the country.

This survey of 400 established shops shows there are more than two million square feet of shop space available, 3000 skilled repairmen and some 13 million dollars worth of repair parts in inventory. Each regional office will have a breakdown of this survey to assist in expediting repairs.

Asks Users of Graphite Crucibles To Save Scrap

Fred L. Wolf, chief, Graphite Section, Mica-Graphite Branch, Materials Division, WPB, has issued a request to all users of graphite crucibles to accumulate crucible scrap.

Mr. Wolf said eventually central stations probably would be provided for processing scrap. No definite procedure has been established as the section is still engaged in investigating equipment and methods which might be used. He said further that Tercod and Syncarb scrap should be segregated from other types.

Several crucible manufacturers already are conducting limited reclamation operations. Mr. Wolf stated he did not infer from the request that such operations should be discontinued, since a considerable amount of graphite and silicon carbide may be recovered.

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

L ORDERS

L-30 (Amendment): Household Utensils, effective July 31. Extends restrictions on use of iron, steel and zinc to Aug. 15. Iron and steel may be used at 90 per cent rate in base period in manufacture of cooking utensils, at 70 per cent in manufacture of kitchen ware and essential household articles. Zinc may be used at 50 per cent rate.

L-49 (Revision): Beds, Springs, Mattresses, effective Aug. 4. Prohibits production of mattresses Sept. 1 and of studio couches, sofa beds and lounges on Nov. 1, if they contain iron or steel. Establishes quotas for production of bed springs, and sets up regulations governing renovation of mattresses springs, lounges and other products.

L-54-a (Amended): Office Machinery, effective Aug. 4. Permits manufacture by major companies between July 1 and Oct. 31 of not more than 12.25 per cent of number of nonportable typewriters billed to customers in 1941. Woodstock Typewriter Co. is only firm permitted to manufacture after Oct. 31. Complete allocation control over new typewriters, all of which are reserved for the Army, Navy, and Maritime Commission, is continued. Assigns quota of parts for export which may be produced up to Oct. 31

L-151: Watthour Meters, effective July 31. Prohibits production of household electric meters after Sept. 26, 1942. Curtails output in the interim to 2.5 per cent of total number made during entire calendar year 1941 No deliveries are allowed unless for use of Army, Navy, Maritime Commission, or War Shipping Administration; delivered under preference rating assigned by order P-46; or authorized by Director General for Operations. Manufacture and delivery of repair and maintenance parts not affected. Mfrs. must file with WPB a report by Aug. 15 and on 10th of each succeeding month showing inventories, deliveries, and unfilled orders.

L-158 (Amendment): Automotive Replacement Parts, effective Aug. 3. Authorizes producers to schedule production of essential replacement parts ahead of all other orders rated lower than A-1-a. Consumers not required to turn in old parts in exchange for new unless the part is installed by the producer or distributor.

L-188: Loose Leaf Metal Parts, effective Aug. 3. Permits use up to 30 per cent by weight of iron and steel used in 1941 to make blank book and loose-leaf metal parts and units. Restricts use in any calendar quarter after Aug. 4 to one-fourth of the 30 per cent allowed. Certain styles of books and parts must be eliminated entirely.

M ORDERS

M-9-a (Amendment): Copper, effective Aug. 1. Places all deliveries of copper under complete allocation by Director General for Operations. Brass mills and wire mills are subject to the same restriction. Dealers supplying brass mill and wire mill products to the industry may make delivery only when order bears appropriate allocation classification and purchaser's symbol and bears a preference rating of A-1-k or higher.

M-9-b (Supplementary order): Copper, effective Aug. 3. Transfers control of allocation of copper to foundries and ingot makers from M-9-a to M-9-b. Makes some procedural changes.

M-9-c (Amendment): Copper, effective July 29. Adds additional items to Military Exemption List.

M-15-f: Rubber, effective July 31. Bans use of rubber cement in a specific list of articles.

M-38 (Amendment): Lead, effective Aug. 3. Revokes supplementary order M-38-j which had established a monthly lead pool on the basis of 15 per cent of quantity produced in the second preceding month.

M-78 (Amendment): Mercury, effective Aug. 5. Lists of permitted and prohibited uses are revised. Use in manufacture of fireworks and film developing preparations prohibited. Amount used in production of cosmetics cut from 80 to 30 per cent. Restrictions lifted on deliveries to laboratories for specified purposes, manufacture of anti-fouling paint for merchant vessels, and maintenance and repair of industrial control equipment.

M-106 (Amendment): Shellac, effective July 31. Places all shellac, except for specified uses, under complete allocation. Exceptions and special authorizations granted on appeals prior to June 24 are revoked. Phonograph record makers must apply for supplies on PD-617.

M-126 (Revision): Iron and Steel Use, effective Aug. 5. Military Exemption list is revised. Blank book and loose-leaf metal parts removed from provisions of iron and steel order by terms of L-188, effective Aug. 3.

M-191 Lithium, effective July 16. Places lithium compounds under complete allocation. Provides for monthly requests on Form PD-585 and reports from producers on PD-586. Deliveries of 25 lb. or less in any month are exempted from restrictions.

P ORDERS

P-72: Elevator, Escalator Repair Parts, etc. Revoked Aug. 1, being supplanted by P-90.

P-91: Elevators, Escalators, Dumbwaiters. Revoked Aug. 3, being supplanted by P-90.

P-115 (Amendment): Canning Plant Maintenance and Expansion, effective July 29. Assigns same preference ratings for supplies to persons engaged in freezing, dehydrating, or fresh packing fruits and vegetables as canners. Ratings assigned are: A-1-a for emergency maintenance or repair; A-1-c for replacement, addition or expansion; A-1-j for normal maintenance, repair and operation, all subject to specific limitations.

PRICE SCHEDULES

No. 194: Effective July 30, all price-regulated commodities imported into Alaska and resold there are brought under a cost-plus pricing method.

WINDOWS of WASHINGTON

How the Smaller War Plants Corp. expects to relieve a distress that threatens our national economy . . . Starts with $150,000,000 to aid little plants swing over to a war-time basis

WASHINGTON

JUST how much help will be forthcoming from the new Smaller War Plants Corp. in enabling a large number of threatened small manufacturing establishments all over the country to continue to stay in business?

The answer is not at all clear. But it seems the new organization is getting off to a more practical start than those headed by Floyd B. Odlum and others who previously had been charged with the responsibility of looking out for small business. The organization has authority that hitherto has not been clear-cut.

Another fortunate circumstance is that the Smaller War Plants Corp. is headed by a practical machinist and engineer, Lou E. Holland, of Kansas City, who admits to being a "grease monkey", is a first-rate and aggressive executive and organizer. One of his latest achievements was the successful organization of a pool of 32 small shops in the Kansas City area and getting them going on war work.

Mr. Holland realizes that he has a tough job on his hands and he proposes to proceed carefully and examine all possibilities before freezing his plans. The main factors involved are rather simply stated. They are three in number. First it is necessary to find a particular kind of work that a given small shop can do. Then it is necessary to put an experienced engineer in the plant and get a few sample pieces made to show what can be done and to ascertain a cost on which the bid is to be based. Then, after the contract or subcontract has been awarded, comes the problem of getting a supply of needed material in the shop, and that alone is a tough assignment these days.

Co-operation Essential

All this means that the job of assisting small industry cannot be performed without the right type of organization, or without full co-operation from primary contractors and from the Army and Navy and other procurement agencies.

Mr. Holland regards his task as one of the major ones in the war. All over the United States there are ghost towns and cities, a result of large-scale migration of labor to war plant locations. Wholesale transfer of purchasing power away from these towns and cities is having a damaging effect on their economy. All sorts of merchants and services, various types of professional men in those towns and cities are suffering. Landlords have lost many of their tenants and are threatened with inability to pay taxes.

This type of distress threatens to become a danger to our national economy, says Mr. Holland, and must be minimized to the greatest degree possible.

In approaching his task, Mr. Holland counts on his successful experience with the Kansas City pool as a background. All of the shops in this pool are "small" —Mr. Holland does not like to define the term "small" but admits that when it is used he thinks of a shop with anywhere from 10 to 100 or possibly 150 men.

Small Plants "Limited"

He also thinks of a small shop as one in which the management and men are not accustomed to working to close tolerances or with a variety of materials. He thinks of a small shop as one with a limited variety of equipment and a limited experience in their use.

Hence, there is just no way to get a shop of this kind into war work unless you send a competent engineer in the plant. This engineer has to show the plant operator just how to get set up to make the particular part that is to be produced. He must design special jigs and fixtures, he must solve the problem of getting required accuracies with available machines. He must determine the cost and must help the small manufacturer to make up his proposal.

"But when you have gone about it that way," says Mr. Holland, "it is amazing what the small shop can do. One of the fellows in the Kansas City pool used to repair instruments and we found a war part that he, with the help of our engineer, could make on his machines. It is a long, round part, with no plus tolerance and with a minus tolerance of two ten thousandths. This chap turns them out with a minus tolerance of one ten-thousandth, and with a beautiful finish. Here is a fellow you never would have picked out to do a job of this type, and now the Ordnance officers show his product to other manufacturers as an example of what they want.

"While the Smaller War Plants Corp. still is to be organized, and while I am not yet sure about all details involved, we will have to have a good force of engineers in the field. These men will be scattered around the country and they will have to be self-starters since no detailed direction from Washington can get results. They will have lists of facilities at small plants. From there on they will have to depend on their initiative and aggressiveness, first to find work the small plant can do, second to take the small manufacturer by the hand and get him going.

"I do not yet know how many of these engineers we will need. Out of 24 engineers we considered in setting up the Kansas City pool only two proved to be of the ingenious, practical type that we needed. Say the Smaller War Plants Corp. will require at least 300 of these 'grease monkeys', and you can get some idea of the problem, especially in view of the general shortage of engineers."

The Smaller War Plants Corp. was set up by Congress with $150,000,000 at its disposal. This sum is not large when considered in the light of large-scale needs. However, with RFC and with other means for financing plants for war production, it is likely that the financial angle will be the simplest one involved in this setup.

There is some possibility that the job of the corporation may be made a little easier than now appears possible. There is a growing realization in some quarters in Washington that too much centralization of war production is not a good thing for the reason that it brings so much dislocation of the normal economy, through migration of war workers on a wholesale scale. The idea of some gradual shift away from the congested areas back toward those areas that need work would not meet with much opposition provided there was assurance that it could be worked out without causing a halt in war production.

England's Back-Yard-Shops

Experience in England possibly may be regarded as setting the pattern here for the British got into total war production long before we even were approaching it. When Sir Louis Beale, co-ordinator of Empire and Allied Requirements of the British Supply Council in North America, spoke before the convention of the American Society of Mechanical Engineers in June he talked inspiringly on this subject. As an example of all-out production he told of what is going on in his home city of Tunbridge Wells, a former non-industrial community of 36,000 not

far from London. Under the leadership of an automobile dealer whose establishment acts as a central clearing house of technical information and orders, and as a collection and assembly depot, every garage and backyard machine shop in Tunbridge Wells has been drawn into the manufacture of "bits and pieces" of war materiel. As a result, a volume of parts which otherwise would demand a specialized plant of great size, is pouring out of this typically English "home town".

Now that we in the United States have reached a war production volume that calls for every ounce of materials of many different kinds that we have available, it might very well be that one of the next steps would be a study of our wartime economy as it affects communities of people, and get ready to effect a certain amount of redistribution of war work in the interest of maintaining the health of all parts of our body economic.

Call for Idle Equipment That Still Is Serviceable

Manufacturers who have idle motors, generators and other types of used equipment which are still serviceable can help the general cause by advising the Surplus Used Equipment Section of the War Production Board's Conservation Division of its availability.

The section has accumulated a card index file covering some 20,000 electric motors, 3000 boilers, 1000 engine-generators, 400 turbo-generators, 300 motor-generators, 250 diesel-generators, 1000 generators, 300 steam turbines, 150 diesel engines, 200 steam engines, 100 gas engines, 400 rotary converters and 5000 miscellaneous items. The list does not include construction machinery or machine tools, these being handled by other WPB branches.

When WPB receives requests for equipment required on war work they are checked against the card file of the Conservation Division. If a machine listed in the index will meet the requirements, the prospective buyer is notified where it may be obtained. Many buyers are glad to get these used machines because they can be had for prompt delivery, thus eliminating delays often encountered in obtaining new equipment.

Although this system has been in existence only a short time it has been instrumental in placing a large amount of idle equipment back in service. The War Production Board regards this activity as especially desirable in that each used idle machine thus returned to service saves material and manufacturing operations that otherwise would be required to build a new piece of equipment. So far, more than 600 motors and more than 450 boilers have found new owners through this medium. Many other items have been exchanged in substantial numbers.

The Conservation Division does not attempt to handle negotiations for the sale of idle equipment. Its function is to locate the items and to make their availability known when inquiries are received. It is conducting this census with the aid of used equipment dealers throughout the country.

Essential vs. Nonessential "Civilian Goods"

Key officials in the War Production Board warn that there is little ground for optimism among nonessential goods manufacturers as a result of WPB's recent discussions on diverting steel for civilian use.

"When we talk about steel for civilians," explains one highly-placed authority, "we mean steel for the railroads, not steel for baby buggies. There is little possibility that present bars will be let down or sharply modified.

"We will all be finding out soon that war is just what General Sherman said it was. This war will be hell, not only on the battle fronts but on the home front. But, when the big casualty lists start to roll in, we will be in a position to derive a degree of satisfaction from the knowledge that we are supporting the fighting forces with every last ounce of our strength."

Asked about the significance of war plant shutdowns, responsible officials say we must expect a certain amount of such interruptions. War plants are proving to have much greater capacity—in many cases 30 to 40 per cent more—than originally expected, and it is difficult to supply them with the right materials, in the right quantities, in the right place at the right time.

But war plant shutdowns do not reflect any bogging down in our war production program. For example, every program based on steel is up to or far ahead of the schedule laid down by President Roosevelt for 1942. This is true of ships, tanks, aircraft and all other military items.

Plan To Replenish Warehouse Steels Studied

General agreement has been reached by the Army, Navy, Maritime Commission and the War Production Board, that steel warehouse stocks are necessary to support many war production lines. Remedial action whereby badly depleted warehouse stocks are to be replenished now is under study. It is expected that an order now in the making will establish warehouse allocations for each mill, with the warehouse distributors being permitted to extend A-1-a and higher ratings. It is not yet certain as to whether the contemplated setup will cure the warehouse situation completely; at least it will provide a considerable degree of relief.

Current thinking among the generals and admirals is that reliance should be placed on privately owned steel warehouses and indications therefore are that no more government steel warehouses will be set up excepting in cases where unusual conditions are entailed.

The problem of getting steel and other materials of the right kind, in the right amounts, to the right place at the right time is continuously under study. One highly-placed man in the War Production Board recalls how the automobile industry, normally relying on its suppliers to carry a large part of its inventory, employed high-grade men to act as "procurement chasers". He is scouting the idea of setting up a country-wide organization of this type to simplify the task of getting materials to assembly lines where and as they are needed.

Technical and Trade Groups Working To Solve War Problems

Seven technical societies and trade associations are working with the Army Ordnance Department, Services of Supply, in solving the problem of adjusting design and production of ammunition and weapons to the shortage of critical materials.

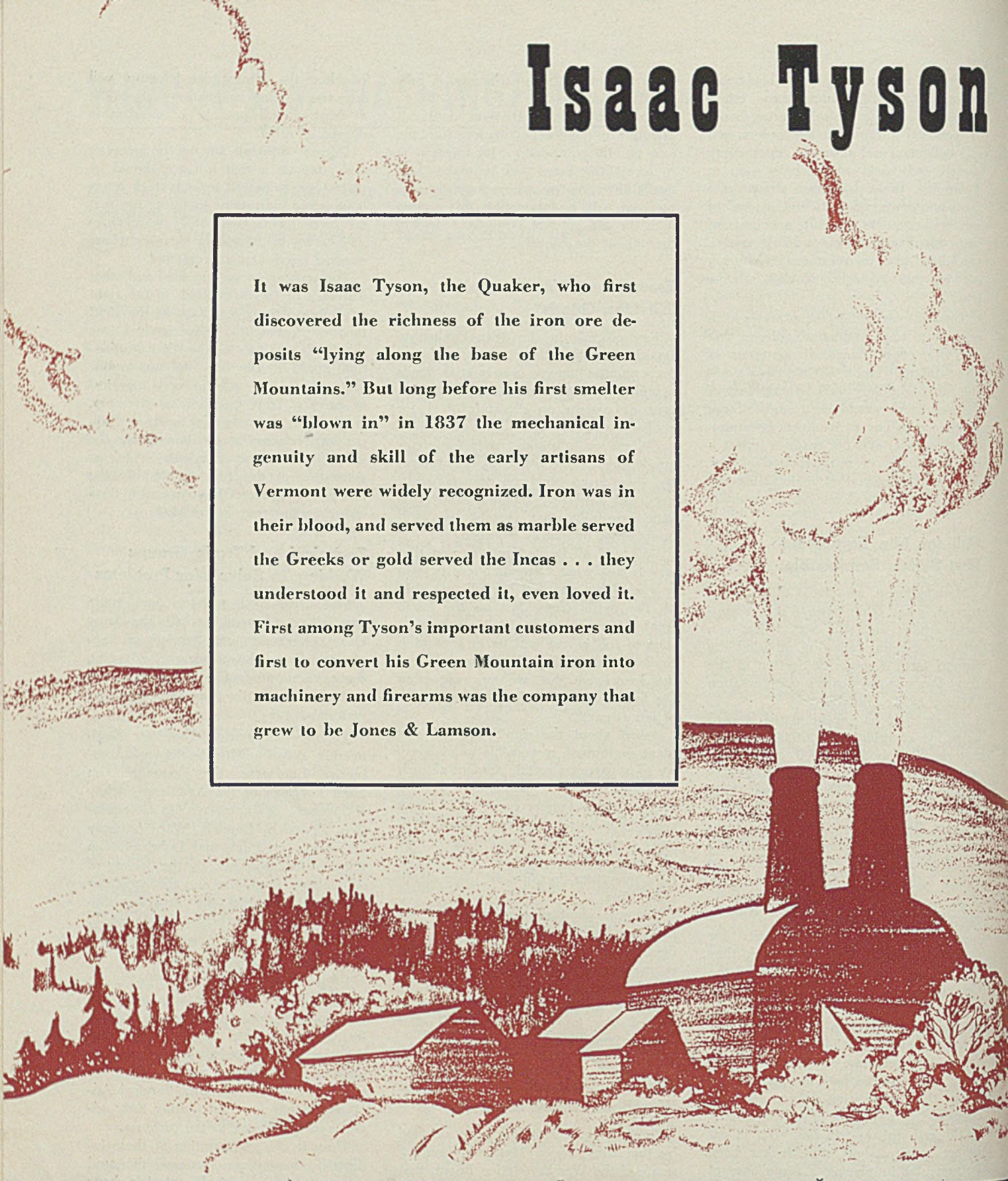
These societies are: The War Engineering Board of the Society of Automotive Engineers; the Committee on Shell Forgings of the American Society of Mechanical Engineers; the Co-operative Research Council War Advisory Committee on Fuels and Lubricants—an organization sponsored by the Society of Automotive Engineers and the American Petroleum Institute; the American Society of Testing Materials; the American Welding Society; the American Iron and Steel Institute; and the National Paint, Varnish, and Lacquer Association.

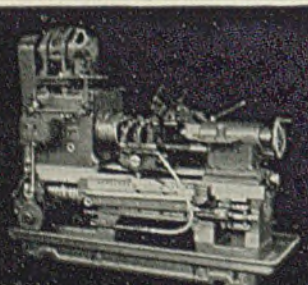
In addition various advisory, engineering research, and technical committees for special projects, which operate under the general jurisdiction of various Ordnance committees, such as the Ferrous and Non-Ferrous Metallurgical Advisory Boards, are contributing their advice and knowledge to the program.

Through the co-operation of these industrial committees, several thousand substitutions of critical materials have been achieved. Their knowledge of modern manufacturing processes, has been extremely valuable in cases where the production of weapons in vast quantities has changed old manufacturing procedures. Die casting, the use of plastics, and metal stamping are specific examples of new methods necessitated by the use of alternate materials.

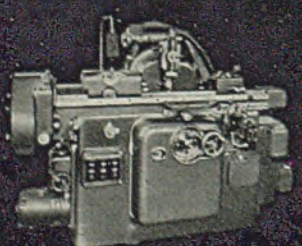
Isaac Tyson

It was Isaac Tyson, the Quaker, who first discovered the richness of the iron ore deposits "lying along the base of the Green Mountains." But long before his first smelter was "blown in" in 1837 the mechanical ingenuity and skill of the early artisans of Vermont were widely recognized. Iron was in their blood, and served them as marble served the Greeks or gold served the Incas . . . they understood it and respected it, even loved it. First among Tyson's important customers and first to convert his Green Mountain iron into machinery and firearms was the company that grew to be Jones & Lamson.





FAY AUTOMATIC LATHES



AUTOMATIC THREAD GRINDERS

OPTICAL COMPARATORS

AUTOMATIC OPENING DIE HEADS

had IRON in his Blood

IT'S seventy years now since Tyson's furnace last smelted Green Mountain ore and metallurgy has progressed from an intuitive craft to an exact and intricate science.

Now Jones & Lamson reaches out to many sources of greater capacity and variety and uses many formulas where each will serve the best. But iron, the basic material of industry, is still in the blood of our people here and, in spite of all the knowledge that science has given us we still value the father-to-son inheritance of the craftsman's sense of material.

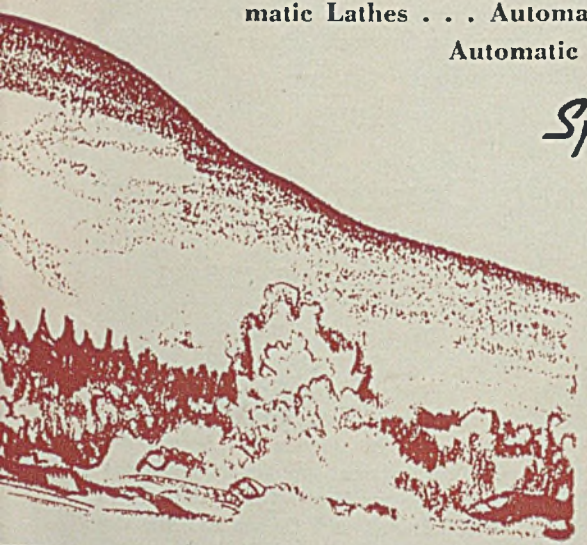
True the Jones & Lamson tradition dates to Isaac Tyson . . . and before, but our leadership in metallurgy, in design, in machine tool building dates far ahead, anticipating your needs today and preparing for post-war problems that can be seen only dimly.

Your inquiry, whether your company is large or small, will receive the careful, detailed study of our engineers. Send your questions to us today and ask for our illustrated catalogs.

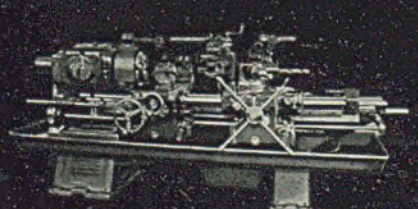
JONES & LAMSON
MACHINE COMPANY

Manufacturers of Ram & Saddle Type Universal Turret Lathes . . . Fay Automatic Lathes . . . Automatic Thread Grinding Machines . . . Comparators . . . Automatic Opening Threading Dies and Chasers

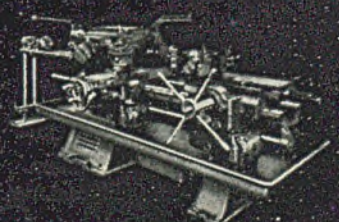
Springfield, Vermont
U. S. A.



PROFIT PRODUCING
MACHINE TOOLS



SADDLE TYPE
UNIVERSAL TURRET LATHE



RAM TYPE
UNIVERSAL TURRET LATHE

Mines Bureau To Build $350,000 Pilot Plant for Gas Reduction of Zinc Ores

WASHINGTON

PAVING the way for development of large, untouched reserves of domestic zinc ores for use in the nation's war machine, the Bureau of Mines will establish a $350,000 pilot plant and laboratory to conduct commercial scale tests of a gas reduction process developed by the bureau for production of the critical metal zinc.

Based on experiments dating back more than a decade, the Bureau's process successfully has passed tests conducted on a laboratory-size furnace and has been found superior in several instances to commonly-used commercial methods which require large amounts of electrical energy or coke and coal, Dr. R. R. Sayers, director of the Bureau of Mines informed Secretary of the Interior Ickes.

The pilot plant, which probably will be built somewhere in the South-Central section of the United States, will have an output of 500 pounds of metallic zinc daily. Funds for construction of the research plant have been provided in the First Supplement National Defense Appropriation Act, 1943, approved by Congress and just signed by the President.

Entirely New Process

Representing a distinct departure in metallurgical processes for treatment of zinc-bearing ores, the bureau's war program plant method uses a natural gas—methane —in several stages of a reducing cycle from which ore concentrate emerges as high-purity zinc. Natural gas frequently occurs near areas which are rich in zinc-bearing ores but which are removed from adequate supplies of electrical energy, coal or coke.

"The bureau believes that the untapped reserves of zinc ores and the abundance of natural gas can be paired successfully into an industrial team which will speed the output of zinc essential to the manufacture of galvanized iron, zinc alloy die castings, brass cartridge cases for guns, batteries and a multitude of other items." Dr. Sayers asserted.

Experiments by bureau metallurgists indicates that only five cubic feet of natural gas are necessary to produce one pound of zinc and that as much as 95 per cent of the zinc can be extracted from the ore by the new process. The scientists have estimated that the amount of fuel required to produce a pound of zinc by using the natural gas reduction method is approximately one-half that needed in commercial furnaces using coal and coke.

Bureau engineers also believe that the construction cost of commercial-size furnaces using the natural gas reduction process would be much smaller than the outlay for electrolytic zinc plants and would compare favorably with the cost of building other types of metallic zinc plants.

Four principal phases compose the bureau's process. At the outset, zinc concentrate is roasted in a pre-treatment furnace to remove undesirable sulphur. The ore then is placed in a retort; methane is added and the retort is heated with methane burners. Zinc vapor then forms and is condensed into zinc metal.

To Test for Method

While the laboratory-size furnace used by the bureau in developing the process generally proved successful, Dr. Sayers explained that many test runs must be conducted with a commercial-size furnace, or pilot plant, and that certain alterations and adjustments must be expected before a method suitable for industrial use can be developed. It was decided, therefore, that construction of the pilot plant should be undertaken as a part of the Department of the Interior war program of developing new mineral processes and methods of providing vital war resources and requirements. Chemists, metallurgists and engineers assigned to the laboratory will work full time in ironing out the problems which may arise.

The director stated that the bureau technicians will co-operate fully with all federal, state or local agencies interested in the development of zinc-reducing processes and that when the commercial process has been perfected it will be made immediately available to anyone who wishes to adopt it.

At present, most of the metallic zinc produced in the United States comes from smelters which use coal and coke. Plants using the electrothermic method and the electrolytic process furnish the remainder.

Although the number of zinc-reduction plants in the nation has increased greatly during the past several years, domestic production of zinc has not kept apace with increasing demands for both civilian needs and war industries, Dr. Sayers explained. The output of zinc plants during 1941 was 735,768 tons.

Under the department's accelerated war-time program for increasing the domestic output of strategic and critical minerals, the bureau already has embarked on an extensive search for more zinc-bearing ore deposits, particularly in the central and western states. Detailed explorations are being planned in areas which appear to have the most promising reserves. Meanwhile, an expanded search for deposits of other vital minerals, such as chromium, manganese, vanadium and tungsten, has been launched by a field force of mining engineers who will cover virtually every mineral producing region of the United States and Alaska.

Low-Grade Domestic Bauxite and Clay Recommended as Source of Alumina

PRODUCTION of alumina, raw material from which aluminum is made, from low-grade domestic bauxite and from clay, heretofore little used for aluminum metal, has been recommended to WPB by the Advisory Committee on Metals and Minerals of the National Academy of Sciences.

Use of a proposed new process by the alumina plants in the country will make it possible to include a substantial quantity of clay with the bauxite feed, so that less bauxite will be needed and the limited domestic reserves conserved.

The committee reported on the results of a year's study of possible new sources of alumina from clay, tailings, high-silica bauxite, alunite, kaolin clay and the like, made at the suggestion of WPB.

Principal source in the past of low-silica bauxite, preferred material for the production of alumina has been Dutch Guiana. Arkansas supplies the remainder. Submarine warfare threatens the amount of flow from Dutch Guiana and Arkansas high-grade deposits are limited, particularly in the fact of the greatly expanded demand for aluminum for war use. Thus the report explores the possibilities of expanding domestic alumina production from other sources.

Alumina is aluminum oxide. The current method, called the Bayer process, for producing it is to treat low-silica bauxite with alkaline solutions which re-

move the greater part of the alumina. The tailings, containing iron, titanium and silicon compounds, are known as "red mud." The committee has found that treatment of this red mud by a recently developed sintering process will permit the production of alumina from high-silicon bauxite as well as from current accumulations of red mud.

Of the several proposals to produce alumina directly from clay without the Bayer process, the committee looked with favor on a sintering process known as the modified Pedersen process, and recommends the construction of a test plant.

Continuation and expansion of the current pilot plant operations around the country, such as those being operated by the Bureau of Mines and by Kalunite Inc., in Utah, are urged.

Finally, the committee said, "because the best raw material for the production of aluminum is bauxite, it is suggested that prospecting program for the discovery of new domestic deposits be prosecuted vigorously and that the known domestic deposits be appraised as to grade, tonnage and minability."

Standards Association To Aid in Pegging Price to Quality of Product

WASHINGTON

DEVELOPMENT of standards to save materials, make fuller use of the nation's production facilities, and make price control more effective by pegging price to quality will be spurred by a new contract between the government and the American Standards Association, War Production Board Chairman Donald M. Nelson and Price Administrator Leon Henderson announced last week.

Under the terms of the contract, the American Standards Association will develop emergency standards in connection with WPB and OPA wartime supply and price control measures and will be reimbursed by the government for the actual cost of the work involved. The contract is limited to $90,000 in any one fiscal year; $60,000 is to be provided by WPB and the remaining $30,000 by the Office of Price Administration.

The increasing importance of standards for pegging the price of goods to their quality has been pointed out recently by Mr. Henderson in connection with the enforcement of price control. OPA's most recent action of this kind was its order forbidding reduction in the size or quality of soap.

Similarly, Mr. Nelson has referred to the importance of standardization and simplification in connection with the program to concentrate civilian production, now being studied by WPB. Used in this way, standards can help conserve resources of materials, manpower, production, and distribution for essential war purposes.

The contract with the ASA emphasizes the policy of both the OPA and the WPB of using existing specialized agencies in their work. The National Bureau of Standards has greatly increased its wartime research, testing and standards activities in co-operation with the war agencies. The new contract enables the ASA, the most important standardizing agency outside the government, to enter more completely into the war effort.

