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STEEL

The Magazine of Metalworking and Metalproducing

VOL. 119, NO. 17 OCTOBER 21, 1946

NEWS

TECHNICAL

FEATURES

MARKETS

NEXT WEEK...

Belt Tensioning with Steel Cords
Gel Lacquer Coatings Provide Durable "Plastic Veneer"
Functions of Alloying Elements in Heat Resisting Steels
Modern Gear Inspection
Correct Use and Servicing of Carbide Mandrels

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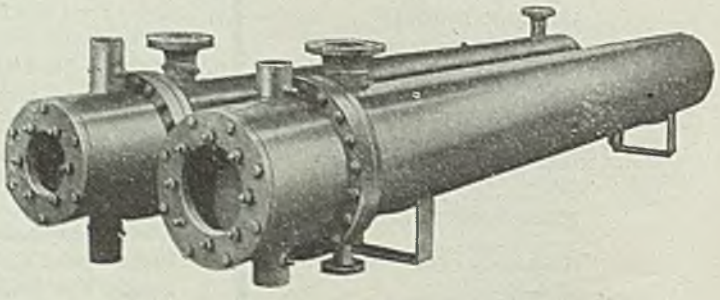

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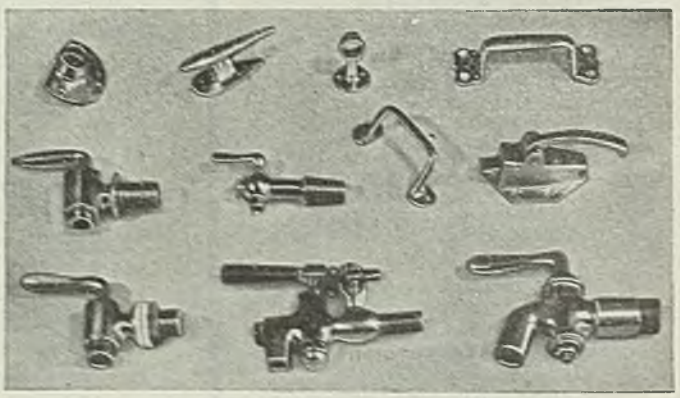

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Only 2 percent of Nickel gives these gear rim blanks and transformer case castings what they need. Nickel improves the strength of standard bronzes and is particularly effective in raising elastic properties . . . increasing shock-resistance as much as 25 to 30 percent. Moreover, Nickel increases castability . . . thus it helps to reduce losses due to mis-runs and affords a widened casting range. The photograph shows Nickel-Bronze castings produced by the Philadelphia Bronze & Brass Corp.

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As the EDITOR VIEWS the NEWS

Dawn of New Era

Every thoughtful citizen should watch eagerly for events that will clarify the meaning of the great change that has come over the American people during the past few weeks. The resentment that caused President Truman to retreat reluctantly from his stubborn support of wage and price controls may not be satisfied by the mere abandonment of government regimentation in peacetime. It may not be appeased until many discriminatory policies of the New Deal have been swept aside, leaving intact only those reforms which have withstood successfully the tests of time and experience.

That the storm of protest may not subside short of this broad objective is indicated by the composition of the opposition to the President's program. When Mr. Truman spoke last Monday night, he had been deserted on his stand for continued controls by overwhelming majorities in both major political parties, by his own cabinet, a majority of labor, most farmers and businessmen and the general public. Standing with him as he surrendered to the inevitable were only Paul Porter, CIO-PAC, and a few New Dealers and left wingers.

No matter how far this surge of rebellion may go eventually, it already has gone far enough to establish a definite trend of the American mood toward the right. This is tremendously significant.

At home it opens up the possibility of giving private enterprise an opportunity to demonstrate its virtues and to regain prestige lost during years of unfair abuse, harmful discrimination and unwarranted regulation. On the international scene, it will permit our system to match its performance with that of totalitarianism in Russia and of socialism in England and certain European countries.

This need not mean a postwar competition between communism, socialism and our own "laissez-faire capitalist" system, as Walter Lippmann describes it. Instead it could mean a rivalry between a communist system in Russia that to an increasing extent is borrowing tricks from the capitalistic bag, a socialist system in England that already is withdrawing from some of the leftist extremes in the Labor party's original program and a system of private enterprise in the United States that does not go back to the worst of laissez-faire but goes forward to an enlightened concept in which private initiative—with proper encouragement and under reasonable restraints—recognizes its obligation to the public weal.

If we will be wise, the rebellion of Oct. 14 could usher in the dawn of a new golden era of opportunity.

THREE MONTHS IN "RED": Detroit Editor A. H. Allen has made an interesting comparison of the tonnage of flat-rolled steel received by the automobile industry with the tonnage required for the motor vehicles it has produced.

He takes American Iron & Steel Institute figures on shipments of hot and cold-rolled sheets and strip and arbitrarily arrives at a tonnage presumably received by the automobile industry in the first seven months of 1946. Then, figuring 0.826 ton of hot-rolled and 0.482 ton of cold-rolled per car, he calculates the tonnage required for the 1,387,701 vehicles actually produced during this period. He finds receipts exceeded requirements by more than half a million tons.

Figuring on the same basis for July alone, he gets a deficiency in shipments of more than 35,000 tons. This deficiency, which evidently started in July, probably continued in August and September. Three months in the "red" as to steel supply could easily account for the present low inventory position of motordom.

After all, automobile output in August was at an annual rate exceeded in only six years in the indus-

(OVER)

try's history. That rate calls for lots of steel, particularly when so much is being commandeered by government for unusual purposes. Also, there are other bottlenecks—copper, lead and components, not forgetting excessive worker absenteeism precipitated by the opening of the hunting season. —p. 79

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TOO MANY STRIKES: A survey of the outlook for Great Lakes shipping indicates that vessel operators may be hard pressed to move adequate tonnages of iron ore, coal and grain before bad weather closes the navigation season.

At present it seems probable that 55 million tons of iron ore may be brought down, against an early season goal of 60 million tons. Good luck may permit shipments of 50 million tons of coal, which was the nominal goal. Considerable grain remains to be moved, which fact is prompting grain shippers to offer attractive rates to vessel operators to shift from ore to grain cargoes.

Primary cause for the late season pressure on the fleet is found in four major strikes—steelworkers in January, iron ore miners in late winter and spring, coal miners in April and May and National Maritime Union in August, to say nothing of chronic labor difficulties with tugboatmen.

Considering these handicaps, the tonnage moved is gratifying. —p. 63

° ° °

FIVE AIR FREEDOMS: In a recent flight around the world, this writer was impressed by the high ratio of American-built to foreign-built planes observed on international airways. This impression now is confirmed by figures supplied by the Civil Aeronautics Board. Of about 225 planes flown by all nations over international air routes as of Sept. 15, approximately 205 were of American manufacture. Five American lines were flying 147 American-built aircraft and foreign lines were flying about 75 planes of which 60 were made in the United States.

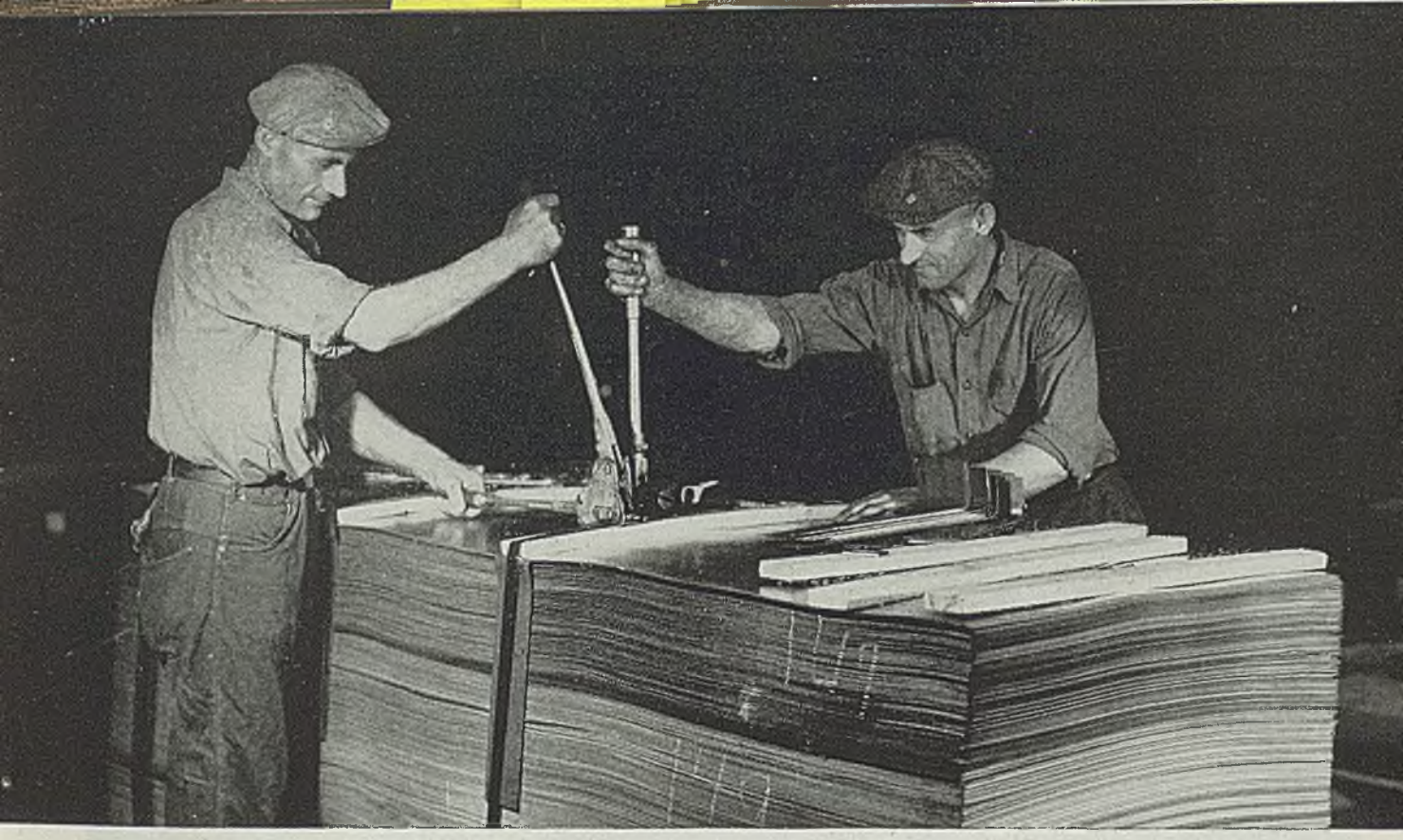
This preponderance is due to the quantity and quality of American aircraft and to the phenomenal performance of the Air Transport Command during the war. No other nation has comparable aircraft building facilities or international air line experience.

If our nation is to retain its rightful share of these advantages, we must have "five-freedom" agreements with many nations similar to those we now have with Britain, France, Brazil, Spain, Sweden, Norway, Belgium and others. This is important to America's postwar aircraft and aircraft parts industries. —p. 72

SIGNS OF THE TIMES: American Railway Car Institute denies charges that export shipments of railway freight cars are impeding delivery of rolling stock to railroads in the United States. Deliveries of foreign cars to date this year total 5693, it states (p. 82), whereas during the first nine months of this year 24,330 cars were delivered to American railroads by car builders and 7389 by railroad shops for a total of 31,719. Only a critical lack of materials is holding up freight car production, the institute declares. . . . Employees of Northrop Aircraft Inc., Los Angeles, for the third time have voted against recognizing CIO as their bargaining agent (p. 85), this time by a vote of 69.3 per cent against the union. . . . General Electric Co. will build a $20 million plant at Schenectady for the manufacture of steam turbines and electric generators. Construction is expected to start before the end of this year (p. 83) and will be completed in 20 months. Installation of equipment will require an additional six to nine months. . . . Chairman Roger C. Slaughter of the House Committee to Investigate the Disposition of Surplus Property has pieced together the details of the story (p.72) of the diversion of 5000 tons of steel rails to Yugoslavia. It involves CPA, UNRRA, the State Department, China and Congress and makes interesting reading. . . . Investigation of the status of centrifugal casting of metals in Germany as of V-E day shows that equipment and technique were comparable to modern American practice (p. 101) and somewhat ahead of British standards. Casting of steel gun barrels was highly developed and the use of a thin sand mold consisting of clean silica sand spun in the mold just before casting may represent a real advance in casting heavy tubing. . . . Prefabricated homes of metal are figuring more prominently in the housing program. Northwestern University eased the problem presented by record-breaking enrollment by erecting prefabricated steel and aluminum housing units (p. 77) to afford living quarters for 1000 students and their families. RFC has entered into a guaranteed-market contract with a Philadelphia manufacturer (p. 76) to produce 10,000 prefabricated steel homes at f.o.b. factory prices ranging from $2925 to $3672 . . . . In the first of an important series of articles on magnesium (p. 92) Consulting Editor Allen G. Gray presents valuable background data on production facilities and costs in privately and government-owned magnesium plants in the United States.

E. C. Shane

EDITOR-IN-CHIEF



How to Lower The Machine-Side Cost of Steel

Steel is a low cost large tonnage product when compared with other metals. But the net cost delivered alongside your machinery and equipment varies greatly in different plants depending upon the mill methods of packing and shipping—and the manufacturers' methods of receiving and handling.

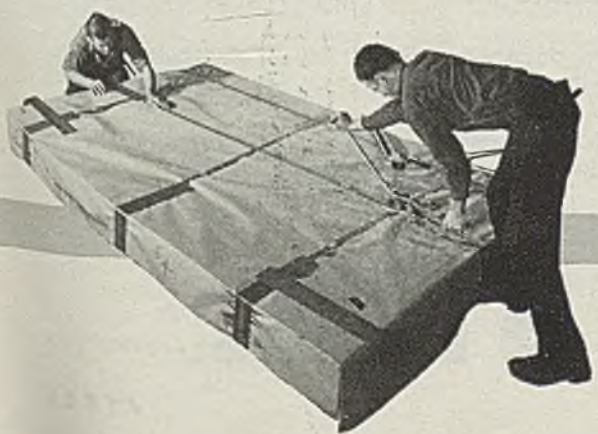
The preservation of quality is still another factor in final machine-side delivery. For these reasons Inland packing and shipping experts are always studying and trying new and better methods that will not only protect the quality but lower the delivered cost of steel.

They are also glad to work on your particular problems—determining the method of transportation; type of cars or trucks required; sizes of lifts or packages; protection needed for material in transit; methods of unloading; character and capacity of unloading and handling equipment... all important factors in net costs of delivered steel.

Proof of results is revealed in cases where unloading costs were reduced by 75% . . . car unloading improved from 6 to 16 cars in eight hours . . . storage space reduced 40% . . . and there are many other cases of important savings for Inland customers.

We are still unable to meet the great demand for Inland steel . . . but we are always glad to cooperate with our customers in determining not only the right steel for their particular needs but also to aid them in developing the lowest possible machine-side cost of steel.

You are invited to call whenever you believe we may be of service.



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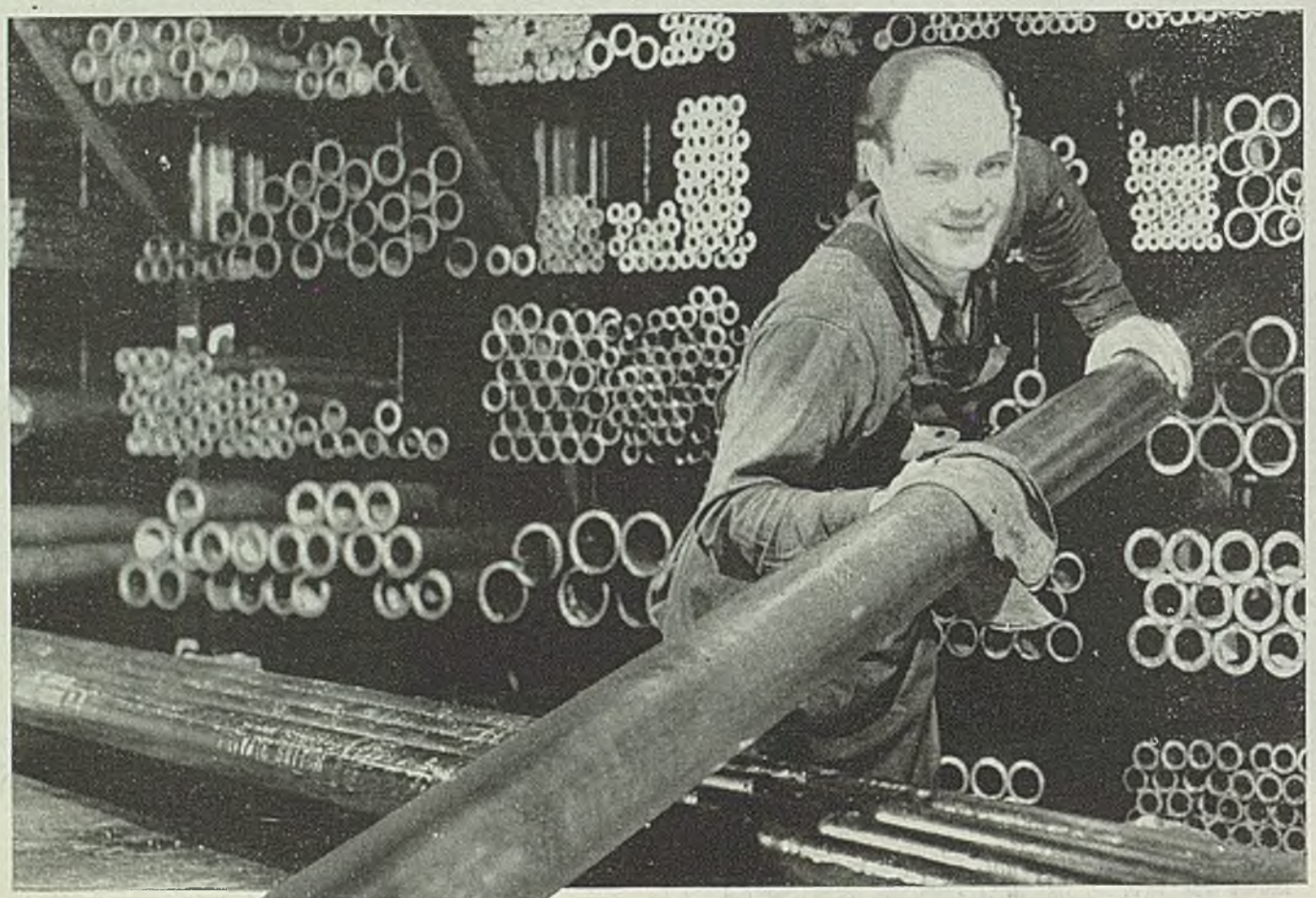