The ASA is a federation of 77 national technical and trade associations and government departments. Among the 10 governmental members are the Army, the Navy, the Department of Commerce, of which the National Bureau of Standards is a part, and the Department of Agriculture. American standards are developed through the work of hundreds of committees comprising over three thousand specialized technical experts representing manufacturers, distributors, and civilian and industrial consumers.

The ASA has been actively engaged in developing standards for war use since early in the defense program. Emergency standards for gas ranges and hot water heaters have been developed at the request of WPB. A series of three standards for quality control in mass production which were developed at the request of the War Department are now in extensive use by both government and industry. Currently the ASA is developing standards for safety shoes and boys' and girls' clothing sizes at the request of the Standards Branch of OPA; standards for radio materials and parts for the Radio and Radar Branch of the WPB; and standards for electrical measuring instruments of the indicating type, bolts for high temperature use, and the packaging of radio tubes for the Simplification Branch of WPB.

Exhibit Depicts Early High-Speed Steel Research

Commemorating the origin of its high-speed tool steel, Bethlehem Steel Co. has presented an exhibit to the Smithsonian Institution, Washington. Frederick W. Taylor, who formulated the Taylor system of industrial management, and Maunsel White, metallurgist for Bethlehem, in 1898 carried on experiments at Bethlehem that brought forth the steel. The central feature of the exhibit is a small-scale reproduction of the Taylor-White laboratory, containing replicas of the lathe, heat-treating and heating furnaces and the optical thermometer constructed for this test, one of the first of this type used in metallurgical work. Some of the original tools made by Taylor and White, the stamp used for marking their products and specimens of other tool steels of the period are included, with many factual data and a copy of the slide rule for calculation of cutting feed, speed and depth, developed by C. G. Barth, a mathematician associated with Mr. Taylor, one of the first of this type used in metallurgical work.

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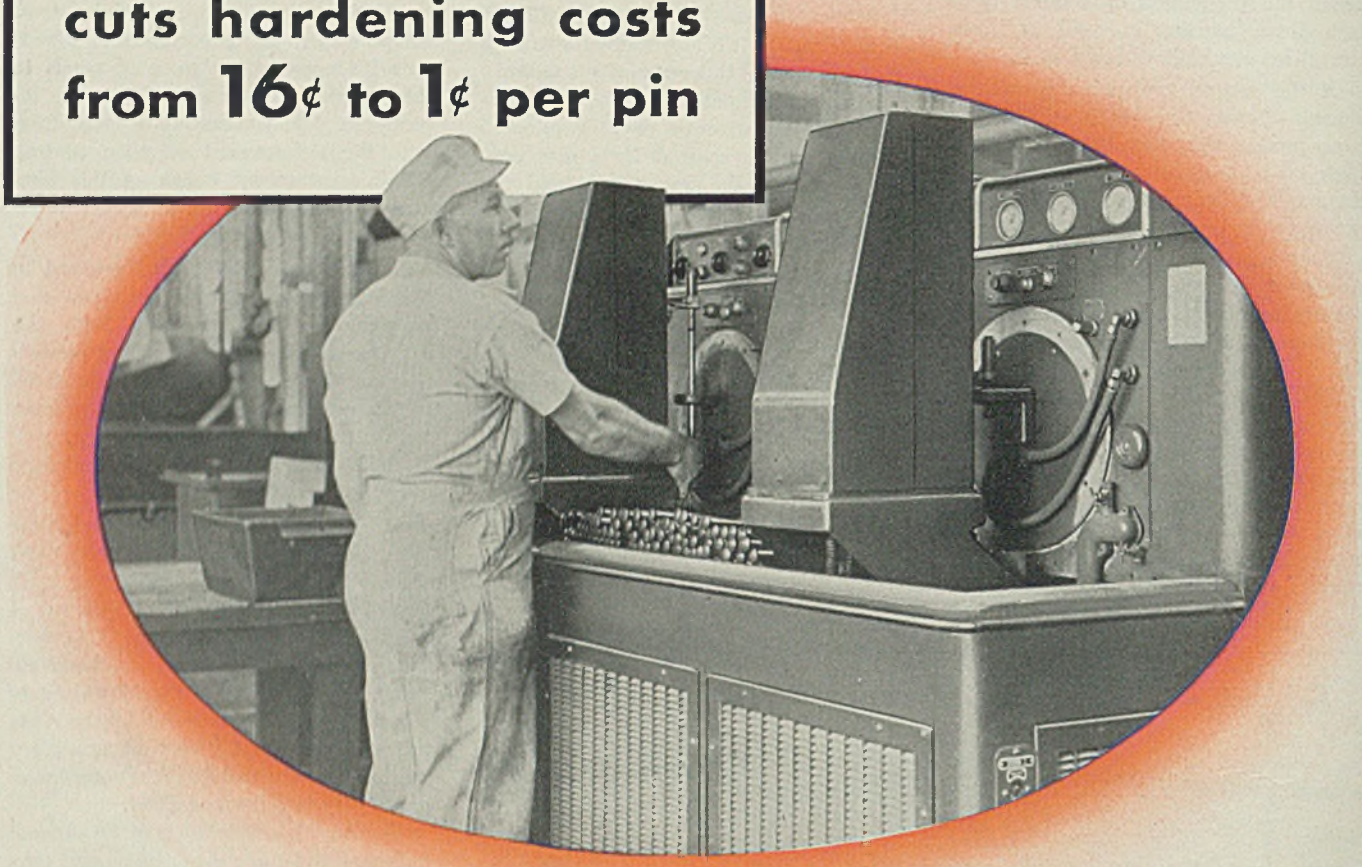
cuts hardening costs from 16¢ to 1¢ per pin



● Today, the battle-cry of production is SPEED. Tomorrow, in the Battle for Business, it will be ECONOMY.

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As for *speed:* TOCCO users report increases in output of as much as 600%.

And here is a typical report on TOCCO *economy:* Marmon-Herrington Co., Inc., Indianapolis, Ind., is hardening tractor track pins at a rate of 200 per hour at a cost of 1¢ per pin. Formerly pack-hardened at a cost of 16¢ per pin. TOCCO Jr., in assembly line, minimizes haulage. No sand-blasting required. TOCCO machine is always "on the alert," ready for instant hardening of any quantity of pins. Also, strength and life of TOCCO-hardened pins are greater.

Find out how TOCCO can give *you* increased SPEED, ECONOMY and QUALITY for hardening or heating operations.

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SPEEDY ELECTRIC HEAT IS GENERATED WITHIN THE SECTION TO BE HEAT-TREATED

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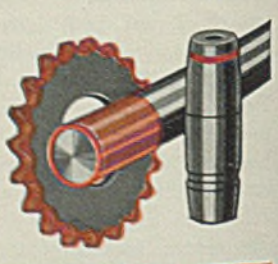
World's Fastest, Most Accurate Heat-Treating Process



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

MIRRORS of MOTORDOM

Mr. Kanzler goes to Washington . . . Made conspicuous success in co-ordinating Detroit district war industries, now will seek better balance in national effort . . . Allied officers tour plants

DETROIT

ON the capable shoulders of Ernest C. Kanzler, who in about six months has made an enviable record co-ordinating war plant activities in this area, now falls the tremendous job of bringing a better balance in the war production effort of the entire nation. His appointment as deputy chairman of WPB in charge of program progress was made by Donald M. Nelson in Washington last Tuesday and Mr. Kanzler left for the capital that night.

No stranger to Washington, nevertheless he left Detroit with at least an inward feeling of regret, for he had made a conspicuous success of the job he tackled here last January, and he is now moving into uncharted waters in an effort to whip a problem every bit as critical as the German U-boats which infest the western Atlantic.

According to official pronouncement, Mr. Kanzler will keep fully and currently advised as to the nature and extent of the war production program and the orders issued to effectuate it. He will follow the overall progress and results, comparing them with objectives to determine or anticipate where the program is behind expectations. This will include locating bottlenecks, weak spots, unbalance in production schedules, dislocations in supply systems, and the like.

Proud of Detroit's Part

He will analyze the program with key people in the WPB, armed services, other war agencies or in industry, as to the actual causes of trouble and corrective measures under way, appraising the adequacy of such measures and suggesting such expedients as seem called for.

He will report directly to Mr. Nelson, WPB chairman, and W. L. Batt, vice chairman, working in close contact with J. L. Knowlson, vice chairman on Progress Determination, and Amory Houghton, Director General of Operations.

In accepting the new position, Mr. Kanzler distributed a few bouquets around his old stamping ground, saying:

"I could not leave my Detroit activities with the WPB without paying tribute to the automotive industry and to the plants in the Michigan region which have co-operated so wholeheartedly in the war effort. The magnificent job done by the industry and the plants in Michigan has established a reputation for this district throughout the world. One has but to look at a list of the visitors to Detroit to realize that it has become the Mecca for those looking for the arsenal of Democracy.

"I have accepted my new assignment in Washington because this seems the best thing to do. I expect to keep in close touch with the Detroit war activity, and want to express my sincere thanks and appreciation to all of those who have co-operated with us."

Named chief of WPB's Automotive Branch Jan. 21, shortly after Nelson became chairman, Mr. Kanzler opened a Detroit office three days later, with one assistant, in a downtown postoffice. His first press conference was so crowded because of the limited quarters that reporters and photographers were literally

Ernest C. Kanzler

climbing over each other. But his office "clicked" from the start and grew steadily to the present staff of 300, now occupying a couple of floors of a large office building at the corner of Grand Boulevard and Woodward avenue.

To many his success was a pleasant surprise. He was not considered to be a production man in the modern sense of the word, although he did have charge of production at Ford from 1920 to 1926. He was known primarily as a legal and financial expert, being a graduate of Harvard Law School and a member of the bar in Michigan.

He began work with Ford in 1916—he and Edsel Ford married sisters—and in 1926 was named a director and second vice president. In 1928 he organized the Universal Credit Co. to handle installment financing for Ford dealers, and was president of the organization from its inception until he was called to Washington, Jan. 5, by W. S. Knudsen, to become head of the OPM Automotive Branch.

Coming back to Detroit three weeks later to locate the Automotive Branch where it should be, in the heart of the industry, Kanzler soon saw his idea of decentralizing WPB activities accepted, and he was named director of the Detroit region. At that time there was considerable speculation over the possible duplication of activities between the WPB Automotive Branch and the Automotive Council for War Production, organized by the motor industry to correlate its war production activities. Strange to say, there has been little if any serious conflict between these two agencies, the one appearing to complement the other, and the two together serving to accelerate and facilitate the entire production program.

D. J. Hutchins, head of the Materials Section of the Detroit WPB office, becomes acting regional director until a new appointment is made. R. L. Vaniman, deputy chief in charge of the Washington office of the Automotive Branch, will be acting chief of that division. Kanzler will take his personal staff with him to Washington. They include a number of old-time automotive production experts, some of whom have emerged from retirement for the duration.

Bomber Turret Plant Operating

Retinue of U. S., Russian and British air force officers, headed by Lieut.-Gen. H. H. Arnold, chief of the Army Air Forces, spent two days here recently inspecting war plants and meeting with executives of the motor industry. Included on the industrial tour was the new Briggs Mfg. Co. bomber turret plant where production is now under way at a rate 55 per cent ahead of original schedules. Shipments are at a rate of several million dollars a month, and already costs on the turrets have been reduced by better than 30 per cent through introduction of improved manufacturing methods.

The turret, providing flexible fire power in large bombers, is made up of literally thousands of individual pieces, ranging from small gears ¼-inch in diameter

to large aluminum castings. Briggs received its first contract to make bomber turrets last Aug. 18, set up a pilot line in one of its Detroit plants pending construction of a new plant, and shipped the first unit on Dec. 23. The new plant was occupied May 15 and for three months production has accelerated, in July alone exceeding original promises by 100 per cent.

Establishment of an inventory and requisitioning branch in the regional office of the WPB here has been announced. Manager is C. W. Strawn, vice president of Bliss-Strawn Distributing Co., Detroit, assisted by R. L. Grindley. Functions will be similar to those of this branch in Washington—to assist manufacturers in procuring materials for critical war jobs after the manufacturers have exhausted other means of obtaining them. Quantities of raw materials "frozen" by WPB restrictions can be cleared through the new inventory branch which will help to bring buyer and seller together.

Recruit Mechanics for Overseas

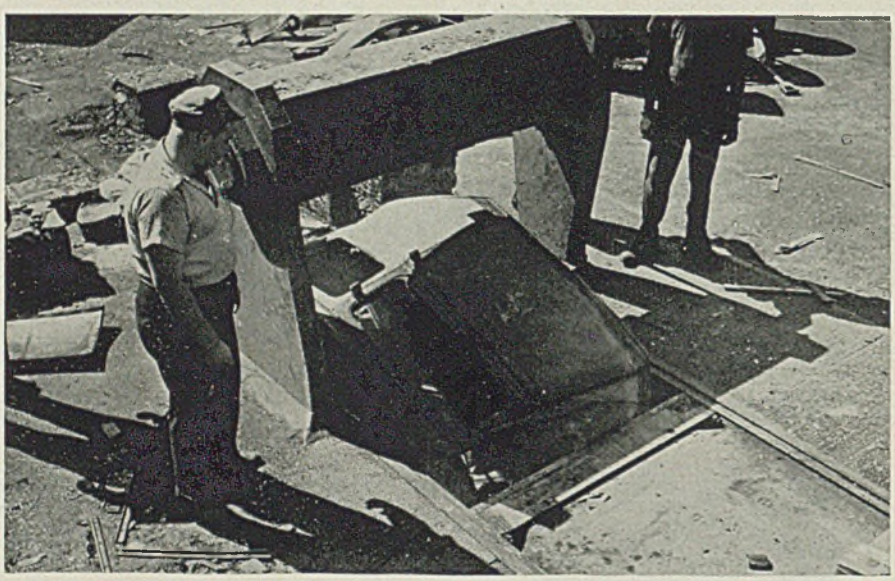
Drive to recruit not less than 22,000 experienced automobile mechanics for overseas military service before the end of the year has been launched under sponsorship of the National Automobile Dealers Association. Already two regiments of 8000 men have been recruited and installed at Camp Sutton, S. C. Maj. Herman Goodin, first vice president of the NADA, heads up the enlistment drive.

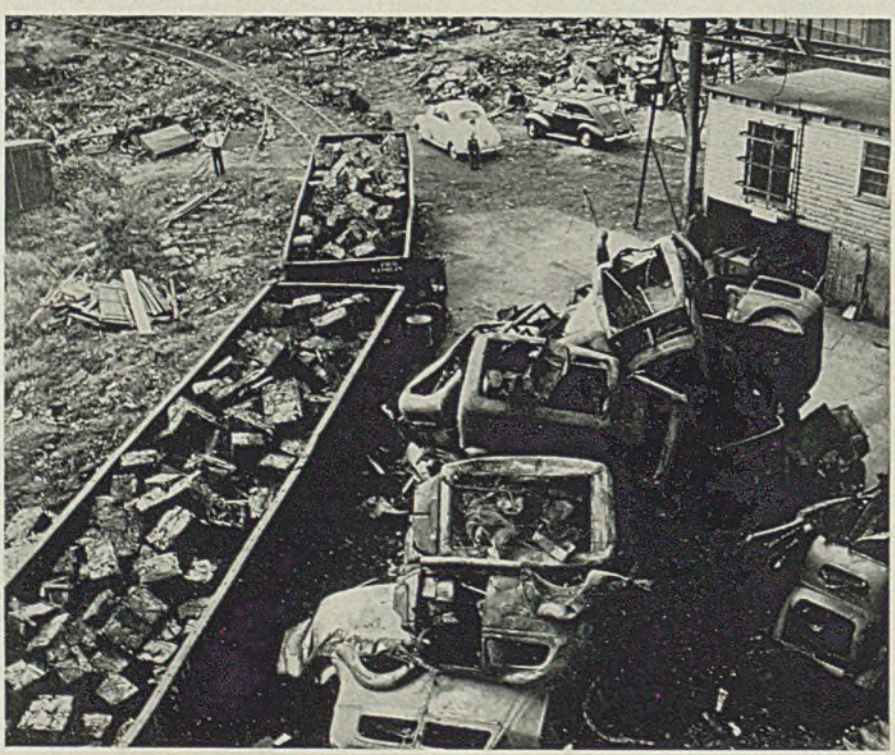
In convention at Chicago last week, the UAW-CIO heard its president, R. J. Thomas, report that paid-up membership for the month of May was at an all-time high of 612,702, making it what he claimed the largest labor union in the country, if not in the world.

First production of butadiene for the synthetic rubber program is expected next month, with styrene output to follow in October. Eleven companies are in process of building a total of 24 butadiene plants; four are building a total of 12 styrene plants. Firestone, Goodyear, Goodrich and U. S. Rubber will operate the chief copolymer synthetic rubber production plants with projected annual output of 570,000 tons. Production of butyl rubber now has been projected to 130,000 tons annually, more than double the original schedule. Three Neoprene plants operated by DuPont will add another 40,000 tons to bring peak projected output to 870,000 tons a year. This high level of output is still two years away, barring unforeseen complications in production and compounding, always distinct possibilities.

Shell Quencher With Fingers

A Michigan shell plant producing 75-millimeter projectiles has worked out an unusual gadget for oil quenching rough forged shells as they emerge from a heat treating furnace. The shells travel through the furnace on their sides, 14 in a row, on a conveyor chain. As they emerge white hot, a bar with 14 horizontal steel fingers awaits them and they slide over the fingers. Through a system of gears and cams the fixture rotates 90 degrees, lifting the shells to a vertical position. The bar then back tracks and descends into an oil bath where the shells are quenched in an agitated bath for several minutes. The fixture then reverses its travel again, raises the row of shells to the conveyor table, rotates to place them flat again, and they move on through a cooling hood and then to machining operations.





✦

"Before and After"

This is what happens to "jalopy" bodies in a wrecking yard, converting them into scrap bundles for use in the open hearth of a steel mill. A major source of material for several months, these yards in June supplied about 450,000 tons, which may be the peak, as supplies have been diminishing. Suggestions are under consideration for commandeering old cars not suitable for transportation, to provide more scrap

Are cutters ground and set properly in your shop?

Information taken from "Steel"

About two years ago the need for tremendous expansion in machine tool building caused the builders to adopt extensive "in-plant" training courses for machine operators. Many manufacturers also went into instruction for machine operators on a large scale.

Almost invariably the instructors found that the young men taking these courses asked more questions about the grinding and setting of cutters than about any other detail of machine operation. As a result, some companies are conducting special instruction on the proper grinding and setting of cutters.

This is extremely important. Cutting tools which are improperly ground or are set too high or low in relation to the work impair production, waste power and contribute to excessive tool breakage and to unnecessary wear and tear on machines.

An improvement of only a few per cent in the grinding and setting of cutters in all of the machine shops in the arsenal of democracy would be equivalent to installing and manning thousands of new machine tools.

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MOLY

Railroads, Once Thought Outmoded, Handling All-Time Peak Traffic

WITH heavy long-haul tonnage demands on railroad freight locomotives, Office of Defense Transportation is seeking to avoid a motive power shortage by increasing efficiency of operation.

Serviceable freight locomotives now available are estimated by ODT at 18,000 and allocation of material to locomotive builders by WPB will provide for only 265 new units before the end of the year. Whether this number will be sufficient is problematical, according to Joseph B. Eastman, director of war transportation.

Use of trucks for short-haul service has released locomotives and freight cars for longer rail movements, motor transport being useful in moving many types of merchandise and bulk cargo.

The number of local freight trains moving over branch lines for short distances has been reduced by all the larger steam railroad systems. General order No. 1 by ODT fixed minimum weight limits for less-than-carload freight and has resulted in release of almost 65,000 cars per week for through freight loading and has made available an increasing number of locomotives for long-haul service.

Fewer Engines, More Mileage

In 1929 freight locomotives seldom ran more than 100 to 150 miles before being sent to terminal roundhouses for service and running repairs. At present they frequently cover 400 to 500 miles.

A smaller number of motive-power units is moving a record volume of revenue tonnage farther than ever before, but Mr. Eastman warns if a future choke-point in motive power is to be avoided an even higher standard of efficiency must be developed.

Figures by ODT show that the 121 major railroad systems in the United States in the first six months of 1942 hauled approximately 300,000,000 ton-miles of freight. During the first four months the total was 188,000,000 ton-miles. The previous peak was in the first four months of 1929 when 141,000,000 ton-miles of freight was moved. In the 1929 period class I railroads had 24,616 serviceable locomotives to handle the load, while in 1942 they had only 17,893.

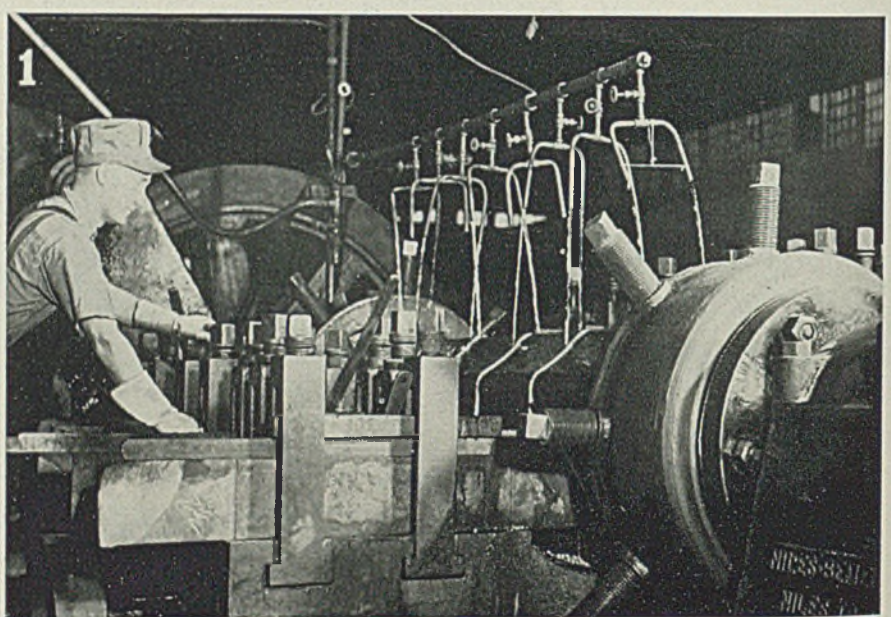
This accomplishment is due to the fact that locomotives are larger and have greater tractive power and can move longer trains of more heavily loaded cars. ODT is said to be considering the possibility of transferring passenger locomotives to freight service if the pressure for more motive power becomes serious.

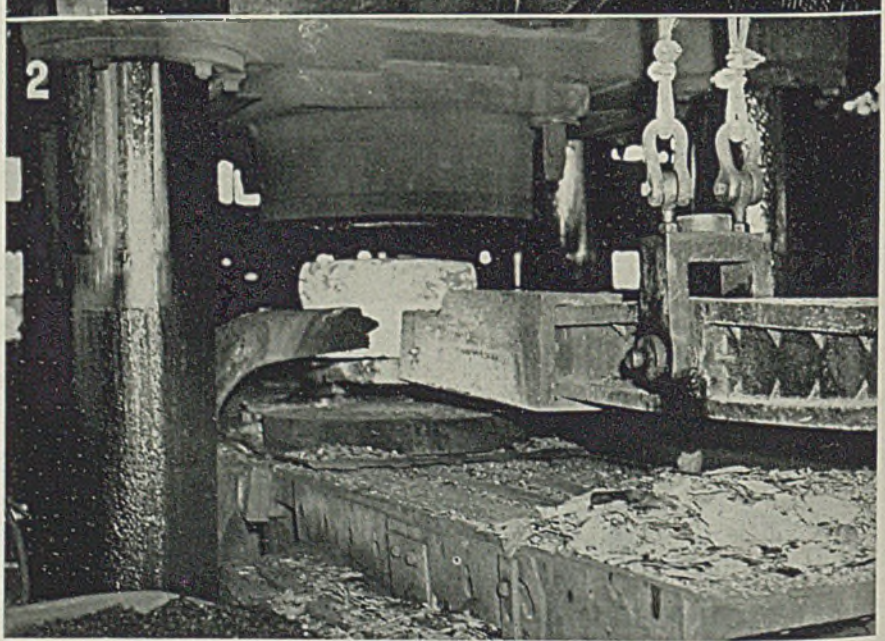
Class I railroads placed 48,769 new freight cars in service during first six months this year, according to statistics of the Association of American Railroads. About one-fourth of these were built in railroad shops.

Spectacular performance in handling the unprecedented traffic caused by the war was reported recently by M. W. Clement, president, Pennsylvania railroad. At the outbreak of the war in Europe rail transportation almost overnight jumped from near the bottom of a depression to an all-time top. Equipment that had been out of use for a decade was brought into service, on tracks that had carried no great volume of traffic in years.

Railroad officials had been preparing for increased demand for transportation and were able to assume the greater load. Immediately performance moved upward and in 1940 ton-miles increased 11.9 per cent over 1939; in 1941 the increase over 1940 was 27.3 per cent and in the first three months of 1942 the growth was 30.2 per cent. Cumulative gain in 1942 over 1939 was 85.5 per cent.

"Under the leadership of men whose names are watchwords in the industry," said Mr. Clement, "and through their association at Washington, the railroads have worked through the years keeping up morale in the industry; keeping up a relationship with labor that still is an outstanding example in that field; keeping up their public contacts individually and through shippers associa-





tions and continuing to perform better service through all that period."

First factor in enabling the roads to meet the upward surge of war transportation demand was rehabilitation of car and in 1942 there were 232,000 more in service than in 1939.

With the failure of the tanker fleet to supply the East with oil and gasoline, the railroads were called upon to resume a movement that had been dormant for years—a railroad tank car movement. Before the summer of 1941 only a negligible amount of crude oil and its products were shipped by rail to the Atlantic coast. In January, 1942, daily shipments were 100,000 barrels; for the week ended May 23, daily shipments were 706,800 barrels.

Comparing 1942 with 1939, carloadings had increased 38.2 per cent in the first four months, and ton-miles increased 86.8 per cent. The ton-miles record in 1941 was the greatest for all time, 6.2 per cent greater than the previous high, in 1929. Not only was the business greater but it was being handled with increasing efficiency. Freight locomotive miles per day increased from 104 in 1939 to 116.4 miles in 1941, tons per loaded car from 26.9 to 28.5 and tons per freight train from 813 to 915.

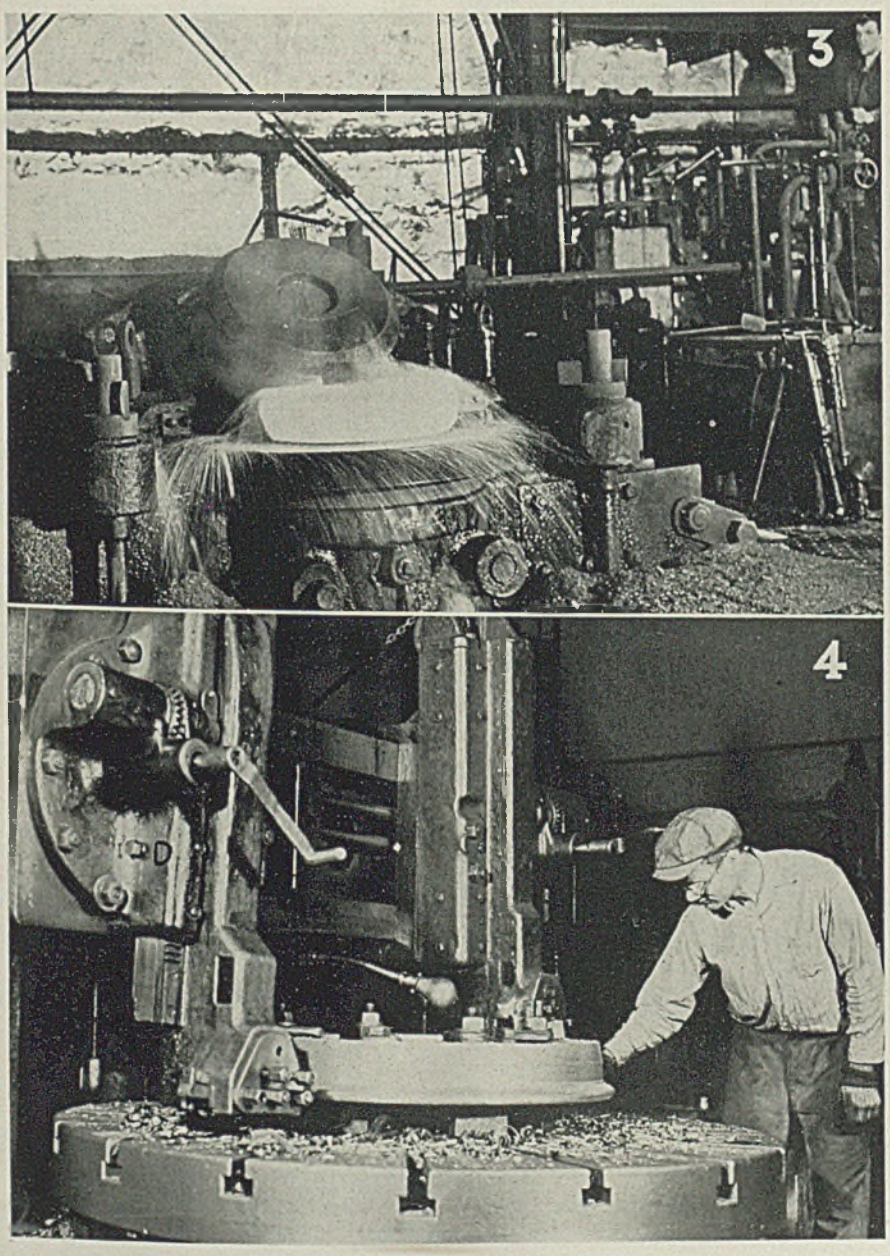
Passenger performance paralleled that in freight. An increase began at the start of the war and after Pearl Harbor an enormous movement of troops imposed a further burden. With lessened use of the automobile railroads now are handling the greatest passenger load in their history.

Freight Car Forecast Up 4.6 Per Cent for Third Quarter

Regional Shippers' Advisory Boards estimate an increase of 14.6 per cent in freight car requirements for second quarter, over actual carloadings in the corresponding quarter last year. The estimate covers 29 principal commodities, as furnished to the car service division of the Association of American Railroads.

Total car requirements for third quarter are estimated at 6,959,721, 4.6 per cent greater than actual loadings of 6,653,849 in third quarter, 1941, iron and steel products are expected to require 632,249 cars, an increase of 5.7 per cent; coal and coke, 2,654,706 cars, up 10.7 per cent; machinery and boilers, 63,118, a gain of 23 per cent. Agricultural implements and vehicles, other than automobiles, are estimated to require 20,883 cars, 22.7 per cent less than last year.

No announcement is made of requirements for transportation of ore and concentrates, chemicals and explosives, in accordance with a war-time regulation. Due to conversion of automobile plants to war production, forecasts for this division have been discontinued.



Making Railroad Tires For United Nations

Conversion to war production was completed recently by the American Locomotive Co., New York, when it reopened its seventh and last plant, at Chicago Heights, Ill., devoted 100 per cent to military or war-related products. The plant, with the exception of the spring shop, had been closed for 10 years. Locomotive and freight car wheel tires are an important product, and tires from the Chicago Heights mill are to be shipped to many of the United Nations

Accompanying photos illustrate some of the steps in manufacturing carwheel tires

Fig. 1—One of the first operations is cutting ingots into blocks on a slicing lathe. After ingots are sliced through to core, blocks are broken off with wedges. The Chicago Heights plant has three open-hearth furnaces with capacity for more than 80,000 tons of ingots annually

Fig. 2—Block of steel under 5000-ton press. It will be flattened and hole will be punched in it before it is sent to rough-shaping machine

Fig. 3—Rough shaping carwheel tire

Fig. 4—Steve Engels, a butcher until the recent reopening of the Chicago Heights mills, checks a measurement on a tire for export to one of the United Nations

Activities of Steel Users and Makers

ELECTRICAL equipment valued at several million dollars has been ordered from International General Electric Co., New York, for the new $50,000,000 mill of National Steel Co. of Brazil, now under construction at Volta Redonda, Brazil, according to Major Carlos Berenhauzer Jr., of that country's purchasing commission. Commenting on the order, Harry A. Winne, vice president of the G-E sales unit, said the company's engineers are using silver in place of tin, copper and other scarce metals in almost every motor, generator, transformer and other piece of equipment built for war use.

♦

Development of a plywood "Victory drum" for greases will enable Standard Oil Co. (Indiana) to save 2000 tons of steel per year formerly used for packaging heavy lubricants. The new drums will be made in 100-pound, 50 and 25-pound sizes. It is estimated that 40 tanks or 5000 machine guns can be made from the steel saved.

♦

Six thousand tons of steel will be conserved by using wood in the construction of five new Westinghouse war production plants, G.H.A. Parkman, of the Westinghouse Electric & Mfg. Co., reports.

♦

Plant and grounds of Pittsburgh Plate Glass Co., Kokomo, Ind., have been transferred to the General Electric Co., it is announced by M. E. Lord, manager, Fort Wayne, Ind., division of the latter company. The plant will be owned by the Navy, but will be operated by General Electric to manufacture motor and generator equipment for naval vessels.

♦

Rheem Mfg. Co. has moved its main office from Richmond, Calif., to Washington, D. C. The keel for the first of the 32 Liberty ships to be built at the company's new yards at Providence, R. I., was laid recently. In addition to its war work Rheem is maintaining its regular line of products.

♦

Weirton Steel Co., Weirton, W. Va., and Follansbee Steel Corp., Follansbee, W. Va., and their employes, have been congratulated by the British War Materials Mission, for completing a one-year allocation of tin plate for the British Empire. A letter from David E. Scott, representing the Mission, to each of the companies states: "The performance of your company in this program has been 100 per cent."

♦

Link-Track Engineering Co., Chicago, has purchased from the RFC at auction Durbin Malleable Casting Co., Evansville, Ind. Claude Rorabeck, president of Link-Track, states $150,000 will be spent for new equipment, including electric furnaces. Link-Track manufactures track links for tractors and tanks. Receipt of more than $4,000,000 in war orders necessitated substantial expansion, and recently the company purchased a foundry in Vincennes, Ind.

♦

Central Illinois Co., Chicago, has acquired the stock of Strong, Carlisle & Hammond Co., Cleveland, wholesale machine tool and mill supply concern for about $1,750,000. G. J. Zimmerman, president, has been inactive for some time because of illness. Russell C. Feldman is head of the Central Illinois Co.

♦

Atha works of Crucible Steel Co. of America, Harrison, N. J., is planning to hire women as war production inspectors to replace men called to arms or those who are used in more important work, according to E. A. Van Cleve, manager.

♦

J. B. Klein Iron & Foundry Co., Oklahoma City, Okla., has changed its name to Robberson Steel Co. Management and personnel remain unchanged.

♦

Lo-Hed Hoist Division of American Engineering Co., Philadelphia, has appointed Eiler Equipment Co., Minneapolis, representative for Lo-Hed electric hoists.

♦

United Hoisting Co. Inc. has moved its offices and plant to new quarters at 5 West Sheffield avenue, Englewood, N. J.

♦

Republic Coal & Coke Co., Chicago, has opened a district sales office in the Union Trust building, Cincinnati, with Ray T. Patton in charge as district manager.

♦

Candler-Hill Corp., Detroit, has moved from 2200 Eighth street to new quarters at 405 Midland avenue.

♦

Scully Machinery & Equipment Corp., Chicago, has been formed to take over the used and rebuilt foundry equipment business of Scully-Jones & Co., Chicago. J. A. Scully, president of Scully-Jones, will also serve as president of the used machinery firm, and R. P. Scully, formerly vice president of Scully-Jones, will act as vice president and sales manager of the new organization, which will be located at 2031 West Seventy-fourth street.

♦

Fostoria Pressed Steel Corp., Fostoria, O., is celebrating its twenty-fifth anniversary. Organized in 1917, during the

Scoreboard Reminds Workers of Scrap Loss

Workers at Greenfield Tap & Die Corp., Greenfield, Mass., follow day-by-day progress of the company's war production drive on a novel, glass-enclosed scoreboard erected at the plant's entrance. Each day's output pushes a shell from an antiaircraft gun closer to the targets—three planes labeled Hitler, Mussolini and Hirohito. Board also serves as a reminder that scrap spoilage hinders production. A second shell, labeled "misses," shows how much nearer the target production could be if scrap loss were reduced

first World War, the company now is engaged entirely in war production, lighting facilities for more efficient work in war plants. In observance of the occasion a brochure has been issued calling attention to services the company is ready to provide for expediting output through better illumination.

♦

Pittsburgh branch of York Ice Machinery Corp., York, Pa., is now located in the Hostetter building, 7 Ferry street.

♦

Doehler Die Casting Co., Toledo, O., has been awarded the Army-Navy Production Award with Star for especially meritorious production of war materials. L. H. Pillion, vice chairman of the board, announced last week.

♦

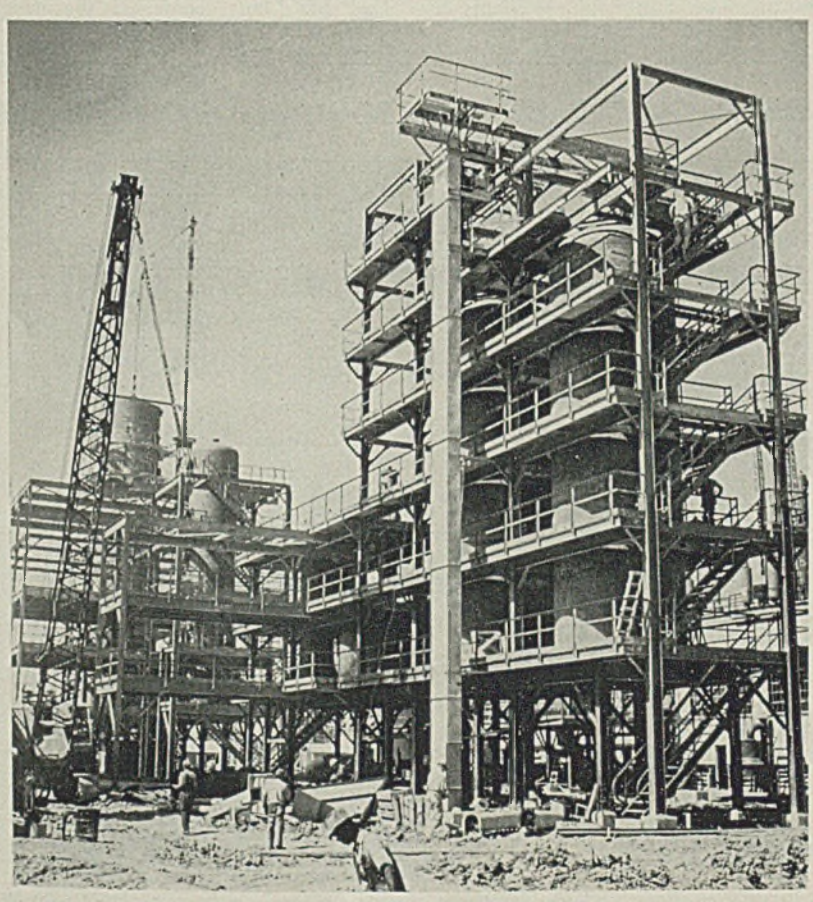
Buda Co., Harvey, Ill., has opened a new plant for building diesel and gasoline engine generator units, to be known as its Diesellight division. R. K. Mangan, executive vice president, states the addition will more than double output of engine generator units. Between 200 and 350 workers will be employed.

Abrasive Tool Co. Names New Eastern Dealers

Abrasive Machine Tool Co., East Providence, R. I., has completed arrangements for sale of its grinders in the area formerly served by Henry Prentiss & Co., who have retired from business.

Russell, Holbrook & Henderson, 99 Hudson street, New York, will cover the metropolitan area, northern New Jersey and eastern New York state, including Schenectady. C. H. Briggs Machine Tool Co., Onondaga Hotel building, Syracuse, N. Y., will be in charge of territory adjacent to that city. George Keller Machinery Co., 1807 Elmwood avenue, Buffalo, N. Y., will serve the Buffalo-Rochester district. Motch & Merryweather Machinery Co., Penton building, Cleveland, has been assigned Erie county, Pennsylvania, in addition to their regular territory. Swind Machinery Co., Philadelphia, will add to their usual coverage several northern Pennsylvania counties. The New England area will, for the present, be handled from company's home office.

Synthetic Rubber Process Requires Large Plant



New Butadiene plant being built for Standard Oil Co. of New Jersey, shown in accompanying photograph, gives some idea of the quantity of steel and massive equipment necessary for production of raw material to make this synthetic rubber. Similar plants, locations a military secret, are being constructed in various parts of the country. Butadiene is one of the basic petroleum by-products converted into Buna-S and Buna-N rubber to fill the requirements of the armed forces and possibly some essential civilian needs. Wide World photo

Employers Want to Sell Tools to Employes

CHICAGO

Many Illinois manufacturers producing war material are experiencing difficulty in selling tools to employes as result of a bill passed by the last Illinois General Assembly prohibiting sale by an employer of any article not produced or handled by the employer in the regular course of trade. The measure was designed in the interest of retailers.

It has been the custom in times past for employers to buy tools at cost for their employes and the inability to do so now has created complications in the extraordinary efforts by Illinois manufacturers to produce more war materials. An effort is being made by a committee of the Illinois Manufacturers' Association to obtain relief from the prohibitive effect of the law with respect to tools, and a conference has already been held with Attorney General Barrett to obtain his co-operation. If nothing else can be done, the association will sponsor an amendment which will permit the sale of tools to employes.

Mining Directory of Minnesota Is Issued

Institute of Technology, University of Minnesota, has issued the twenty-third edition of the *Mining Directory of Minnesota*. It contains maps giving names and locations of all operating mines, reserve properties and mines that have been exhausted. It lists beneficiating plants that have shipped ore or are on tax records as containing ore.

Another section lists names of mining companies and holding organizations identified with Minnesota iron ranges, officials, subsidiaries and properties in which they are interested.

The volume also contains general statistics of the iron ore industry. Several pages are devoted to names, addresses and business connections of men associated with mining in Minnesota.

Col. R. H. Morse, president and general manager, Fairbanks, Morse & Co., has contributed funds for construction of a hospital and nurses training school in Beloit, Wis., by the John Morse Memorial Foundation, established in memory of his son, John Morse, 25, who was killed in an automobile accident in San Rafael, Aug. 22, 1941.

"Employes' Suggestions So Obvious We Should Have Thought of Them"

MANY improvements in plant operations suggested by employes of the Cooper-Bessemer Corp., Mt. Vernon, O., in labor-management conferences "seem so obvious to us that we wonder why we had not thought of the improvements before," B. B. Williams, president, said last week.

Company in one month after the inauguration of the labor-management cooperation plan received 36 definite suggestions. Seven of these immediately were put into effect.

"One of the most important of these suggestions had to do with the milling out of 'windows' in the heads of large steel connecting rods for gas engines," said Mr. Williams. "The connecting rod is a rather formidable piece of metal about three feet long and seven inches thick.

"In milling a window in the end of the rod we take out a piece of metal sometimes as much as a foot wide. This is a heavy piece of metal and is awkward to handle because it usually drops out and has to be picked up again.

"To solve the difficulty, one of our workmen suggested that before we begin the boring operation we screw an eyebolt in the metal so it could be handled by a crane.

"When this was done and the boring operation completed, the crane carried the metal away and eliminated the problem of the metal falling on the floor and having to be lifted and moved by hand.

"The improvement was a simple thing to make, but it saved us valuable time. Our management could have thought of it. This is no reflection on anyone, for some of the greatest inventions have seemed ridiculously obvious after they are conceived. It only goes to show the great value of labor-management cooperation."

Workers Hesitate

One problem in the labor-management consultations is the hesitancy of many workers to make suggestions, Mr. Williams pointed out.

"The workman in the factory is not always the most outspoken individual. He is accustomed to keeping his thoughts to himself, and going about his business without talking very much about it.

"In our conferences, with labor representatives sitting across the table from company officials, we have constantly to tell the workers to 'take your hair down and tell us all you know.'

"The attitude of one worker in our labor group is probably indicative of the feeling of many employes. He had been letting himself talk freely for several minutes and then suddenly reflected that he had never been so free with his boss before in his life. . . .

"It took a great deal of persuading to keep him talking. He had years of experience in our plant behind him. Except for the stimulating appeal to his patriotism and for the fact that we, the management, were listening to him intently, he might never have brought his valuable store of ideas out of his subconscious mind."

In carrying out the demands of the War Production Board, Mr. Williams said the plant's production must be increased 50 per cent within the next three months and 100 per cent within six.

The corporation is receiving large government orders for diesel engines and air compressors.

The labor-management co-operative effort is under the direction of a general committee headed by L. F. Williams, a director. Three special committees at the Mount Vernon plant are responsible to the general committee.

A production committee analyzes bottlenecks which occur in production, and relieves them by improved scheduling, routing, subcontracting and more efficient use of plant facilities.

A suggestions committee gives encouragement to every worker to express his ideas for improved operation.

V-for-victory committee is setting up, in a graphic manner, "thermometers" and other devices to show employes how much of their efforts are reflected in results.

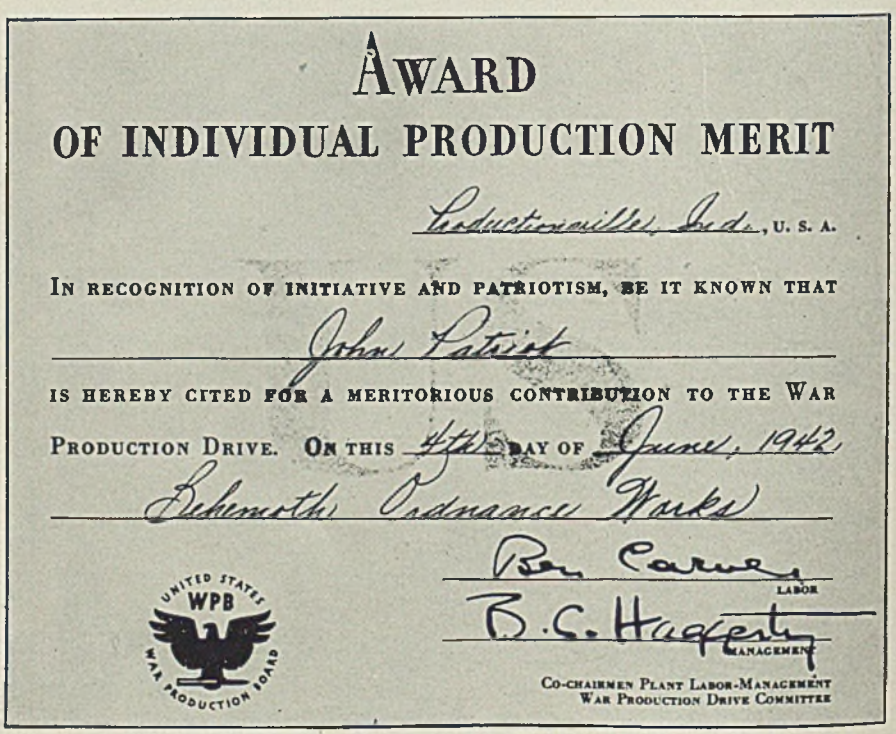
Workers Rewarded for Ideas With Certificates of Merit

First two awards of individual production merit to be reported to WPB were announced recently.

Awards are given for what has been termed "America's secret weapon"—the ideas of men in the plants for the improvement of quality or the increase of war production.

The labor-management committee in the Busch-Sulzer Bros.-Diesel Engine Co., St. Louis, conferred the awards

"John Patriot" Is Cited for Meritorious Contribution



AWARD
OF INDIVIDUAL PRODUCTION MERIT

Productionville, Ind., U. S. A.

IN RECOGNITION OF INITIATIVE AND PATRIOTISM, BE IT KNOWN THAT

John Patriot

IS HEREBY CITED FOR A MERITORIOUS CONTRIBUTION TO THE WAR PRODUCTION DRIVE. ON THIS 4th DAY OF June, 1942

Behemoth Ordnance Works

Ben Carver
LABOR

B. C. Hagerty
MANAGEMENT

UNITED STATES WPB WAR PRODUCTION BOARD

CO-CHAIRMEN PLANT LABOR-MANAGEMENT WAR PRODUCTION DRIVE COMMITTEE

War Production Board established three awards for workers in war plants who suggest or devise means for increasing production. "Award of Individual Production Merit", specimen of which is reproduced above, is the first of the three. This is given to any worker at the discretion of the labor-management plant committee. Second in ascending scale of importance is "Certificate of Individual Production Merit" which will be issued by War Production Drive Headquarters, Washington. Third is the "Citation of Individual Production Merit" for an outstanding effect on the entire war effort, to be signed by Donald M. Nelson, WPB chairman

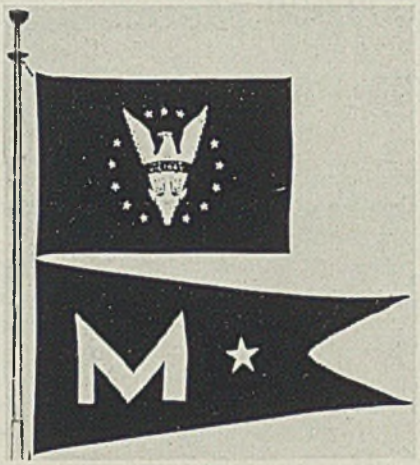
on Clarence H. Howdeshell, a machinist in the hoist plant, and Milton Carr, an inspector in the diesel shop. Each man submitted suggestions that increased the plant's efficiency.

Howdeshell's suggestion concerned an improved method for machining hoist parts which enabled four pieces to be finished in the time formerly required for one. His suggestion also improved the quality of the product and eliminated a source of rejection by the inspectors thus effecting a further saving in man-hours and valuable material.

Mr. Carr suggested a new and safer method of handling large diesel engine crankshafts to prevent damage to delicate bearing surfaces. Damage to a finished crankshaft involves the loss of from 300 to 400 man-hours of highly skilled labor and several thousand pounds of nickel steel, amounting to more than $4000 in cost.

Victory Fleet Pennants Fly Over Seven Shipyards

Maritime Commission's "M" burgee, the Victory fleet pennant and the employes' insignia were presented to Bethlehem-Fairfield Shipyard Inc., Baltimore, July 25 by Rear Admiral Emory S. Land, chairman of the Maritime Commission. T. S. McElroy, yard manager, received the flags and B. T. Manor, representing the employes, received the token button.



This flag and pennant are flown in shipyards and plants which have done outstanding work on the merchant marine Victory fleet. All co-operating yards and plants may fly the Victory fleet flag, (at top of staff) but only those meeting rigid requirements of the Maritime Commission are awarded the "M" pennant. The pennant is awarded for a six months period, during which the recipient must qualify to retain it. If lost for a period a yard may regain it for another period. With the second and subsequent awards go additional gold stars

Later each executive and worker was given a button. Workers took an hour off for the ceremonies.

Liberty ship JOHN P. POE was launched, the forty-sixth from this yard. Construction of the yard was started less than 18 months ago and the first keel was laid April 30, 1941, the first launching being five months later. The yard has been given orders for 248 vessels to be delivered before the end of 1943. The best record so far made is 51 days from keel to launching and a hull has been outfitted in 11 days, compared with 94 days required for the first vessel. The yard employs about 30,000 men, most of whom never had seen the inside of a shipyard before starting work there.

The "M" pennant and merit insignia badges have been awarded to six other yards and plants and their employes, in addition to Bethlehem-Fairfield. They are: Oregon Shipbuilding Corp., Portland, Oreg.; California Shipbuilding Corp., Wilmington, Calif.; Permanente Metals Corp. (Richmond Shipyard No. 1), Richmond, Calif.; General Machinery Corp., Hamilton, O.; Joshua Hendy Iron Works, Sunnyvale, Calif.; Webster - Brinkley Steering Co., Seattle. Oregon Shipbuilding Corp. has received an additional gold star for a second period of meritorious performance.

American shipyards made a new record in July when 71 ships of 790,300 deadweight tons were delivered to the Maritime Commission, four more than in June. This included 52 Liberty ships, eight cargo carriers for Great Britain, six tankers, two C-1, two C-2 ships and a Great Lakes ore carrier.

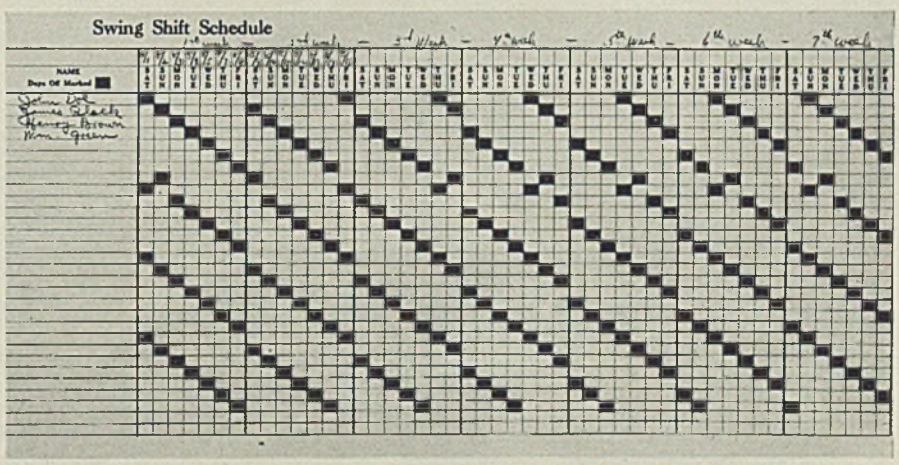
Foreman's Chart Solves Week-End Absentee Problem

An "Alternating Swing Shift" plan that requires 28 men for every 24 jobs has resulted in a 75 per cent reduction in week-end absenteeism at the plant of Ohio Crankshaft Co., Cleveland.

Prior to its recent introduction the time lost because of week-end absenteeism was excessive, as high as 796 hours being recorded over one Saturday and Sunday, equivalent to 25 per cent loss of man-hours for the total working force that week-end. Layoffs resulted from the general inclination to remain out over the "holidays", despite urgent demand for production. But now the problem is believed to be practically solved. Production has improved; trend of rejections is sharply downward.

The system was devised by G. P. Adams, general foreman on the night shift, who through working with plans for control of work and materials became expert in devising charts to define future course of action.

It applies to hourly rate men, and to a three eight-hour shift basis. It provides for the workers in the aviation division one full day of rest in seven. Each man knows in advance his day off, which occurs on a different day each week. A schedule is posted for a cycle of seven weeks.



Black squares on "Alternating Swing Shift" chart indicate days off. Illustration shows only a portion of the sheet, which in the example referred to has spaces for 66 names

Weeks commence on Saturdays. A black square in the chart indicates a day off, and it will be noted that the position of these squares extends backward through the weeks. For example, a Saturday off is followed next week by a Friday, instead of a Sunday.

The four extra men in the 28 are "top" operators—familiar with all machines in their groups. They go from one job to another during the cycle of seven weeks, filling the spots left vacant by men on "off-days".

Canada Votes $3,000,000,000 More; Aims at 500 Tanks, 800 Planes Monthly

TORONTO, ONT.

PARLIAMENT has voted $3,000,000,000 additional for the Dominion's war effort and the munitions and war industry is at the threshold of new achievements. War expenditures in Canada during 1941 totaled approximately $2,300,000,000, more than double those of 1940. In the four years of the first World War such expenditures were $1,025,000,000.

C. D. Howe, Minister of Munitions and Supply, reviewing plans for the next few months, stated that before the end of the year Canada will be building 500 tanks per month, most of which will be of the ram type. He stated eastern Canada has the second largest tank-building plant in North America.

The airplane industry before the end of the year will switch from training to combat planes, for which plants have been tooling up for some time, with output of about 800 planes per month. Mr. Howe said that 70 per cent of munitions production now is going to the fighting fronts. Though the raw material situation is difficult, no plant yet has been forced to slow down production schedules because of shortage. Canada provides about two-thirds of her steel requirements and imports the remainder.

Fairchild Aircraft Ltd., Longueuil, Que., has been licensed to build the new Curtis "Helldiver" bombers for the United States Navy. Canadian Car & Foundry Co. Ltd., Montreal, has received orders for more than 1000 of them. It is stated engines for these planes will be provided by the United States.

Change Steel Practice

To conserve Canada's diminishing supply of tungsten, molybdenum and vanadium, the Department of Munitions and Supply has ordered producers and consumers of high-speed steel to make changes in practice. The new order defines two classes of these steels, class A all alloy steels containing not less than .55 per cent carbon, more than 3 per cent molybdenum and 7 per cent or less tungsten. Class B includes those with less than .50 per cent carbon and more than 12 per cent tungsten. Supply of class B steel to a consumer can not be greater than one-third by weight of class A used in the same period, and total may not exceed half the average monthly quantity used during the year ended June 30, 1942.

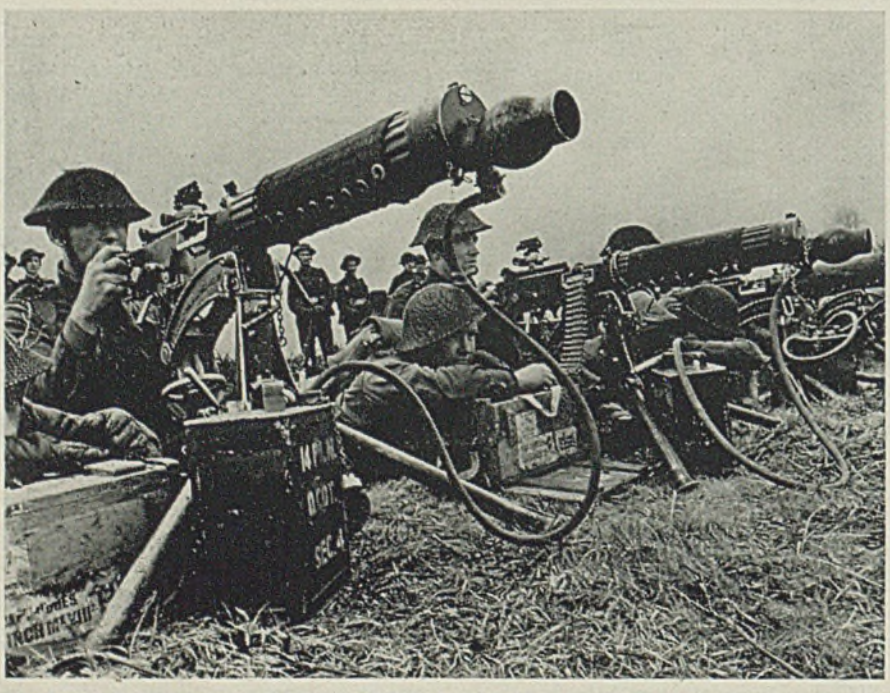
Consumption of strategic metals in Canada is spurring search for new sources and special courses have been initiated to inform prospectors concerning needed metals and their identification. Geological experts are being sent into the field to assist prospectors. Development of marginal and submarginal properties is being studied.

Gages and cutting tools no longer may be purchased from suppliers outside Canada, except by permit from the director general of gages and cutting tools production branch of the Department of Munitions and Supply. The government-owned company, Cutting Tools & Gauges Ltd., is now prepared to satisfy domestic demand.

Provincial government of Manitoba last week announced that Canadian women would be employed in mining industries to prevent reduction in output of strategic metal ores, due to an expected shortage of manpower. An official of the mining department said the Mines Act had been amended to permit the action, first of its kind in the province.

Mining firms employing women must first satisfy the mine branch that their assignments will be above ground, on suitable shifts and that they will have proper facilities. The heavier types of work will continue to be handled by men.

Fabric Over Steel Protects Heads and Hands



Canadian troops practicing with Vickers machine guns in Great Britain. Fabric jacket on gun protects gunner's hands when he carries the barrel, heated from firing. Fabric mesh on steel helmets serves dual purpose, reducing heat generated by sunlight, and holding leaves or grass for camouflage. Photo passed by Canadian censor

Plan To Display Useful By-Products of War Plants

By-products of material used in manufacturing plants, especially those in war production which are now considered waste, may be displayed in an exhibition proposed by the Committee of Adjustment to War Conditions of the Illinois State Council of Defense, Chicago.

Charles M. Thompson, dean of the College of Commerce, University of Illinois, is chairman of the committee, and working with him are six advisory committees composed of 100 industrial experts.

It is estimated that there are possibly 50 by-products of various waste war materials, with exception of metals, which have new usefulness under present conditions. Including wood, stone and glass, many of these materials are serving where metals formerly were used.

The plan is to assemble this so-called waste material for the benefit of manufacturers who on account of the priorities situation cannnot find material to continue in business. Date and place for the exhibit have not been announced.