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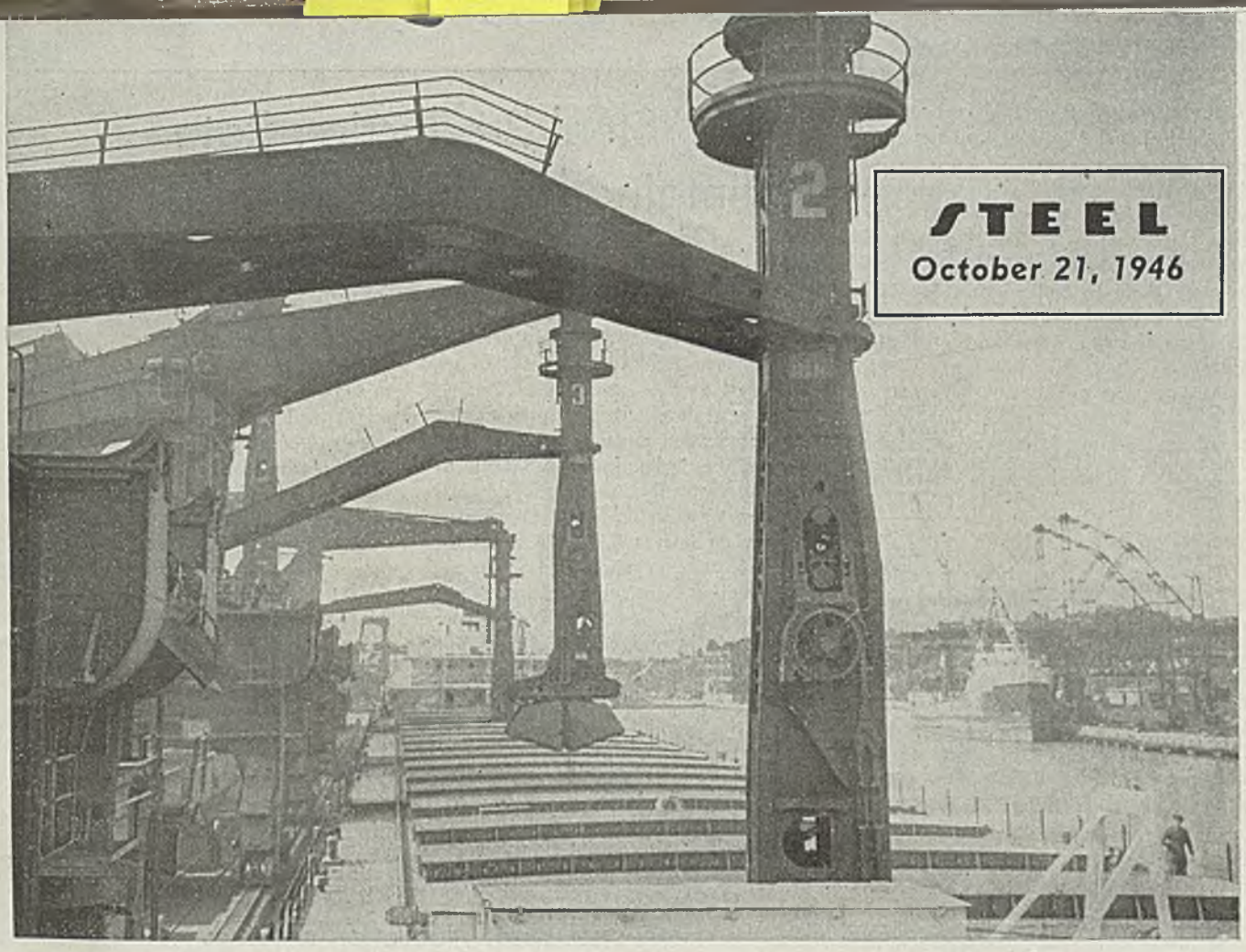
STEEL
October 21, 1946



With the 1946 shipping season nearing an end, the iron ore fleet is busily engaged in building up stockpiles at lower lake docks and furnaces as much as possible. Above, the Pittsburgh Steamship Co.'s LEON FRAZER is shown unloading ore at Conneaut, O.

Lake Fleet in Close Race To Build Adequate Stockpiles for Winter

Ore movement will approximate 55 million tons. Coal shipments behind schedule but deficiency is being overcome. Wheat shippers compete for vessel space. Four major strikes have slowed season's activity

SHIPPERS on the Great Lakes are engaged in a nip and tuck battle to move adequate tonnages of iron ore, coal and grain before bad weather ends the 1946 shipping season.

Goals for all three commodities will be no more than barely met; in some cases, "near misses" are indicated. The total traffic will be considerably below that moved during the war years.

For the leading commodities, the outlook is as follows:

Iron ore—Total movement will approximate 55 million tons, against an early season goal of 60 million tons or better. Shipments to mid-October amounted to about 47 million tons and considerable pressure is being applied to bring down maximum tonnage in the few weeks remaining in the season. If present consumption rates are maintained through the winter, inventories will be extremely low and unbalanced next spring.

Coal—Goal of 50 million tons to upper lake ports expected to be reached, although coal shipping season was cut from 32 to 24 weeks this year by two-month coal strike. Shipments at present are slightly more than 3 million tons behind those of a year ago, but are being accelerated. Overall movement is believed adequate although pinches may develop in some localities.

Wheat—Shippers offering attractive rates to vessel operators and attracting some away from ore trade. Considerable tonnage remains to be moved down the lakes.

Primary cause for the decreased lake traffic is found in the four major strikes which have affected shipping. 1. The steel strike in January which interrupted consumption of iron ore, and generally slowed down industrial activity; 2. the strike by iron ore miners in the late winter and spring which interrupted the production of ore for early season shipments; 3. the coal strike in April and May which denied vessels upbound cargoes and for a time even bunker coal;

4. the attempted tieup of lake shipping by the National Maritime Union in August.

The early season movement of ore was severely blighted by these strikes. Less than three quarters of a million tons of ore were moved in April and only slightly more than 3½ million tons in May. A comparison of shipments by months this year and last shows how great the loss was:

	1946	1945
April	729,902	7,282,074
May	3,616,115	11,121,203
June	8,654,437	10,621,309
July	10,848,385	11,372,282
August	9,774,442	10,731,804
September	9,636,353	10,543,099
Total to Oct. 1	43,259,634	61,671,771

The estimated total 1946 movement of 55 million tons will compare with shipments last season of slightly more than 75 million tons. The estimate of 55 million tons may vary up or down, depending on the weather at the end of the season. Favorable weather in late November may raise the figure to 56 million tons or even slightly more. The shippers are not counting heavily on this.

In the first place, the lake ore fleet at the middle of September numbered only 268 vessels in commission, compared with 283 in commission late in 1945.

In the second place, competition of wheat shippers for bottoms is more spirited. Wheat shippers are offering attractive rates on grain and are drawing vessels away from the ore trade, both for carrying grain and for winter storage. Present indications are that a number of freighters will leave the ore trade in late November for grain storage.

The bidding for independent ships recently has been so keen that rumors have been current in the industry that the Office of Defense Transportation would reenter the lake shipping picture with directives for cargo loading. In fact, ODT last week placed restrictions on loading Canadian grain in U. S. ships.

Whether the estimated 55 million-ton ore movement will provide an adequate stockpile to carry furnaces depending on Lake Superior ore through to the beginning of the 1947 season is an open question. Some ore men are confident the stocks will be sufficient; others express a fear that stockpiles will be uncomfortably low next spring, especially if steel mill operations continue at the present rate.

Stocks of ore at furnaces and Lake Erie docks on Oct. 1 totaled 37,572,950 tons. Expectations are that about 12 million tons will be moved during October and November.

Consumption at the current rate of operations is between 6¼ and 6¾ million

(*Please turn to Page* 166)

Heavy Steel Production Rate Maintained During September

MARKING the third successive month in which steel ingot and steel for castings output exceeded 6,500,000 tons, September production totaled 6,517,212 net tons, the American Iron & Steel Institute reported last week.

This was down slightly from August when production amounted to 6,886,863 net tons, the decline being due partly to the shorter month, but it was substantially greater than output in September, 1945, when it was 5,982,475 net tons.

The average operating rate of the industry during September was 86.4 per cent, which compares with 88.2 per cent in August and with 76.3 per cent in September of last year. With the exception of that in August, weekly production in September was the largest for any month since July, 1945.

For the first nine months of this year ingot production totals 47,342,897 net tons. This is a decline of 14,503,548 net tons compared with output of 61,846,445 tons produced in the like period of 1945 and is accounted for by the loss of production during the early months of the year resulting from strikes in the steel and coal industries.

Despite the heavy strike loss it begins to look as though 1946 output of steel ingots will establish a new peacetime record. Output in the first nine months of the year attained a total only 2,000,000 tons below production in the like period of 1929. Should current monthly output be maintained for the next three months output for 1946 will exceed 67 million tons. In no year in history prior to 1941 has output attained such a level. Production in 1940, the last full peacetime year was 66,981,662 net tons.

Electric Range Builders Not To Get Priority Aid

No priorities or other special help in getting steel will be granted for domestic electric range manufacturing or

STEEL INGOT PRODUCTION STATISTICS

Based on reports by companies which in 1944 made 97.6% of the open hearth, 100% of the bessemer and 85.8% of the electric ingot and steel for castings production

	Estimated Production—All Companies								Calculated weekly production all companies	Number of weeks in mo.
	—Open Hearth—		—Bessemer—		—Electric—		—Total—			
1946	Net tons	Per cent of capac.	Net tons	Per cent of capac.	Net tons	Per cent of capac.	Net tons	Per cent of capac.	Net tons	
Jan.	3,528,090	51.1	207,512	47.4	136,452	29.2	3,872,054	49.6	874,053	4.43
Feb.	1,300,944	20.9	25,905	6.6	65,668	15.6	1,392,517	19.8	348,129	4.00
March	5,946,698	86.2	363,949	83.1	196,400	42.0	6,507,047	83.3	1,468,859	4.43
1st qtr.	10,775,732	53.8	597,366	47.0	398,520	29.4	11,771,618	51.9	915,367	12.86
Apr.	5,333,139	79.8	286,088	67.5	241,031	53.3	5,860,258	77.5	1,366,028	4.29
May	3,699,979	53.6	153,409	35.0	219,064	46.9	4,072,452	52.2	919,289	4.43
June	5,145,594	77.0	251,253	59.2	227,979	50.4	5,624,826	74.4	1,311,148	4.29
2nd qtr.	14,178,712	69.9	690,750	53.7	688,074	50.1	15,557,536	67.9	1,195,814	13.01
1st 6 mos.	24,954,444	61.9	1,288,116	50.4	1,086,594	39.8	27,329,154	59.9	1,056,403	25.87
July	6,016,253	87.4	365,332	83.6	228,083	48.9	6,609,668	84.9	1,495,400	4.42
Aug.	6,251,271	90.6	373,837	85.4	261,755	56.0	6,886,863	88.2	1,554,597	4.43
Sept.	5,914,769	88.7	371,465	87.8	230,978	51.2	6,517,212	86.4	1,522,713	4.28
3rd qtr.	18,182,293	88.9	1,110,634	85.6	720,816	52.0	20,013,743	86.5	1,524,276	13.13
9 mos.	43,136,737	71.0	2,398,750	62.2	1,807,410	43.9	47,342,897	68.9	1,213,920	39.00
1945										
Jan.	6,469,340	90.5	379,062	76.0	355,910	76.8	7,204,312	88.8	1,626,256	4.43
Feb.	5,968,326	92.4	347,227	77.1	337,212	80.6	6,652,765	90.8	1,663,191	4.00
Mar.	6,927,939	96.9	398,351	79.8	379,639	81.9	7,705,929	95.0	1,739,487	4.43
1st qtr.	19,365,605	93.3	1,124,640	77.6	1,072,761	79.7	21,563,006	91.5	1,676,750	12.86
Apr.	6,541,627	94.5	372,952	77.2	375,308	83.6	7,289,887	92.8	1,699,274	4.29
May	6,664,117	93.2	402,100	80.6	383,450	82.7	7,449,667	91.8	1,681,640	4.43
June	6,129,763	88.5	379,807	78.6	330,952	73.7	6,840,522	87.1	1,594,527	4.29
2nd qtr.	19,335,507	92.1	1,154,859	78.8	1,089,710	80.0	21,580,076	90.6	1,658,730	13.01
1st 6 mos.	38,701,112	92.7	2,279,499	78.2	2,162,471	79.9	43,143,082	91.0	1,667,688	25.87
July	6,318,975	88.6	381,832	76.7	284,764	61.6	6,985,571	86.3	1,580,446	4.42
Aug.	5,172,344	72.3	347,088	69.5	215,885	46.6	5,735,317	70.7	1,294,654	4.43
Sept.	5,435,799	78.7	352,847	73.2	193,829	43.3	5,982,475	76.3	1,397,775	4.28
3rd qtr.	16,927,118	79.9	1,081,767	73.1	694,478	50.5	18,703,363	77.8	1,424,475	13.13
9 mos.	55,628,230	88.4	3,361,266	76.5	2,856,949	70.0	61,846,445	86.6	1,585,806	39.00
Oct.	5,146,787	72.0	242,122	48.5	207,867	44.8	5,596,776	69.0	1,263,381	4.43
Nov.	5,641,308	81.5	358,664	74.2	200,494	44.7	6,200,466	78.9	1,445,330	4.29
Dec.	5,523,277	77.4	343,266	68.9	191,394	41.4	6,057,937	74.8	1,370,574	4.42
4th qtr.	16,311,372	76.9	944,052	63.8	599,755	43.6	17,855,179	74.2	1,358,842	13.14
2d 6 mos.	33,238,490	78.4	2,025,819	68.5	1,294,233	47.1	36,558,542	76.0	1,391,646	26.27
Total	71,939,602	85.5	4,805,318	73.3	3,456,704	63.4	79,701,624	83.5	1,528,608	52.14

For 1945 percentages are calculated on weekly capacities of 1,614,338 net tons of open hearth, 112,658 tons of bessemer and 104,640 tons of electric ingots and steel for castings, total 1,831,636 tons; based on annual capacities as of Jan. 1, 1945 as follows: Open hearth 84,171,500 net tons, bessemer 5,874,000 tons, electric 5,455,890 tons.

For 1946 percentages are calculated on weekly capacities of 1,558,041 net tons open hearth, 98,849 net tons bessemer and 105,491 net tons electric ingots and steel for castings, total 1,762,381 net tons; based on annual capacities as of Jan. 1, 1946, as follows: Open hearth 81,238,250 net tons, bessemer 5,154,000 net tons, electric 5,500,290 net tons, total 91,890,540 net tons.

similar industries, Civilian Production Administrator John D. Small told the Electric Range Industry Advisory Committee at a meeting in Washington.

Pointing out that steel mills are operating at almost full capacity, he warned that any substantial increase in steel operations now would mean time and output lost later in repair and maintenance.

However, Mr. Small indicated the situation is not without encouraging factors, listing the following: (1) Increased capacity of a couple million tons of sheet steel scheduled to come in next fall; (2) a small increase in capacity of about 168,000 tons by next April, within existing facilities for finishing light gage sheet, as result of improved technical processes; (3) some industries may soon be using less steel, as demand for their products becomes more nearly satisfied and inventories fill up.

Some members of the committee suggested that CPA give them "plus steel" (that is, direct mills to ship more steel than called for on quotas) to supply specified models for the housing program, but CPA opposed this action.

Finished Steel Shipments Score Sharp Increase During August

SHIPMENTS of finished steel in August by companies representing 99.3 per cent of the industry, as reported to the American Iron & Steel Institute, totaled 5,406,470 net tons, at 90.4 per cent of capacity, compared with 4,639,610 tons, 78.4 per cent of capacity, in July. Shipments to other members of the industry for further conversion in August totaled 441,014 tons, compared with 380,116 tons in July.

Every classification showed an increase over July, especially marked in flat-rolled products and wire. Thus, hot-rolled sheets increased in August to 640,926 tons, from 538,723 tons in July, cold-rolled sheets to 385,327 tons from 337,888 tons, galvanized sheets to 139,462 tons from 131,179 tons. Strip, hot and cold-rolled, totaled 291,152 tons in August and 213,782 tons in July. Drawn wire reached 211,418 tons in August, from 150,998 tons in July and nails and staples rose to 58,291 tons from 46,955 tons in July. Tin plate ran parallel with other sheet products, reaching 294,750 tons in August, compared with 250,721 tons in July. The accompanying table gives details.

Compared with the like period in 1945 shipments to Sept. 1 this year were 32,154,914 tons, representing 69.2 per cent of capacity, against 43,689,537 tons, at 88.6 per cent of capacity.

WAA Receives No Bids for East Chicago Armor Plant

War Assets Administration received no bids recently for the surplus $26 million cast armor plant in East Chicago, Ind., which American Steel Foundries, Chicago, built and operated during the war. A WAA spokesman said that the agency will develop a plan for use of the property and will then readvertise it for sale or lease.

AMERICAN IRON AND STEEL INSTITUTE
CAPACITY, PRODUCTION AND SHIPMENTS

Period AUGUST - 1946

Steel Products	Number of companies	Items	Maximum Annual Potential Capacity Net Tons	Current Month: Production: Net Tons	Current Month: Production: Per cent of capacity	Current Month: Shipments (Net Tons): Total	Current Month: Shipments (Net Tons): To members of the industry for conversion into further finished products	To Date This Year: Production: Net Tons	To Date This Year: Production: Per cent of capacity	To Date This Year: Shipments (Net Tons): Total	To Date This Year: Shipments (Net Tons): To members of the industry for conversion into further finished products
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	40	1	xxxx	xxxx	xxx	405,295	175,476	xxxx	xxx	2,235,611	1,020,467
Structural shapes (heavy)	12	2	9,421,550	347,540	46.3	350,609	xxxx	2,065,107	34.9	2,080,202	xxxx
Steel piling	4	3		23,443		27,874	xxxx	122,427		106,611	xxxx
Plates (sheared and universal)	29	4	17,080,770	445,168	30.7	451,275	30,275	2,640,986	23.2	2,616,529	177,176
Skelp	5	5	xxxx	xxxx	xxx	50,344	18,744	xxxx	xxx	249,018	113,179
Rails—Standard (over 60 lbs.)	4	6	3,657,000	202,261	65.1	199,322	xxxx	1,070,881	44.0	1,035,530	xxxx
—All other	5	7	392,000	14,514	43.6	17,312	xxxx	93,155	35.7	95,204	xxxx
Splice bars and tie plates	13	8	1,745,960	65,733	44.3	71,013	xxxx	387,661	33.3	411,289	xxxx
Track spikes	11	9	349,400	13,082	44.1	13,633	xxxx	86,037	36.9	90,996	xxxx
Hot Rolled Bars—Carbon	34	10	xxxx	733,360	xxx	578,320	77,034	* 4,255,852	xxx	*3,470,791	* 430,993
—Reinforcing—New billet	15	11	xxxx	99,709	xxx	107,273	xxxx	585,893	xxx	637,330	xxxx
—Rerolled	12	12	xxxx	11,880	xxx	12,762	xxxx	89,434	xxx	89,792	xxxx
—Alloy	23	13	xxxx	187,818	xxx	163,305	12,920	1,050,329	xxx	* 873,935	80,792
—Total	40	14	22,329,660	1,032,767	54.4	861,660	89,954	* 5,981,508	40.2	*5,071,848	* 511,785
Cold Finished Bars—Carbon	24	15	xxxx	129,690	xxx	123,938	xxxx	* 808,037	xxx	* 802,920	xxxx
—Alloy	23	16	xxxx	21,162	xxx	20,011	xxxx	141,061	xxx	* 125,834	xxxx
—Total	31	17	2,851,510	150,852	62.3	143,949	xxxx	* 949,098	50.0	* 928,754	xxxx
Tool steel bars	17	18	255,010	9,501	43.9	9,121	xxxx	68,397	40.3	* 68,076	xxxx
Pipe & Tubes—Butt weld	14	19	2,176,520	150,238	81.2	133,581	xxxx	862,923	59.5	821,354	xxxx
—Lap weld	9	20	730,200	33,566	54.1	34,944	xxxx	175,004	36.0	190,248	xxxx
—Electric weld	10	21	1,536,900	79,629	61.0	72,547	xxxx	477,384	46.6	408,336	xxxx
—Seamless	13	22	3,169,600	235,093	87.3	206,798	xxxx	1,358,157	64.3	1,196,719	xxxx
—Conduit (cap. & prod. incl. above)	6	23	xxxx	xxxx	xxx	10,937	xxxx	xxxx	xxx	57,949	xxxx
—Mech. tubing (cap. & prod. incl. above)	12	24	xxxx	xxxx	xxx	42,355	xxxx	xxxx	xxx	271,584	xxxx
Wire rods	26	25	7,293,670	442,128	71.3	100,607	32,452	* 2,728,517	56.2	* 646,834	* 225,096
Wire—Drawn	41	26	5,742,890	362,773	74.4	211,418	14,168	* 2,160,644	56.5	*1,248,893	88,399
—Nails and staples	19	27	1,260,360	60,685	56.7	58,291	xxxx	365,325	43.3	364,004	xxxx
—Barbed and twisted	16	28	543,610	19,320	41.8	18,503	xxxx	134,763	37.2	132,762	xxxx
—Woven wire fence	16	29	1,121,860	36,186	38.0	35,317	xxxx	243,463	32.6	243,185	xxxx
—Bale ties	13	30	149,700	9,641	75.8	9,826	xxxx	55,915	56.1	58,713	xxxx
Black Plate—Ordinary	9	31	xxxx	xxxx	xxx	63,997	53	xxxx	xxx	474,954	1,167
—Chemically treated	8	32	465,000	9,493	24.0	11,638	xxxx	85,569	27.6	83,846	xxxx
Tin and Terne Plate—Hot dipped	9	33	3,758,850	181,288	56.8	202,913	xxxx	1,155,293	46.2	1,244,074	xxxx
—Electrolytic	9	34	2,231,850	91,765	48.4	91,837	xxxx	568,413	38.2	580,859	xxxx
Sheets—Hot rolled	31	35	19,785,320	1,362,903	81.1	640,926	49,389	8,488,415	64.4	3,786,001	260,093
—Cold rolled	14	36	7,309,460	543,147	87.5	385,327	xxxx	3,404,181	69.9	2,449,338	xxxx
—Galvanized	16	37	2,924,130	131,280	52.8	139,462	xxxx	900,959	46.3	920,873	xxxx
Strip—Hot rolled	27	38	7,180,030	260,559	42.7	166,982	29,814	1,500,366	31.4	942,882	* 157,999
—Cold rolled	34	39	5,067,450	133,151	51.1	124,170	xxxx	* 826,323	40.5	* 804,919	xxxx
Wheels (car, rolled steel)	9	40	315,400	26,206	97.8	28,024	xxxx	151,656	72.2	155,829	xxxx
Axles	6	41	398,170	14,482	42.8	14,147	xxxx	80,410	30.3	77,510	xxxx
All other	3	42	169,510	4,149	28.8	516	xxxx	28,173	25.0	3,580	xxxx
TOTAL STEEL PRODUCTS	142	43	xxxx	xxxx	xxx	5,406,470	441,014	xxxx	xxx	32,154,914	2,555,361
Effective steel finishing capacity	142	44	64,648,000	xxxx	xxx	xxxx	xxxx	xxxx	xxx	xxxx	xxxx
Percent of shipments to effective finishing capacity	142	45	xxxx	xxxx	xxx	90.4%	xxxx	xxxx	xxx	69.2 %	xxxx