Index of Activity Advances to New Peak

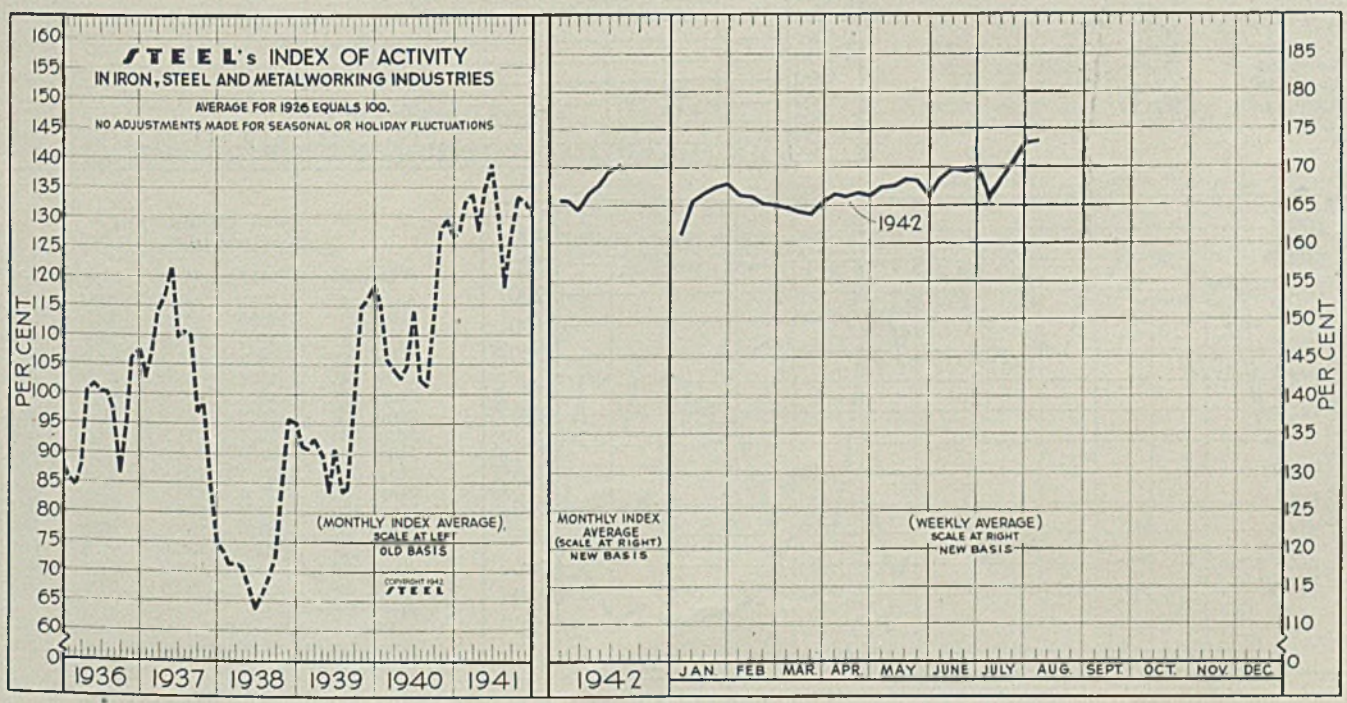
EXCLUDING the temporary dip recorded during the Fourth of July holiday week, STEEL's index of activity in the iron, steel and metalworking industries moved steadily upward throughout the past month. The weekly index averaged 170.4 during July, compared with 169.4 in the preceding month. Currently it is at a new all time peak.

During the latest week ended Aug. 1 the index advanced 0.3 point to 173.3, reflecting gains in revenue freight carloadings and electric power consumption. This represents the fourth consecutive weekly increase recorded by the index.

Necessary open-hearth furnace repairs during the week ended Aug. 1 forced a decline of one-half point in the national steel rate to 98 per cent of capacity. Steel scrap collections are improving somewhat and are slightly more than necessary to sustain the current steel ingot output. However, steel producers report scrap stocks at dangerously low levels, and every effort to accumulate material has failed. Because of this situation some observers anticipate a somewhat lower level of steel operations through the winter months.

Electric power consumption again advanced during the latest period to reach a new peak of 3,469,146,000 kilowatts. This represents a gain of 11.8 per cent over that recorded in the like 1941 week and compares with output of 3,625,645,000 in the week of July 25.

Freight carloadings recorded a slight improvement during the week ended Aug. 1, totaling about 860,000 cars compared with 855,522 during the preceding week and 883,065 in the like 1941 period.



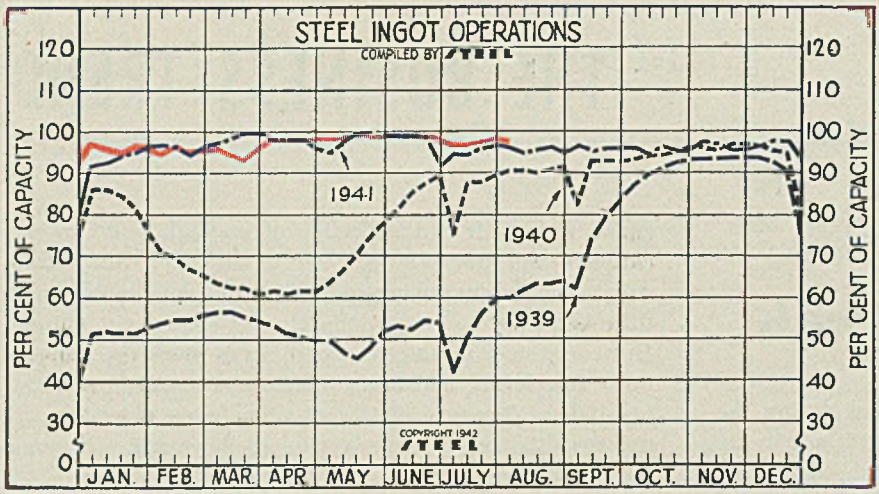
STEEL's index of activity gained 0.3 point to 173.3 in the week ending Aug. 1:

Week Ended	1942	1941
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	171.6	133.2
July 25	173.0	132.9
Aug. 1	173.3†	123.3

†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	170.4	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

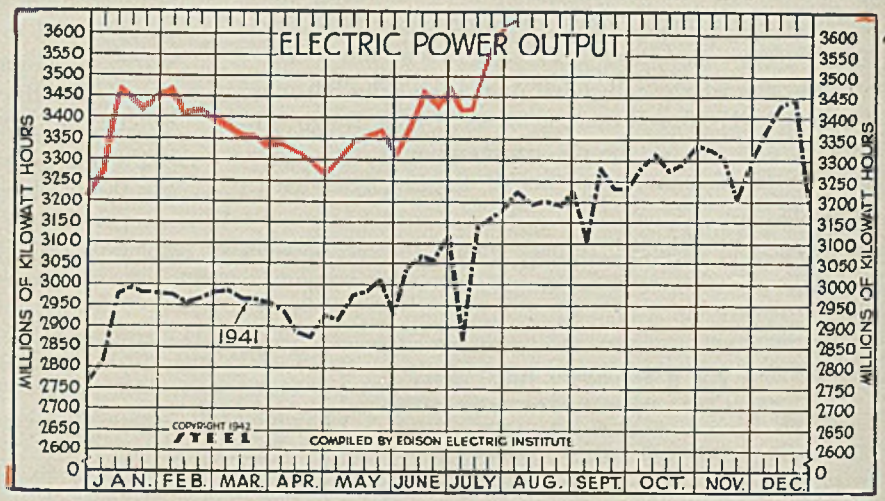
(Per Cent)

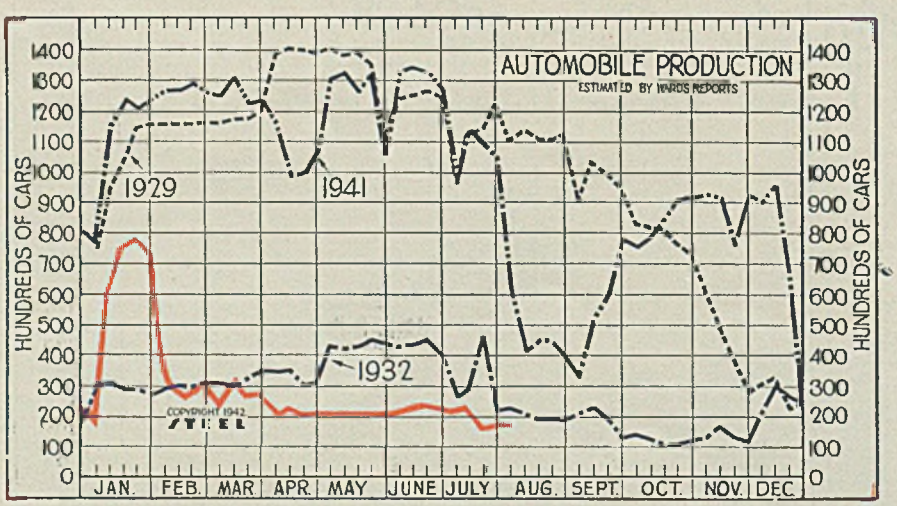
Week ended	1942	1941	1940	1939
Aug. 1....	98.0	97.5	90.5	60.0
July 25....	98.5	96.0	89.5	60.0
July 18....	98.0	95.0	88.0	56.5
July 11....	97.5	95.0	88.0	50.5
July 4....	97.5	92.0	75.0	42.0
June 27....	98.5	99.5	89.0	54.0
June 20....	99.0	99.0	88.0	54.5
June 13....	99.0	99.0	86.0	52.5
June 6....	99.0	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

Electric Power Output

(Million KWH)

Week ended	1942	1941	1940	1939
Aug. 1.....	3,649	3,226	2,762	2,400
July 25.....	3,626	3,184	2,761	2,427
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





Auto Production

(1000 Units)

Week ended	1942	1941	1940	1939
Aug. 1....	18.3	62.1	17.4	28.3
July 25....	18.3	105.6	34.8	40.6
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

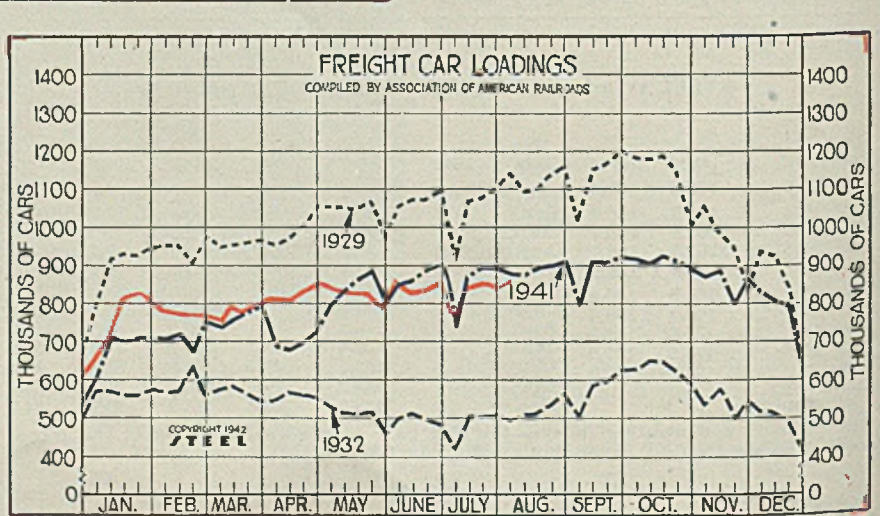
Figures since Feb. 21 last include Canadian trucks and automobiles and United States trucks.

Freight Car Loadings

(1000 Cars)

Week ended	1942	1941	1940	1939
Aug. 1.....	830†	883	718	661
July 25.....	856	897	718	660
July 18.....	857	899	730	656
July 11.....	855	876	740	674
July 4.....	759	741	637	559
June 27.....	853	909	752	666
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

†Preliminary.

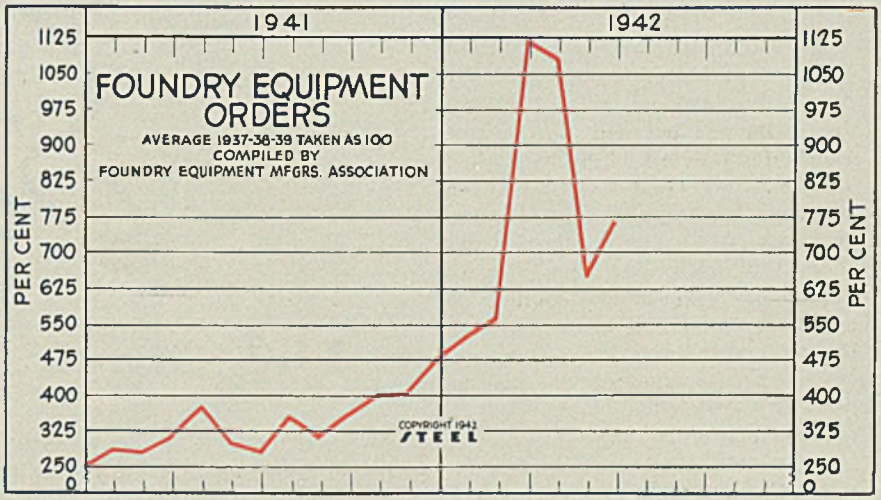


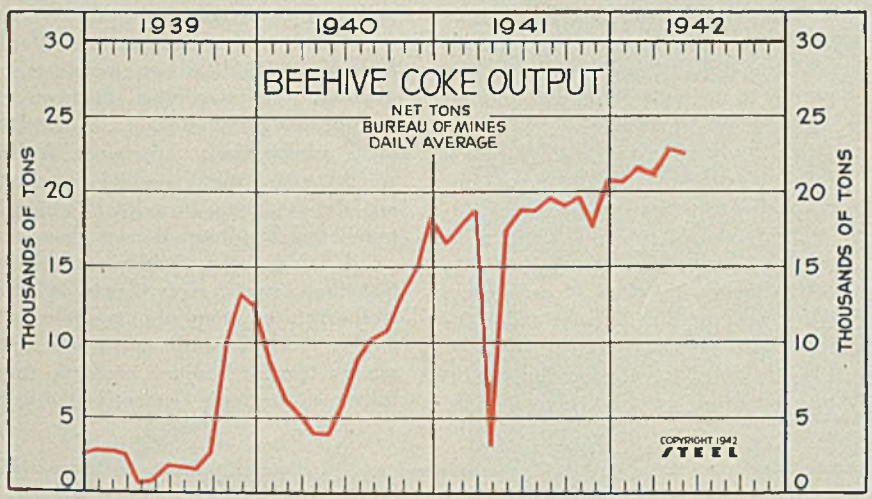
Foundry Equipment Orders

Monthly Average

(1937-38-39 equals 100)

	1942	1941	1940
Jan.	532.7	285.3	149.0
Feb.	567.9	281.1	135.7
March	1122.4	315.2	183.2
April	1089.3	377.2	145.2
May	653.6	298.7	129.1
June	774.0	281.1	164.9
July	....	358.1	194.4
Aug.	....	312.9	165.4
Sept.	....	363.8	161.2
Oct.	....	403.8	264.0
Nov.	....	408.5	254.2
Dec.	....	481.2	257.8
Year	....	345.6	184.0





Beehive Coke Output

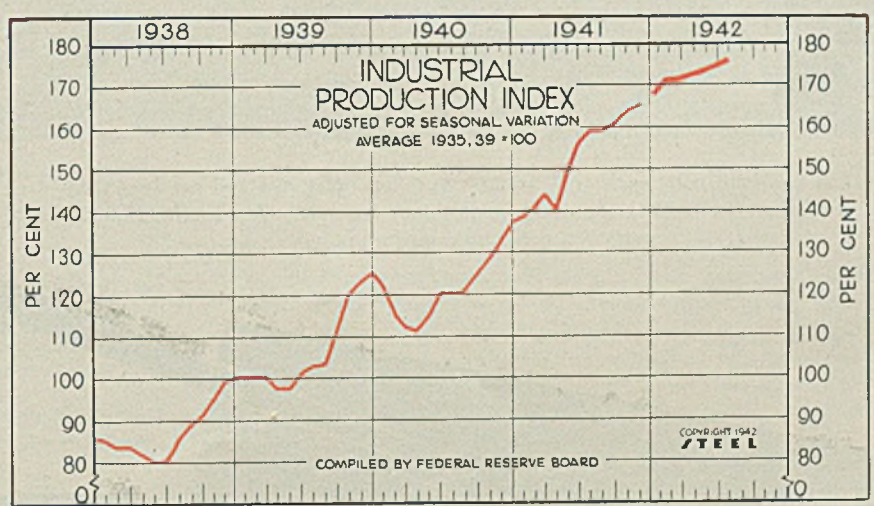
(Daily Average)

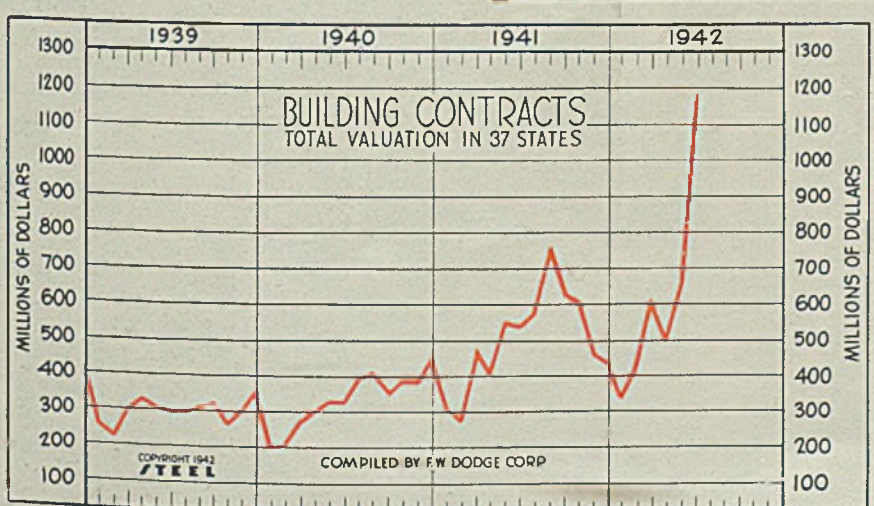
	1942	1941	1940	1939
Jan.	20,874	16,581	8,826	2,973
Feb.	21,771	17,729	6,212	2,954
March	21,032	18,890	5,196	2,544
April	22,571	3,100	3,938	796
May	22,487	17,458	3,930	919
June	.....	18,803	6,036	1,992
July	.....	18,655	8,877	1,852
Aug.	.....	19,697	10,293	1,633
Sept.	.....	19,133	10,872	2,892
Oct.	.....	19,768	13,441	9,831
Nov.	.....	17,727	15,138	13,315
Dec.	.....	20,968	18,516	12,544
Total	.....	17,402	9,256	4,498

Industrial Production
Federal Reserve Board's Index

(1935-39 = 100)

	1942	1941	1940	1939	1938
Jan.	171	139	122	102	86
Feb.	172	141	116	101	84
March	172	143	112	101	84
April	173	140	111	97	82
May	174	150	115	97	80
June	177	157	121	102	81
July	...	160	121	104	86
Aug.	...	160	121	104	90
Oct.	....	163	129	121	95
Nov.	...	168	133	124	100
Dec.	...	167	138	126	101
Year Ave	....	154	122	108	88





Construction Total Valuation In 37 States

(Unit: $1,000,000)

	1942	1941	1940	1939	1938
Jan.	$316.8	$305.2	$196.2	$251.7	$192.2
Feb.	433.6	270.4	200.6	220.2	118.9
Mar.	610.8	479.9	272.2	300.7	226.6
April	498.7	406.7	300.5	330.0	222.0
May	1190.3	548.7	328.9	308.5	283.2
June	.....	539.1	324.7	288.3	251.0
July	.....	577.4	398.7	299.9	239.8
Aug.	.....	760.3	414.9	312.3	313.1
Sept.	.....	623.3	347.7	323.2	300.9
Oct.	.....	606.3	383.1	261.8	357.7
Nov.	.....	458.6	380.3	299.8	301.7
Dec.	.....	431.6	456.2	354.1	389.4
Ave.	.....	$500.6	$333.7	$295.9	$266.4

Safe and

The Mark of the Aircraft

A MODERN bomber roars across the field, whips into a climb with the speed and agility of a pursuit ship, banks over and away . . . . safe and sound. But safe and sound through forethought, for every part of this complicated structure has been inspected—gaged, measured and checked, then double checked—to eliminate flaws, however minute. Nothing is too small to be neglected. Any one of thousands of unimportant details on the ground may become the margin between life and death of a crew when the pilot calls for performance in the air.

To be sure he gets what he calls for, a corps of inspectors at the Glenn L. Martin Co. oversees every part and manufacturing operation on this mighty bomber, from the raw material stage until its take-off.

The aircraft inspector is a symbol of airworthiness and the excellent manufacturing standards required to attain it. So much depends on airworthiness—the aviator's success, the tide of battle—the fate of a nation perhaps. In the performance of this duty the inspector is a middle man. He seeks, and gets, co-operation from every man who makes an aircraft part—from the foreman, the management, the subcontractor. The customer, too, is an advocate of the inspector; indeed, he has his own inspectors as a triple-check. The inspector guarantees the quality of little things as well as big ones. Every man in the Glenn L. Martin Co. backs the inspectors to the limit. Nothing is allowed to interfere with safety.

Aircraft inspectors are highly trained technicians skilled in the diverse jobs performed by the craftsmen in their industry. At the Martin Co. 2000 or so inspectors help to lift workmanship onto a steadily improving plane of excellence. Every one of the 25,000 parts and 300,000 or so rivets which add up to make a B-26 medium bomber is scrutinized by these men, whose edict is, "It's got to be right." Their eyes are keen, their instruments and gages and scales measure precisely, their knowledge of materials and their properties are broad.

A random trip through the Martin factories at Middle River emphasizes the importance of inspection. First we see the incoming raw stock . . . .metal of many compositions and shapes, leather, wood, resin, plastics—which constitute just the beginning of a list of materials numbering hundreds. We see mounds of small parts, subassemblies, barrels of fastenings, rivets, screws, nuts, bolts. A well-organized group of men—skilled, scientific, exacting—study micro and X-ray photos, test for hardness, strength; carefully measure each element in the basic

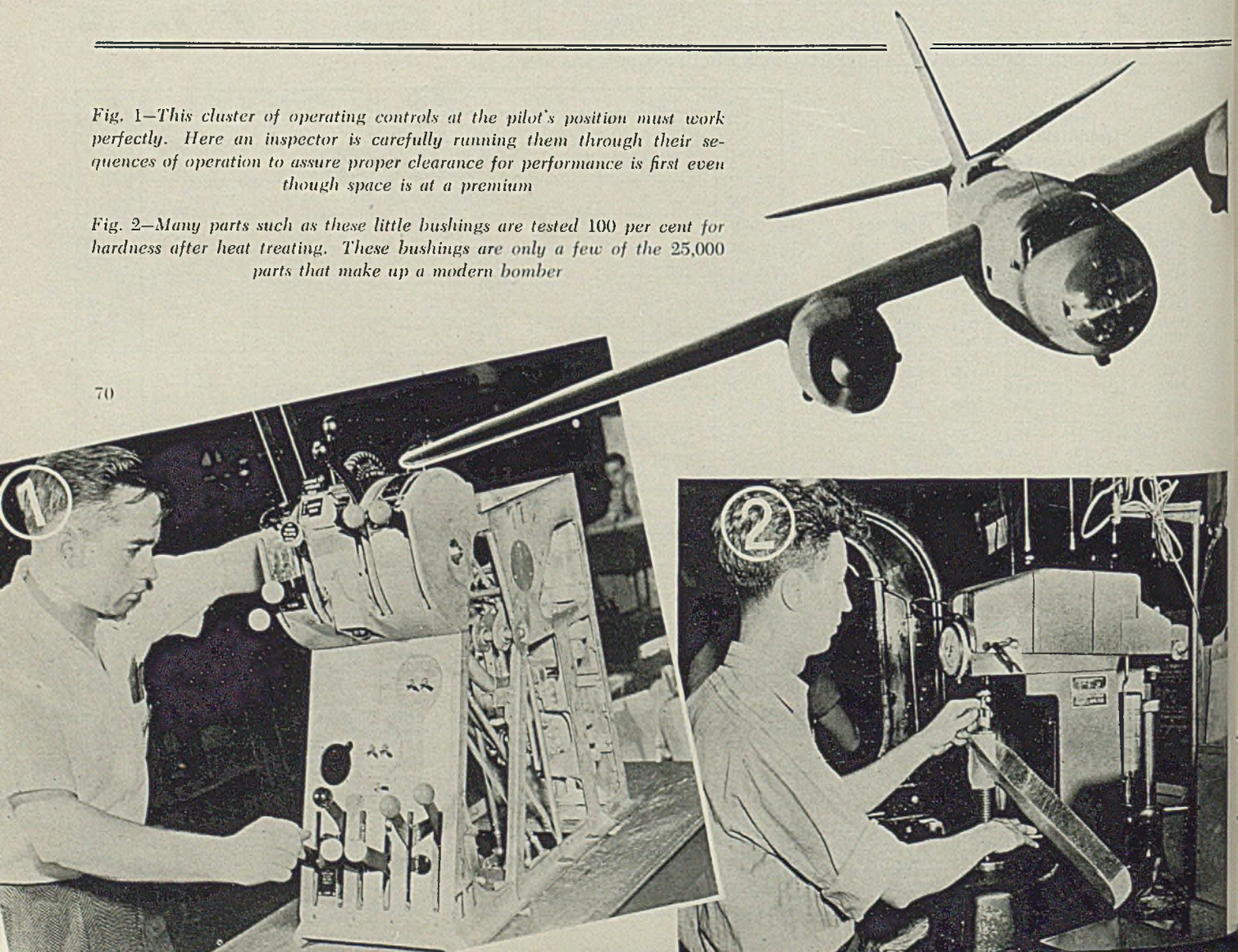


Fig. 1—This cluster of operating controls at the pilot's position must work perfectly. Here an inspector is carefully running them through their sequences of operation to assure proper clearance for performance is first even though space is at a premium

Fig. 2—Many parts such as these little bushings are tested 100 per cent for hardness after heat treating. These bushings are only a few of the 25,000 parts that make up a modern bomber

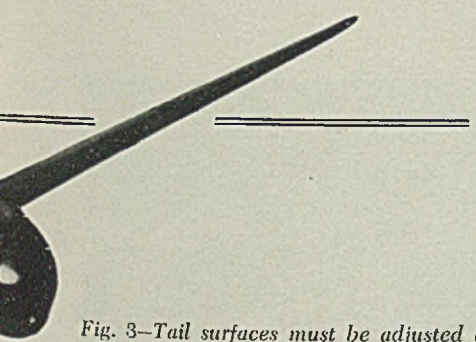
Sound....

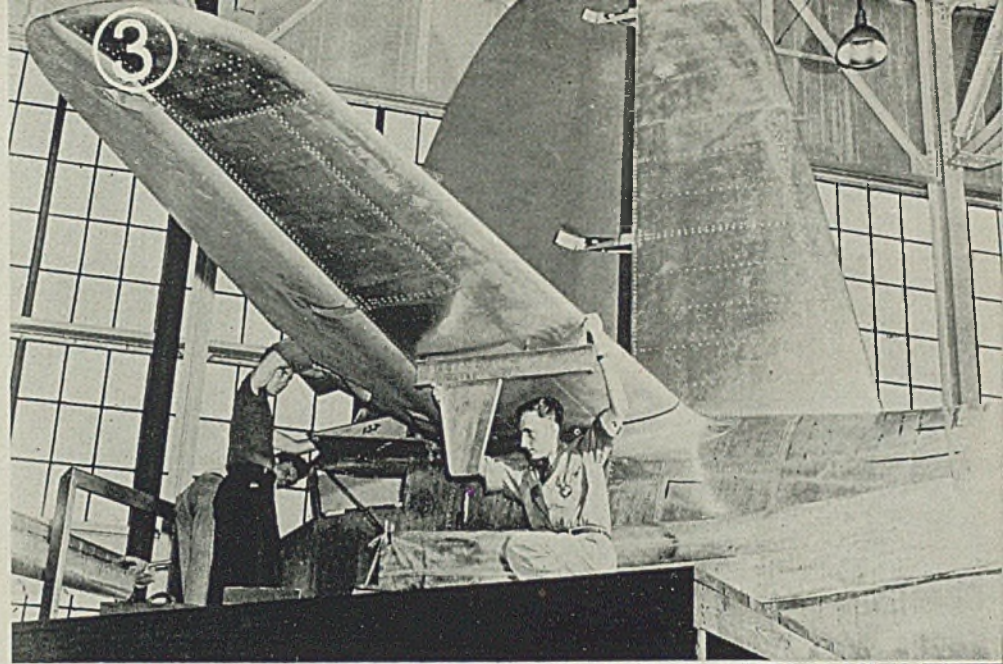
Inspector

quality of the incoming aluminum alloy materials. They are inspectors of raw stock. Further along the production line we see the same meticulous care exercized on machine fittings.

Highly stressed structural subassemblies are carefully inspected for flaws. The engine mount, a cluster of ingeniously welded chromium-molybdenum steel tubes—marvelously light and strong, designed to support more than 28 times its weight against the shock and fatigue loads of an engine weighing over a ton —is magnetized to detect minute cracks

(*Please turn to Page* 102)





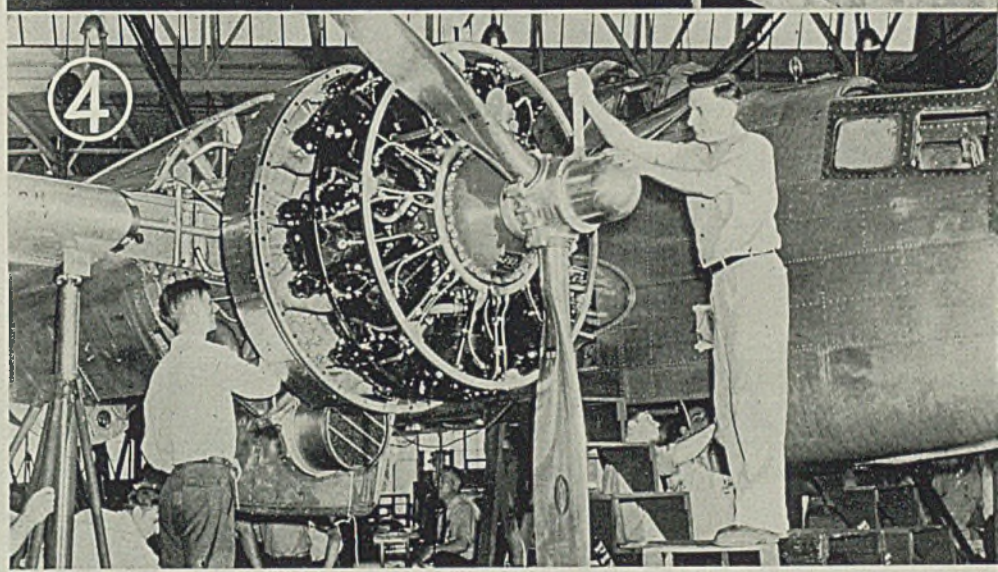
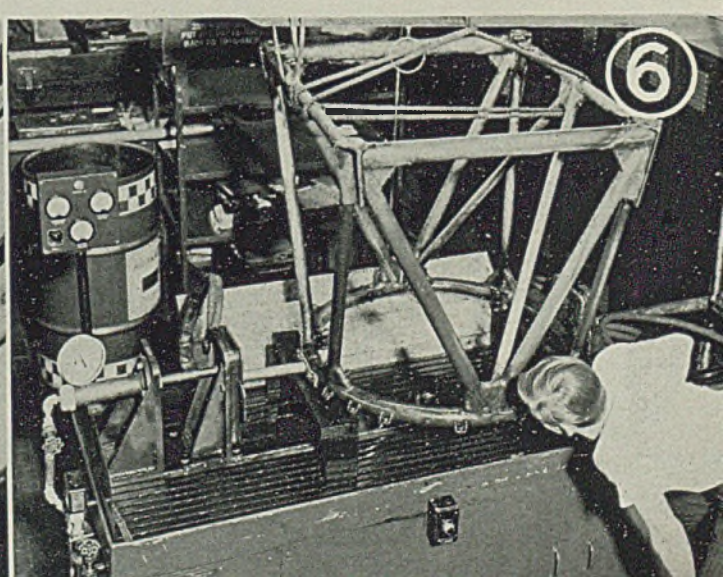


Fig. 3—Tail surfaces must be adjusted exactly with relation to fuselage. Note the special gage the inspector is using here to check the angle of incidence

Fig. 4—Revolving at a constant speed around 2400 revolutions per minute, this full-feathering 3-blade propeller is carefully gone over by an inspector. Its double-row radial engine directly behind it supplies more than 1850 horsepower

Fig. 5—Inspector employs special gage to measure the tension of control cables which must be adjusted to a specified value during final assembly. Note maze of intricate structural framing, ducts, pipes, cable, etc.