Stabilization Program Disintegrates

Lifting of meat controls accelerates liquidation of restrictions on wages and prices. Virtually complete restoration of free economy by yearend now expected

WAGE-PRICE control program of the administration disintegrated rapidly last week following lifting of restrictions on meat by President Truman.

Acting promptly on the President's suggestion that liquidation of remaining wartime controls on the economy be accelerated, Reconversion Director John Steelman and OPA Director Paul Porter moved to decontrol wages and prices on a broad scale. Indications at weekend were that practically all controls would be a thing of the past at least by yearend.

Except for products in extremely critical supply and rents, decontrol in many industries appeared only a matter of weeks at most, in some cases days. Indications are such basic commodities as steel, however, will continue under control for the time being chiefly because of their importance in the housing program. But even in the case of such commodities it was believed restrictions would be off at latest by the end of the year. In fact, expectations are some relatively minor steel products would be relieved from control fairly promptly, though steelmakers last week were in the dark as to just what OPA planned to do, and were continuing to press for ceiling price relief pending clarification of the situation.

Office of Price Administration last week was understood to be working on a program for decontrolling hundreds of items. However, because of confusion in OPA as a result of the sudden collapse of its house of cards and the difficulties incident to the co-ordination of activities of the various control agencies concerned, some delays in decontrolling specific products may be encountered.

That the future of wage controls will be clarified very shortly was indicated last week by Chairman W. Willard Wirtz of the Wage Stabilization Board. Following a meeting with Reconversion Director John Steelman, Mr. Wirtz said he had received the clarification promise from Mr. Steelman. One of the matters discussed was a proposed plan for giving price relief for any wage increases agreed to by labor and industry. If this plan is adopted it will mean the death of all wage controls.

Chairman Wirtz pointed out that if restrictions are retained on wages a problem of discrimination will be involved. Under present rules there are no controls on wages in industries not under price ceilings, but in industries under price control workers must have WSB approval to get more pay if the employers are to obtain price relief.

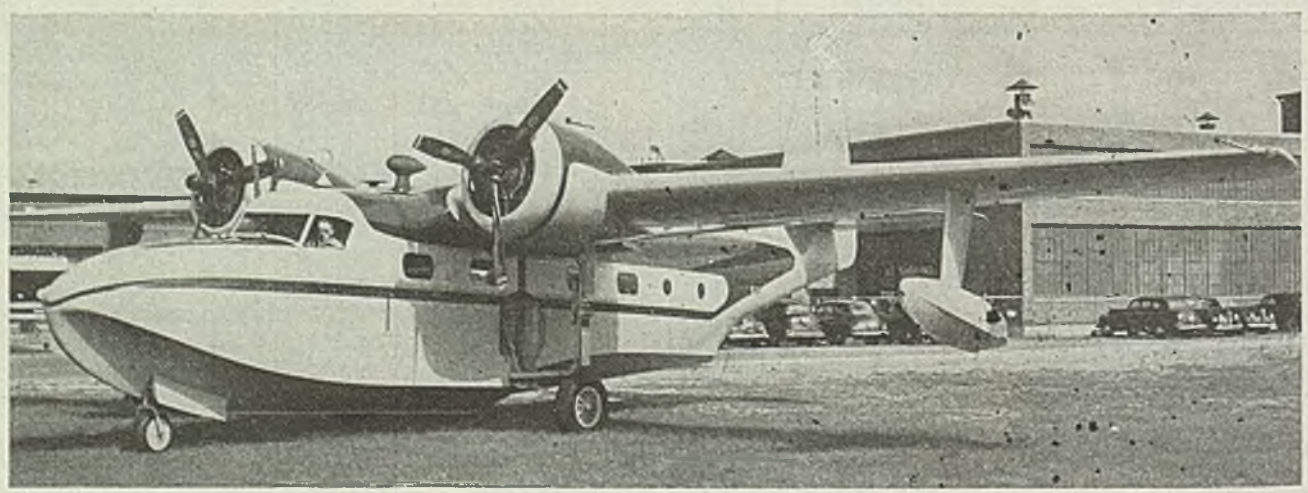
No specific date was given by Director Steelman as to when he would announce his decision for either continuing or killing the wage board.

Date for abandonment of wage controls probably has been brought closer by the report of the OWMR advisory board recommendation to President Truman that he take such action "within the next few days."

This board recommended reconstituting the Wage Stabilization Board as an all-public body to carry out the remaining statutory functions of the board including rulings on wage reduction applications and the administration of the strike notice provisions of the Smith-Connally Act. The board further recommended that effective immediately all wage agreements reached in collective bargaining be automatically approved for use in applying for higher prices on those goods still subject to OPA price control. It also pointed out to the President the advisability of ending wage controls voluntarily now before the arrival of the next wage rise forces such action.

Administration spokesmen indicated the reason wage controls were not abandoned last week with meat price controls was the fear that dynamite wrapped up in the wage-price issue might invite irresponsible action on the part of some employers and union labor leaders. It was felt more time was needed to study the situation, and perhaps condition employers, labor and the public beforehand. There also was talk of asking some advance assurances, especially from labor leaders, against intemperate wage demands.

The President would like to take final action on the wage stabilization program



AMPHIBIAN: The Mallard, a passenger amphibian built by Grumman Aircraft at Bethpage, Long Island, N. Y., rests comfortably on land. The hull is ruggedly built for rough water landings, and, where no water is available, the plane can land on uneven terrain with comparative safety. NEA photo

well before election day, but probably will not be able to make up his mind until he has had time to observe the consequences of the elimination of meat price ceilings. The meat situation, because of the meat scarcity, holds the most dangerous potentials from the standpoint of encouraging inflation. If the price-wage situation now is adjusted within the meat industry satisfactorily from a public standpoint, then the President will feel it safe to go further in letting go of controls.

The three factors which the administration is watching closely in the case of the meat industry are: 1—The on-the-hoof prices currently being paid for livestock. 2—the outcome of the wage controversy which has been pending for several months between packers and packing-house workers, and whose solution has been held up because the wage increase demanded by the workers could not have been used by the packers up to this time in getting approval of higher meat prices: and 3—the prices which the packers will feel impelled to charge for meat after reaching an agreement covering higher wages for their employees.

If the prices currently paid for livestock to be slaughtered are unduly high in the opinion of the administration, and if the retail prices after settlement of the present wage controversy as a result of an increase show too much rise, then the decision probably will be against complete elimination of wage controls. If, on the other hand, the meat price situation does not get out of hand, then termination of wage controls will be looked upon as a less hazardous venture.

In marking time on its wage policy, the White House last week had its ear attuned to the proceedings at the American Federation of Labor convention in Chicago. White House economists construed the news dispatches from Chicago as indicating a moderate position on the part of AFL. They gathered that the main AFL gripe is that wages in many instances have lagged behind prices, and that AFL wants an end to wage control so that these laggard cases may be brought in line.

It may well ensue that the administration will not try to freeze its final wage-price policy until after the Congress of Industrial Organizations goes into its convention at Atlantic City on Nov. 18. By that time, White House economists feel, the situation will have become more highly clarified.

August Steel Payroll Reaches Postwar High

Total payroll, average employment and average hours per week in the iron and steel industry reached postwar highs during August, according to the American Iron & Steel Institute.

Payroll for August, the largest since May, 1945, was $145,226,300 compared with $137,988,900 in July.

Average hours per week for wage earners within the industry rose during August to 38.5 from 36.9 the preceding month.

Average number of employees climbed to 595,600 in the month of August compared with 585,100 in July.

Hourly piecework or tonnage workers in the industry received average hourly wages of 134.6 cents per hour during August, compared with 135.1 cents per hour the previous month.

Steel Products Warehouse Body Meets in November

Following meetings of the Chicago and Cleveland chapters of the Steel Products Warehouse Association Inc., Clayton Grandy, president of the national organization, last week announced election of the following officers to direct regional activities in those areas in 1946-47:

The Chicago chapter re-elected the following: Thomas J. Reid, Century Steel Corp., chairman; S. E. Hokin, Hokin Steel & Tin Plate Co., vice chairman; D. L. Friedman, Friedman Brothers Steel Co., secretary; E. A. Greenberg, Western Sheet Steel Co., treasurer; and H. P. Alpirn, Briggs & Turivas, trustee.

Officers elected by the Cleveland chapter were: M. S. Phillips, president, the Lake Erie Steel & Blanking Co., chairman; H. J. Mervis, Singer Steel Co., vice chairman; Thomas J. Fitzgerald, Reliance Steel Division, Detroit Steel Corp., secretary; K. V. Schwartz, the General Sheet Steel Co., treasurer; and Harry Resnick, the Universal Steel Co., trustee.

Mr. Grandy also announced the association will hold its annual convention at the Hotel Book-Cadillac, Detroit, Nov. 14-15.

Present, Past and Pending

■ HUPP CORP. BUYS CHICAGO GEAR WORKS

CHICAGO—Hupp Corp., Detroit, has acquired 100 per cent of the capital stock of Amgears Inc. and the plant and properties of the American Gear & Mfg. Co., this city. Operations will be consolidated and the new acquisition operated as a Hupp subsidiary in Chicago.

■ STEEL SHEET CAPACITY CENTER MOVES WEST

SEAL, O.—This Wyandot County, O., town now is the geographical center of the hot-rolled steel sheet and strip capacity, according to the American Iron & Steel Institute. In 1938, the center was placed farther east in Richland county.

■ STRUTHERS BLAST FURNACE RESUMES

STRUTHERS, O.—Struthers blast furnace has resumed production of pig iron for foundries which make castings for the Kaiser-Frazer Corp. The stack, leased for three years by Kaiser-Frazer Corp., had been idle during the past year due to inability to operate profitably under government price controls.

■ GREAT LAKES STEEL TO INCREASE CAPACITY

DETROIT—Facilities to increase steel production by 500,000 tons annually will be completed early next summer by Great Lakes Steel Corp. Expansion includes a new mill for cold rolling sheets and increased ingot capacity.

■ OPA TO PROSECUTE STEEL PRICE CEILING VIOLATORS

WASHINGTON—Sellers and buyers of iron and steel products violating ceiling prices will be prosecuted, OPA said last week. In Detroit, suits totaling more than $300,000 have been filed against resellers, who added "finder's" fees to selling prices or otherwise charged more than ceiling prices.

■ POWER STRIKE LOSS AT PITTSBURGH HUGE

PITTSBURGH—Power strike, nearing its fourth week, has resulted in a loss of over $350 million for industry in this area. Steel producers and other large industrial plants, which have their own power supply, have been relatively little affected. However, some have suffered production losses and are finding it increasingly difficult to sustain schedules.

■ BUILDING MATERIALS CONTROL CONTINUES

WASHINGTON—Building materials will not be decontrolled, Housing Expediter Wyatt said last week following a conference with President Truman. Higher prices resulting from general lifting of controls, he expects, will be offset in part by improved flow of materials.

Machine Tool Pricing Program Revised by WAA

Standard general purpose tools placed on fixed price basis in accelerated national sales program

IN AN accelerated national sales campaign, about $350 million worth (acquisition cost) of surplus government-owned machine tools are being offered for sale on a fixed price basis. The War Assets Administration's new pricing program will be established in an amendment to regulation No. 13.

Heretofore, the Clayton formula method of pricing has ruled the pricing of all standard general purpose machine tools. "However", Robert M. Littlejohn, WAA administrator said, "such pricing has proved a deterrent to sales of many such tools and in a campaign to speed up sales it has been decided to remove from the Clayton formula all such machine tools that have been slow sellers and to price them on a dollar basis by make, model, and size. Then, too, the cost of handling and storage of the machine tools at present is consuming nearly 20% of WAA's entire annual budget."

The new pricing arrangement is expected to accomplish the following objectives: (1) Encourage all types of manufacturers to replace their worn out or obsolete machinery with government-owned, up-to-date and latest design machine tools; (2) assist small business, particularly, veterans, in the purchase of tools essential to civilian production; (3) it will provide equipment for rebuilders and machine tool manufacturers for rebuilding for domestic and export sales.

This fixed price basis is also expected to encourage the foreign trade to make purchases for their own production requirements. The new prices cover 60 to 70 per cent of all surplus government-owned machine tools. Consisting mainly of general purpose, high-production machine tools, some specialized, nonstandard tools are included, thus making it possible for many shops to acquire specialized equipment, which, when altered, can be used as general purpose.

Holds Tool, Die Shops Using Very Few Obsolete Machines

Manufacturing plants have more modern equipment in them now than at any time before the war, according to M. O. Shepherd, works manager, Bunnell Machine & Tool Co., Cleveland. Leading in the modernization programs have been the special tool and die plants because they realize that in order to manufacture precision equipment precision machines are necessary, Mr. Shepherd asserted. For this reason, he said, very little obsolete machinery exists in the better tool and die shops.

REPORTS STANDARDIZATION PROGRESS: "Substantial progress and fine British co-operation" in the program to standardize machine parts and engineering practices used by Britain and America were reported by William L. Batt, president, SKF Industries Inc., Philadelphia, and wartime vice chairman of the War Production Board. Mr. Batt is shown talking to reporters on his return from a London conference where British and American standards authorities agreed to draw up agreements for uniform screw, pipe and instrument threads and design and engineering practices

Monarch Machine Tool Co. Reports Backlog Holding

Net earnings of the Monarch Machine Tool Co., Sidney, O., for the third quarter of 1946, after taxes and other charges and subject to year-end audit and adjustment, totaled $171,177, Wendell E. Whipp, president, reported last week. Net earnings for the third quarter of 1945 were $111,675.

Net sales for the third quarter of 1946 were $1,615,335 compared to $2,820,092 for the third quarter of last year.

Net earnings for the first nine months of 1946, after taxes and other charges and subject to year-end audit and adjustment, totaled $454,928 on net sales of $4,922,633 and compares with net earnings of $429,172 on net sales of $10,837,690 for the first nine months of 1945.

"Our backlog of unfilled orders," Mr. Whipp said "continues to hold at approximately the level prevailing Jan. 1. Shortage in castings and other materials which were especially aggravated earlier in the year are clearing up and should permit us to maintain a good volume of shipments for the next quarter."

Nations Meet To Establish Worldwide Standards Group

Representatives of 20 countries are now in session in London to set up an International Standards Association to co-ordinate standardization work throughout the world. The meeting, which began on Oct. 14 and will last through Oct. 26, is expected to adopt a constitution and by-laws, choose an international headquarters, and possibly elect a full time secretary.

Countries represented at the meeting are: Australia, Belgium, Brazil, Canada, Chile, China, Czechoslovakia, Denmark, France, Great Britain, India, Mexico, Netherlands, New Zealand, Norway, Poland, Russia, South Africa, Sweden, and the United States.

The two-man delegation from the United States is composed of Dr. P. G. Agnew, vice president and secretary, American Standards Association, and E. C. Crittenden, associate director, National Bureau of Standards, Department of Commerce, and ex-officio chairman of the ASA Standards Council.

Continental Steelworks Strive To Increase Output Despite Shortages

Belgian production held back by scarcity of coke and scrap. France unable to make sufficient tonnage to satisfy domestic requirements. German output reduced owing to lack of coal. Poland expanding operations

LONDON

DORMAN LONG & CO. LTD., Middlesbrough, are building a new £500,000 ($2,000,000) power plant at their Cleveland works. Construction also has been started on a new central ore preparation plant for the whole of the group at a cost of £1,250,000 ($5,000,000). The latter scheme will also serve the £8,000,000 ($32,000,000) project for a new steelworks and universal beam mill on a virgin site between the company's Cleveland and Redcar works. A certain amount of preliminary preparation has already been put in hand on this project. It is anticipated that the new power plant will be in operation next February. Approximately 2400 tons of steel will be used in the construction of the boiler plant itself and another 1000 tons of structural steel framework in the power house building.

A recent export price for merchant bars, under 3 in., was £20 11 s 0 d ($82.20) per ton, fob port of shipment.

Austria

First blast furnace to be put in operation since the war was blown in at Donawitz recently. Five open-hearth furnaces are at present operating in the area and the monthly output of steel is around 12,000 tons for the country as a whole. The Austrian government has evolved a plan for the nationalization of the industry, which has been presented to the Allied Control Council. It is reported that the Russians are opposed to the scheme. In the meantime it has been stated that the Austrian government is planning for a production of 950,000 tons of steel for 1947.

Germany

Output of iron and steel in the British zone of Germany has been reduced owing to lack of coal; five steelworks will close completely and in eight others production will be considerably reduced. Output of steel ingots and castings in August, in the British zone, was 272,000 tons, but the program for each month of the last quarter of the year is for an output of 22,000 tons. Stocks of coal which had accumulated in the Ruhr have been used up, and the present production of coal, although improving, is not sufficient to allow for full operation of the iron and steelworks.