Fig. 6—Electromagnetic inspection in this machine reveals minute cracks equivalent to 50 magnifications of the naked eye—an examination most important in checking this highly stressed engine mount fabricated from welded alloy steel tubing. It must support a ton of surging power plant against the terrific forces developed in power dives and landings, yet the mount weighs only 80 pounds



By HENRY W. YOUNG

Fabrication and Installation Practices in Building the

SHASTA PENSTOCKS

. . . . are no "pipe"

NOW THAT Grand Coulee dam is completed and some of its generators spinning, eyes of the construction and industrial world are focussed on Shasta dam in California as the largest dam in the world still under construction. It is the chief feature of the Central Valley project of the United States Bureau of Reclamation. On March 1, this year, it passed the halfway mark in the placing of the 60,000,000 cubic yards of concrete that it will eventually contain. It is expected that the contractors, the Pacific Constructors Inc., will complete construction and the Bureau of Reclamation will have the equipment installed to begin furnishing power late in 1943 or early in 1944.

The great dam has many interesting features, but this discussion is chiefly concerned with one feature of the 375,000-kilowatt power plant—the five steel penstocks, the installation of which is now practically completed. With an inside diameter of 15 feet and a length varying from 807 to 935 feet, they extend through the dam and down the west slope of the deep canyon into the great powerhouse.

The problem of their fabrication and installation is not that of any ordinary pipe line. Consider the height of this dam —over 600 feet—and the working head of water to which the penstocks are subjected, which is 240 to 475 feet. The resulting pressure in the penstocks is so great that every welded seam must be as nearly perfect as mechanical skill can make it. And so every inch of weld is checked and rechecked by the penetrating eye of the X-ray tube.

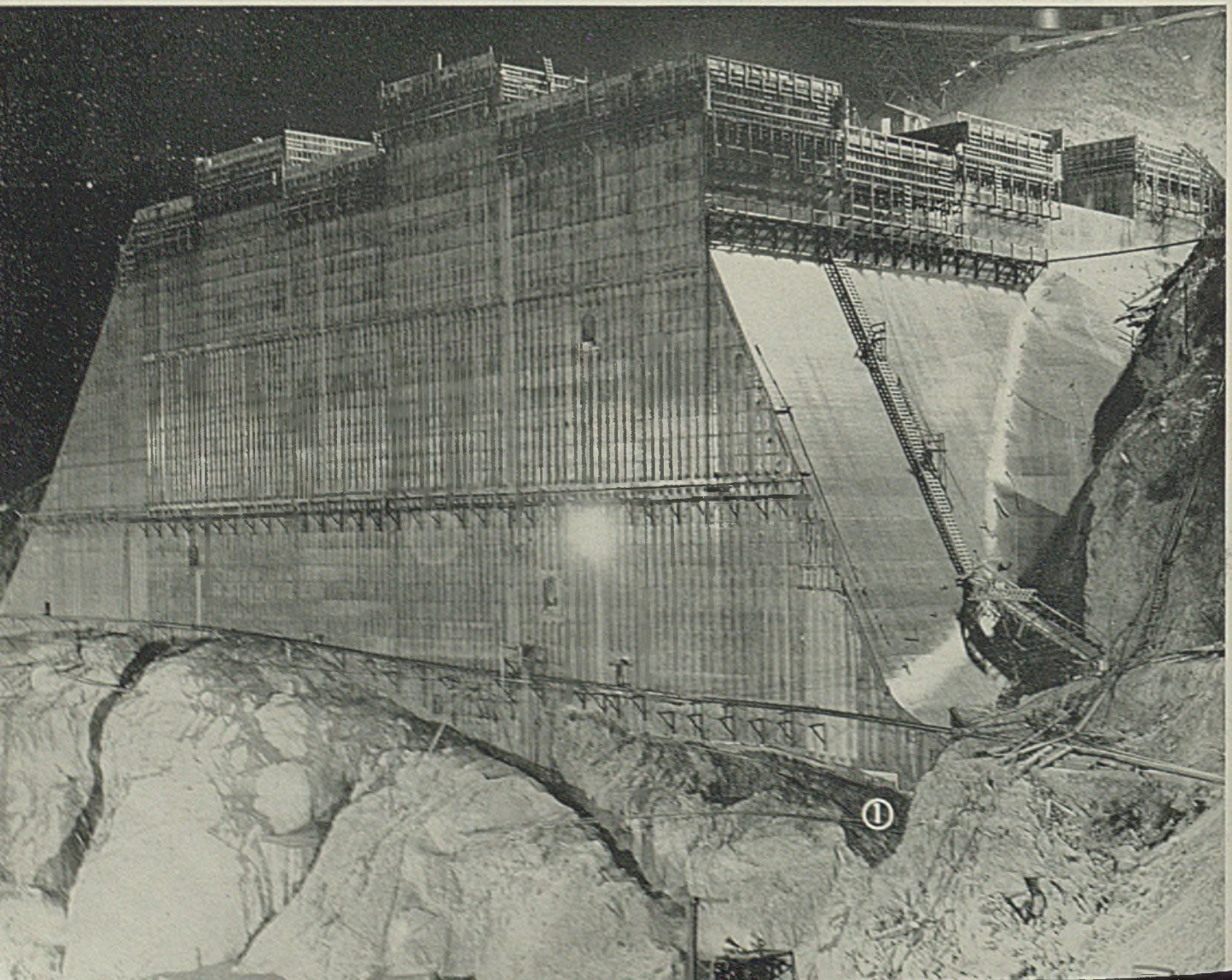


Fig. 2—Penstock fabricating plant. At the right are fabricated sections ready to go to the dam on special trailers, there to be swung into place by the cableway high-line. Figs. 1, 2, 3 and 4 official photos, United States Department of the Interior, Bureau of Reclamation

Fig. 1—This "chunk" of concrete, bathed in the light of night work, is the right or west abutment section of Shasta dam. Exposed below is some of the clean, hard bedrock on which the spillway will be erected, every crevice and fissure cleaned out

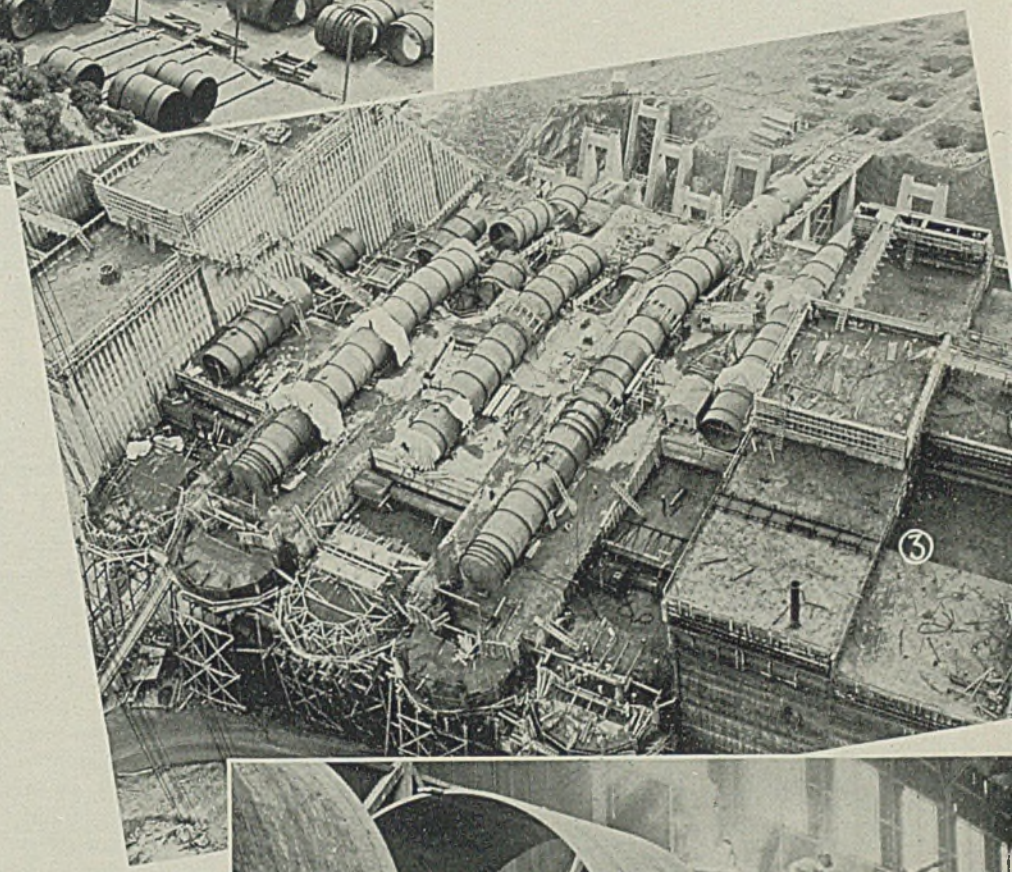
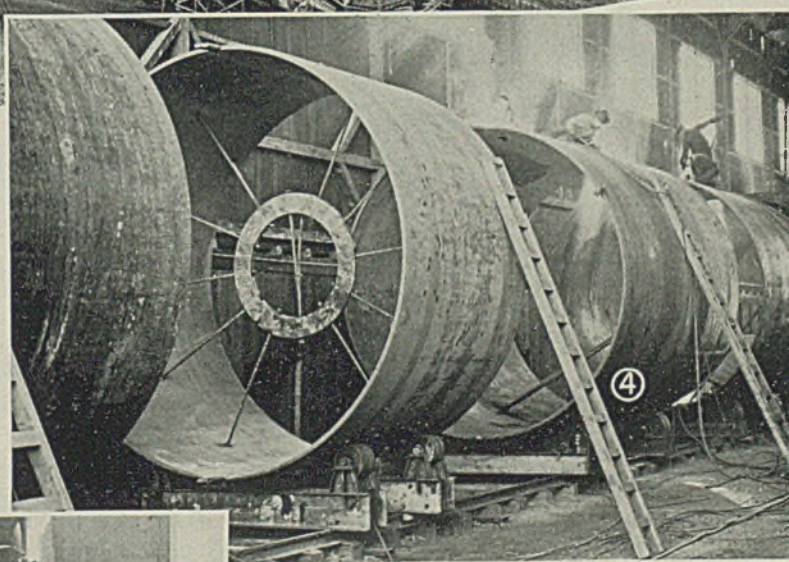


Fig. 3—Here the penstock sections are being placed in the dam. At every point where a penstock section crosses a contraction joint between the 50-foot concrete blocks, a slip joint is installed in the penstock to be welded solid from the inside after the concrete has cooled and the contraction joints grouted. Note the supporting pillars and pits for other supports leading off to the right rear

Fig. 4—At left is a ring with the spider still in it before welded to form a standard ring section. Further down the line, pairs of rings are welded together to form the standard penstock section. Note on the top edge, second from left, the ears projecting when the weld is carried out past the edge of the rings to provide test coupons which will be prepared from these ears. This provides a check on every longitudinal weld



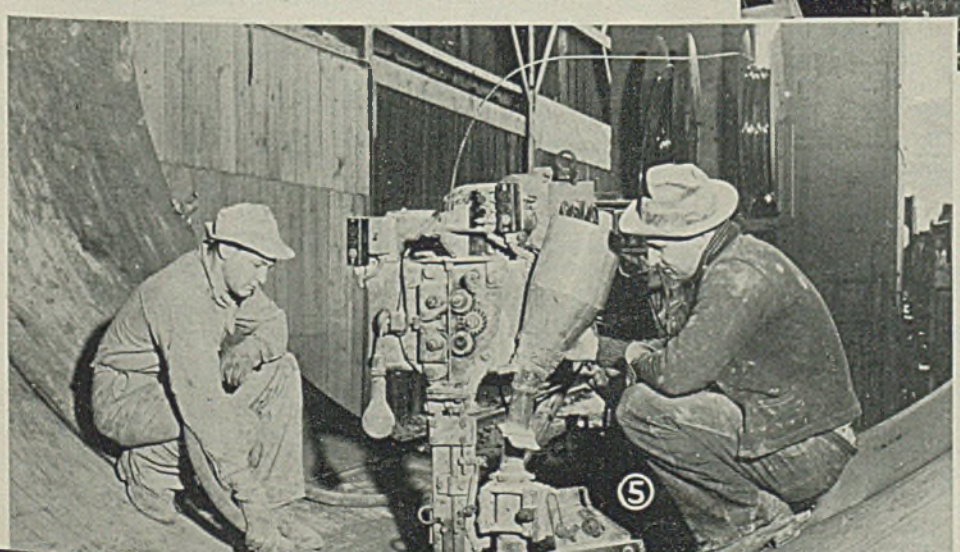
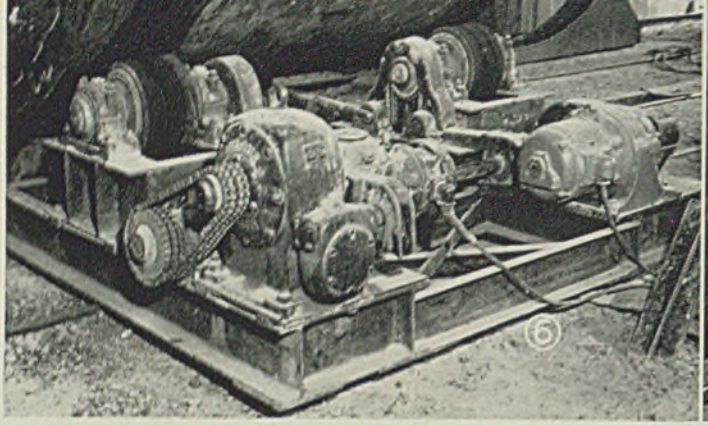


Fig. 5—Head of automatic Union Melt welding machine in position to weld inside circumferential seam. Excess flux is picked up by "vacuum cleaner"

BIBLIOTEKA POLITECHNIKI ŚLĄSKIEJ



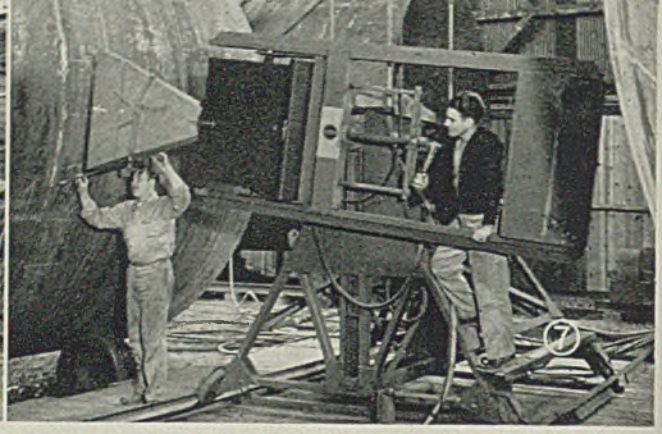


Fig. 6—This is the automatic rotating machine made by Link Belt to slowly turn the penstock sections while the circumferential welds are being made

Fig. 7—X-ray machine rides on rails parallel to penstock production line. Every inch of penstock welding must pass radiographic examination

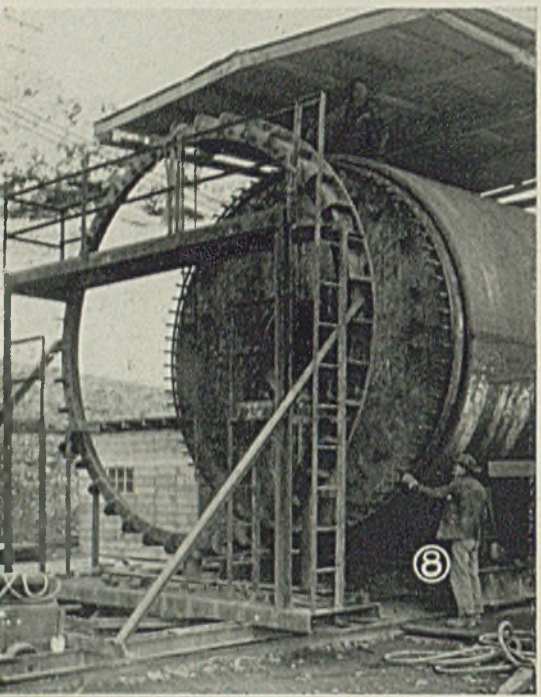


Fig. 8—When a section of the penstock is completed, it is given a hydrostatic test at the shop by bolting these heavy heads onto each end

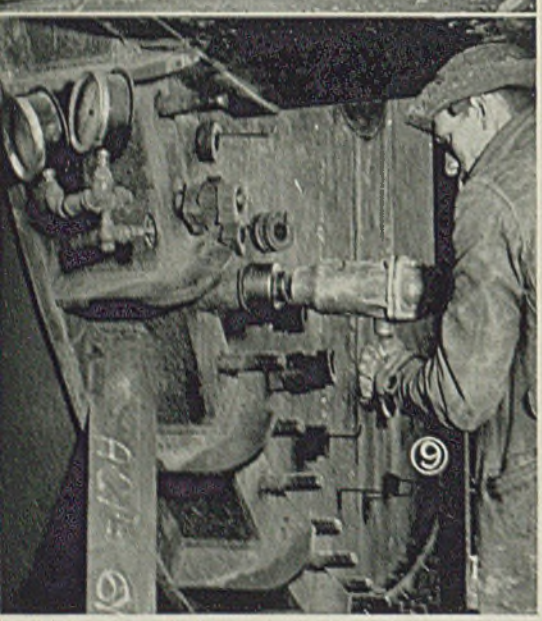


Fig. 9—A compressed air impact wrench is used to tighten the nuts on the head for the hydrostatic test

Fig. 10—This shows schematically arrangement provided to allow for expansion and contraction of penstock sections. Rockers are set at right angles to penstock when it is at a temperature of 42.5 degrees Fahr.

Fig. 11—Sketch indicating how a weld coupon is made at the same time the penstock seams are welded

The steel plates for the penstocks are shipped by rail from the plant of the Chicago Bridge & Iron Co., where they have been fabricated from plate rolled at the Gary plant of the Carnegie-Illinois Steel Corp. The plates are of flange-quality boiler steel, A.S.T.M. A-89-39. They arrive at Coram siding about a mile below the dam curved to conform to the radius of the penstocks. Here they are delivered to the Western Pipe & Steel Co. of California, contractors for the fabrication of the penstock sections. A. H. Wright is superintendent of this plant, while Gilbert L. Yetter is engineer in charge of manufacture and installation for the Bureau of Reclamation. Through their courtesy, the following description of fabrication and installation procedure was secured.

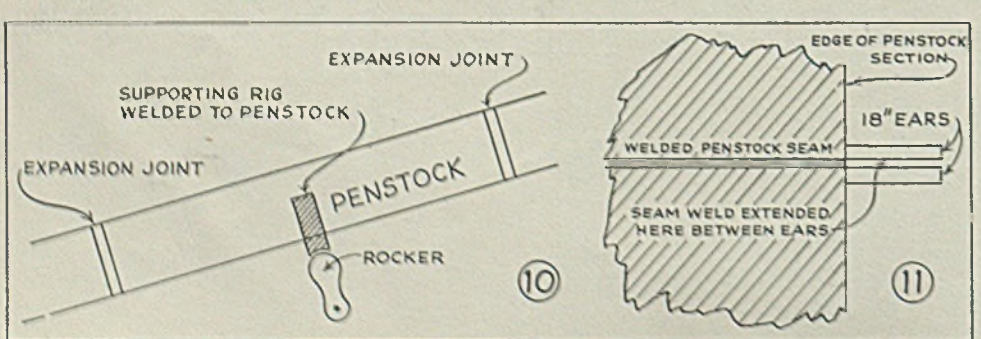
When the plates come into the Coram fabricating plant, they are first squared up on jigs. As the plates are already formed, the next step is to fit the joints and tack weld to form rings of the diameter of the penstock. Spiders or spreaders are then put into the rings to hold them round while welding.

The spiders are made up of twelve 1½-inch radial bolts equally spaced and fastened to a central hub. They are threaded into nuts tack welded to the interior of the cylindrical surface. By adjusting the tension on each bolt, the section is tightly drawn to accurate circular shape, minimizing distortion.

The next step is to put the rings on a table where the longitudinal seams are welded by a stationary automatic welding machine, the work on the table moving under the welding head. The plates come beveled so that the abutted edges form a double V-groove, the angle varying with the plate thickness. Both inside and outside welds are made at one pass. The Union Melt automatic arc welding machine uses American Steel & Wire lightly coated electrode in coils fed automatically into the arc. The welding electrodes are ¼ and 5/16-inch in diameter, supplied in 150-pound coils. The feed is mechanical, from a spool or drum.

After the longitudinal welds are completed in each individual ring, the spider is removed and two of the rings are butted together and welded to form a single 20-foot standard section for the penstock. Most of the standard sections are straight. Where the penstock curves, special sections must be made containing more rings.

But continuing with the standard section, two rings are butted together with longitudinal seams staggered and revolved on a dolly car, mounted on



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rubber tired supports as shown in Fig.4. Outer circumferential tack welds are made while a bulldozer consisting of an old-style compressed-air riveter forces the two edges together and holds them in true alignment.

Now the section is mounted on a table and revolved slowly by a Link-Belt automatic rotating machine, Fig. 6, while the automatic welder makes the inner seam in a continuous operation. See Fig. 5. The outer weld is made in the same way. When welding the thicker shells, preheating is employed. A torch is held stationary at a point slightly ahead of the arc while the ring is revolved.

The automatic welder is mounted in such a manner that the supporting arm can be raised to a maximum of 16 feet above the table. Therefore, it can operate inside or outside of the ring. The technique of welding on plates up to 2½ inches in thickness, inclusive, is to make the first bead on one side in a manner to fuse the metal to half the plate thickness. The bead on the opposite face of the plate is then made so as to penetrate the first bead deeply. In that way, perfect fusion and penetration are assured. Average rate of welding is 10 inches per minute. Current flow is varied for different thicknesses of plate, sometimes is as high as 1700 amperes. Arc drop is held constant at 40 volts.

The welding of a section having been completed, defects notable from the surface are repaired by manual welding and then the weld is ground down to within 1/16-inch of being flush with the plate metal on each side of the seam using air-powered hand grinders. Welds are not ground flush because leaving the weld slightly thicker than the plate produces a better contrast between weld and plate in making the X-ray examination of the weld, which is the next step.

For this work, a General Electric X-Ray Corp. remote-control type of X-ray outfit is used, making a 4½ x 17-inch negative. See Fig. 7. The film is enclosed in a cassette inside of which are two screens coated with calcium tungstate. The film is placed between the two. The cassettes are also suitable for making double length films 4½ x 34 inches.

A drawing of the penstock has previously been laid out with location marks for every inch of weld in the whole length. The penstock sections are then marked up in accordance with this drawing, showing all location marks. When the film is made for any particular portion of any seam, the location mark of that particular spot is placed in lead numbers on the cassette and so is recorded on the film. The film is subsequently filed, and it will be possible later to go back through the files and locate any particular inch of horizontal or circular weld in all of the three-quarters of a mile of penstocks.

When a welding defect shows up on a film, it is remedied at once by chipping out with a compressed air chipping tool and re-welding manually. The repaired section is then ground down and re-photographed. Only when the repair shows well done is the film filed. In determining whether welds are satisfactory or not, they are compared with a set of standard permissible defect films of A.P.I.-A.S.M.E.

A section having now been welded and having passed the X-ray inspection test, the internal stresses are relieved by annealing in a furnace at 1100 to 1200 degrees Fahr., at which temperature it is held for 1 hour for each inch of thickness of the shell. In cooling, it is retarded to 600 degrees Fahr. over a period of approximately 3 hours, after which it is permitted to come to atmospheric temperature.

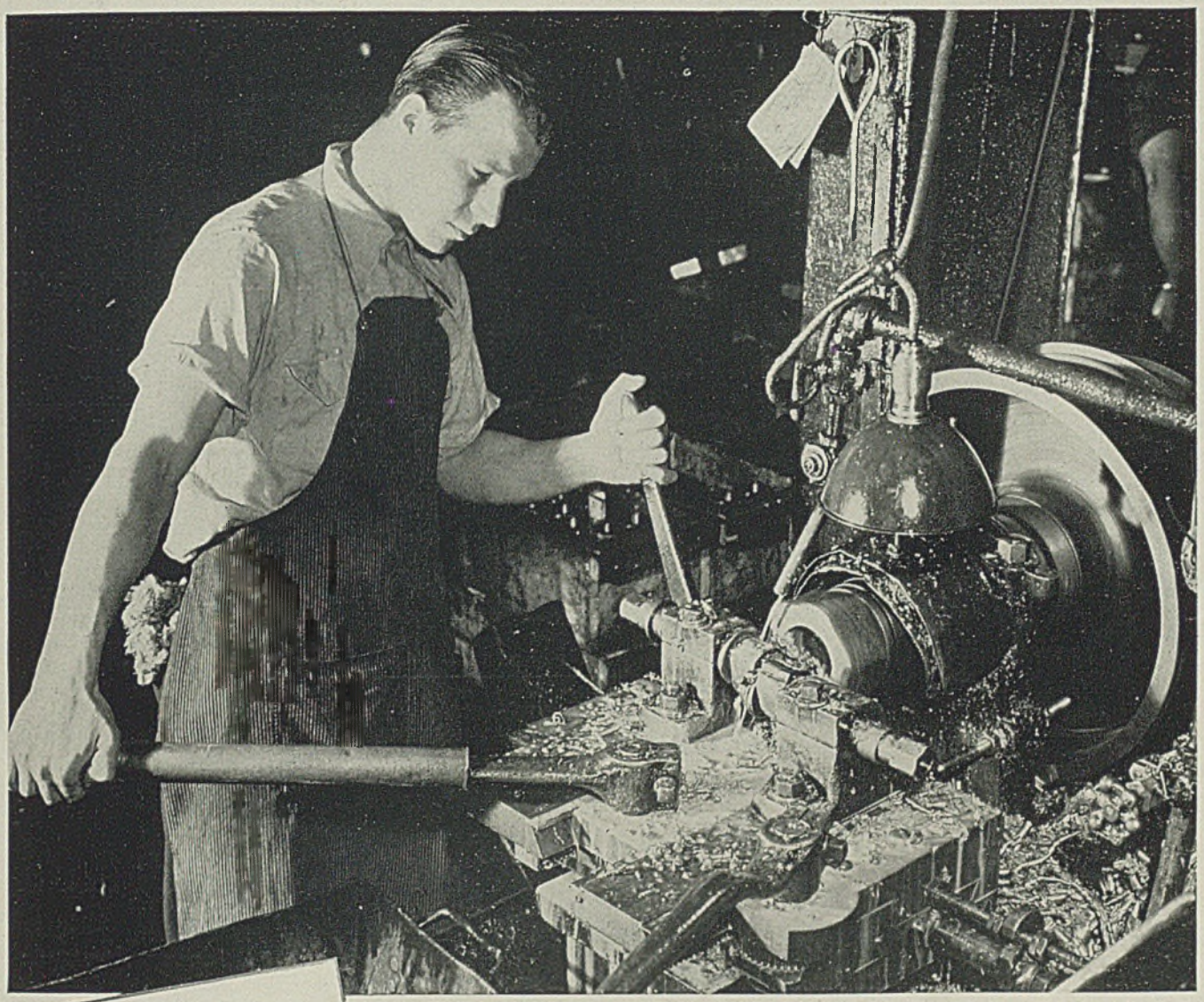
The annealing furnace is of the car-bottom type, fired with butane through 12 burners on each side and insulated with special insulating brick so that constant temperatures can be maintained. The liquid butane is passed through a vaporizer and then, under forced draft, through the burners. Temperature control is through the use of five iron-constantin thermocouples from different locations in the furnace.

The section is now ready for a hydrostatic test at 185 to 550 pounds per square inch, depending upon the part of the penstock into which the section is to go. It should be remembered that the lower or powerhouse end of the penstock is subjected to much greater hydrostatic pressure than the upper end, so the wall thickness increases toward the lower end of the penstocks.

(*Please turn to Page* 111)

Modernistic "Standpipe"

SHIELDED ARC equipment supplied by Lincoln Electric and the skill and materials of Chicago Bridge & Iron Co. resulted in this 2,500,000-gallon arc welded steel reservoir at Tulsa, Okla., end-use of which is to supplement slack period water supply for the city. Architecturally, the huge tank harmonizes with an adjacent residential section. It features only eight vertical supporting ribs, extending up the shell at equidistant points, over the ellipsoidal roof to the airplane beacon-equipped cupola. The overflow pipe from the roof is incorporated in one of the ribs, while another houses a ladder and electrical conduits



This R B & W "production soldier" is giving nuts a smooth bearing-surface — always at right angles to the thread. Nuts semi-finished on a threaded arbor always seat at right angles . . . eliminating all possibility of complicated combined tension and bending stresses. This, together with counterboring of the lead end, means that your assembly man is assured of quicker starting and perfect bearing with R B & W nuts.

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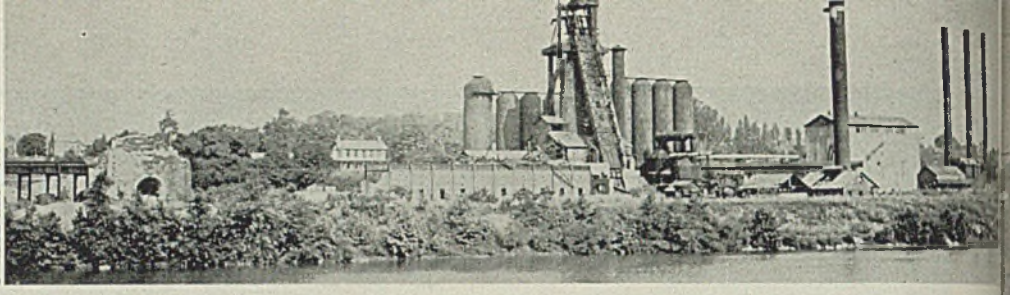


Left, above, Durham furnace built by Cooper & Hewitt in 1874-75 on site of old No. 2 stack. First operated Feb. 21, 1876

Right, works of Thomas Iron Co. as it appeared in 1936. One of the original stacks built by David Thomas in 1855 is shown at left

WHEN CHARCOAL IRON INDUSTRY HELD SWAY

(Concluded from Last Week's Issue)

CORNWALL FURNACE at Cornwall, Pa., was one of the most productive of the earlier furnaces and holds the record of having remained continuously in operation for the longest period. In 1766 it produced 945 tons of pig iron and castings, and in each of the next six years in which continuous records were kept, produced between 700 and 800 tons. It was built by Peter Grubb in 1742, and was in production from that time until 1883.

Robert Coleman, who had made cannon for the Continental army at Elizabeth furnace, following the war, came into possession of Cornwall furnace. Coleman, along with Peter Grubb and William Bird, father of Mark Bird, was one of the self-made pre-Revolutionary ironmasters. Coleman also acquired the nearby Hopewell forge that Peter Grubb had built. Erecting Colebrook furnace in 1791, also supplied with ore from the Cornwall deposit, he became one of the most successful ironmasters of his day. The Cornwall property remained largely in the possession of the Coleman family for generations. Mrs. Mary Buckingham, one of the Coleman descendants, maintained it until recent years when it was given to the Pennsylvania Historical Society, which accounts for its excellent state of preservation. A steam blowing engine was substituted for the water power originally supplied by Furnace creek in 1840. The notice board bearing Manager Peter Schmaltz's order on the occasion of the visit of Washington and LaFayette is in the engine room.

Oxford furnace, Oxford, N. J., built in 1742, cast cannon balls during French war of 1755 and for Continental army. Stack used anthracite in its later years until 1882

But to get back to the cannon that were cast at Cornwall and at scores of other furnaces while the Revolution was in progress, in all fairness, something should be said of Henry Knox. His visits to the furnaces that were casting cannon and ball for the Continental armies, although not as extensively chronicled, may have been more numerous than Washington's. Knox, our first Secretary of War, was in command of artillery throughout the Revolution. Washington made him a colonel in command of a single regiment of artillery following a feat that he performed in connection with the cannon that Ethan Allen had captured at Ticonderoga. Knox hauled these cannon through the wilderness to Boston, a distance of 200 miles, with 80 yoke of oxen; and got them in place on Dorchester Heights in time to bark defiance at Howe when he sailed for Halifax on March 17, 1776.

General Knox, as he was to become, came closer to being one of the leading personalities of the revolutionary period than our school history books commonly indicate. His record was one of unflinching loyalty to Washington and to the cause, and he put the colonial iron industry's cannon and cannon ball to good account. It was Knox' cannon, ferried across the Delaware at Trenton in Durham iron boats in advance of the 3000 infantrymen, about all that remained of Washington's army, that notably helped to strike terror to the surprised Hessians. At the beginning of the fighting, Knox' artillery, trained at point blank range on the main egresses from Trenton, struck such terror to 1500 Hessians under the command of Col. Rawle that they surrendered immediately without waiting to hear from the dreaded long rifles of the colonials. The Continental Congress thought so well of the showing made by Knox' artillery at Trenton that it promoted him to Brigadier General and increased the numerical strength of his command which had been a regiment to a brigade of four regiments.

Disaster Is Prevented

Knox' cannon helped soften the defeat at Brandywine that might otherwise have meant final defeat. They again did good work at the battle of Monmouth, which while not a clean cut victory might have proved disastrous had it not been for one of his well-placed batteries that helped to cover the Continental army's retreat. Artillery which Knox got into position under difficulties was an important factor in the reduction of Cornwallis' forces at Yorktown, earning for him high commendations from Washington and promotion to Major General.

It is beyond the reach of this study to determine in exactly what quantity cannon were supplied to the Continental army by the colonial iron industry. When it is considered that Washington could not even get shoes and clothing for his forces most of the time, no doubt there was a vast gap between the number of cannon that he got and the number he tried to get or could have used. But, on the other hand, it must be considered

WHERE THE FLAYING FISHES PLY

OFFICIAL U. S. NAVY PHOTOGRAPH

Ohio Seamless Tubing is on Patrol Duty with the Torpedo Fleet . . . These diminutive demons are designed for offensive action. But, propelled at furious speed in angry seas, they must also take plenty of slapping around. That's why all parts of their powerful engines must have built-in stamina to withstand the stress and strain that comes in the line of duty. ¶ In at least five vital spots Ohio Seamless Tubing takes over this responsibility in many of the marine motors that power torpedo patrol boats. For camshaft rocker lever shafts, water tubes, oil line, gas lines, bearing and bushings — for all these engine parts Ohio Seamless supplies tubing to meet the Navy's exacting specifications. ¶ On both production line and firing line this tubing has proved its mettle for machinability, hardness, and accuracy as to size and gauge. And just as its quality, precision-workmanship, uniformity and strength now add to the superiority of America's hard-hitting weapons for Victory, so will they help give you a competitive advantage when you again manufacture products for peacetime.

THE OHIO SEAMLESS TUBE COMPANY

SHELBY, OHIO

OHIO SPECIAL QUALITY

that the English were notoriously weak in the artillery branch, and certainly as the war progressed the evidence all goes to show that the artillery of the Continental army was becoming increasingly effective. It is not without significance that whereas previous to the Revolution cannon were cast only occasionally in the colonies, in 1792 after hostilities were closed 16 cannon and 740 cannon balls were included among the iron export items that left Philadelphia, along with 21 tons of bar iron, 40 casks of nails and 19 anchors.

Much could be written about the steel and iron that the industry provided for American long rifles which were so effective that at the close of hostilities the English discarded their Tower muskets permanently and adopted guns like them. As has been seen, enough steel was made in Pennsylvania alone to provide the essential steel parts for a good many rifles, and many were made, not only in Pennsylvania but in Massachusetts, New York, and elsewhere. Then, too, aside from the cannon and the muskets that it provided was the loyal personal support that the iron industry gave to the cause. This in itself, considering the industry's economic importance, could easily be considered a deciding factor in balancing the scales for independence.

In "Pennsylvania Iron Manufacture in the Eighteenth Century," Arthur Cecil Binning sums it up as follows:

"The development of the iron industry in the colonies made possible the success of the separation from the mother country. If the industry had not reached such a high stage of development, the colonists would have been helpless in the struggle. One of the outstanding factors which led to the successful terminus of the struggle, the importance of which cannot be overestimated, was the colonial iron industry which turned out cannon, shot and munitions for the Patriot troops as well as iron and steel for weapons which were used in the campaigns of the Revolution."

In Pennsylvania, he states, air furnaces were erected during the emergency to cast cannon from pig iron or scrap. Boring mills were established and a gun lock factory set up. The provincial arsenal at Carlisle, established in 1761, turned out swords and pikes, as well as rifled muskets. Contracts for arms and muskets also were in Philadelphia, Lancaster, York and Bedford, among other places. Cornwall Iron Works cast salt pans as well as cannon. The salt pans were put into service in salt works along the Jersey coast, set up to relieve the shortage caused by the cutting off of the normal source of supply from England. Camp kettles, blaze pans, frying pans, stew pans and tea kettles also were supplied in large quantities for the Continental army's use.

As soon as the country had caught its breath, economically speaking, following the Revolution the iron industry underwent a notably expansion, particularly in Pennsylvania and Northern New Jersey. The iron industry likewise began to flourish in an important way in North Carolina and in Kentucky and Tennessee, and took on renewed life also in Maryland and New York State.

Tench Coxe, an eloquent disciple of American industrial sufficiency at the opening of the 19th century estimated that in 1794 the number of new forges and furnaces erected in Pennsylvania since 1787 was equal to one-half the number that had been erected in all previous years.

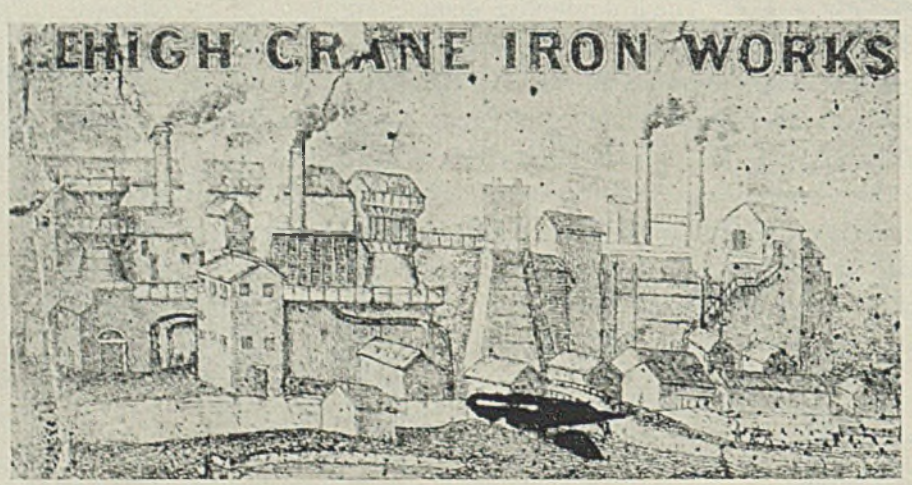
Following the Revolution the output of American blast furnaces was cast into pig more extensively than in the earlier days, for remelting and further refining. Many finery forges came into existence, and wrought iron became a product of increasing importance. Likewise there was an important upgrowth of iron manufacturers providing farming tools and other articles that had largely been imported from England previously. Some new steel furnaces were erected also. But for many years, indeed, practically up until the introduction of the bessemer process, and following the Civil War, when the crucible process also began to develop, most of the country's steel, and practically all of the best steel was imported from abroad.

Foreign competition, mainly from England, became a problem to the developing wrought iron industry, just as the restrictions imposed on the charcoal iron industry by the mother country had been in colonial days. The American wage scale, particularly for "finers" was considerably higher than in England and other countries. But, all in all, the industry consistently prospered and grew. In his report on the Arts and Manufactures of the United States, prepared for A. Gallatin, Secretary of the Treasury under James Madison, Tench Coxe estimated that in 1810 53,908¾ long tons of pig iron were produced. This had increased to 317,306 long tons in 1840, when the hot blast process was introduced and raw anthracite began to replace charcoal, particularly in the productive Northern New Jersey and Eastern Pennsylvania regions where the original supply of wood for charcoal in the proximity of the older furnaces had become exhausted and which was also in the proximity of the Pennsylvania anthracite fields.

Anthracite Is Employed

The Crane Iron Co., Catasauqua, Pa., made the first fabulous success of smelting ore with anthracite, the main secret of which was the use of a hot blast and a more powerful blowing engine in which the cylinders were of cast iron rather than of wood. Blowing cylinders or tubs as they usually were called of wood had largely replaced leather bellows in that period immediately following the Revolution. The Crane works was patterned after the Yniscedevin works in Wales established by George Crane, after whom the company, originally the Lehigh Crane Co., was named. David Thomas, who had been associated with Crane in the development of the "stone" coal furnaces in Wales, and who came with Crane's consent, put the new furnace on an operating basis. He had two 5-foot blowing cylinders cast in England, but found them too cumbrous to ship, so had to get them cast in this country after his arrival, then bored. The Philadelphia concern which bored them had to install special equipment in order to perform the feat.

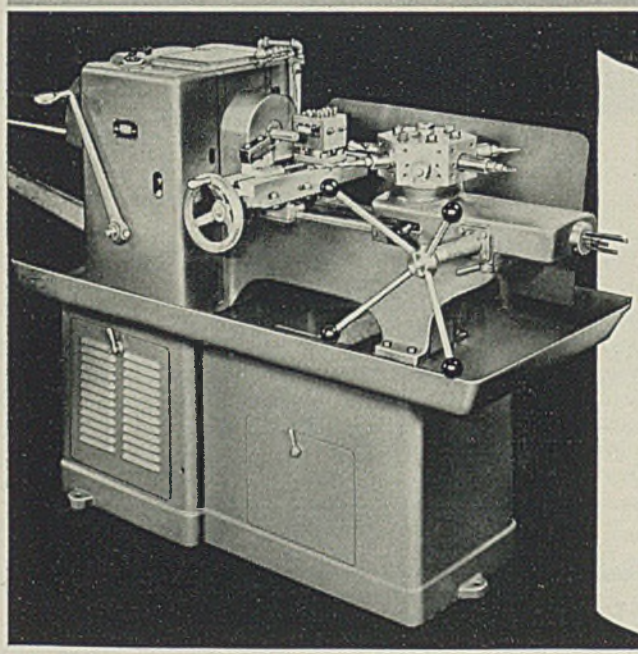
The original Crane anthracite furnace was 42 feet high with a 12-foot bosh. The blast was heated to 600 degrees. The blowing engine was operated by a



This old wood-cut of Crane Iron Works, Catasaqua, Pa., from the A. T. Keller collection is said to be the oldest picture of this historic anthracite stack in existence

BIG ADVANTAGE

OF THE OSTER No. 601 "RAPIDUCTION" LATHE



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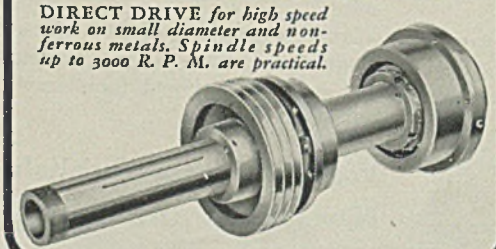
WORM DRIVE *for smooth flow of power required for making heavy forming cuts with absence of chatter and...*

DIRECT DRIVE *for high speed work on small diameter and non-ferrous metals. Spindle speeds up to 3000 R. P. M. are practical.*



On small diameter work not exceeding 1½" (round bar) 1⅛" (square bar) or 1⅝" (hex bar), the Oster No. 601 "RAPIDUCTION" Lathe is used on a wide variety of bar and chucking operations with efficiencies comparable to more complicated, higher priced machines.

In numerous instances, manufacturers have purchased batteries of the Oster No. 601 "RAPIDUCTION" Lathe chiefly to release their automatics for other work demanding that type of equipment.

Furthermore, the manually controlled, six position turret and the SIMPLIFIED construction and use of the No. 601 "RAPIDUCTION" Lathe speeds up training of new operators, thereby releasing more highly skilled operators for other work.

Complete details describing all the advantages of the No. 601 machine are quickly available. The form below offers you a quick, easy way to ask for this information.

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Ironmaster's mansion of Warwick furnaces on French creek near Pottstown, Pa.

12-foot breast wheel, and two-thirds hematite and one-third New Jersey magnetite were employed in the first charge. The furnace was kept continuously in blast for six months, and produced 52 tons of iron in the record week of its first campaign.

Anthracite furnaces multiplied rapidly once the commercial possibilities of smelting with this fuel had been established. The Crane company employing ores from nearby hematite and limonite deposits supplemented with rich magnetite ores from northern New Jersey erected five additional furnaces within the next three decades, one in 1842, one in 1846, two in 1850 and one in 1867.

The Allentown Co., the Lehigh Valley Iron Co., and the Thomas Iron Co., which David Thomas established in 1855 all sprang up in this general locality, and a 40-mile long region extending from Pottstown and Reading to the confluence of the Lehigh with the Delaware at Easton, Pa., became for a time the country's most productive pig iron producing area, coming to be known in the trade as the Philadelphia area, the name still applied to it as a steel producing district.

Coal Substituted for Charcoal

The scope of this article does not permit of more than a hasty sketch of the subsequent development of the American iron industry. Anthracite stacks began to multiply in the earlier charcoal ironmaking regions, and towering iron jacketed furnaces with steam driven blowing engines soon entirely supplemented the truncated pyramids of stone—most of them, following the Revolution, capped by noblike chimneys—that had served the country so well while it was coming into being. Nevertheless, the charcoal iron furnace was not done. It migrated westward and southward and came into being wherever there was plenty of wood for charcoal and good ore. It no longer was dependent entirely on water power to drive the blowing engines and the later furnaces often were equipped with hot blast stoves, and had two, sometimes four or six tuyeres. But where conditions were propitious it continued to thrive.

During the railroad building era the charcoal iron industry supplied cast iron car wheels, while anthracite and, later, coke-fueled furnaces were making pig iron for puddling into wrought iron for rails. Charcoal iron boiler plates and boiler tubes also held the fort in the railroad market. The coming of gas and municipal water supply system, called for cast-iron pipe, also lamp posts, and there was likewise a demand of no small proportions for ornamental iron work much of which was supplied by the charcoal furnaces. The demand that its product commanded for car wheels, however, was the one about which all other demands revolved; just as the railroads' need for rails created the key demand for wrought iron. The charcoal furnaces alone, during this period, could produce consistently iron of sufficiently good quality for car wheels. In 1890 more charcoal iron was made in the country than in any other previous year. Michigan was one of the big producing states.

It took nothing less than open-hearth practice of steelmaking and metallurgical control to finally shove the charcoal furnace industry aside.

Transparent Coating Protects Metal Items

A new transparent protective coating for metal and ceramic surfaces, developed recently by Ault & Wiborg Corp., Cincinnati, is reported to reduce rejects due to rust, surface scratches, shop wearing, grease and dirt. Known as Protektol stripping lacquer, it permits visual inspection of the coated parts.

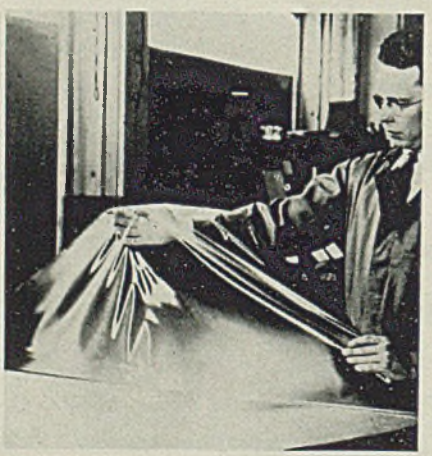
The plastic base coating is said to be particularly applicable to highly polished surfaces such as flat sheets, molds, irregular shapes, dies and bearings—offering protection during handling, fabrication, shipping, storage and installation.

In application, the liquid is sprayed, brushed, dipped or roller coated; then air dried to leave a flexible glass-clear coating of from 0.001 to 0.0015-inch. One gallon when sprayed to a thickness of one mil, will cover approximately 250 square feet of surface, according to the company. Drying time of the material at 200 degrees Fahr. is 6 to 8 minutes.

To remove the coating, it is necessary merely to lift one edge with the fingernail and peel, or blow off with an air jet. Degree of adhesion to the part protected is controlled to eliminate possibility of accidental removal.

Water and sunproof, the coating is not affected by most greases and oils. There is no deterioration or cracking at temperatures between 0 and 200 degrees Fahr. The coating also is available in colors.

After being removed from the article it protects, the lacquer may be returned and reduced to liquid form again, the company reports.



Westinghouse Publishes New Spectrum Chart

Every part of the electromagnetic spectrum, of practical significance, is analyzed in detail in a new 7-color wall chart recently published by the Westinghouse Research Laboratories, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Approximately 30 x 40 inches in size, the chart is printed on heavy white cloth and is bound at top and bottom in ⅜-inch black-enameled wooden rods. Emphasis is placed on uses of each kind of radiation. In addition, spectral terms are carefully and simply defined. Charts are available for $2 each.

WE'RE LOOKING FOR

TOUGH CUSTOMERS

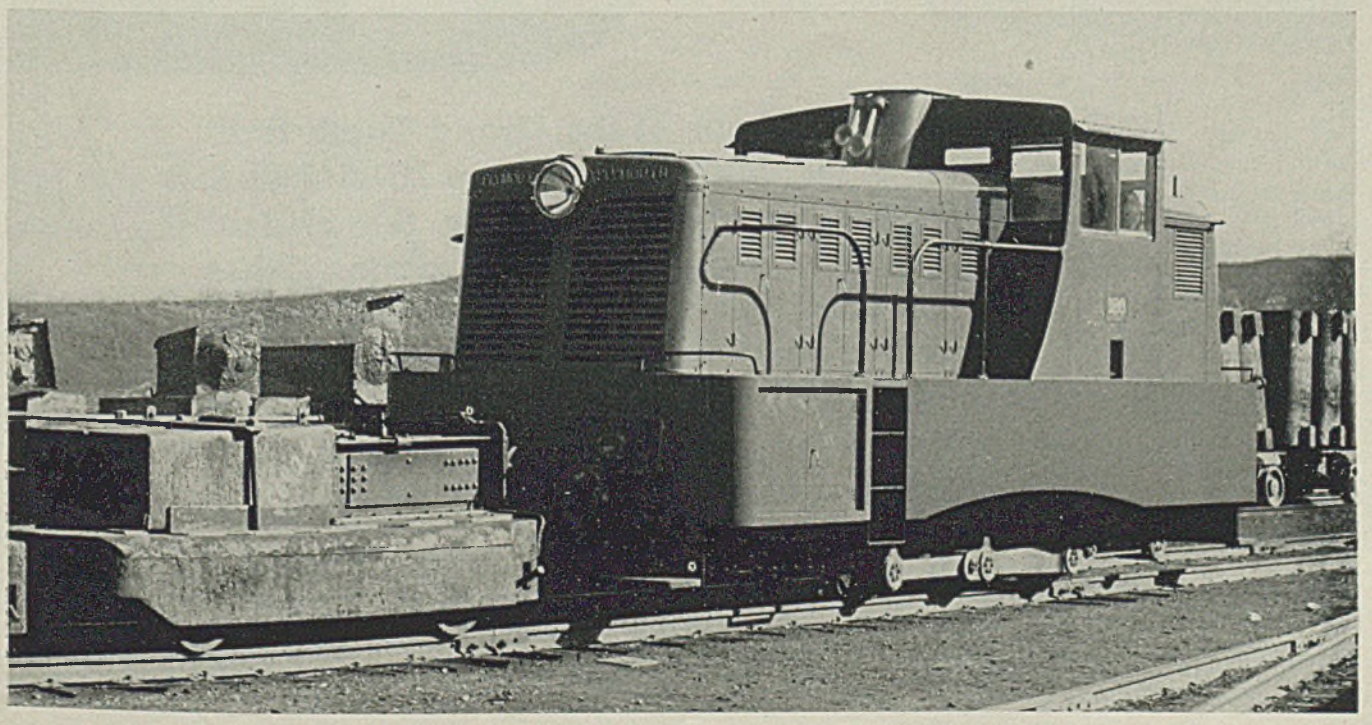
We're looking for manufacturers who are in a fighting mood . . . who are battling to move tons of equipment with which to crush the Axis . . . who are tackling the toughest job American industry ever faced. For those men we have a message. It is simply this:

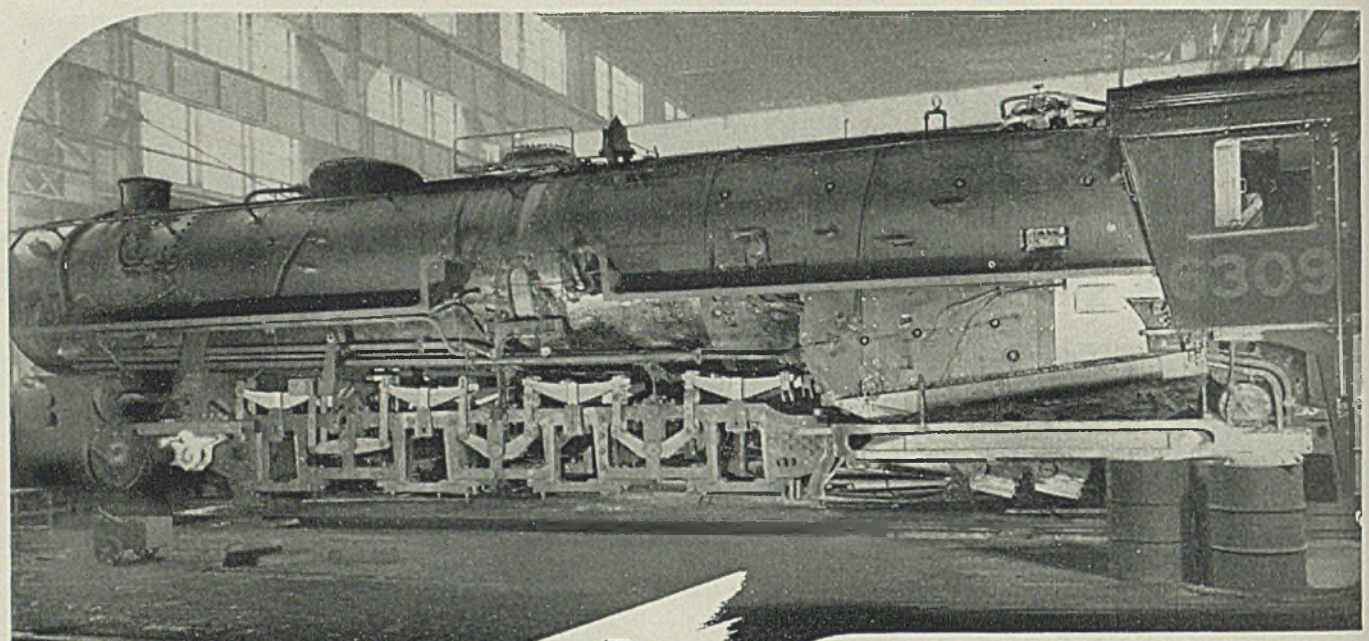
We build tough locomotives. They can stand up under the knock-down, drag-out schedules it's going to take to win this war. Right now Plymouth Locomotives are hauling essential materials for the Victory program . . . are taking punishment and asking for more. They are available in accordance with the war production planning of our Government. We are on a war schedule. That's *our* job. If *your* job is on a similar schedule, let's pull together.

PLYMOUTH LOCOMOTIVE WORKS

Division of THE FATE-ROOT-HEATH COMPANY

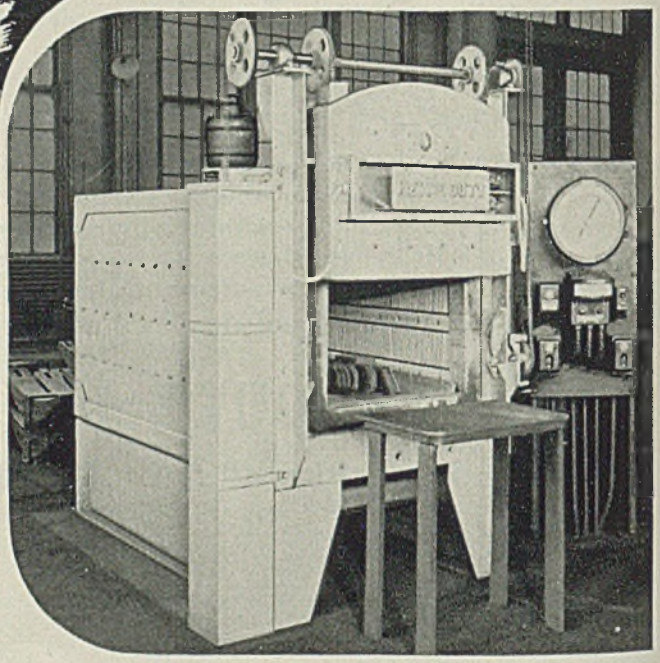
PLYMOUTH • OHIO • U. S. A.





Flexibility

IS NECESSARY IN A MAINTENANCE SHOP



In the maintenance shops of the Grand Trunk Railroad at Battle Creek, Michigan, a Type HD-247218-A Box Furnace, as shown, is used for the critical drawing of engine springs and other parts. Other Hevi Duty furnaces are used for carburizing, hardening and subsequent heat treating. The flexibility and accuracy of these furnaces have done much to keep rolling stock maintenance at a low cost.

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MILWAUKEE, WISCONSIN

WAR ★★★★★ and the electroplating industry

By W. W. McCORD
Chief of Electroplating Section, Consumers' Durable Goods Branch
War Production Board, Washington

THIS COUNTRY IS AT WAR. It may strike you as entirely unnecessary and even redundant to have a speaker start an address with that statement, but if you had handled the quantities of interviews and correspondence which I have since Pearl Harbor in which it was evident that this fact was making no particular impression, you would understand why I started in this manner.

I reiterate, *this country is at war.* It is not merely at war; it is at war to prevent you from becoming a slave. There has been altogether too much disposition to take the attitude: "Oh yes, we are at war and oh yes, we must win the war, but that has nothing to do with me, personally." The hell it hasn't! Maybe you are willing to spend the rest of your life with a gestapo agent showing you where to dig, but I certainly am not.

We must win this war regardless of what it may cost any individual either in money, life or property. That is a serious statement, and its implications are not pleasant. However, it is a fact which we must all face squarely for the only alternative is virtual slavery. The trouble is that too many individuals have refused to recognize that there is no alternative choice. They want to win the war, but at no cost to themselves. It can't be done.

We are going to win this war. The American people will not fail when it comes to a showdown. We have the man-power, and it is the right kind of stuff to do the job. If this were just back in the times of the Crusades when opposing armies lined up, and each individual picked out somebody on the opposite side that he thought he could lick, and they went to it with a multiplicity of more or less personal combats, we would probably end this thing in a hurry.

But a modern war is not won that way. Individual battles are won by tanks, airplanes, guns and ammunition, and the commander who has the preponderance in those respects generally comes out on top.

In other words, individual battles are largely won behind the lines. The goods have to be produced and they have to be transported to the places where they can be used to advantage.

In order to produce the vast quantities needed for modern warfare, it requires raw materials, and particularly metals, in previously unheard of quantities. We have always had a more or less smug self-complacency that this country was the one most blessed with natural resources and that we could always get anything we wanted. It is difficult to change that viewpoint. However, we are in for a rude awakening.

The plain facts are that we haven't enough copper, aluminum, nickel, chromium, rubber, wool, steel, and a lot of other materials. About the only things in which we really have a surplus are gold, silver, cotton and wheat. So far we have enough lead and zinc.

Faced with the fact that there is not sufficient material of any given kind to meet all needs, there is no option left but to use what materials are needed for war purposes and then if there is any left over to use that to the best possible advantage in other ways.

I don't suppose there is a single person who would take issue with that general statement.

The trouble is that when the application of the general principal hits us personally, too many of us forget it and think only of the personal angle.

I suppose that at least once a day I am asked in confidence whether these supposed shortages are just somebody's crazy figures. If I succeed in nothing else today, let me get the true picture about that over to you.

This picture has been changing so fast that today's figures mean nothing tomorrow. A situation is analyzed in the light of events as they then appear, and then something like the fall of Singapore occurs, and the picture is completely changed in a thousand different ways. The figures on which you were given information are just plain screwy, in view of developments.

So when I say to you that the shortages are real and not the figment of anyone's imagination, that is probably an understatement. Let's run over them.

Aluminum: Not enough for a long time to come.

Rubber: Not enough and with poor chance that synthetic will arrive in time.

Copper: Not enough and with little or practically no chance there ever will be.

Tin: Not enough and with little or practically no chance of betterment.

Chromium: Very tight, however, the Montana ores may provide sufficient chromic acid by the end of this year, although this does not help ferro chrome materially.