Italy

Alti Forni e Acciaiere d'Italia (ILVA), Genoa, which are controlled by the semi-official Institute for the Reconstruction of Industry, showed a loss in 1945 of 47,200,000 lire, which is mainly ascribed to the necessity of paying wages to redundant workers. Italian works are generally adversely affected by shortage of coal; one works at Bari has had to close down.

Czechoslovakia

The iron and steel industry will have to increase its present rate of output to meet the two-year plan set to it. The means of production are available but labor, especially skilled labor, is scarce and the quality of the coal and coke available is not good enough. Scrap supplies are improving, but iron ore is still short and coke deliveries are irregular. More iron ore is needed from Russia. The output of pig iron in Poland for the first seven months of the year was 505,000 metric tons, and for steel 910,000 tons. Exports in July amounted to 17,605 tons, mainly of merchant bars, plates and sheets, and wire rods. A trade agreement has recently been arranged with Sweden covering the exchange of Swedish ore and special products against Czech coal, coke, rolled steel and machinery.

Poland

According to reports from Warsaw, the production of iron and steel in Poland is increasing. Of 28 steelworks taken over by the government 25 are now in operation, and of the 19 blast furnaces operating before the war, one was working in February, 1945, and 15 in June of this year. Two open-hearth furnaces were operating in February, 1945, and 31 in June of this year.

Huge Steel Modernization Plan Proposed in Wales

A £35 million modernization and development program for South Wales steel strip mills is under active consideration, according to reports received in this country from England. The project, involving the leading producers of tin plate, was revealed by the British Iron & Steel Federation in a recent report.

It is proposed that a new company be formed to acquire the appropriate plants and other assets now separately owned. The principal companies involved are said to be Guest, Keen & Nettlefolds Ltd., Richard Thomas & Baldwins, Briton Ferry Steel Ltd., John Lysaght Ltd., and Llanelly Steel Co. Ltd.

TRAINING CHINESE SHIPBUILDERS: Four youthful Chinese marine engineers are undergoing a 6-month course in practical shipbuilding at the Ingalls Shipbuilding Corp., Pascagoula, Miss. The Chinese, who have just completed a preliminary course in naval architecture and marine engineering at Massachusetts Institute of Technology, Cambridge, Mass., are shown above with R. E. Lyons, fourth from left, foreman of the Ingalls mold loft

More Flat-Rolled Steel Capacity To Become Available Next Year

Facilities now under construction will add 3 million tons by late 1947, speaker tells sheet metal distributors at annual meeting in Atlantic City. Cites various factors now tending toward easing pressure on available supply

R. M. NELSON

SHEET and strip steel capacity will be increased 3 million tons to a total of 19 million by late next year, or early 1948, R. M. Nelson, distributor programs manager, American Rolling Mill Co., Middletown, O., predicted in Atlantic City last week. This will represent an increase of approximately 19 per cent over available capacity at the end of the war and also over capacity in 1941, as there were no important expansions in these lines during the war, the speaker said.

Mr. Nelson spoke at the 36th semi-annual meeting of the National Association of Sheet Metal Distributors, which was held jointly with the fifty-second annual convention of the National Wholesale Hardware Association at the Marlborough Blenheim, Oct. 14-17.

Sheet metal distributors re-elected all officers with A. M. Vorys, Vorys Bros. Inc., Columbus, O., continuing as president and O. F. Murphy, Lyon, Conklin & Co. Inc., Baltimore, and John P. Speck, Tiffin Art Metal Co., Tiffin, O., as vice presidents.

A feature of the distributors' meeting was a symposium on measures which could be taken to reduce costs and facilitate business. This covered plant layout and equipment, cost accounting, sales methods and various other phases of distribution.

Production Far Below Capacity

Mr. Nelson pointed out that in the first seven months of this year sheet and strip production amounted to approximately 7 million tons, compared with a practical operating rate of 9½ million, this loss of 29 per cent being ascribed to labor troubles, maintenance shutdowns and materials shortages. However, the situation has since improved. August operations were at 97 per cent of capacity and indications are that September sheet and strip production was just about the same, he said.

While sheets are expected to continue in tight supply throughout 1947, an easing in pressure is indicated. He said many companies which had been keyed up to operate 100 to 150 per cent over their 1941 rate are now taking a more realistic view, with their projected manufacturing programs having been cut materially. Further, he pointed out, there has been a continued rise in general consumer inventories in 1946, with a sharp increase of $800 million in July to an all time high of $18 billion, according to Department of Commerce statistics, and in August, he added, there had been a further rise of $325 million.

With specific regard to steel, he said there is definite evidence that supply lines are filling up in some consumer directions, notably radios and small appliances. He also declared unbalanced inventories of materials and manufacturing components have made it unnecessary to pile up steel in many instances. This is particularly true in major appliances and automobiles.

He also pointed out that recent surveys of appliance dealers have shown that a considerable portion of their "orders" evaporate when confronted with actual delivery; also purchasing power supporting durable goods demand has undoubtedly been dissipated in many instances through strikes and the purchase of other types of goods. Sharp rises in prices have acted to decrease the market for many consumer durable good items.

When more normal conditions prevail, steel research laboratories will have new and improved steels to sell, and several specialty steel products, introduced just prior to the war, will have many new applications. He mentioned zinc-coated sheets; galvanized sheets specially treated to take and hold paint; flat-rolled steel in coils; and alloy and stainless steel in sheets, strip, and wire for a multitude of new uses.

However, there are still clouds on the production horizon, because of the scrap shortage and the Great Lakes shipping strike, he said. Mills are going into the winter with inadequate stocks of scrap and iron ore. This may cut into production during the next six months, he said.

R. A. Wilkins, vice president in charge of research, Revere Copper & Brass Co., Baltimore, asserted that the problem of failures of copper in construction, as experienced in some instances, has been solved. Failures were not due to corrosion, but rather to engineering deficiencies, particularly in not making proper allowances for expansion and contraction of the metal. These failures began to show up with the rolling of the lighter gages on the more modern mills, he said.

Standardization and Production Problems Discussed at Porcelain Enameling Meeting

STANDARDIZATION of laboratory and plant shop tests, production problems including de-enameling methods and use of non-enameling sheets, improved methods of fabrication incorporating latest cleaning and pickling practices, and broadened market prospects through greater use of decorative coloring processes were major topics discussed at the Porcelain Enamel Institute's eighth annual forum held at the University of Illinois, Urbana, Ill., Oct. 9-10-11.

The forum opened with a symposium on cleaning and pickling equipment and practice at which W. N. Noble, Ferro Enamel Corp., Cleveland, and R. D. Evans, Chicago Vitreous Enamel Products Co., Chicago, in a paper pointed out normal metal preparation treatment prior to application of porcelain enameling consists of an alkaline cleaner for removal of oils, a neutralizer to remove

excess acid and protect surfaces to be porcelain enameled from subsequent rusting and a dryer to remove moisture.

Considerable interest was shown in a paper by J. S. LeMunyon, Tappan Stove Co. Mansfield, O., on good housekeeping. Mr. LeMunyon placed emphasis upon carelessness as the main cause of poor work and revealed the activities of his company's six-man committee in combating this problem.

For special or expensive parts, de-enameling of defective products is being carried out on an increasing scale, according to Dr. G. H. Spencer-Strong, Pemco Corp., Baltimore. Sand blasting shows considerable promise in many de-enameling operations.

Wayne H. Deringer, A. O. Smith Corp., Milwaukee, discussing problems encountered in porcelain enameling non-enameling sheets, said steel which is likely to warp during enameling operations should be fabricated into pieces whose dimensional requirements are not right; be coated with a low firing enamel, and should, if possible, be fired in a continuous furnace.

Addressing the group at the forum's banquet, R. A. Weaver, president, Ferro Enamel Corp., Cleveland, pointed out the huge potential market for porcelain enamels in home construction, declaring that should present plans materialize this development alone would necessitate nearly doubling present output.

It was announced the 1947 conference will be held at Columbus, O., in September.

Return to Competitive Economy Held Essential

Return to a competitive economy "where it is respectable to save money, to own property and to receive earnings for the use of productive tools," was called for by Allen W. Rucker, speaking at the twenty-seventh annual meeting of the American Trade Association Executives in Cleveland.

Mr. Rucker, whose home is in Cambridge, Mass., and who is founder and president of the Tool Owners Union, a nonprofit organization composed of owners of any tool or device used in the production of useful goods and services, branded as enemies of society various groups throughout the world who appear determined there shall be no peace. Full production, he declared, cannot be attained without internal and external peace.

James L. Fri, New York, president, Upholstery & Drapery Fabric Manufacturers Association, was elected president of the ATAE at the closing session of the convention. He succeeds Richard P. White, American Association of Nurserymen, who was named treasurer. Vice presidents elected were: Walter S. Doxsey, American Steel Warehouse Association; Reuel W. Elton, National Paint, Varnish & Lacquer Association; King Hoagland, Institute of Carpet Manufacturers of America; Minita Westcott, Mirror Manufacturers Association; and Carl S. Whittier, Last Manufacturers Association.

Personnel Relations Held Demanding Major Attention

Speaking in Cleveland Oct. 15 before the Industrial Training Directors Association of the Cleveland Chamber of Commerce, John A. Stephens, vice president in charge of industrial relations, United States Steel Corp. of Delaware, said management should give personnel responsibilities as much attention as sales, operations and finance.

"Executives today must pilot their enterprises through industrial and political seas in which, with increased frequency, the biggest and most destructive waves result from labor or labor-government action," he said.

Gray Iron Founders Will Discuss Manpower, Sales

Program of the 18th annual meeting of the Gray Iron Founders' Society Inc., to be held in Cincinnati Oct. 22-23, will include panel discussions of two of the industry's most pressing problems—how to make the most of its manpower and how to sell gray iron castings. Other topics to be discussed include: "The Present Situation of the Industry with Respect to OPA," by H. L. Edinger, president, Barnett Foundry & Machine Co., Irvington, N. J.; and "Our Relations with the Industrial War College," by Howard A. Stockwell, Barbour-Stockwell Co., Cambridge, Mass.

MEETINGS . . .

Oct. 21-24, Wire Association: Annual convention, Hotel Statler, Buffalo. Richard E. Brown, 300 Main St., Stamford, Conn., is secretary.

Oct. 22-23, National Conference on Hydraulic Machinery, sponsored by Illinois Institute of Technology, and Armour Research Foundation, Chicago, to be held at Hotel Continental, Chicago. Conference secretary is O. I. Teichmann, 35 W. 33rd St., Chicago 16.

Oct. 22-23, Gray Iron Founders' Society Inc.: Annual meeting, Netherland Plaza, Cincinnati. Society headquarters are at 1010 Public Square Bldg., Cleveland 13.

Oct. 23-25, American Society of Body Engineers Inc.: Technical convention, Detroit. Headquarters of the society are at 100 Farnsworth Ave., Detroit 2.

Oct. 23-26, National Tool & Die Manufacturers Association: Annual meeting, Congress Hotel, Chicago. Headquarters are at 1412 Union Commerce Bldg., Cleveland 14.

Oct. 25-26, Southern Ohio Section, National Open-Hearth Committee, American Institute of Mining & Metallurgical Engineers: Annual fall meeting, Deshler-Wallick Hotel, Columbus, O.

Oct. 28-30, American Gear Manufacturers Association: Semi-annual meeting, Edgewater Beach Hotel, Chicago. Newbold C. Goin, Empire Bldg., Pittsburgh 22, executive sec'y.

Oct. 28-31, American Institute of Steel Construction Inc.: Annual convention, del Coronado Hotel, Coronado, Calif. Institute headquarters are at 101 Park Ave., New York 17.

Oct. 29-Nov. 1, Refrigeration Equipment Manufacturers Association: Exposition, Public Auditorium, Cleveland. R. Kennedy Hanson, Clark Bldg., Pittsburgh, executive secretary.

GOVERNMENT CONTROL DIGEST

OFFICE OF PRICE ADMINISTRATION

Zinc: Slab zinc ceiling price advanced 1 cent to basis of 9.25c, East St. Louis, for prime western. Other advances, all effective Oct. 14, are: Zinc scrap, ¾-cent a pound; leaded zinc oxides to 8 cents a pound; lead-free zinc oxides, ¾-cent above March, 1942, "freeze" price levels; rolled zinc products, 1 cent a pound. (MPR Nos. 3, 124, 166 and SR-14G; OPA-T-5088)

Exports: Several changes have been made in the revised export price regulation, principally revising applicable mark-up provisions in order to bring them more in line with export practices. (Export Price Regulation; OPA-T-5061)

Copper: Premium and toll charges for converting or casting refined copper into special shapes have been advanced, effective Oct. 14, $2 a ton when toll charge premium in effect on Aug. 11, 1941, and premium in effect March, 1942, were $1 to $3.50 a ton; $4 when these premiums were over $3.50 a ton. (MPR-9; OPA-T-5093)

CIVILIAN PRODUCTION ADMINISTRATION

Lead: Fourth quarter allocation of lead has been set at 10 million pounds for manufacture of insecticides, 50 million pounds for uses other than making insecticides, and 2 million pounds as a reserve for appeals, making total allocation for use in all lead chemicals 31,000 tons. (L-354; CPA-LD-333)

Antimony: Antimony ores, concentrates, metal and alloys have been added to the list of materials which are subject to CPA's import control. The action was taken to restrict the importation of ore concentrates or low-grade metal intended for refinement in bond and the re-export of the resultant products. (M-63; CPA-LD-338)

Exports: Export quotas for the fourth quarter for principal building materials, other than lumber, have been established. The list includes about 80 groups of commodities, ranging from plumbing equipment and supplies to building board, cement, cooking and heating devices, cast iron soil pipe, builders' hardware, saws, metal culverts and gutters, electric wiring devices and prefabricated and ready-cut houses. (CPA-LD-328)

Priorities: Housing priority assistance to obtain the following groups of materials are now available to builders, effective Oct. 7, in order to channel these additional items into veterans' housing: Galvanized steel sheet; certain types of electrical service entrance equipment; furnace pipes, fittings and ducts; copper tubing fittings; building papers and sheathing papers; and copper sheet. HHH and HH ratings for copper sheet and galvanized steel sheet cannot be extended to producers. (PR-33; CPA-563 and NHA-631)

NATIONAL HOUSING AGENCY

Cast Iron Soil Pipe: Definition of a "new producer" of cast iron soil pipe and fittings has been revised in Premium Payments Regulation No. 8 to make it clear that a producer whose new plant was "substantially completed" at the time the regulation was issued shall not be considered a new producer with respect to that plant. (Reg. No. 8; NHA-640)

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

"Five Freedoms" of the air, agreed upon between United States and Great Britain, expected to prove helpful to American airline operators and aircraft builders. Similar agreements have been signed with numerous other nations

GOVERNMENT aviation officials who engineered the agreement signed at London in September feel it will prove a good thing for airline operators and aircraft construction companies of the United States.

At Bermuda in February, it will be recalled, the two big world air powers —the United States and Great Britain— agreed on "five freedoms" in their air dealings with each other. These freedoms, for which the United States originally laid the foundation at the historic Chicago air conference, are:

1—The privilege to fly across the territory of another country without landing; 2—the privilege to land anywhere for non-traffic purposes; 3—the privilege to put down passengers, mail and cargo in a foreign country when they have been taken on in another; 4—the privilege to take on passengers, mail and cargo in one country for another; 5—the privilege to take on and put down in a country passengers, mail and cargo originating in a third country or destined for a third country.

The Bermuda agreement set forth the five freedoms which Britain and the United States would recognize in dealing with each other. The London agreement goes further; by it Britain and the United States will deal not only with each other but with other nations on the basis of the five freedoms.

Hope for Universal Adoption

We already have "five-freedom" agreements with France, Brazil, Spain, Sweden, Norway, Belgium and other countries, so that our government people hope the London agreement paves the way for eventual universal adoption. They hope particularly that the way has been opened for early resumption of discussion with Argentina which country now has with Britain one of the old-style cartel agreements by which the two countries split the traffic two ways. This British-Argentine agreement, as it now stands, denies to other countries, including the United States, the privileges of the air and airports of Argentina. It is hoped also that discussions will be reopened soon with Mexico which also hitherto has favored two-way agreements.

The London agreement may also pave the way for eventual acceptance of the five freedoms principle by Russia—at least so our government aviation people hope. So far Russia has signified a desire to fly its planes to New York and San Francisco but still reels back in horror over suggestions that American planes fly to Moscow.

Of the five freedoms, the fifth freedom is the most important from the American point of view. Under it we have a free hand in developing the full potentials of air travel wherever this freedom is recognized. Where the fifth freedom is recognized there can be no holding back of development through arbitrary unilateral policies. The fifth freedom puts the emphasis on development, in contrast with two-power agreements which place the emphasis on limiting and dividing the traffic.

According to figures supplied by Edward J. Slattery, information chief of the Civil Aeronautics Board, the United States is the leading power both in flying planes over international routes, and in supplying planes flown by other countries.

Of some 225 planes flown by all nations over the world's international air routes as of Sept. 15, approximately 205 were of United States manufacture. As of that date five American lines were flying 147 planes over international routes, all American built. And foreign countries were flying some 75 planes of which 60 were of American make. There are two big reasons for this situation. One is that the United States has the needed planes available. The other is that the United States-made planes are accepted generally for their safe and economical performance.

The number of planes flying the American flag over international airways will be increasing shortly, says Mr. Slattery. Some 24 additional planes will be needed to take care of two new round-the-world routes to be operated by Pan American and jointly by TWA and Northwest Airlines. These two routes are ready to go as soon as landing rights in India have been arranged—and under the London pact this detail should not prove too difficult. In addition to the 147 planes in operation over international routes under the American flag as of Sept. 15, says Mr. Slattery, 50 more planes—rebuilt military planes—will be operated as fast as they are converted.

DR. NORMAN L. GOLD

Chief of the Industrial Rehabilitation Division, UNRRA, Dr. Gold explained to the House committee investigating surplus property disposal why 5000 *tons of steel rails intended for China were diverted to Yugoslavia. Traffic congestion necessitated an embargo on shipments of all supplies except food to China, Dr. Gold said, and he ordered the diversion to Yugoslavia. NEA photo*

This international aviation business, says Mr. Slattery, is "big" business. The price of one of the new Constellations now being operated in increasing numbers on American lines is around $500,000, and the cost of planes tends to go up as they get bigger and of improved design. It is a business which furnishes work for hundreds of parts and accessory manufacturers and for many thousands of workers.

How Yugoslavia Got Rails

The story of diversion of 5000 tons of steel rails to Yugoslavia as developed by the House Committee to Investigate the Disposition of Surplus Property, amused Washington by reason of many acrimonious exchanges between the participants at the hearings. Its chief effect was to reinforce suspicions shipments of scarce steel products may be going abroad as pawns in the game of international politics.

What happened, as dug out laboriously by Chairman Roger C. Slaughter (Dem., Mo.), was that the CPA, at request of Gen. George C. Marshall, gave urgent

priority on 50,000 tons of steel rails and accessories for shipment to China. By mid-July 41,000 tons had been shipped by UNRRA and China had asked that the remaining tonnage be held up until congestion at Chinese ports could be cleared up.

So Dr. Norman Leon Gold, chief of UNRRA's Industrial Rehabilitation Division, decided, under authority designated in a directive from UNRRA's director general, Fiorello H. La Guardia, to ship 7000 tons of rails and accessories to Yugoslavia which was in "urgent need" of them. The intention was to ship an equivalent tonnage to China out of subsequent shipments from the mills.

Later, it was testified by Col. Edward F. Kunze, chief of the State Department's UNRRA Division, the tonnage of rails for Yugoslavia was reduced from 7000 to 5000. That was after the matter "came to light and people had begun to talk about it."

Representative Slaughter charged that diversion of the rails from China to Yugoslavia was "downright fraudulent" and a "breach of faith" under the CPA directive. Mose Harvey, director of CPA's Bureau of International Supply, told the committee he had protested against the diversion.

Thereupon Mr. La Guardia held a press conference at which he sought to distract attention by calling the CPA a "ward-heeling co-operative." He said that if John Small, CPA chairman, would exchange jobs with him he (La Guardia) would clean up the CPA in 60 days.

Mr. Small replied by telling reporters that Mr. Harvey had "testified to the facts" when he told the House committee "international politics" apparently played a part in the rail shipment to Yugoslavia. He added that an official who "resorts to personalities does so for the obvious reason the facts are not to his liking."

The last word in the controversy will be that of Congress; indications are that when Congress again assembles it will vote the UNRRA out of business.

Famous Yacht *Mayflower* Done

The historic *Mayflower*, operated by the Navy as the private yacht of several presidents, probably is in the news for the last time. She is being offered by the Maritime Commission for "operation or scrapping." Bids will be opened Nov. 6—and the expectations are—she will be sold for scrap for the *Mayflower* was built at Glasgow just 50 years ago. She has led an existence both adventurous and glamorous. In 1931 it looked as though she had come to the end of her string when she caught fire and sank at the Philadelphia Navy yard. Subsequently she was raised and sold as scrap but the needs of World War II prevented execution of this plan. The big demand for all manner of craft led to her requisitioning and repair at a cost of more than a million dollars. Starting in 1942, she was operated by the Coast Guard—during the war in an escort and patrol capacity. She can be inspected at the Coast Guard on Curtis Bay, Baltimore.

Paraguay Trade Agreement

The United States has concluded a reciprocal trade agreement with Paraguay, a feature of which is reduction in Paraguayan duties on various iron and steel products, office machines, etc., imported from the United States.

The United States has sold small quantities of small tools including axes, hatchets, etc., in Paraguay. Duty on such articles is now reduced from 0.19 to 0.10 guarani (Peruvian currency unit) per kilogram. Import duties on horseshoes are reduced from 5.73 to 4.00 guaranies per 100 gross kilograms, and on horseshoe nails, from 11.45 to 8.00 guaranies per 100 g.k.

Paraguay has not, in the past, been a large importer of business machines and office equipment. Concessions now granted, it is said at the State Department, will help expand this market. The agreement freezes present duties on mechanical coin counters, cash registers, calculating and bookkeeping machines, typewriters, parts, etc., against further increase.

Harriman's Voice To Be Heard

At his first press conference as secretary of commerce, W. Averell Harriman stressed the importance of maintaining industrial peace. The country, he declared, is harmed irreparably by interruptions to production.

Mr. Harriman did not go into detail as to the course of action he contemplates. However, off-the-record remarks he has made to friends indicate he proposes to exert a strong voice as a member of the President's cabinet.

His answers to questions by newsmen were on the "cagey" side. Briefly they were as follows:

1—Whether he is a representative of big business is a question that might be debated; anyway, the American people seem to have accepted him "as is."

2—There is no significance in the fact that his first conference in the Commerce Department was with the Small Business Unit. This arrangement was just an accident. The department, he hoped, could do something for small business, but he had no special plans.

3—Under the law, the secretary of commerce must foster not only the business interests of the country, but the welfare of the country as a whole.

4—He always has made it a point when moving into a job to get along with and depend on the people he finds working there. He has no shakeup in mind.

5—"Former Secretary Wallace," said Mr. Harriman, "is my warm personal friend. He called me up and we are going to get together for a visit. He had some carefully-laid plans for the department and, among other things, I hope he will tell me about them."

6—Mr. Harriman declared he supports the foreign policy of President Truman and Secretary Byrnes, but refused to go into detail.

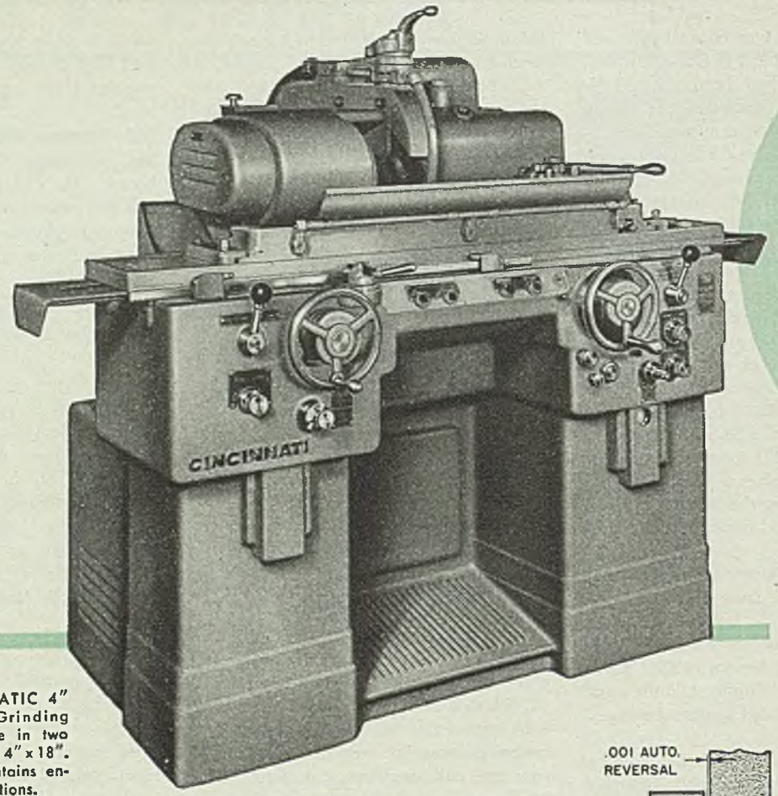
In regard to politics, he had been a life-long Republican until in 1928 he bolted to support Al Smith, said Mr. Harriman. Then he supported President Roosevelt throughout his stay in the White House. Now he is in sympathy with the aims of the Democratic party. "I hope," he said, "we get some good Democrats in Congress."

Czechs Seeking U.S. Advice

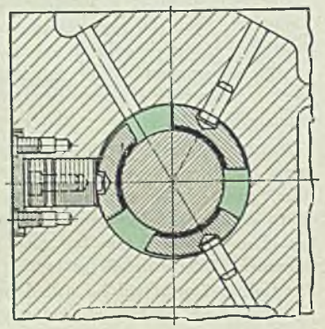
Just returned from Czechoslovakia where he served the government as industrial adviser, Alex Taub, formerly chief engineer of the old Foreign Economic Administration, reports authorities in that country are looking to the United States for guidance in their planning. Under its program of nationalizing large companies, about 60 per cent of the industrial capacity has been taken over by the government. Now the government is concerned with operating these plants efficiently in the public interest.

The government has put the program under the direction of experienced, competent men. It has a policy of encouraging efficient management by providing liberal compensation for good performance. While details as to the part the United States will be called on to play in development of industry in Czechoslovakia, says Mr. Taub, have not yet been clarified, this assistance will involve advisory services, the use of American processes under license agreements, and the importation of considerable special equipment from the United States. Czechoslovakia can benefit particularly from utilization of modern American materials handling equipment.

Internationally famous as a motor designer, particularly for Packard and General Motors, Mr. Taub devoted considerable time to helping lay out the targets for the automotive industry of Czechoslovakia. While production there will be a drop in the bucket by United States standards, it is to represent a considerable increase over previous levels.



CINCINNATI FILMATIC 4" Plain Hydraulic Grinding Machine. Available in two sizes, 4" x 12" and 4" x 18". Catalog G-520 contains engineering specifications.



FILMATIC SPINDLE BEARINGS. Self-adjusting shoes produce independent, converging oil films which develop high radial pressures, forcing grinding wheel spindle into central position and keeping it there. No down time is ever charged against FILMATIC bearings.

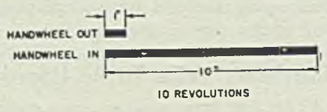
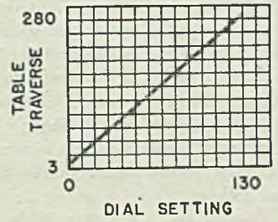
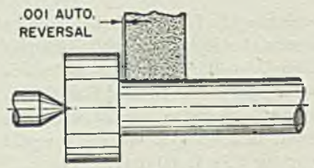


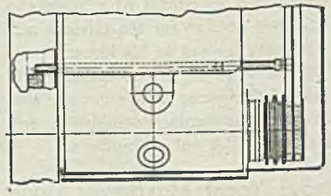
Chart above illustrates distance table travels in ten revolutions of handwheel. Slow speed for grinding shoulders; high speed for setting up is ten times faster.



Infinitely variable table traverse speeds — hydraulically powered, 3" to 280" per minute — the right speed for every job, including wheel truing.



Accurate table reversal within .001", an important feature when grinding next to shoulders; reduces spoilage.

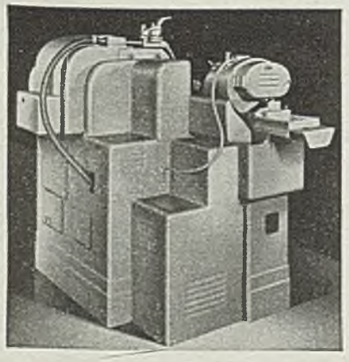


Two-speed grinding wheel drive has double diameter V-belt sheaves to provide increased wheel speed for worn wheels; increases wheel life.

7 FEATURES *that lower costs*

OF GRINDING SMALL PRECISION WORK

● It takes a lot of figuring with a sharp pencil to reduce the cost of producing small precision ground parts, but it can be done, and perhaps at just as big a saving as the larger and more expensive parts. The illustrations on these pages will help you. They show several ways in which CINCINNATI FILMATIC 4" Plain Hydraulic Grinders lower the cost of grinding small precision work. In addition to these features there are other advantages such as: Independent Table Traverse Rate for truing the wheel; Exceptionally Accurate Sizing, adjustments in increments as small as .0001" on work diameters; Single Lever Control for table traverse, work rotation, and coolant; Dog Controlled Table Reciprocation from 1/16" to full stroke; Finger-tip Positive Stop for Cross Feed Handwheel; Rapid and Visible Pick Feed Adjustment, and many other features which combine to give you fast, accurate, low cost production for your small parts. Engineering data may be obtained by writing for catalog G-520. A brief description of this machine will be found in Sweet's Catalog File.



Left: Ample and effective coolant guards are shown in this rear view of the machine. Motors are protected from dust and moisture, minimizing electrical maintenance.

Right: Kneehole in the new FILMATIC 4" Plain Hydraulic permits operation of the machine while the operator is seated comfortably on a chair or stool.

CINCINNATI GRINDERS INCORPORATED

CINCINNATI 9, OHIO, U. S. A.

CENTER TYPE GRINDING MACHINES

CENTERLESS GRINDING MACHINES • CENTERLESS LAPPING MACHINES

Guaranteed-Market Contract Placed for 10,000 Steel Houses

Eight types of prefabricated homes to be built for veterans by William H. Harman Corp. under arrangement with government agencies. Company will step up production from 50 homes in December to 1000 monthly by next May

UNDER a guaranteed-market contract placed by the RFC under a directive from the National Housing Expediter, Wilson Wyatt, the William H. Harman Corp., Philadelphia, will produce 10,000 prefabricated steel homes for veterans.

This is the second such directive involving factory-built homes. The first called for production of 19,400 prefabricated, part-steel homes by the Homeola Corp., Chicago.

Eight types of houses will be built by Harman, divided almost equally between two and three bedroom homes. The fob factory prices for two-bedroom models will range from $2925 to $2965; for the three-bedroom, from $3352.50 to $3672. The price of a house as it leaves the factory will be about half the cost of a complete home ready for occupancy. The National Housing Agency's Technical Office has estimated that the cost of a Harman house, erected and fully equipped, and including $1000 for the price of a lot or land, will range from $6000 to $7500, depending on whether it is a two or three-bedroom type.

Prices Subject to Revision

These prices will be subject to reduction if cost savings result from mass production. As an incentive for lowering costs, the producer will be permitted to retain one-third of the savings, with the remaining two-thirds passed on to the consumer. Provision also will be made for price adjustments, up or down, to reflect changes in wage rates or material costs.

The basic design of the house is a one-story structure of conventional design—rectangular in shape with a pitched roof. Panels made of steel channels and sheets form the walls, roof and partitions of the house. Blanket-type insulation is used in the wall and ceiling panels. Gypsum wallboard is used as an interior wall finish. Windows are of steel casement-type glazed with double strength glass. Both exterior and interior doors are of the flush panel type.

In addition to the panels and parts for erecting the house "shell," the house "package" as it is shipped from the factory will include the following equipment: Kitchen cabinets of enameled steel; bathroom fixtures; and electric or gas range, and an electric, gas, or oil hot water heater; oil or gas heating equipment and a 275-gallon tank (if oil heat); and electrical wiring.

The "packaged" house will be shipped to a dealer, who in turn will contract for its erection. The erector will lay the foundations and the floor, and then erect the prefabricated parts and assemblies shipped from the factory.

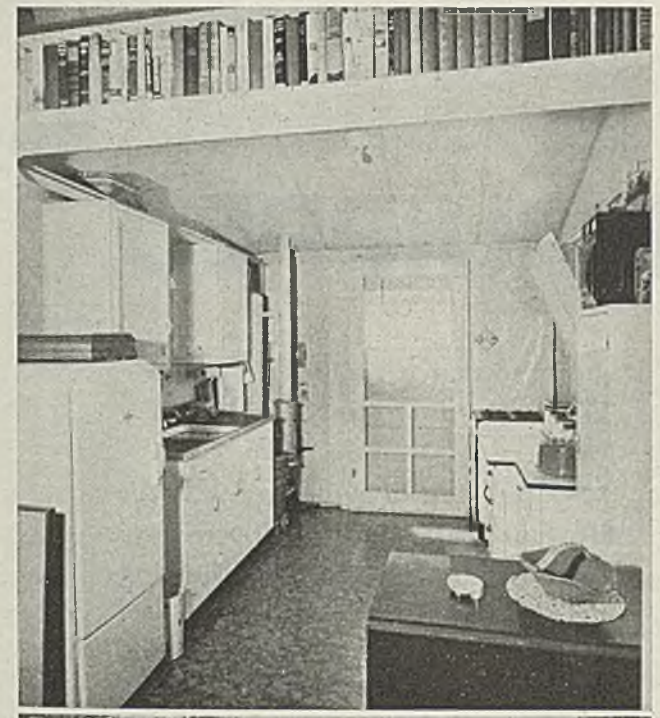
With the factory delivery price representing about 50 per cent of the cost of the completed structure, the remainder covers the cost of excavation and grading, foundations, floor, finished painting, shades, screens, utility connections, refrigerator, freight and drayage, the labor cost of erection, walks, finish grading, planting, permits, surveys, insurance, and dealer's and erector's profits.

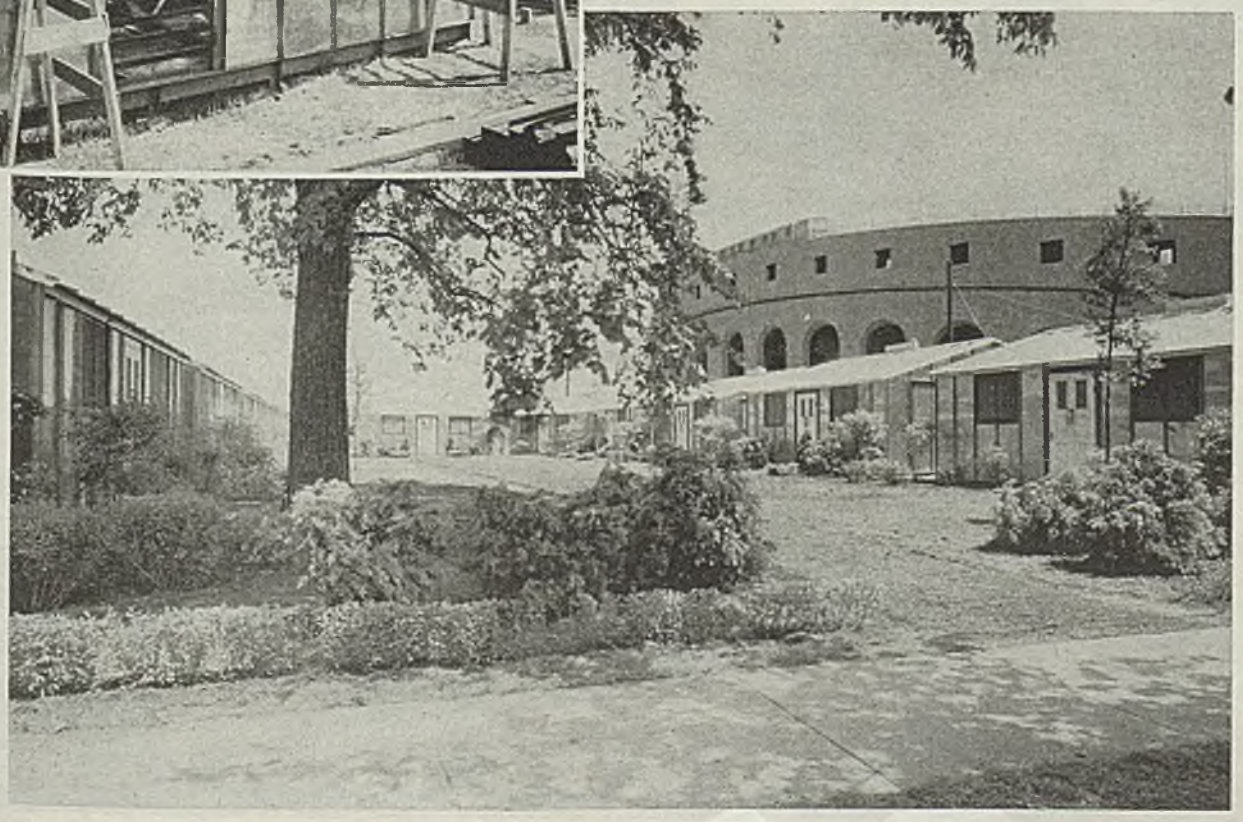
The Harman Corp. plans to get into production in December with an initial output that month of 50 homes, stepping it up to 200 in January, 300 in February, 600 in March, 800 in April, and reaching a production peak of 1000 homes a month in May.

Export Quotas Established For Building Materials

Export quotas for the fourth quarter for principal building materials, other than lumber, have been announced by the Civilian Production Administration. The list includes about 80 groups of commodities which carry export quotas which range up to 6.6 per cent of anticipated production. In most cases the quotas are under 4 per cent.