Cadmium: Not nearly enough to take care of war demands, and many specifications have had to be changed.

Nickel: Not nearly enough and with practically no hope that there ever will be.

That does not leave very much for any plater except war work.

He still has gold, silver, lead and zinc with which to plate for civilian usage. So far, we still have plenty of gold, silver and lead. We also have been able to meet all demands in zinc.

You have gold and silver for ordinary usage and not much else. Immediately the cry is raised that they are too expensive. *Now get this point. We haven't a free market.* Prices are pegged and they are pegged on a relationship which existed before the war. This is no indication of what their relationship would be if a free market existed. It is entirely artificial at this time not taking into effect the changes caused by the war. I sincerely believe that if a free market existed, and all the opposing elements allowed to compete for each individual metal, you would be surprised to find that a pound of nickel or tin would probably command a higher price than a pound of gold or silver. We need and can use the nickel or tin

From a paper presented at the 1942 Grand Rapids convention of the American Electroplaters' Society.

but we have a great surplus of gold and silver for which we have no immediate need.

Our ideas regarding values are so fixed that it is extremely difficult for us to appreciate this change. It is not that gold and silver have become less valuable but that due to extraordinary circumstances, *tin and nickel have become infinitely more valuable.* So when you are told that you cannot use what seems to you an inconsequential amount of tin or nickel or something else, you just stop and ask yourself whether you would want to use it if you had to pay the pound price in gold. Furthermore, when you consider gold or silver as a covering, do not do it with the old relationship in your minds, but with the realization that actually you may be using a cheaper metal than nickel or tin. This is the economic side, but the really important one is that your country needs that nickel or tin, and if you are going to remain a free man, it must have it.

Perhaps you are not as constricted regarding civilian usage as you think you are, provided you will get over some of your preconceived ideas regarding values, but you are still pretty constricted. Unfortunately, dollar values still exist, and I recognize that people who buy things pay in dollars and they will not buy if the article costs too much according to their former sense of values. So while you may be able to use some gold and silver, where formerly it was not even considered, particularly as time goes on and the demand for any kind of goods increases, necessarily its usage will be limited.

In other words, you may continue to do a little plating in special fields for civilian consumption, but it will not be of any great magnitude. Gold, silver, zinc and lead plating may even become more popular than in the past. However, nobody will get rich on the amount that will be done for civilian purposes.

That leaves war work. I am not going into detailed discussion of the particular applications of plating in military usage.

The plating trade is lucky. As soon as I sit down, about a hundred men will jump to their individual feet and say, "What do you mean lucky, when my plant is shut down?" The statement still stands. Individually, you may be unfortunate, and that may continue without much hope for you, but the fact remains that the plating trade as a whole is lucky. They have lots of work to do and will continue to have it for the duration.

I can point out plenty of industries that were told to stop entirely their former system of manufacture and to go out and find something to do for war purposes. Nobody has told you to stop plating. They have told you that you cannot plate with certain metals for certain purposes, but so long as you stay away from those prohibited areas, you can continue to plate. Also there is a very large volume of war plating to be done, and if you are able to get enough of it, you can continue your previous type of manufacturing without essential change, as was necessary with so many industries.

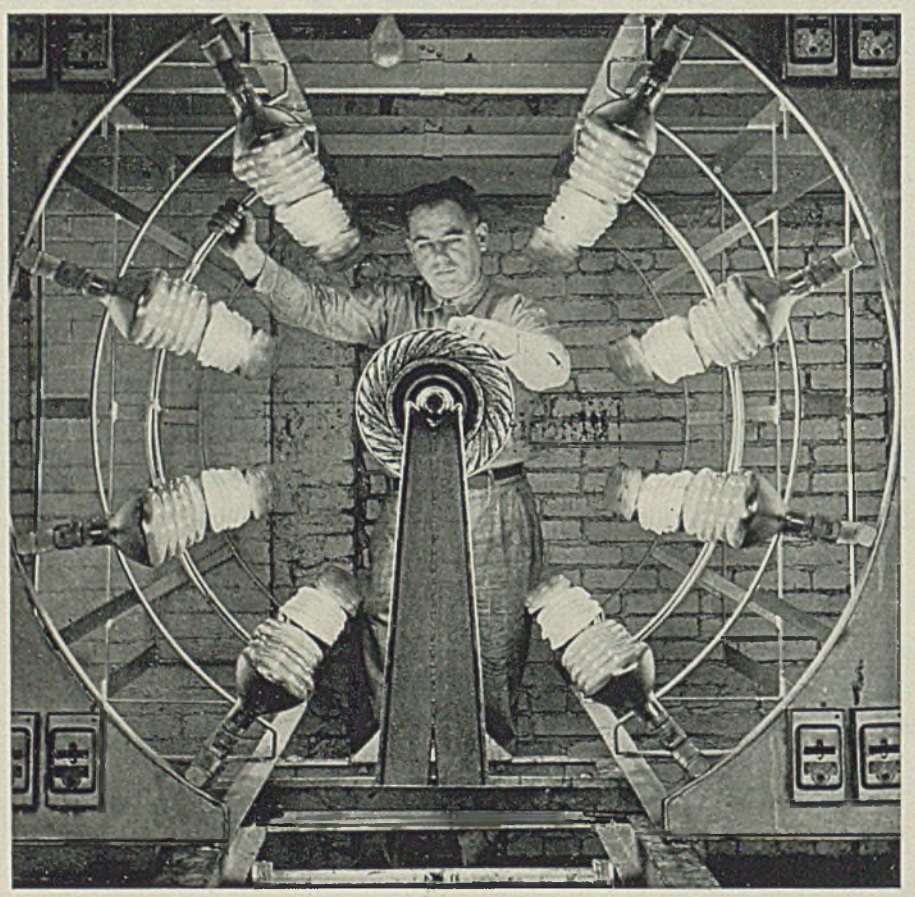
Now that distinctly does not mean that every individual plater is going to be able to go along just as he always did and have plenty of work. There simply is not enough work to go around, and when there isn't enough for everybody, someone is bound to get hurt.

What Percentage Will Remain in the Plating Business? To arrive at that percentage, we must know how much war plating there is going to be. I have already told you that today's figures mean nothing tomorrow as far as totals to be produced are concerned. Added to that is the difficulty that articles which are specified for a plated finish today may not be so specified tomorrow. They are coated with a given metal, and the supply of that metal becomes inadequate or progressively tighter, and it becomes necessary to find places where it can be eliminated. Specifications are changed and something else is substituted. Vice versa, some materials become scarce and another material is substituted, but the latter material has to be protected against corrosion, so a plate is added. The steel cartridge case is a good illustration of this.

The picture changes rapidly. All I can say has to be in very general terms and subject to change without notice.

(*Please turn to Page* 113)

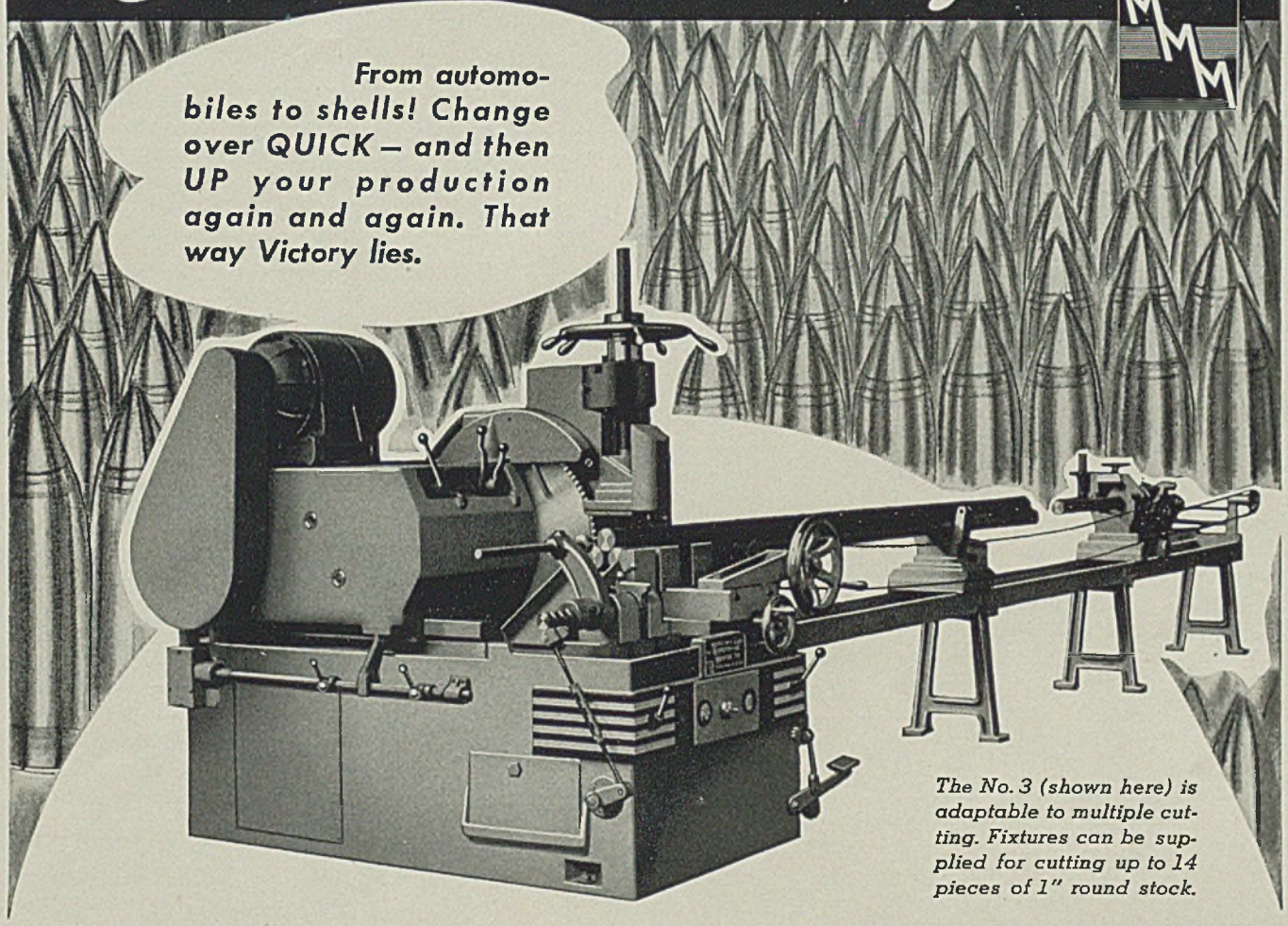
Armature "Baker"



THIS SETUP shows how infra-red lamps cut armature baking time to one-third the former time in a small industrial repair shop. Here radiant drying lamps reduced the drying time for 12-inch armatures from 18 to 5 hours. The setup consists of 123 infra-red Westinghouse 250-watt reflector drying lamps arranged in tubular form in two equal adjustable banks. Each bank is supported from the roof on barn door slides, which permit the lamps to be adjusted to the proper distance from the armature surface. Three 10-kilowatt sections, each consisting of eight groups of 5 lamps, permit 3 armatures to be baked simultaneously or individually. Temperatures range between 240-260 degrees Fahr.

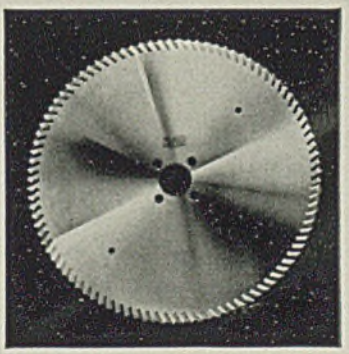
Over and Up!

From automobiles to shells! Change over QUICK — and then UP your production again and again. That way Victory lies.



The No. 3 (shown here) is adaptable to multiple cutting. Fixtures can be supplied for cutting up to 14 pieces of 1" round stock.

With the development of adequate equipment designed and refined expressly for the purpose, the cold sawing of metal figures more and more prominently in the lift that is being imparted to the nation's war effort. Motch & Merryweather Cold Sawing Machines have already cut many millions of shell slugs with uniform accuracy, with square ends, without burr or scrap, at new and tremendous top speeds. The installing of Motch & Merryweather Cold Saws has invariably brought about an exceedingly swift transition from peace-time to war-time production. Their ability to "take it" every hour in the week, month after month, has jumped the output of munitions in a degree impossible to estimate. Ask for our bulletin.



Motch & Merryweather Segmental Saw Blades have definitely set new standards of speed, precision and endurance.

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MOTCH AND MERRYWEATHER THE MACHINERY CO
CLEVELAND CINCINNATI DETROIT PITTSBURGH

AVOID "OVERWELDING"

. . . to save electrode material
. . . to keep down your costs
. . . to speed welding work
. . . to help win the war

By C. M. TAYLOR
Vice President
Lincoln Electric Co.
Cleveland

LIKE the sick man who took two pills because he reasoned that if one pill was good for him, then two would be twice as good, there are many users of welding who put too much metal in their welds. Like the sick man, they probably reason that if a certain amount of weld metal assures a certain strength, then more welding will provide greater strength. They fail to realize—both the sick man and the "overwelders"—that overdoses are not only wasteful but may actually weaken instead of strengthen.

Now, more than ever before, should "overwelding" be avoided. Our winning the war depends on getting the greatest possible production of war equipment in the fastest possible time and by applying every ounce of war-essential materials and labor with greatest possible efficiency, which means least possible waste.

Welding being employed so extensively and being so vital to fast production of ships, planes, tanks, guns and other ordnance, it must be used with greatest possible effectiveness. Thus "overwelding" must be avoided for that simply wastes the operator's time as well as weld metal.

The logic of using just the proper amount of welding and *no more* is obvious. For example, if only 1 per cent of last year's production of welding electrodes went into overwelding, the total waste of electrode metal—which could have been applied to other or additional production—was 3,156,430 pounds!

How can you tell when the amount of welding is right for the job and that you are not committing the crime of overwelding? The following method will prove helpful as a guide in checking weld dimensions to meet designed strength requirements.

Assume a plate to which a bar or strap is welded, as in Fig. 1, with direct tension, no bending or eccentric loadings to result in shear on the beads. The load is known and dimensions of the plate are known.

If we let: P = load
S = stress in pounds per square inch in the plate
t = thickness of plate
and b = width of plate
Then . . . $P = S \times t \times b$.

The structural code permits 13,600 pounds per square inch in shear on throat area. The load value of a 1-inch fillet weld in longitudinal shear is 9600 pounds per lineal inch with shielded-arc electrodes (0.707 x 13,600 = 9600). With other types of electrodes, load values will be lower.

Two beads of equal length and size equal to plate thickness are used in Fig. 1; consequently, the total bead capacity is $2 \times t \times 9600$ pounds per lineal inch. Since load equals $S \times t \times b$, the effective length of weld per side will be

$$\frac{S \times t \times b}{2 \times t \times 9600} \quad \text{or} \quad \frac{S \times b}{2 \times 9600}$$

As an example, assume that S equals 16,000 pounds per square inch unit stress.

$$\text{Then } \frac{16{,}000 \times b}{2 \times 9600} = 0.833\,b$$

If unit stress in the plate is expressed in Kips (1000 pounds) per square inch, multiply this by plate width (inches) and divide by 19.2 to obtain effective length of bead per side. If L equals effective length of bead each side and K equals Kips, then

$$L = \frac{b \times K}{19.2}$$

The tabulation Table I, which may be extended, is an example: The same method can be used for estimating effective

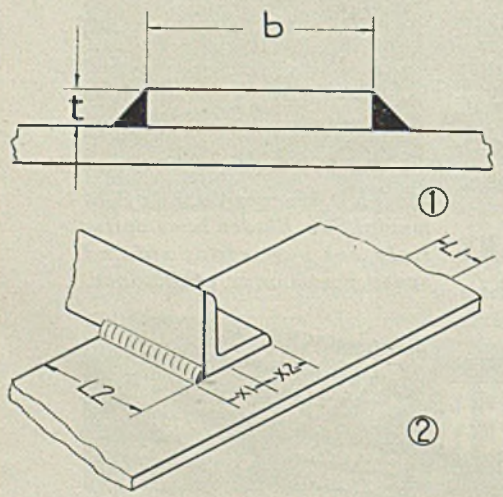

TABLE I—Effective Length of Bead, Each Side

Plate Width (b)	Values of "L" Unit Stress in Plate—Kips (K)						
Inches	8	10	12	14	16	18	20
1	0.42	0.52	0.625	0.73	0.83	0.94	1.04
2	0.84	1.04	1.250	1.46	1.66	1.88	2.08
3	1.26	1.56	1.875	2.19	2.49	2.82	3.12
4	1.68	2.08	2.5	2.92	3.32	3.76	4.16
5	2.1	2.6	3.125	3.65	4.15	4.7	5.20
6	2.52	3.12	3.75	4.38	4.98	5.64	6.24

TABLE II—Length of Bead (Shorter) in Equal Leg Angles

Angle	Length of Bead—Inches Unit Stress in Angle—Kips						
	8	10	12	14	16	18	20
2 x 2	1.11	1.39	1.67	1.94	2.22	2.5	2.78
3 x 3	1.67	2.08	2.5	2.93	3.33	3.75	4.17
4 x 4	2.22	2.78	3.34	3.38	4.44	5.0	5.56

TABLE III— Bead Length at 20,000 P.S.I. Stress

Size of Angle	Area Sq. In.	Distances Bead to Center of Gravity X_1	Distances Bead to Center of Gravity X_2	Load (Kips) Area x 20 Kips	Length Beads *L_1 = Load x X_2 a x 9.6 x t	Length Beads L_2 = Load x X_1 a x 9.6 x t
2 x 2 x ¼	0.94	1.41	0.59	18.8	2.31	5.52
2 x 2 x ⅜	1.36	1.36	0.64	27.2	2.45	5.13
2½ x 2½ x ¼	1.19	1.78	0.72	23.8	2.85	7.07
3 x 3 x ¼	1.44	2.16	0.84	28.8	3.37	8.65
3 x 3 x ⅜	2.11	2.11	0.89	42.4	3.48	8.25
4 x 4 x ¼	1.94	2.91	1.09	38.8	4.4	11.8
4 x 4 x ⅜	2.86	2.86	1.14	57.2	4.55	11.3
4 x 4 x ½	3.75	2.82	1.18	75.0	4.6	11.0

*It is usual to make this bead somewhat smaller in size than "t", and therefore longer than indicated above, because of shape of angle edge.

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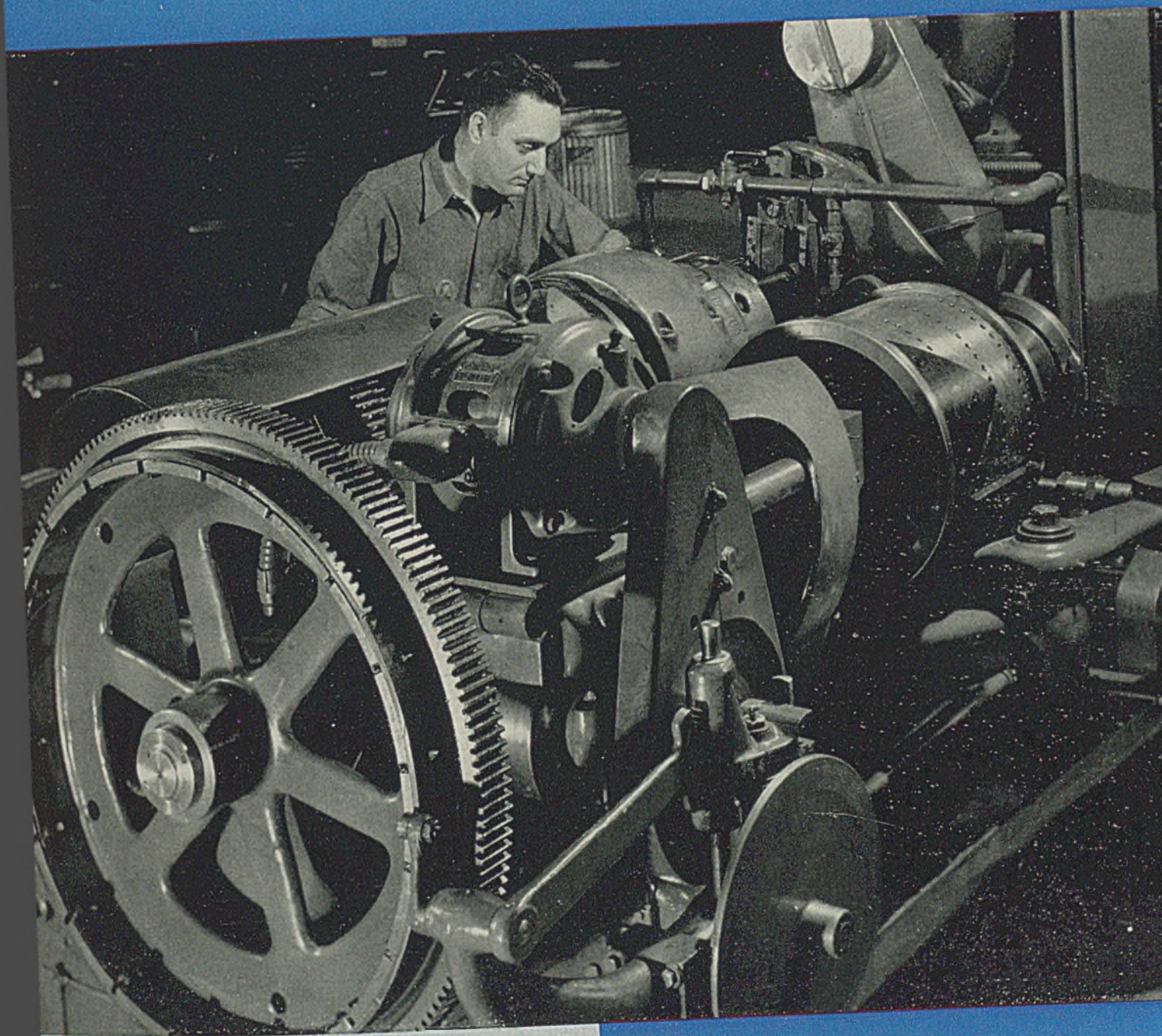

• A large grinding machine builder in New England recently installed a battery of Cleveland *Single Spindle* Automatics in his production line to speed up building of his own machines, at present mostly absorbed by the aircraft industry. Results of this installation have been gratifying and note-worthy. "Bottle-necks" have been broken, production pyramided, costs cut down rapidly. Aircraft plants are getting precision grinding machines a little faster than was possible before because of the efficiency and flexibility of these Cleveland Automatics. • Descriptive bulletins on the size you can use in your production are ready to send you.

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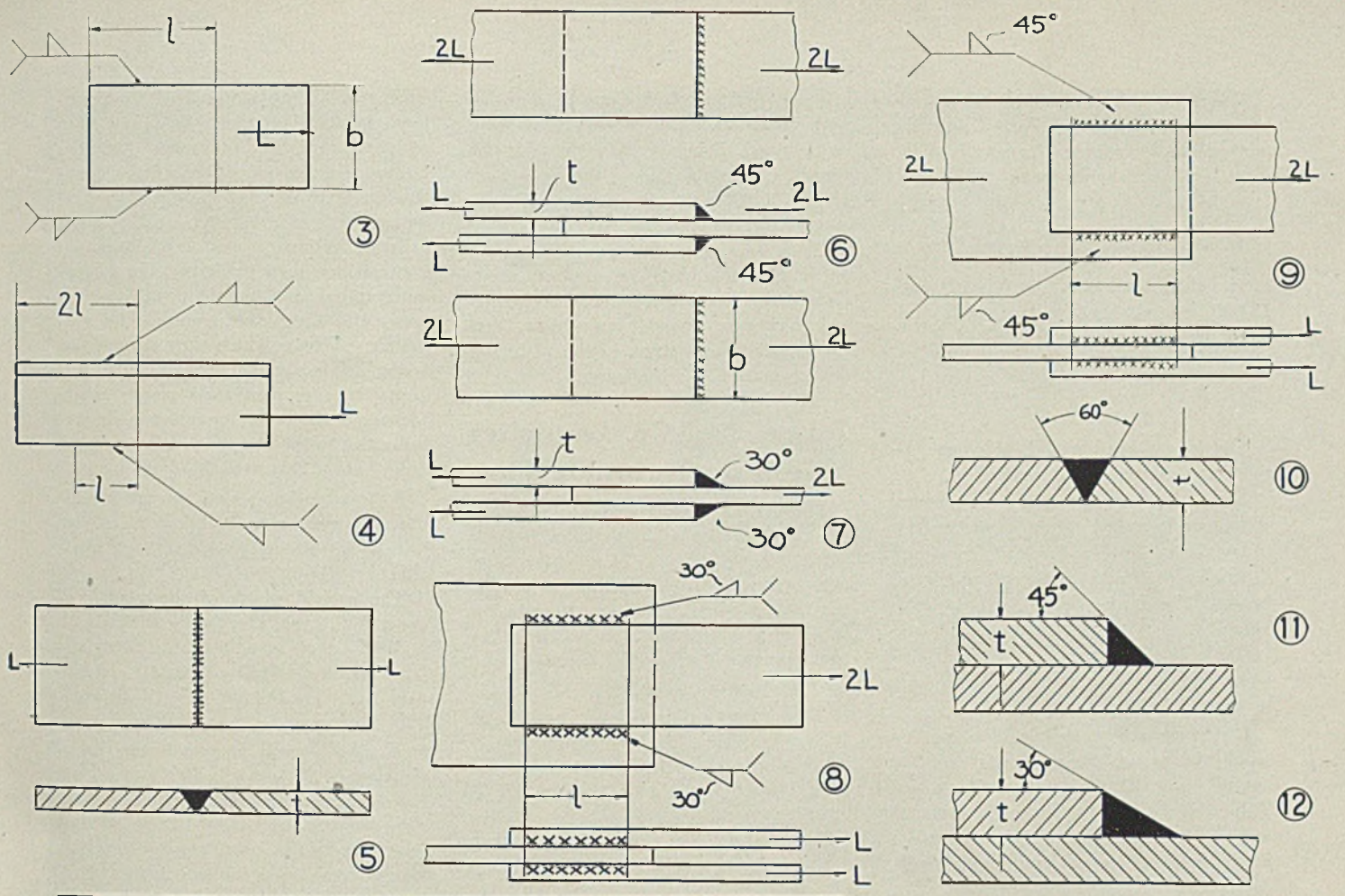


TABLE IV—Bead Length for Various Joint Types

Type of Joint	Throat Area, One Bead	Unit Stress Lbs./Sq. In.	Size of Bead
Fig. 3	0.707 t 1	K = Unit Stress in Kips in bar	$\frac{bK}{20}$ = 1 = effective length one bead
		$\frac{L}{t\ b\ (1000)}$	
Fig. 4	0.707 t 1	K = Unit Stress in Kips	$1 = \frac{aK}{15}$
		a = length of leg	
Fig. 5	tb	$\frac{L}{tb}$	$\frac{L}{Sb}$
Fig. 6	$\frac{\sqrt{2}\ t\ b}{2}$	$\frac{\sqrt{2}L}{t\ b}$	$\frac{\sqrt{2}\ L}{Sb}$
	0.707 t b	$\frac{1.414\ L}{t\ b}$	$\frac{1.414\ L}{S\ b}$
Fig. 7	$\frac{\sqrt{3}\ t\ b}{2}$	$\frac{2\ L}{\sqrt{3}\ t\ b}$	$\frac{2\ L}{\sqrt{3}\ S\ b}$
	0.865 t b	$\frac{1.153\ L}{t\ b}$	$\frac{1.153\ L}{S\ b}$
Fig. 8	$\frac{\sqrt{2}\ t\ 1}{2}$	$\frac{2\ L}{2\sqrt{2}\ t\ 1}$	$\frac{2\ L}{2\sqrt{2}\ S\ 1}$
	0.707 t 1	$\frac{0.707\ L}{t\ 1}$	$\frac{0.707\ L}{S\ 1}$
Fig. 9	$\frac{\sqrt{3}\ t\ 1}{2}$	$\frac{2\ L}{2\sqrt{3}\ t\ 1}$	$\frac{2\ L}{2\sqrt{3}\ S\ 1}$
	0.865 t 1	$\frac{0.576\ L}{t\ 1}$	$\frac{0.576\ L}{S\ 1}$

TABLE V—Bead Data

Type of Joint	Volume of Bead	Unit Stress in Bead	Ratio of Unit Stresses in Bead	Volume for Same Unit Stress in Bead	Ratio of Volumes for Same Stress
Fig. 10	$\frac{t^2\ b}{\sqrt{3}}$	$\frac{L}{t\ b}$	1	$\frac{t^2\ b}{\sqrt{3}}$	1
Fig. 11	$\frac{t^2\ b}{2}$	$\frac{\sqrt{2}\ L}{t\ b}$	$\sqrt{2}$ or 1.414	$t^2\ b$	1.73 or $\sqrt{3}$
Fig. 12	$\frac{\sqrt{3}\ t^2\ b}{2}$	$\frac{2\ L}{\sqrt{3}\ t\ b}$	$\frac{2\sqrt{3}}{3}$ or 1.1153	$\frac{2\sqrt{3}\ t^2\ b}{3}$	2

lengths of beads for joining angles to plate as in Fig. 2, where the legs of the angle are equal. If t equals thickness and a equals length of leg, then the area A is approximately:

$$A = 2ta - t^2$$

Since the t^2 may be dropped and still retain an ample margin of safety, the area becomes $2\ ta$. Load is, therefore, $2ta \times S$. Assuming bead capacity as $t \times 9600$ and calculating bead length as outlined for Fig. 1, we have:

$$\frac{2ta \times S}{t \times 9600} = \frac{aS}{4800} = \text{total bead length}$$

In angle connections of the type shown in Fig. 2, it is customary to proportion the beads inversely as their distance from the center of gravity. Therefore, in proportioning the two beads, the shorter bead (at toe of angle) will be one-third of the total bead length since the distance from the center of gravity to the heel of the angle is $1/3a$. The shorter bead will then be:

$$\frac{1}{3} \times \frac{aS}{4800} = \frac{95}{14{,}400} = \frac{aK}{14.4}$$

As an example, again assume that S equals 16,000 pounds per square inch unit stress. Then shorter bead will be

$$\frac{1 \times a \times 16}{14.4} = 1.11a$$ (a being length of leg)

This is for unit stress of 16,000 pounds per square inch in angle. Using the more general expression for length of the short bead, we should have:

$$\frac{2a}{3} \times \frac{K}{9600} = \frac{aK}{14.4}$$

The short bead of a 3-inch angle with 18,000 pounds per square inch unit stress, welded as in Fig. 2, would be:

$$3 \times \frac{18}{14.4} = 3.75 \text{ inches.}$$

The longer bead would, of course, be twice the shorter or 7.5 inches.

Thus $aK/14.4$ expressed as a general statement becomes: Multiply unit stress in angle in Kips by length of leg and divide by 14.4 to obtain length of shorter bead. The longer bead is twice this value.