Following are some of the items covered, with the fourth quarter quota in units and the percentage of estimated production: Metal lath, $150,000, 5 per cent; metal window frames, steel and metal window sash, $250,000, 4.2 per cent; steel shutters, $5000, 0.3 per cent; metal door frames, steel and metal doors, $400,000, 4.4 per cent; cast iron soil pipe and cast iron soil pipe fittings, 250 tons, 0.18 per cent; woven wire screen cloth, insect, 4 million square feet, 4 per cent; bathtubs, cast iron and steel, and porcelain, 5000 each, 1.7 per cent; coal and wood cooking and heating stoves, gas stoves and ranges and kerosene cooking stoves, $1,300,000, 2.2 per cent; gas water heaters, kerosene room and water heaters, water heaters and parts, electric, domestic, coal and wood water heaters, $250,000, 2.1 per cent; steel buildings, $5 million, 6 per cent (estimated production includes fabricated steel only); angle irons, beams, channel runners and simplex studs with accessories, channels, girders, H-bars, H-beams, I-bars and Tees, punched or shaped, trusses, U-bars, welded steel structures, Zee bars, $1,500,000, 1.8 per cent (estimated production includes fabricated steel only); house heating boilers, 1000, 2.5 per cent; warm air furnaces, 1000, 0.5 per cent; house heating convectors and house heating radiators, cast iron, $100,000, 1.4 per cent; range boilers, $75,000, 3.7 per cent; domestic conversion oil burners and oil-fired boilers, $200,000, 5 per cent; gas burners and parts, space heaters, except electric, thermostatic elements, warm air registers and grilles, warm air distribution pipe and fittings, heating system controls, coal stokers and parts, unit heaters and ventilators, $115,000, 0.8 per cent; circular saws, not metal cutting, except diamond and steel band, pit drag, and mill saws, woodworking, $400,000, 5 per cent; cross cut and hand saws, $250,000, 6 per cent; saw bit shanks, saw bits and saw teeth, $25,000, 5 per cent; door locks and lock sets, cabinet and other locks of iron, steel, brass and bronze, and hinges and butts, iron and steel, and other builders' hardware, hinges and butts, brass and bronze, $600,000, 2.7 per cent; other hardware, n.e.s., including only bathroom fixtures, cadmium plated, brackets, curtain hooks, curtain cranes, curtain rods, and fixtures, drapery fixtures, safety patent hooks, pulleys, steel robe hooks, sections and shelf brackets, soap dispensers, $600,000, 3 per cent; metal sheet culverts, $200,000, 6.6 per cent; iron and steel manufactures, n.e.s., guttering; Robertson protected metal roofing sheets, steel asbestos-coated roofing; steel asphalt-coated roofing; vitrified steel roofing tile, 3000 tons, 0.5 per cent; plumbers brass goods, $350,000, 3.8 per cent; brass and bronze manufactures, n.e.s., window strips, windows and parts, $150,000, 3.2 per cent; metal conduit, outlets and switch boxes, $1 million, 3 per cent; sockets, outlets, fuse blocks, lighting switches, n.e.s, $500,000, 2 per cent; electric interior lighting fixtures and parts, all types except fluorescent, $250,000, 1 per cent; electric exterior lighting fixtures, except airport lighting fixtures and cargo lights and parts, $250,000, 2 per cent; sheet metal ducts, roof ventilators, gutters and downspouts, $40,000, 0.2 per cent; wheelbarrows, $50,000, 6 per cent.





Prefabricated Metal Homes Solve Housing Problem on Campus

NORTHWESTERN University, Evanston, Ill., solved the acute housing problem presented by a record-breaking enrollment of students, many of them veterans, by erecting prefabricated steel and aluminum housing units on its campus.

The prefabricated metal units were built by the Steelcraft Mfg. Co., Cincinnati, and erected by the R. C. Wieboldt Co., Chicago. The entire project, which is now providing housing for 1000 veterans and faculty members, was completed within 90 days.

The units were placed in clusters in the most attractive settings available and were arranged to preserve the beauty of the campus.

Interiors of the units are arranged to fully utilize available space. Furnishings generally are of the most modern design. Accompanying views show the units erected on the campus, erection and interior.

How the prefabricated steel and aluminum houses are furnished at Northwestern University is illustrated in view at top. Note how space is utilized in elevated bookshelves in foreground. Middle photograph shows installation of aluminum panels in the prefabricated homes. Below, a group of the completed metal homes is shown adjacent to Dyche Stadium on the university campus. Other groups of the houses are scattered in other sections of the campus and are affording living quarters for 1000 veterans and their families

QUOTE—

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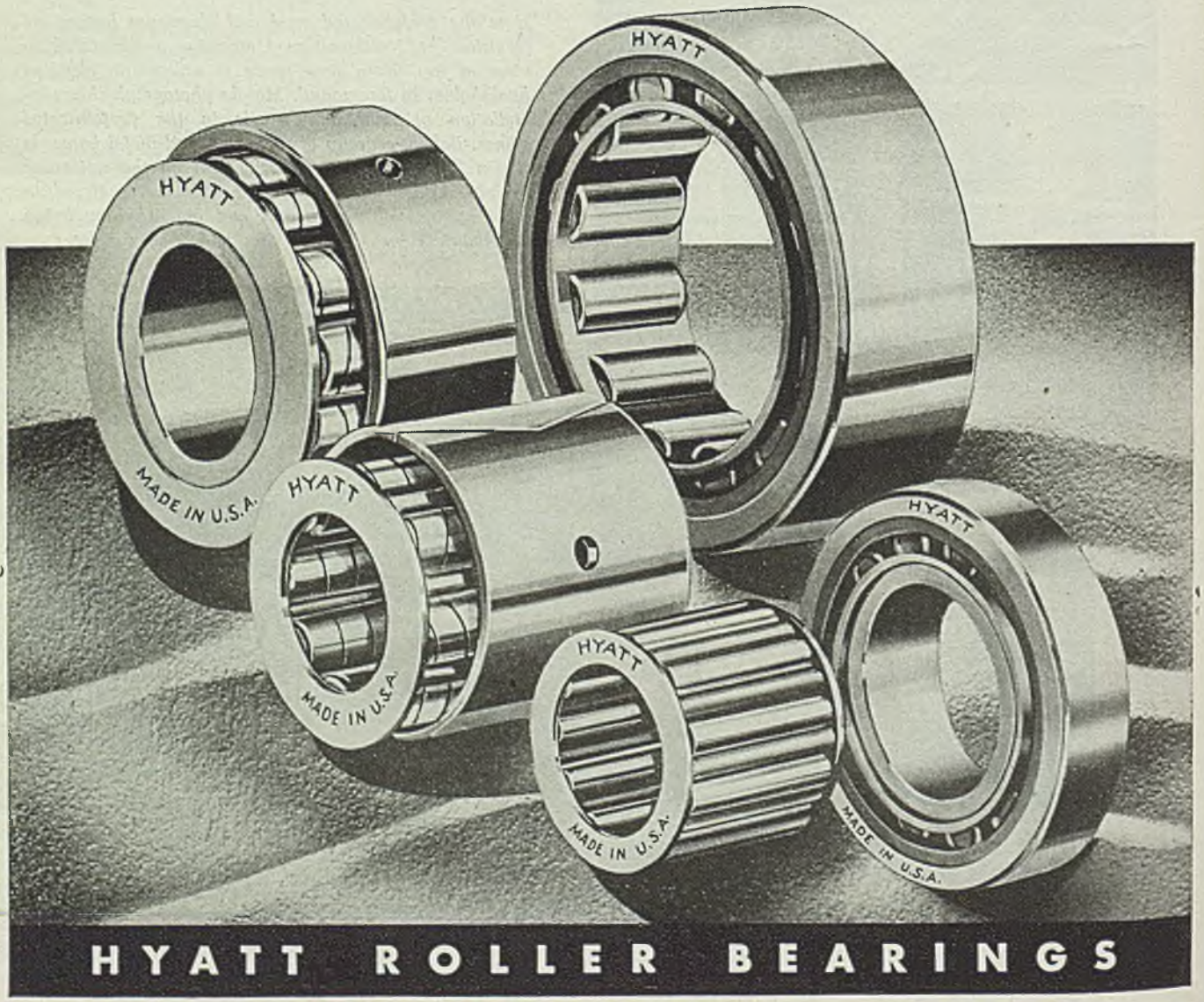
A standard phrase that answers bearing questions in the affirmative.

Leading manufacturers of machines and equipment covering diversified fields quote "Hyatt-Equipped" when they refer to bearing specifications.

Hyatt originated the roller bearing and Hyatt has continued to keep ahead so that it can be truly said—"There is a Hyatt Roller Bearing for every application."

Specializing in roller bearings for fifty-four years, Hyatt engineers have the answers. So put your bearing questions up to them. Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.



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

Mirrors of Motordom

Automakers mystified over where all the steel goes. Floats of material reduced and many are forced to interrupt operations to permit rebuilding of stocks. Further breathing spells to balance inventories expected

DETROIT

AUTOMOTIVE steel buyers are completely mystified over why they cannot receive sufficient sheet and strip to keep their assembly lines geared to a pace even below the 1941 level. They observe that the steelworks operating rate has held around 90 per cent since July. They realize the serious impact of the steel, coal and rail strikes earlier this year. They know that everybody and his brother are putting the pressure on for more steel. Still, they see their floats dwindle from 14 days to 10, to 8, to 6.

In an effort to determine just what has been happening this year, as far as steel shipments are concerned, it may be apropos to consult the figures compiled by the American Iron & Steel Institute and relate them to automotive requirements. Considering the first seven months of the year, shipments of hot-rolled sheet and strip were 3,909,966 tons. If 10 per cent of this amount is deducted for export and 40 per cent of the balance allocated to the automotive industry, the latter figure being the approximate historical pattern although probably a little high under present conditions, then the industry should have received 1,407,588 tons through July 31. Similarly, on cold-rolled sheets and strip, total shipments were 2,721,929 tons, out of which the auto industry might have expected to receive 979,894 tons. So much for theoretical shipments.

Figures Show Favorable Balance

Calculating sheet and strip requirements on the basis of the latest figures developed by the institute, the average automobile calls for a gross of 0.826 ton of hot-rolled and 0.482 ton of cold-rolled. Car and truck production for seven months of the year was 1,387,701. Thus the indicated steel needs are 1,146,241 tons of hot-rolled and 668,872 tons of cold-rolled, or a favorable balance on paper of 261,347 and 311,022 tons, respectively, as at the end of July. It is extremely doubtful if there was anything like this much float on hand at that time. During the first three months of the year, for example, General Motors plants were on strike and the normal intake of steel was disrupted. High export tonnage and certain allocations by government agencies also may have reduced available automotive tonnage. However, it seems safe to say that, as of the end of July, automotive users had a comfortable supply of steel.

Examination of steel shipment figures for the month of July alone suggests the situation started to deteriorate seriously then. Mills supplied 670,378 and 430,015 tons of hot-rolled and cold-rolled, respectively, for the month. Automotive share is calculated at 241,336 tons of hot-rolled and 154,805 tons of cold-rolled. Car production for July was 330,764, indicating a need for 273,211 tons of hot-rolled and 159,428 tons of cold-rolled, or an apparent deficiency of 31,875 tons in the former and 4623 in the latter.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

Tabulated by Ward's Automotive Reports

	1946	1941
January	121,861	524,037
February	83,841	509,332
March	140,777	533,878
April	248,318	489,856
May	247,620	545,321
June	214,511°	646,278
July	330,764°	468,897
August	359,180*	164,793
September	349,124°	248,751
Estimates for week ended:		
Sept. 28	85,495	77,035
Oct. 5	91,925	76,820
Oct. 12	84,421	79,065
Oct. 19	80,000	85,600

°Preliminary.

Seemingly this deficiency continued through August and September, since car production moved up in August about 9 per cent from July and in September about 4 per cent. Three months of operating in the red on steel, so to speak, have brought the automotive press plants to a dangerously low inventory position, with the result that cutbacks were required at Chrysler divisions, and frequent brief stoppages experienced at other plants. As explained before, General Motors units are in somewhat more favorable position currently because they did not operate in the first quarter of the year and thus have carried along fairly heavy floats of steel. The word now, however, is that GM will be scratching for sheet and strip by Dec. 1, even assuming shipments continue at the present rate.

Evidence continues to pile up suggesting a breathing spell to balance out inventories may be in order. When asked about this, some automobile executives shudder and declare it is unthinkable with people demanding new cars so strenuously. H. H. Curtice of Buick says his plant expects to keep going until the Christmas holidays when a 10-day shutdown is scheduled for model changeover and annual inventory. By that time it is hoped better than 150,000 Buicks will have been built since the start of production last fall. Output now is approximately 95,000, which means that in two months the plant will have to complete 55,000. This is something over the September level of production, when 23,272 were built. Prior to the war, Buick's record month was March, 1941, when assemblies totaled 38,913. Despite the fact September production was 40 per cent off from the record high, the working force was the largest of peacetime record, at 22,038, hourly rated personnel numbering 19,520. And the division is seeking another 2000.

Absenteeism Rises

Last week was the start of the bird hunting season in Michigan and with 600,000 licenses issued, an all-time high, the expected absenteeism in motor plants began to happen. First meager report was that the already-high rate of 4.7 per cent was better than doubled as a result of exodus of hunters northward. The worst part of absenteeism is not the mere fact that one out of every ten men fails to show at his post on the assembly line but the fact his absence necessitates a complete reshuffling of work crews, putting inexperienced men in the absentees' jobs, rearranging schedules and in general gumming up the works. Plant operators see little chance of any improvement in the job attendance rate, since the deer hunting season is just around the corner and that may be worse than the bird season.

See Left-Wing Techniques

Walkout of 13 crane operators in the Ford open-hearth plant, which forced suspension of steelmaking operations for 12 days and idleness for 1100 in the plant, had all the earmarks of direction by so-called "subversive" or communistic elements in the Ford local 600 of the UAW-CIO. The crane men first left their jobs after complaining over

PACKAGE PILER: Spare parts are lifted automatically to storage racks at Buick's new parts warehouse at Grand Blanc, Mich. The new structure is 1200 feet long, contains more than 500,000 sq ft of floor space

fumes arising in pouring ingots in which sodium fluoride was being used as a deoxidizer. Obviously, if their complaints were justified, the health hazard would have been adjusted in a matter of hours. Instead, Ford lost an estimated 20,000 tons of ingots at a time when they are critically needed for production of finished steel. The incident is typical of the left-wing union technique of building up a trivial incident to major proportions so that an entire plant's operations are stalled.

Henry Ford II appealed to Philip Murray, president of the CIO, after nine days of the open-hearth tieup, "Can and will the CIO, backed by the responsible majority of its members, control the subversive and insurgent factions which are apparently calling the tune in so many places today?" Murray quickly ducked the issue but it may be significant the strike was settled within a day or two after he had replied. The only important terms of the settlement called for a test with the sodium fluoride "injection" in the molten steel to determine if any health hazard from fuming might be involved. This, of course, could have been done in the first place and doubtless has been done by the Ford open-hearth control staff.

The presence of subversive and inflammatory elements in the Ford union local can easily be substantiated by a casual reading of the newspaper issued weekly by the local. It is strictly defamatory, derogatory and inciting, but all done with a type of sensationalism that is clever beyond the writing ability of any workingman in Ford plants. Thus, a recent issue of the paper following Mr. Ford's address to the Detroit economic club ran the screaming headline. . ."We've been hearing some fine sounding words, Mr. Ford. . .but talk is cheap." And the following story: "We can point out that the very automotive concerns for which Mr. Ford weeps crocodile tears are reaping rich harvests in carryback tax rebates —pushed through Congress by the industry lobbies in Washington. They don't give a damn about production. . .they're trying to turn the clock back and return to the pre-union days of backbreaking sweatshops. And they get millions from the government in tax rebates for not producing." It is the old familiar and vicious communist line.

Large Communications System

Some startling figures are revealed in a study of the communications system in the Ford Rouge Plant, which is typical of most large automotive operations. Ninety million conductor feet of telephone cable, 6,000,000 pieces of incoming mail a year and a larger number of outgoing pieces, 40,000 interoffice memos daily, 247 trunk outside lines into a 13-position administration building switchboard, 1860 lines and 578 extensions within the plant's automatic dial telephone system, 6000 outgoing long-distance calls daily and 6000 incoming, 7000 local calls a day, 75,000 interoffice calls, 150 crank-operated magnetic telephone stations for emergencies, 284 fire alarm stations, 7000 miles of private telegraph circuits linking all branch plants, 114 teletypes in the Detroit area alone with 17 local points at the Rouge plant, private lines to 15 cities in the U. S., 20,000 telegraph messages daily—adding up around 200,000 messages of all kinds daily, most in the Rouge, or roughly 50 for each new car or truck coming off assembly lines throughout the country.

Study Dealer Practices

In the effort to refute some of the popular recriminations of the public against automobile dealers, Pontiac has made itself a survey of its own dealer family and finds: On all deliveries of new cars since last October only 51.1 per cent have been accompanied by an old-car tradein, of total deliveries of new cars 28.2 per cent have gone to veterans and 7 per cent to doctors, only 5.7 per cent of the 1946 models were delivered outside a dealer's trading area, unfilled orders from veterans total 74,444, from doctors 9306 and fleet units 11,826, and dealers have taken 8852 tradeins on which new car deliveries have not yet been made.

Popularity of the hydra-matic drive on Oldsmobile is attested by compilations the company has made showing in 1940 only 10 per cent of new cars incorporated the automatic transmission, while one year later the figure increased to 43 per cent, and currently is 75 per cent. Still available only on Cadillac and Oldsmobile the transmission probably will next become optional on Buick and Pontiac and finally on Chevrolet, assuming the cost of its manufacture can be lowered.

HANNIBAL'S FROZEN ASSET

The Romans smugly thought the icy barrier of the Alps impassable. But Hannibal turned the paralyzing cold to his advantage. He had water poured into the crevices of road-blocking boulders. The expansion of the freezing water "made little ones out of big ones"— and another road led to Rome.

Low temperature, which worked to Hannibal's advantage, is a distinct disadvantage to operating machinery. Under low temperature conditions, some steels that may perform perfectly at ordinary temperatures, develop unsuspected weakness. There is always danger of a parts failure under such conditions.

One way to assure good performance at low temperatures is to specify molybdenum steels. Good hardenability plus freedom from temper brittleness give them good low temperature impact strength. They are a precaution it pays not to ignore. Practical working data are available on request.

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MOLY

Freight Car Builders Short Of Materials

Car Institute says lack of materials, not export shipments, impedes delivery of cars to U. S. railroads

EXPORT shipments of railway freight cars are not impeding delivery of cars to United States railroads, the American Railway Car Institute, New York, replied to charges that foreign business is diverting efforts of the car building industry from much-needed production for American railroads.

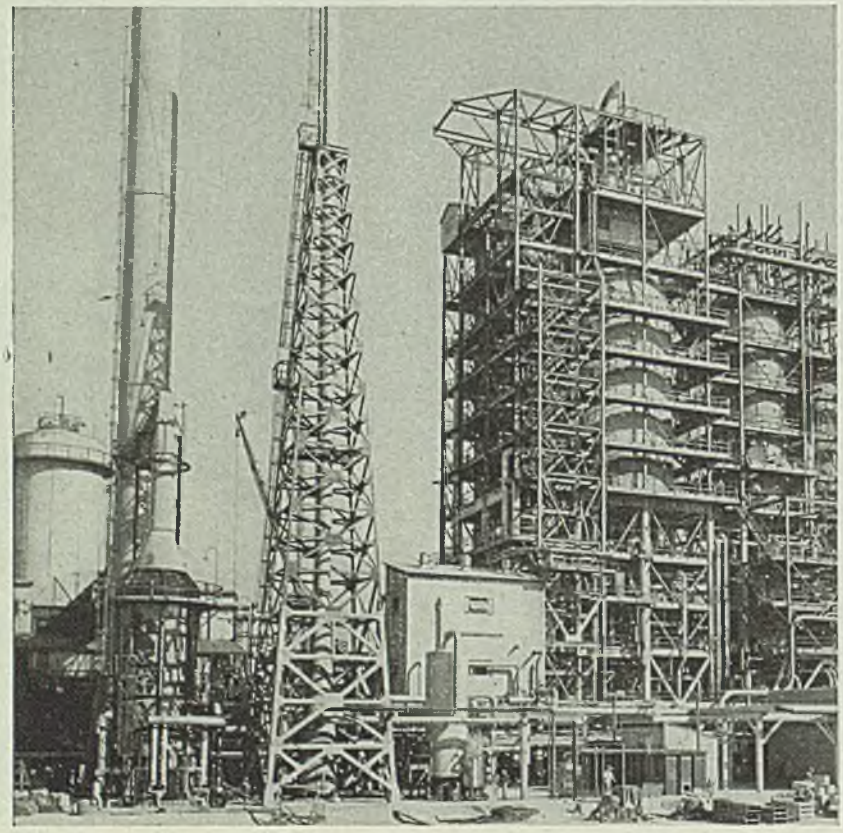
A statement by S. M. Felton, president of the institute, said: "Lack of vital materials, not production of cars for export, is the bottleneck in the car building industry today.

"Foreign orders, primarily for shipment to France, were placed with car builders many months ago at the instance of the State Department and as a direct part of the government's policy of economic rehabilitation in Europe. At the time these orders were received, orders for domestic production were not on hand in any substantial quantity. Materials for foreign cars were thus ordered in advance of materials for many of the domestic cars now undelivered. Moreover these materials are to a large extent different in specifications from those used in foreign cars and could not be diverted for use in domestic car building," Mr. Felton declared.

During September, 671 foreign cars were delivered, but this number, Mr. Felton pointed out, is roughly equivalent to only 335 domestic cars, since most foreign cars are smaller in size. Deliveries of foreign cars for this year to date total 5693, he said. During the first nine months of this year, 24,330 cars were delivered to American railroads by car builders and 7389 by railroad shops for a total of 31,719.

Replying to charges that Mexico has been getting cars at a time when the United States seriously needs them, Mr. Felton said that actually the purchase of new cars by Mexican railroads gives relief to car shortages in the United States. Box cars of U. S. and Mexican railroads are regularly interchanged and war conditions caused many U. S. cars to go and remain in Mexico. An agreement between United States railroads and Mexican railroads, Mr. Felton pointed out, assures the return to the United States of an equal number of cars for all new cars delivered to Mexico.

"If steel and other vital materials were available in required amounts, the car building industry right now has the capacity to produce sufficient cars to meet domestic requirements plus requirements for foreign cars," he said.



"CAT": Sixteen stories high and with a daily capacity for making 1,050,000 gallons of gasoline, fuel oil and other petroleum products, the first of two big "cats"—fluid catalytic cracking units—at the Whiting, Ind., refinery of Standard Oil Co. (Indiana) went into operation last week. Under construction since May, 1945, the unit makes extensive use of corrosion-resisting alloy steels, alloy cladding and stainless steel, and welded fabrication. The fractionator tower is one of the largest shop-fabricated vessels ever shipped to a refinery. Measuring 108 ft long, 16 ft 2 in. diameter and weighing 155 tons, it was transported by rail and barge from Milwaukee. The second cat cracker at Whiting is scheduled for completion next year

25th Anniversary Observed By Wright Steel & Wire Co.

G. F. Wright Steel & Wire Co., Worcester, Mass., recently celebrated its 25th anniversary with a week marked by a four-day sales conference, plant inspections, demonstrations and a Silver Anniversary observance at which service awards were made to 119 employees who have been with the company from 10 to 25 years.

The company, founded by George F. Wright, member of a family which for three generations has been prominent in manufacturing fabricated wire products, produces hexagonal netting, hardware cloth, industrial wire cloth, clothesline, wire strand, plaster netting, plaster lath and chain link fence.

All-Aluminum Bridge Span Erected for Railroad Use

Made possible by wartime development of methods for producing large plates and shapes of aluminum, the first all-aluminum bridge span ever fabricated has been erected over the Grasse river on the Massena Terminal Railroad at Massena, N. Y. (STEEL, Oct. 7, p. 98). The bridge was designed by Aluminum Co. of America and fabricated at the Bethlehem Steel Co. plant at Rankin, Pa.

Although this bridge is the first application of a complete aluminum span, the metal was used in 1933 to replace the steel and wood floor of the Smithfield Street bridge in Pittsburgh.

VOTING MACHINES: Berger Mfg. Division of Republic Steel Corp., Canton, O., is finishing a large production run of voting machines, many of which will be used in the coming election. Machines are made under contract for the Shoup Voting Machine Corp., Philadelphia. They are used in many cities and voting in Rhode Island and New York is almost 100 per cent by machine

BRIEFS . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Skilsaw Inc., Chicago, has purchased Forss Pneumatic Tool Co., Aurora, Ill. The acquisition supplements Skilsaw's line of portable electric tools with a line of portable pneumatic tools.

—o—

Denison Engineering Co., Columbus, O., has appointed Robert R. Stephens Machinery Co., St. Louis, exclusive representative for its hydraulic presses in Missouri, Kansas, Arkansas, Colorado, and parts of Illinois and Oklahoma.

—o—

Geometric Tool Co., New Haven, Conn., division of Greenfield Tap & Die Corp., has moved its Detroit office to 2870 E. Grand Blvd., Detroit 2.

—o—

Chisholm-Ryder Co. Inc., Niagara Falls, N. Y., has acquired the common stock of Ayars Machine Co. Inc., Salem, N. J. The latter company's products will be distributed under the trade name of CRCO-Ayars.

—o—

United Aircraft Products Inc., Dayton, O., has acquired Allen Tool Co., Springfield O., which will be operated as a division.

—o—

Houston Oil Field Material Co. Inc., Houston, Tex., has purchased the common stock of Briggs-Weaver Machinery Co., Dallas, Tex., distributor of machine tools, oil field equipment, etc.

—o—

Moore Corp., Joliet, Ill., has begun construction of a plant addition as part of a large-scale expansion program, which when completed will increase production capacity ten times.

—o—

L. Talenfeld Co., Pittsburgh, has set up offices and a warehouse for handling structural steel at 3535 Butler St., that city. The company had been operating as a steel brokerage firm in the Bakewell building.

—o—

Acme Trailer Mfg. Co., Fresno, Calif., has been organized to build and service four-wheel and six-wheel trailers and semitrailers.

—o—

Donohoo Steel Treating Co., Bettendorf, Iowa, has been organized to engage in heat-treating ferrous and nonferrous metals.

—o—

Wilson Industries Inc., Chicago, in receivership, was sold at public auction which began on Oct. 15.

GE Announces Plans for New Turbine Plant

Construction of $20 million factory at Schenectady, N. Y., expected to be started this year

A $20 MILLION plant for manufacture of steam turbines and electric generators will be built at General Electric Co.'s works at Schenectady, N. Y., with construction expected to be started this year.

Construction would be completed in about 20 months, with installation of new equipment requiring an additional six to nine months. All steam-turbine facilities of the Turbine Division, now located in several buildings, will be situated in the new plant, which will cover about two and one-half times the ground area occupied by the present turbine shop, now the largest manufacturing building in the Schenectady works.

With a frontage of 650 feet, the building will be 1290 feet long. To support the tremendous weight of the building and its heavy equipment and products in process of manufacture, very heavy foundations and extensive pilings will be required. Unusually heavy structural steel will be necessary for the superstructure.

Decision to construct the new building was made after long-term forecasts indicated an increasing demand for large steam turbines and generators. The turbines manufactured will range from 10,000-kilowatt to 200,000-kilowatt capacity. Weight of one of the larger units will be about 760,000 pounds, and the generating capacity would be sufficient to supply light and power to a city of 600,000 population.

When the new turbine plant is completed, approximately 3000 people will be employed in the shop and offices, although the number may vary with changing business conditions.

Birmingham To Celebrate 75th Birthday with Party

Irving S. Olds, chairman of the board, and Benjamin F. Fairless, president, United States Steel Corp., New York, will be guests at a large birthday dinner to be held in Birmingham Nov. 26 in celebration of that city's 75th anniversary. Mr. Olds will be principal speaker.

California Building at Record Clip

Construction contracts in first eight months of year hit new high mark. Residential awards represent 34,000 new houses

SAN FRANCISCO

ALL existing records in the value of new construction contracts were broken in California during the first eight months of this year, the State Reconstruction & Re-employment Commission has just reported.

From the first of the year until the end of August, contracts are estimated to have a value of $750 million. By way of comparison with prewar trends, the U. S. Census Bureau reported for all of 1939 total value of construction contracts in California was $417 million.

Although prices for materials and labor are considerably higher now than in 1939, the rise has not been sufficient to erase the fact that new building is running greater than ever before. In this regard the commission says:

"Because of the large rise in construction costs, the dollar volume of contract awards in 1946 does not represent the same physical volume of building it would have before the war. However, despite reduced buying power of the construction dollar, the volume of work placed under contract in California during the first eight months of 1946 undoubtedly was greater than for a comparable period in any previous year."

Survey Represents All Work

It should be pointed out that the amount estimated in the survey does not represent work completed. It is a total of contracts let, some of which have been completed, some of which are in a stage of construction now and some of which have been delayed because of material shortages.

In breaking down the building awards for this year into various types of construction, the report shows that there has been three times as much private work as public construction.

According to the survey, public construction, such as general public works, public housing and public buildings, totaled more than $200 million, or 30 per cent of the aggregate. Total private construction amounted to more than $464 million. The total of these public and private awards exceeded $664 million. Another $85 million of awards is estimated to be the amount unreported to regular construction news sources.

A breakdown of construction by areas shows that southern California, with a total of $384,589,000 is in the lead, with the San Francisco area second with nearly $201 million.

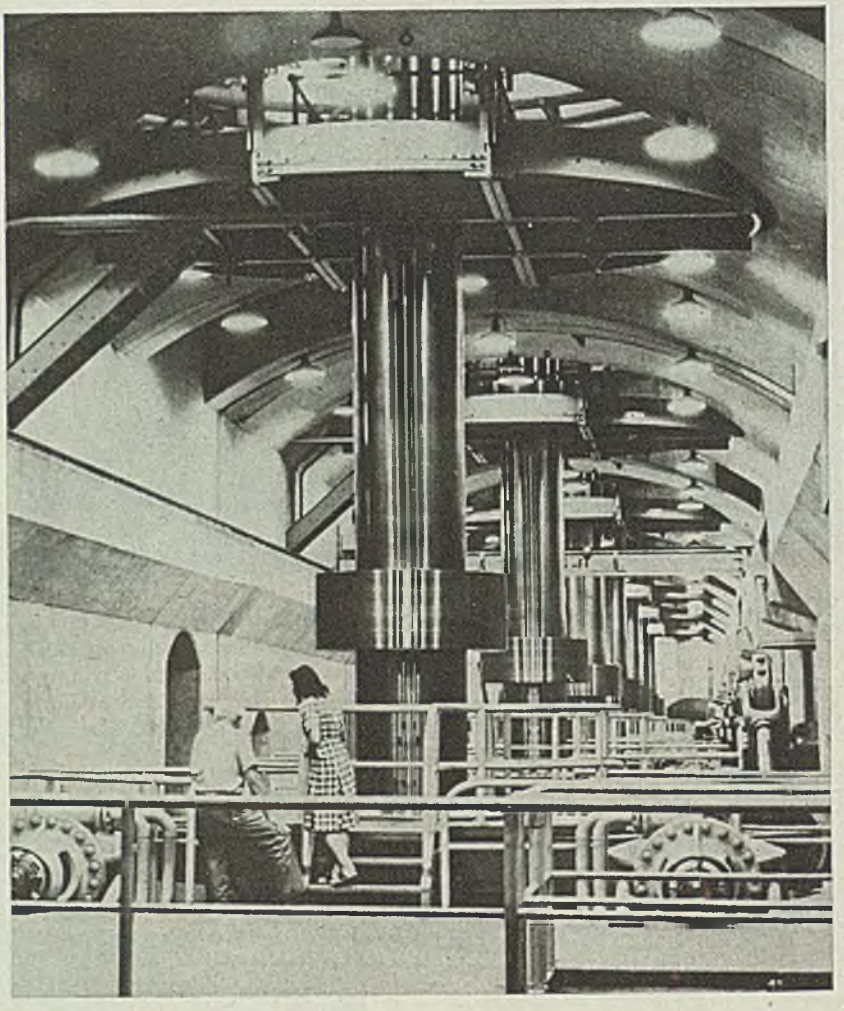
With a combined figure of $225 million, Los Angeles county and the nine San Francisco Bay area counties had 93 per cent of the state's total of private residential awards, and most of the private nonresidential contracts.

The report points out that at an assumed average cost of $7000 per dwelling unit, the private residential contract awards represent about 34,000 new homes. This does not, however, include a considerable number of private home building awards for which contract amounts were not stated.

Contracts reported for public works during the eight months, totaling $200 million, included about $106 million of federal construction projects. Awards by the state, counties, cities and other local agencies amounted to only $94 million, the report stated.

The report shows California has gained many new factories. A total of 408 contracts were awarded for new factories or industrial plant expansions, 356 of which were in nine California counties. Los Angeles county led with 273.

The report also states that employment in construction in the state has been increasing steadily during 1946 and is now at a peacetime peak of 185,000 workers. Because of higher postwar construction costs and the longer time required to com-



TENTH ANNIVERSARY: Glistening shafts, towering to a height of 65 feet, connect the turbines and generators in the turbine gallery of the Nevada wing of the Boulder Dam power plant. The project was completed ten years ago and has just been opened to the public for the first time since the war started. NEA photo

plete work, the employment rise has not been as great in comparison with prewar levels as the dollar volume of contracts would indicate, the commission says.

The War Assets Administration sold surplus war goods in northern California and Nevada during September which cost the government $22,603,712. WAA received in payment $8,135,741, or a recovery to the government of 36.2 per cent of cost. Recovery in August was 27.6 per cent of cost.

The California Manufacturers Association, designated by the Civilian Production Administration to conduct an iron and steel scrap recovery drive in California, has announced a threepoint program to alleviate the shortage.

The first aim is to urge all concerns in the state to resurvey premises for scrap metal and to arrange for placing the scrap in the hands of dealers as soon as possible.

Secondly, the association is insisting that government agencies, especially the Maritime Commission and the Navy, adopt efficient methods of promptly selling ships destined for scrap. The association accuses the Maritime Commission of being a "roadblock" because of slowness in disposing of surplus vessels.

Finally, the association is asking state and municipal governments to take strong action in calling the problem to the attention of the public in addition to insuring that municipal agencies gather and deliver all scrap under their control to dealers.

Seattle Consumers Say Steel Shortage Acute

SEATTLE

Interrupted transportation, shortages of all materials, labor turnover and inefficiency are factors restricting output of steel products in this area.

The position of steel consumers here is outlined by Frank V. Seidelhuber Jr., vice president, Seidelhuber Iron & Bronze Works.

"Since the end of the war," he said, "eastern steel mills have been gradually reducing steel quotas to western manufacturers in response to pressure from interests in their own area, until they are now just a trickle. We have been notified by our last large source that they cannot give us any steel after the first of the year and we know that ours is not an isolated case. Every other plant in this area is facing the same crisis."

He pointed out that steel mills are withdrawing from western territory because they can sell a larger volume on individual orders in their own areas at a lower sales cost. Therefore it is more profitable to sell their complete output in the East.

Union Set Back in Bargaining Election at Northrop Aircraft

Loses campaign as 69.3 per cent of voting employees decline union representation. Outcome viewed as pointing significantly to change of labor sentiment away from wholesale unionization of California industry

LOS ANGELES

THE CIO tried for the third time last week to win recognition as bargaining agent at Northrop Aircraft Inc. The union failed, with 69.3 per cent of the voting employees opposed to its domination. In previous elections the first ended with only slightly less than half the employee vote favoring the CIO and AFL together. Both unions failed again last December when 61.1 per cent of voting workers opposed organization.

The fact opposition is growing among workers in this single plant to accepting any union as bargaining agent is cited by the Chamber of Commerce, industrial department, as being proof wholesale unionization of southern California plants has reached one end of its pendulum-like swing accelerated during the war years.

What has happened at Northrop Aircraft in southern California has occurred at other smaller plants recently, either with or without the aegis of the WLRB.

One fly in the ointment, say chamber officials, is the danger that sooner or later the unions will win over employees in plants by formal vote by reason of the fact only union sympathizers will continue to vote while those against organization will neglect to do so.

Government Silver Returned

Approximately $38 million worth of silver which was cast into electrical conductors in various shapes for use in the RFC-owned Alcoa plant at Los Angeles during the war when copper was scarce will be recast into ingots and returned to the custody of the U. S. Treasury, it was announced last week by the War Assets Administration in Los Angeles.

The wartime Treasury "loan" of the silver totaled 1474 tons. In 29 carloads it arrived at the Alcoa plant between November, 1942, and June, 1943.

Los Angeles Industry Grows

More than $100 million has been invested in erection or expansion of factories in the Los Angeles industrial area to date this year, according to a report last week by the industrial department of the Los Angeles Chamber of Commerce.

The chamber pointed out 206 new factories, creating 13,213 new jobs, were erected at a cost of $56,673,006, while existing plants were expanded with resultant creation of 23,868 new jobs by investment of $57,736,336. Total investment was $114,409,342.

In September $5,163,250 was invested in new or expanded plants—creating 1,189 jobs. Last month 27 new factories were completed with an investment of $760,000 while 32 plants were expanded with investment of $4,403,250.

Flooded with Export Inquiry

Ken Winebrenner, manager of the construction industries section of the Los Angeles Chamber of Commerce, last week told of the flood of inquiries relating to imports and exports to and from that area.

"Building projects in South America will demand quantities of cement, plaster, wire, nails, structural steel and many other items," he said. "It is certain that any excess production of local plants—when that time comes—will be readily absorbed by the orders from abroad."

Among imports already scheduled for quantity shipment into the southern California region, Mr. Winebrenner mentioned gypsum from San Marcos Island, off the Mexican coast, which will be shipped by barge to the California mainland and used to augment supplies of plaster and plasterboard.

Plans Aluminum Alloy Pipe

The Los Angeles Safety Commission last week received applications from a group of manufacturers for permits to make and market soil pipe, soil fittings and grease interceptors of U. S. government formula No. 43 aluminum alloy.

Dollar Volume of Orders for Electric Trucks Declines

Domestic bookings for electric industrial trucks and tractors during July totaled 323 units. Net value of the chassis amounted to $1,529,465, compared with $1,035,066 in June, according to the Electric Industrial Truck Association, Chicago.

Men of Industry

GEORGE W. VON HOFE

M. R. BLATTNER

FRED C. ZIESENHEIM

George W. von Hofe, president, New Jersey Machine Corp., Hoboken, N. J., has been elected president of Packaging Machinery Manufacturers Institute Inc., New York, succeeding **Frank B. Fairbanks**, president, Horix Mfg. Co., Pittsburgh, who served as the institute's president for 2 years. Vice presidents elected are: **Boyd H. Redner**, general manager, Battle Creek Bread Wrapping Machine Co., Battle Creek, Mich.; and **Oscar W. Wikstrom**, president, United States Automatic Box Machinery Co., Boston. The following directors have been elected by the institute: **John P. Corley**, vice president, Miller Wrapping & Sealing Machine Co., Chicago; **E. G. Kuhn**, president, Consolidated Packaging Machinery Corp., Buffalo; and **Carl E. Schaeffer**, sales manager, Stokes & Smith Co., Philadelphia.

—o—

W. J. O'Brien, vice president and director, Glidden Co., Cleveland, has been named chairman of a committee of Glidden executives in charge of manufacturing, research and development. Committee members include three other vice presidents: **R. W. Levenhagen, Paul E. Sprague** and **Dwight P. Joyce**. Mr. O'Brien recently returned from a tour of Sweden, Denmark and Norway, as a member of the Scandinavian Research and Industry Mission.

—o—

Theodore A. Cohen has been named president of the newly formed Taco West Corp., Chicago, and **Richard K. West** has been appointed secretary-treasurer. Mr. Cohen founded, and was formerly vice president of Wheelco Instruments Co., Chicago. Mr. West was recently released from active duty in the Engineering Division, Navy Bureau of Aeronautics. He was once engineering representative for Bakelite Corp., New York, and liaison engineer for Bell Aircraft Corp., Buffalo.

—o—

M. R. Blattner has been appointed head of the business management department, Lincoln-Mercury Division, Detroit, Ford Motor Co. From 1928 through 1941, he served with Chevrolet Motor Division of General Motors Corp., Detroit.