Table II illustrates how tabulations of bead lengths for angles may be made quickly.

Obviously a less approximate method would be to use the dimensions of the angle as given by the steel manufacturers. Table III gives data for eight sizes of angles. It is based on a unit stress in the angle of 20,000 pounds per square inch, a figure used merely because of the ease with which values at other stresses may be obtained. Thus at 18,000 pounds per square inch stress, the bead length is 18,000/20,000 or nine-tenths of the length given in Table III.

Other interesting data may be worked out on the same basis—i.e., uniform stress distribution. Assume a plate of breadth b and thickness t transmitting a load. Then for the same unit stress in the plate the data given in Table V are true.

Rotor Tool Co. Launches "Keep 'Em Running" Plan

Rotor Tool Co., Cleveland, announces an extensive campaign to help the war effort by helping users of air-driven and high cycle electric grinders, buffers, sanders and drills of all makes to care for these vital industrial tools so that they will operate at maximum efficiency and have maximum working life.

This plan, as explained by H. P. Bailey, president, has been worked out to cover all phases of maintenance and conservation of these tools under difficult wartime conditions.

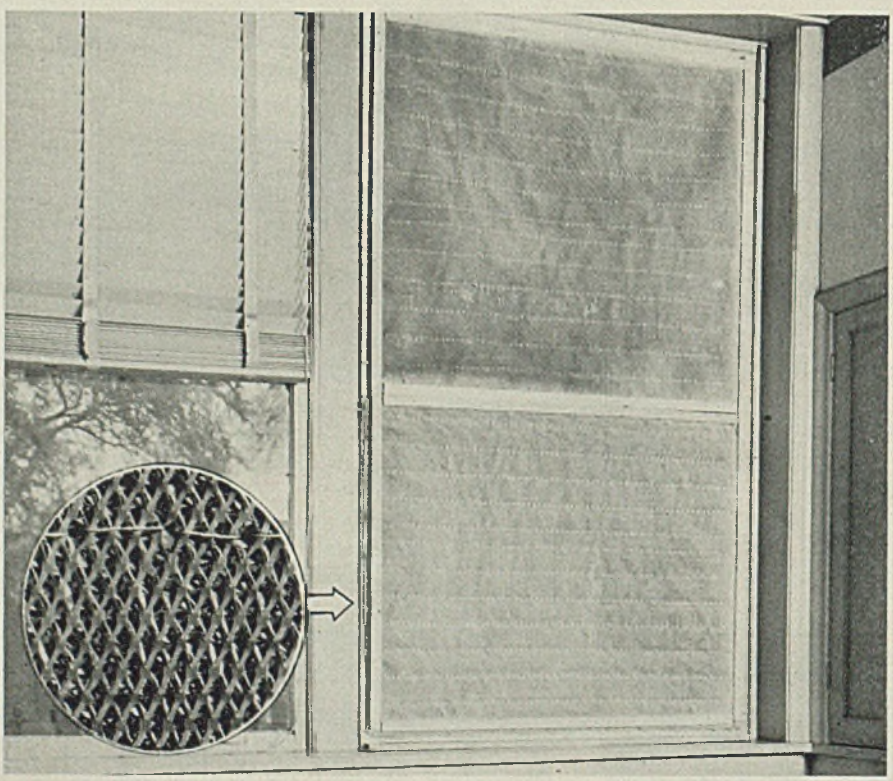
Included in the plan are large shop posters carrying "Maintenance Tips"—each "tip" being emphasized by a cartoon; booklets entitled, "Keep 'em Running" which go into more detail than the posters, for the special benefit of maintenance men; detailed information on repair parts and their use; and personal calls by company service engineers on maintenance men to deliver the foregoing material, and to confer with and advise maintenance men regarding the particular problems which they are encountering. If a service man discovers that a maintenance man lacks proper equipment—a tachometer for instance—he will bring this to the attention of the management before he leaves the user's plant.

Posters and booklets on pneumatic tools—in each case carrying the slogan "Keep 'em Running"—already are available.

The second phase of the plan, covering high cycle electrically driven tools is just being completed. Posters and booklets on this phase—carrying the slogan "Keep 'em Producing"—will be available very soon.

The booklet on pneumatic tool maintenance is 8½ x 11 inches in size and has 12 pages carrying diagrams, instruction drawings and emphasizing cartoons which make the brief, clear instructions just so much more understandable. Subjects covered include: Lubrication; importance of clean air; how to deal with moisture; care and renewal of blades; ball bearings; end plates; governors; safety rules; what to do when starting a new tool, and what to do if a tool loses power.

Blackout and Shatter Screen



THIS BLACKOUT and shatter screen developed by Research Products Corp., Madison, Wis., according to repeated tests, both blacks out lighted windows and arrests flying glass during air raids. It actually is a porous blanket made up of 16 layers of black flameproof expanded fiber and 4 layers of light-colored expanded fiber mounted in a light wooden frame. This construction is said to allow air created by bomb concussions to pass through, yet stopping the broken glass

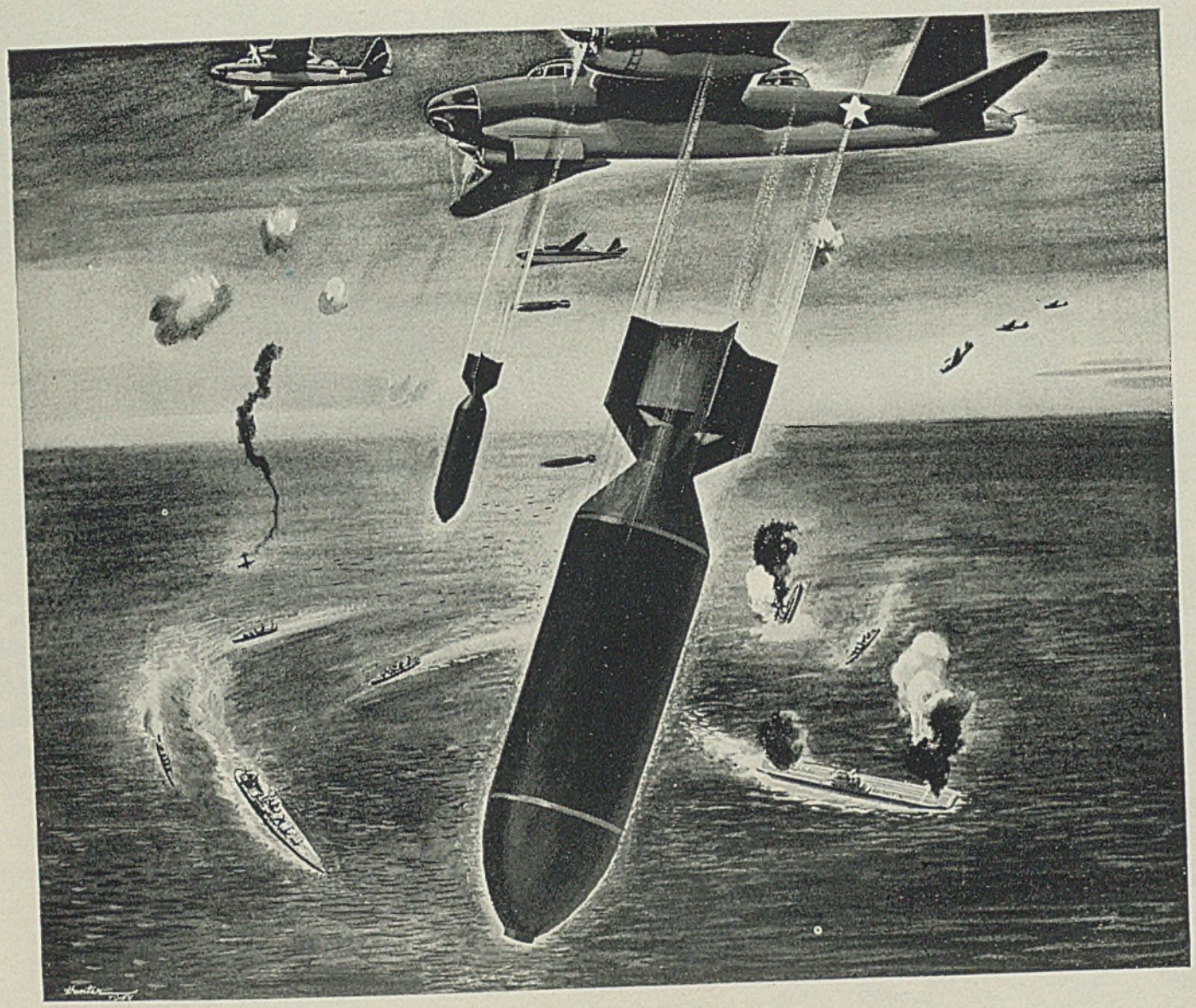
Electro-Deposited Copper Keeps War Plants Going

Five-Thousands of an inch of electro-deposited copper plating averted recently a threatened shortage of electric power in the busy Boston war production area, the Electroplating Division, E. I. Du Pont De Nemours & Co., Wilmington, revealed.

A vertical steam turbine in a local power plant developed a bad "chatter" forcing a shut down. The stoppage came as producers were increasing their demands for electric power.

Investigation showed the shaftway running through the center of the turbine's rotating field had worn so the rotating field did not fit snugly enough on the 35-ton shaft. Upon a suggestion the "chatter" was eliminated by building up the shaftway with an electro-deposition of copper. A deposit varying from two to five-thousandths of an inch did the job, and the turbine was ready for service in about 24 hours.

Representatives of the Trement Old Colony Plating Co., Boston, plated the shaftway with the aid of Du Pont's Electroplating Division.



GAS helped make this bomb!

Down over the spot where the sub's periscope showed itself just a minute before goes a bomb, dropped by one of our patrol planes off the Atlantic coast. And another Nazi submarine is off the list.

Gas helped make that bomb . . . for heat treating of bombs and shell cases—just as with parts for tanks and airplanes and armorplate for ships—is highly important as a step in manufacture for war. Without Gas, today's production pace . . . and the uniformity of quality demanded . . . could never be maintained.

Every one of the Gas industry's resources today is bent on one thing only—a speedy victory for the United Nations. All the experience, research and engineering knowledge gained by this great industry in the last five, ten, twenty years is being made available to American industry in its swift conversion to war production.

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Call your Gas company today. It stands ready to help in any way possible.

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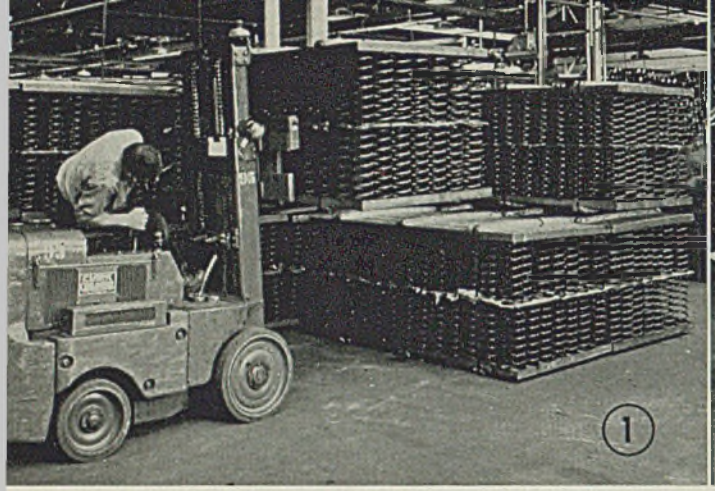

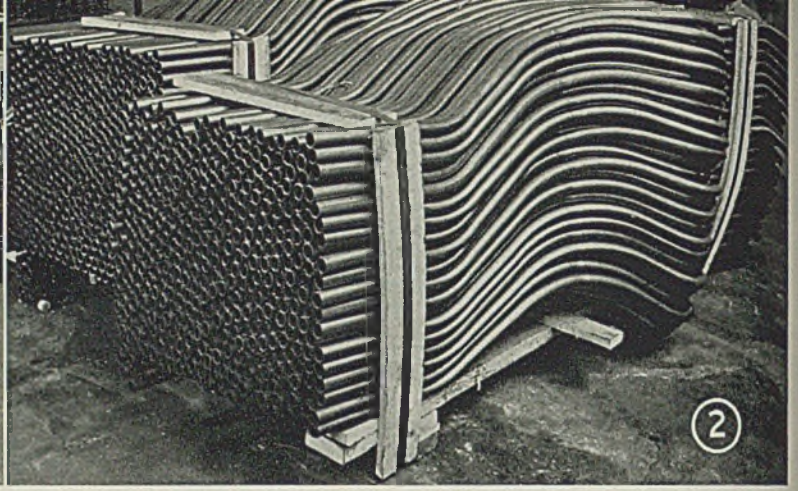

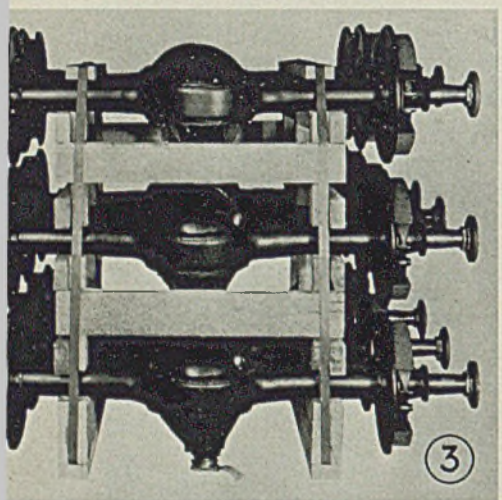

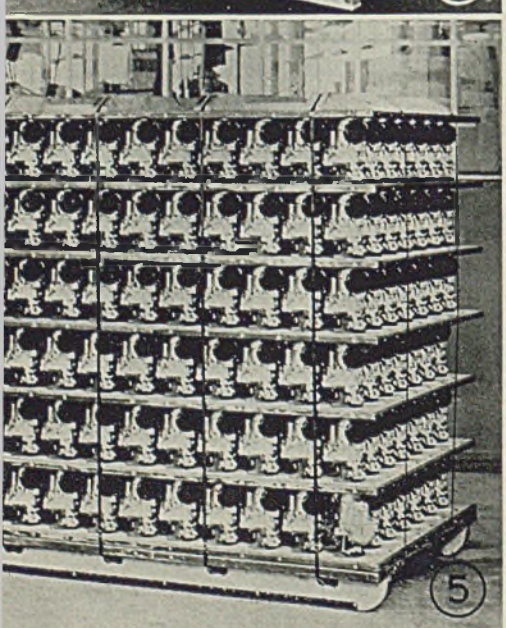

SPEEDING DELIVERIES

....by use of unit packages and mechanized handling equipment

By C. M. GODFREY
Clark Tructractor Division
Clark Equipment Co.
Battle Creek, Mich.

DELIVERIES are of paramount importance these days, and many companies are desperately seeking ways to multiply man-power, speed production and increase all-around efficiency. Since the majority of commodities, despite the progress that has been made in production methods, still are packaged for old-fashioned hand-labor movement instead of for modern mechanized movement, packaging and handling offer a fertile field for further increases in efficiency. The possibilities of unit packaging and mechanical handling are receiving increasing attention in this connection.

Reducing manual handling will greatly increase efficiency in many plant departments including receiving, warehousing, processing and shipping. The adoption of standard packages for materials, parts and finished products (with the use of a machine for handling these packages quickly and economically, speeds deliveries, releases men for production work, eliminates many damage claims and split shipments, lowers handling costs, and makes inventory easier.

Since the packaging of incoming material or parts is usually undertaken with the object of increasing the efficiency of the production step, the production manager should determine the character of the package. In the construction of the package he must take into consideration the shape and weight of each unit as well as many other factors. He may build several different experimental packages before he obtains one that is suitable for

Fig. 1—Coil springs of any size are awkward to handle. But by making up this unit package 182 large coil springs are assembled into a package that is easily handled and shipped. Flanged sheet steel top and bottom sections hold spring ends in place. Reinforcing boards enable steel straps to be applied with sufficient tension to hold all springs tightly in place. Boards also space bottom off floor sufficiently to allow forks of truck to slide under for lifting

Fig. 2—Three dimensional bends in these exhaust tubes make them difficult to handle. The method worked out employs steel straps to hold them on skids. This permits almost 400 to be moved as a single unit

Fig. 3—Axle assemblies are an especially awkward type of product because there are no flat sides. However, by use of spacer frames, nine axle assemblies are made into a single unit that can be handled conveniently by power truck. Steel straps hold the package together

Fig. 4—Old and new packaging methods. Left shows radiators packaged individually in cartons. Right shows double-faced pallet with 16 radiators assembled on it by steel wire and hand strapping. This new multiple-trip folding box eliminates much damage that formerly occurred with the older packaging method

Fig. 5—Here 70 carburetors are packed per layer, six layers being steel strapped to a skid to make up a single unit for handling and shipping. Thus 420 carburetors can be loaded or unloaded on truck or freight car in a single operation. Note edges of intermediate sections as well as top and bottom sections are reinforced with metal straps to absorb wear at exposed points

ennsalt Cleaner is helping speed the produc-
on of Machine Gun barrels in this plant, with
ast, efficient stripping and cleaning.

Prominent Manufacturer of Tools, Gauges, Machines and Specialty Parts reduces rejects—increases production—cuts costs

with PENNSALT CLEANERS

This manufacturer of precision parts—many for guns and aircraft—requires metal cleaners with extraordinarily high standards of performance. The extremely close tolerances to which the parts are held—plus the imperative demand for maximum output made the choice of cleaner important.

Pennsalt Cleaners meet the rigid requirements of this plant with notable success. The operations were:—The unusually thorough and uniform removal of oil and buffing compound from steel and zinc necessary before chrome plating . . . the stripping of hard chrome plate from steel, with the positive assurance of no injury to the steel surface . . . and the heavy-duty cleaning of steel prior to cadmium plating.

The illustration above shows machine gun barrels being cleaned. Pennsalt Cleaner is used to clean new barrels before chrome plating and, in reconditioning barrels, to strip chrome from the steel before replating.

In all their exacting duties Pennsalt Cleaners have an outstanding record. Here it is:—*Increased production because of fewer rejects* . . . a reduction in cleaning costs . . . smoother plating surfaces and more efficient stripping, through better conductivity.

A test in your plant under your own conditions will show you why Pennsalt Cleaners have won the confidence and endorsement of so many manufacturers in a wide range of metal cleaning operations. An experienced technical staff is at your service for information or advice, without obligation. Or write fully to our Pennsalt Cleaner Division, Dept. S.

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Even More...

New Treasury Ruling Permits Purchases UP TO $100,000, in any Calendar Year, of Series F and G WAR BONDS!

The Treasury's decision to increase the limitations on the F and G Bonds resulted from numerous requests by purchasers who asked the opportunity to put more money into the war program.

This is not a new Bond issue and not a new series of War Bonds. Thousands of individuals, corporations, labor unions, and other organizations have this year already purchased $50,000 of Series F and G Bonds, the old limit. Under the new regulations, however, these Bond holders will be permitted to make additional purchases of $50,000 in the remaining months of the year. The new limitation on holdings of $100,000 in any one calendar year in either Series F or G, or in both series combined, is on the cost price, not on the maturity value.

Series F and G Bonds are intended primarily for larger investors and may be registered in the names of fiduciaries, corporations, labor unions and other groups, as well as in the names of individuals.

The Series F Bond is a 12-year appreciation Bond, issued on a discount basis at 74 percent of maturity value. If held to maturity, 12 years from the date of issue, the Bond draws interest equivalent to 2.53 percent a year; computed on the purchase price, compounded semiannually.

The Series G Bond is a 12-year current income Bond issued at par, and draws interest of 2.5 percent a year, paid semiannually by Treasury check.

Don't delay—your "fighting dollars" are needed *now.* Your bank or post office has full details.

Save With . . .

War Savings Bonds

This space is a contribution to America's All-Out War Program by STEEL

Fig. 6—Rubber mats can also cause handling difficulties. One way to solve them is to steel strap the mats on double-faced pallets as shown here. In this way, some 250 are handled by the fork truck as a single package

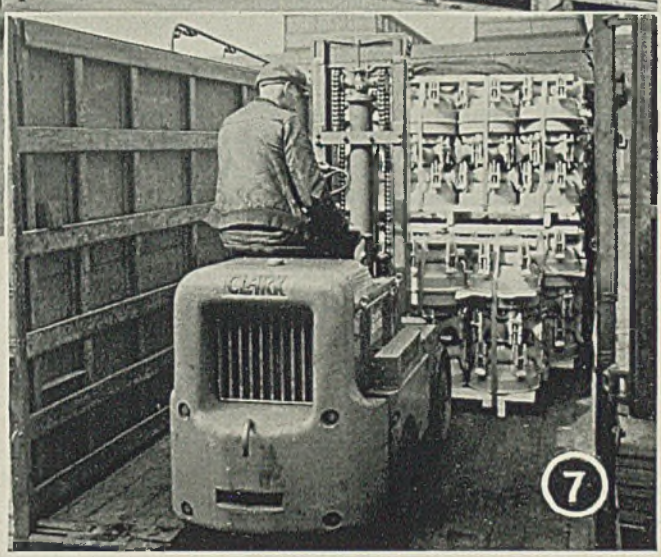


Fig. 7—Castings steel strapped to skids make a unit package that is quickly loaded and unloaded at both shipping and receiving end. This reduces time transportation facilities are tied up at both ends, enables them to make more trips per day

most requirements, and later he may find changes and improvements necessary. Figs. 1, 2, 3, 4 and 6, showing coil springs, exhaust tubes, axles, radiators and floor mats are examples of packages which can be developed for odd-shaped or hard-to-pack parts.

The original design and construction of the unit package should be adaptable to the assembly line, but packages suitable for assembly line operations may not meet requirements of the receiving and inspection departments. And those for freight cars may not be suitable for transport trucks. Slight changes in design usually eliminate the objectionable features.

The amount of material required daily for production use may prove the deciding factor in limiting the size of the package. However, it is entirely possible to construct a package which may be broken into several segments without requiring additional manual handling. This is usually a multi-layer package, with each providing sufficient material for a specified amount of time on the assembly line. In Fig. 5 are shown carburetors as packed during shipment and as unpacked ready to be taken to the assembly line. Note the "layer" construction of the packages shown here.

The former method of packing automobile clutches was to pack three in a carton. The modern "layer" method now employed in which about 160 clutches are packaged into one unit load, reduces handling operation and increases efficiency of both vendor and buyer. The package is taken directly to the assembly line of the motor car or truck manufacturer, the emptied package is easily bundled for return to the vendor for many additional trips. This increases greatly the economy of the packages.

It is also possible, where several different items are shipped from one plant to another, to incorporate the various types of parts in one unit package, provided the material is delivered to the same point on the assembly line. This has accounted for much of the success of the unit package method in the automotive industry.

Coal-Tar Pitch Kills Magnesium Fires

A product reported actually to extinguish magnesium fires and bombs, instead of merely confining the fire, is announced by Waverly Petroleum Products Co., Philadelphia.

Known as Speedi-Out, it operates by cutting off completely the supply of oxygen from the bomb. In a demonstration test at Wright Aeronautical Corp. recently the product completely extinguished a magnesium fire bomb in 2 minutes, 53 seconds.

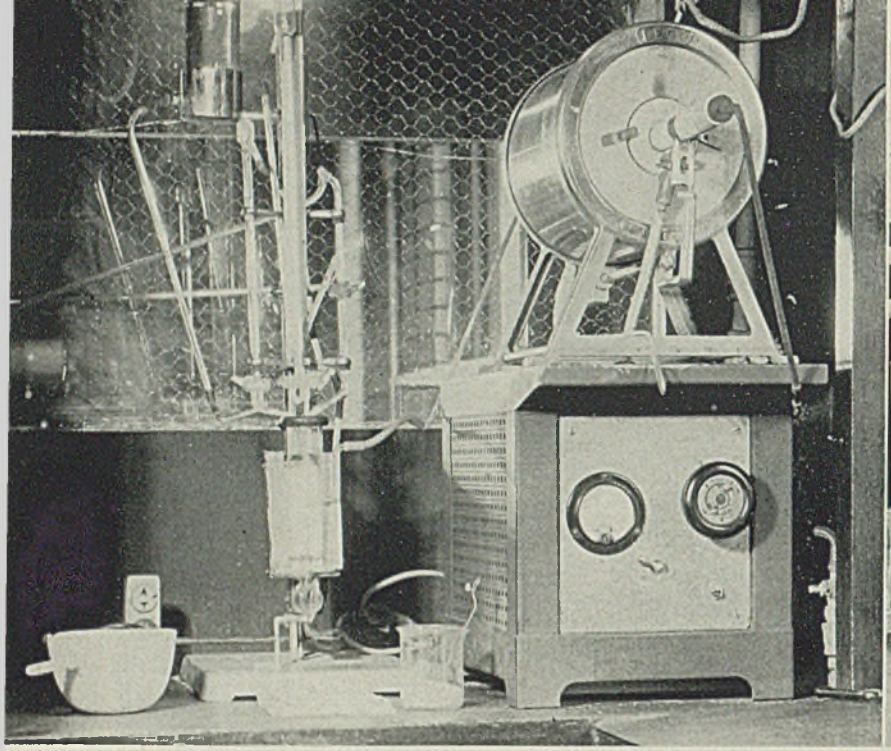
The product is a hard coal-tar pitch that is nonabrasive, noncorrosive and nontoxic. It has a 6/35 mesh with a softening temperature exceeding 300 degrees Fahr. By extinguishing the fire instead of merely confining it, the manufacturer points out, the product lessens damage to machines and other property. Also, when dry, it can easily be chipped off and the machine or other property salvaged.

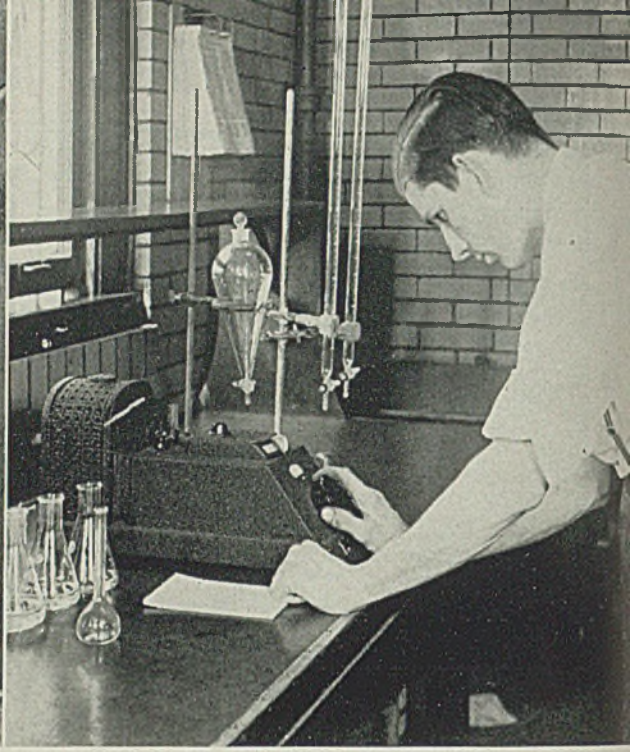
Lessons in Aircraft Riveting for Schools

Aircraft Riveting Fundamentals, by George E. Tabraham; paper. 32 pages, 8½ x 10¾ inches· published by Bruce Publishing Co., Milwaukee, for 50 cents.

This is a simple manual for students learning to rivet aircraft parts, designed for school use. It is plentifully supplied with diagrams and concise instructions for procedure. Common mistakes are shown with methods of correction.

Practical work is offered in a series of ten jobs to be executed by the student and checked by the instructor.





Left, above, this is the equipment used in the sulphur determination described here. Right, photoelectric calorimeter used in the quick molybdenum determination

SHORTCUTS

. . . . for determining sulphur and molybdenum in alloy steels

By E. R. VANCE
Chief Chemist
Timken Roller Bearing Co.
Canton, O.

STEEL MILLS of this country are being called upon to supply larger tonnages of steels than ever before for our wartime use. Plants that formerly produced enormous quantities of plain carbon steels are being revamped to furnish even larger amounts of the alloy steels of which tanks, destroyers and bombers are made.

The chemical laboratory is doing its bit for the program by furnishing faster, more accurate control analyses of these grades of steel. With recently developed chemical procedures which are less time consuming, an analyst has a greater capacity for work and has more time for extra duties which are appearing every day. These methods for the determination of sulphur and molybdenum have been in use for the past several years in the chemical laboratory of the Timken Roller Bearing Co. on all types of plain and alloy steels. They have proved their merit, checking accurately the results obtained by standard gravimetric procedures, in addition to being far less time consuming.

While no claim is made for originality in the following methods, some of the modifications and the manner of applying these procedures to the control chemical laboratory may be of special interest.

Sulphur in Steel: The combustion-oxidation method for determining sulphur in steel employs a combustion furnace and titration assembly known as the Lecosulphur determination distributed by the Laboratory Equipment Co., Benton Harbor, Mich. It is the fastest method known to this laboratory for the determination of sulphur in all types of steel, the result being obtained within 2 minutes after the steel has been weighed. The sulphur dioxide gas formed by the fusion of the steel sample in a stream of oxygen at 2100 degrees Fahr. is absorbed in a weak starch solution with potassium iodate solution.

Solutions: No. 1 is hydrochloric acid solution of one part concentrated hydrochloric acid to one part water. No. 2 is a starch solution consisting of 0.3-gram of wheat starch, 8.0 grams of potassium iodide in 1 liter of water. Make a thin paste of the wheat starch and a little water and stir into approximately 0.6-liter of boiling water. Cool, add the potassium iodide and dilute to 1 liter and shake well.

Solution No. 3, the titrating solution, consists of 0.2-gram of potassium iodate, 1.2 grams of potassium iodide, 0.2-gram of potassium hydroxide, in 1 liter of water.

Procedure: A 1.0-gram sample of steel is weighed into a porcelain combustion boat, after which 0.1-gram of 30-mesh tin metal is sprinkled over the sample and the boat covered with a porcelain shield. The titration vessel is filled to the 0.075-liter mark with the starch solution, to which is added 0.001-liter of hydrochloric acid (1 to 1) and a few drops of the potassium iodate titration solution to produce a blue color.

The boat containing the sample is then placed in a combination furnace which is maintained at a temperature of 2100 degrees Fahr. and an oygen flow of 2 liter per minute is introduced into the combustion tube. The oxygen and sulphur dioxide gas formed are lead through a plug of glass wool to remove iron oxide and then through a bubbling apparatus in the lower part of the starch-filled titration vessel where the gas stream is broken into minute bubbles for better absorption.

As the sulphur dioxide gas is bubbled through the titration vessel, the blue color will fade and an additional amount of titration solution must be added to maintain the blue end point. When no further fading is noticed and the blue end point is permanent, a reading is taken from the burette and converted directly to sulphur, 0.001-liter being equal to 0.001 per cent sulphur.

Molybdenum in Steel: The increasing demand for molybdenum steels, as well as the popularity of recently simplified photoelectric colorimeters was responsible for an investigation to establish a meth-