—o—

Reginald C. Smith has been promoted to contract manager, eastern district, with offices in New York, H. K. Ferguson Co., Cleveland. He will direct the company's sales effort in the eastern states, and will have a leading part in the sales program of the Ferguson Export Division. Mr. Smith has been with the Ferguson organization for the last 3 years, and has been project manager in charge of some of the company's larger wartime operations.

—o—

Wilma Soss has been appointed public relations consultant, Budd Co., Philadelphia. Mrs. Soss was with Evans Products Co., Detroit.

—o—

Ralph S. Merkle has been appointed manager of parts sales, Radio Tube Division, Sylvania Electric Products Inc. Mr. Merkle, recently released from the Army, originally joined the company in 1929. Until June, 1942, he served the company progressively as sales engineer, sales representative, commercial engineer, and in customer technical service.

—o—

Frank P. Smith has been appointed sales engineer, Cleveland region, E. I. du Pont de Nemours & Co. Inc., Wilmington, Del. He reports to W. E. **Kreuer**, regional industrial sales manager in Cleveland. After Nov. 1, Mr. Smith's office will be located in Pittsburgh. He will serve the clientele formerly served by W. J. Bradley for the Du Pont Finishes Division. Since his release a year ago from the Navy, Mr. Smith had worked in the Philadelphia area. He joined the company in 1928.

—o—

Fred C. Ziesenheim has been appointed sales manager, Plastics and Die Casting Machinery Divisions, Hydraulic Press Mfg. Co., Mt. Gilead, O. He will direct sales and assist in development of new machines for those two divisions of the company.

—o—

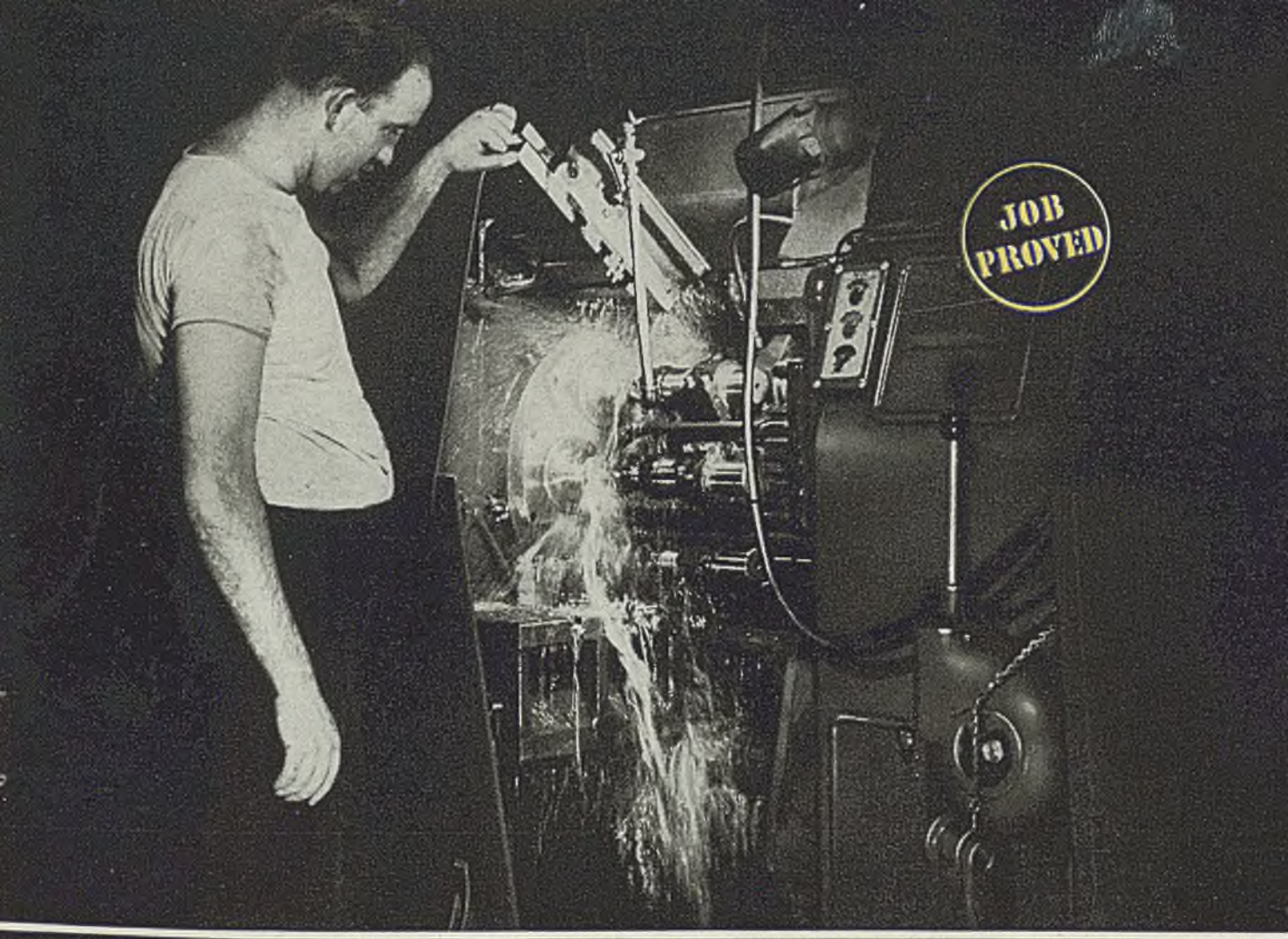
George S. Warren has been appointed vice president in charge of engineering, Arms-Franklin Corp., Youngstown, and also Taylor-Wilson Mfg. Co., Pittsburgh. Mr. Warren was in New Castle, Ind., with Ingersoll Steel & Disc Division, Borg-Warner Corp., Chicago.

—o—

Howard C. Cross, high temperature alloys specialist, Battelle Memorial Institute, Columbus, O., and **John W. Freeman**, department of engineering research, University of Michigan, Ann Arbor, Mich., are visiting research laboratories in England, on a mission for the Office of Naval Research. The mission is investigating British developments in heat-resistant alloys, particularly test procedures.

—o—

Bailey Meter Co., Cleveland, has announced the following additions to its staff of field engineers: **Thomas M. Nourse** to the Buffalo branch office; **Peter M. Harris**, San Francisco branch; **Arthur J. Schager**, New York branch; **Robert F. Talbert**, Detroit branch;; **George J. Dun-**



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SUNICUT . . .

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A precision manufacturer was turning, boring, and threading small precision parts on Gridley automatics. Accuracy varied. Chatter marks frequently marred the work, and threads were poor. Rejects were too high.

Here are the facts:

Type of Machine: National Acme Gridley Automatic Screw Machine: 2⅝" capacity: Model R.B.: Six Spindles

Material Machined: Commercial Rod Brass

Speed: 400 Surface-Feet per Minute
Feed: .003"

Lubricant: Sunicut

A change to Sunicut was recommended by a Sun Cutting Oil Engineer. Chatter marks disappeared. Tolerances were maintained. Better threads were made possible, and rejects diminished, resulting in increased production.

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INDUSTRIAL PRODUCTS

egan, Pittsburgh office; and **Gilbert Peters** to Denver. These men have completed a training course at the company's factory in measurement, combustion and automatic control, especially as it applies to power plants. **J. J. Haslam,** recently released from the Marine Corps, is returning to the firm's Kansas City branch office. **H. W. Hilker** has been transferred from Cleveland to the Los Angeles branch office.

—o—

George R. Vila has been appointed sales manager for latex, Lotol, rubber dispersions and plastic products, Naugatuck Chemical Division, United States Rubber Co., New York. He will make his headquarters at the division's plant in Naugatuck, Conn., and will also maintain an office at the company's general offices in New York. Mr. Vila had been assistant development manager of the Naugatuck Chemical Division. He joined the division in 1936.

—o—

Robert C. Singleton has been appointed technical adviser to Nelson Sales Corp., Lorain, O. He was senior metallurgical engineer for Nelson Specialty Welding Equipment Corp., San Leandro, Calif.

—o—

Charles E. Gibson has been appointed manager, claim department, Republic Steel Corp., Cleveland, succeeding **C. H. Guy,** retired. In 1923, Mr. Gibson joined Trumbull Steel Co., Warren, O., which was merged with Republic in 1930. Recently he had been assistant manager of the claim department. Mr. Guy, whose retirement is due to ill health, joined Republic in 1928. Prior to that he had been chief inspector for 13 years with Youngstown Sheet & Tube Co., Youngstown. **F. A. Behner,** who was assistant chief metallurgist of Corrigan-McKinney Steel Co. prior to its merger with Republic in 1935, has been named assistant manager of the claim department. He had recently been a metallurgical assistant in Detroit for Republic. **D. W. Livingstone,** who has been in the claim department since its formation in 1928, has been named assistant to the manager of claims.

—o—

P. F. Bronckhurst has been placed in charge of the new Denver offices of Hydropress Inc., New York.

—o—

W. A. Roberts, vice president, Tractor Division, Allis-Chalmers Mfg. Co., Milwaukee, has been elected president of Farm Equipment Institute.

—o—

Emil Haegele has been named assistant general foreman of the Pennsylvania Metallic Tubing Co. plant, Philadelphia.

—o—

D. P. Wertheimer has been appointed sales manager, Sterling Bolt Co., Chicago, succeeding **J. B. Epstein.** He was assistant sales manager for the company during the last 6 years.

—o—

Hayward Niedringhaus, president, Granite City Steel Co., Granite City, Ill., has been appointed community chairman of the Committee for Economic Development for that city. He is a director of American Zinc, Lead & Smelting Co., St. Louis, and National Enameling & Stamping Co., Milwaukee.

—o—

Ben L. Wise has been appointed production engineer, National Electric Welding Machines Co., Bay City, Mich. He was assistant general manager, Federal Machine & Welder Co., Warren, O. Prior to that, he was application engineer, Westinghouse Electric Corp., Pittsburgh.

—o—

P. H. Cove has been appointed director, employees' service department, Cincinnati Milling Machine Co., Cincinnati, succeeding **Dr. Otto P. Geier,** who is retiring after 33 years with the company. Mr. Cove has been with the company 28 years. **Sol Einstein** is leaving a post as vice president of the company, but will retain his place on the board. **Carl F. Roby,** who was managing director of the Birmingham, England, plant, has been named assistant to the vice president, **Walter Tangeman.**

—o—

George H. Kaiser has been appointed district sales manager, Cleveland, Columbia Tool Steel Co., Chicago Heights, Ill. He will have full charge of the company's sales office, sales department and warehouse in Cleveland. Mr. Kaiser joined the Columbia staff in 1930, and had been sales manager in Chicago since 1942.

—o—

J. A. Hill has been appointed manager of electric tool sales, Independent Pneumatic Tool Co., Chicago. He has been with the company since 1920, and was most recently manager of its New York branch office. **W. C. Rush** has been named manager of the firm's new Cincinnati branch office. Mr. Rush had been in the St. Louis branch.

—o—

Jack Kollman has been appointed general superintendent, Chicago manufacturing plant, Ekco Products Co., Chicago. He was technical engineer in the company's Bakery Division, and previously was in charge of construction and plant expansion. Mr. Kollman has been with the company 25 years.

—o—

Earl W. Mahoney, former metallurgist at the Brier Hill plant, Youngstown Sheet & Tube Co., Youngstown, has moved to the company's main offices in Youngstown. He is associated with **Karl Fetters,** special metallurgical engineer, and works out of the office of **J. L. Mauthe,** vice president in charge of operations. Mr. Mahoney joined the com-

CHARLES E. GIBSON

BEN L. WISE

JACK KOLLMAN

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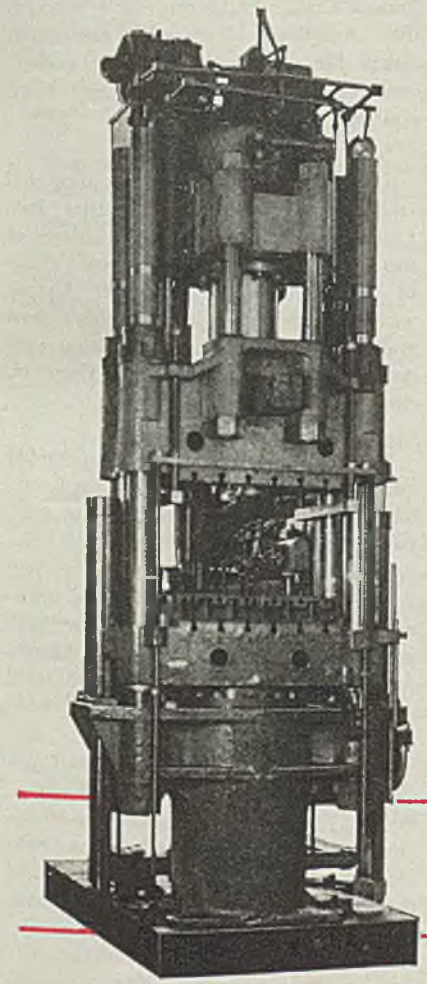

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pany in 1936. He worked in the Campbell laboratory and plant before he was transferred to the Brier Hill plant. **Adolph J. Boehme**, tax and land agent for Youngstown Sheet & Tube Co., has retired, due to ill health, after nearly 40 years with the firm. He helped lay out some of the first buildings of the company in 1901, working for a private engineer. He joined the company in 1907.

—o—

W. O. Kupper has been appointed manager, middle western sales, Fittings Division, Ladish Drop Forge Co., Cudahy, Wis. He will head the company's new Chicago office. Mr. Kupper was manager of southern sales for the Fittings Division.

—o—

Earl E. Morgan has been appointed general superintendent, Sawhill Mfg. Co., Sharon, Pa. He will direct and supervise production and fabrication of tubular products for the company. For the last 10 years, Mr. Morgan was chief industrial engineer, Lorain, O., works, National Tube Co., Pittsburgh. Prior to that, he was an industrial engineer with United States Rubber Co., New York.

—o—

George A. Hays has been appointed vice president and general manager, Hinderliter Tool Co., Tulsa, Okla., division of H. K. Porter Co. Inc., Pittsburgh, following retirement of **Frank J. Hinderliter** who founded the company in 1920. Mr. Hays was vice president of Oil Well Supply Co., Dallas, Tex., subsidiary of United States Steel Corp., New York. He had been with that company and its affiliates in various capacities since 1922.

—o—

John P. Roche has been named vice president and general manager of sales, Heppenstall Co., Pittsburgh. He will also become a director of the company. Mr. Roche had been with Oliver Iron & Steel Corp., Pittsburgh, where, since 1944, he was secretary of the corporation and assistant to the president.

—o—

P. J. Aquilino and **Henry J. Shuster** have been appointed assistant managers in the Washington and Philadelphia branches, respectively, Ahlberg Bearing Co., Chicago. Mr. Aquilino has been with the company since 1928. Mr. Shuster was recently released from the Navy. Both men will be under the direction of **James Herman**, recently appointed eastern district manager.

—o—

Phillip E. Sharr has been appointed superintendent of the Bartlett, Calif., alkali producing plant, Pittsburgh Plate Glass Co., Pittsburgh. Mr. Sharr has been with the company's Columbia Chemical Division for the last 9 years, and served as chief engineer at the firm's West Coast plant for the last year.

—o—

Kennametal Inc., Latrobe, Pa., announces the appointment of the following three tool engineers as representatives: **George E. Smith** and **Wendell F. Grubbs**, Philadelphia office; and **E. C. Kelly**, Detroit office.

—o—

Harry G. Uphouse has been appointed eastern sales representative for industrial and miscellaneous steel castings, Continental Foundry & Machine Co., Pittsburgh. He maintains offices in Philadelphia.

—o—

Dr. Edwin Gregory and **Brigadier Arthur Levesley** have been appointed directors, Edgar Allen Co. Ltd., Sheffield, England. Dr. Gregory joined the company in August, 1944, as chief metallurgist. Brigadier Levesley was appointed foundry manager of the firm in October, 1945, having been released from active duty with British Army that September. He joined the staff of Edgar Allen & Co. Ltd. in 1910.

—o—

W. M. Donohoo has established his own firm, Donohoo Steel Treating Co., Bettendorf, Iowa. For the last 12 years Mr. Donohoo was superintendent, Heat Treating Division, M. A. Ford Mfg. Co. Inc., Davenport, Iowa. Prior to that, he was heat treating superintendent, Rock Island Arsenal, Rock Island, Ill. **G. W. Donohoo**, a son, has joined the new firm as vice president. A new building, recently completed, houses the organization.

—o—

Carey Mann has been appointed manager, Cleveland branch, central engineering and service department, Westinghouse Electric Corp., Pittsburgh, succeeding **D. E. Inman** who was transferred to East Pittsburgh as manager of the department's engineering section. Mr. Mann joined the company in 1929. He served a few years with another firm, and returned to Westinghouse 5 years ago as a consulting and application engineer in the company's Cleveland office.

W. M. DONOHOO

—o—

E. G. Porst, chief chemist, and **P. C. Stufft**, assistant director of research, Pemco Corp., Baltimore, have received the American Standards Association award for contributing to the development of standards for Army and Navy equipment and procedure.

—o—

Harry F. Gracey has been appointed training director, SKF Industries Inc., Philadelphia. He will have charge of the company's factory-wide organizational development program. Mr. Gracey was in charge of industrial, foreign trainee and engineering student training programs, Victor Division, Radio Corp. of America, New York.

—o—

G. A. Shallberg Jr. has been appointed advertising manager, Borg-Warner Corp., Chicago. He has returned to the company after service in the Army.

—o—

Ralph Levi has been appointed manager, Housewares Division, New York sales office, Ekco Products Co., Chicago, succeeding **Tom Doe** who has resigned to return to the West Coast.

—o—

W. A. Holtzman has been elected president and treasurer, Hart-Carter Co., Peoria, Ill. He is also a director of the company. **P. E. Henseler** has been elected vice president and director of the firm, and **S. E. Ross**, assistant secretary and assistant treasurer.

—o—

E. L. Krejci, Hammond, Ind., works manager, American Steel Foundries, Chicago, has been appointed Hammond community chairman, Committee for Economic Development.

—o—

Duncan Stuart Campbell has been appointed to the staff of field engineers, Illinois Tool Works, Chicago. Mr. Campbell was shop superintendent, American Gear & Mfg. Co., Chicago, and prior to that, a gear engineer, Fuller Mfg. Co., Kalamazoo, Mich.

—o—

Robert M. Field has been appointed vice administrator for staff operations, War Assets Administration. He has been an officer and director of various subsidiaries of United States Steel Corp., New York. **Morton M. Boyd** has been appointed deputy administrator for general disposal, WAA, succeeding Frank

Creedon, recently resigned. Mr. Boyd has resigned as vice president and director of purchases, Union Supply Co., Pittsburgh, subsidiary of United States Steel Corp. He still remains a member of the company's board of directors. **John S. Cooke** has been appointed assistant deputy administrator for general disposal, WAA. He was head of Sales Group 1, consumer goods.

—o—

C. R. Dobson has been named vice president in charge of operations, H. K. Porter Co. Inc., Pittsburgh. Mr. Dobson was chief industrial engineer, Jones & Laughlin Steel Corp., Pittsburgh.

—o—

Eugene C. Bosl has been appointed a sales representative, Hanson-Van Winkle-Munning Co., Matawan, N. J. Mr. Bosl, recently released from the Navy, is now located in the Milwaukee office of the company.

—o—

Robert C. Coburn, recently released from the Navy, has been appointed sales representative in the main office of Iceberg Refrigerated Locker Systems Inc., New York.

—o—

Liquid Conditioning Corp., New York, has announced the appointment of the following engineering sales representatives: **John B. Foley,** Syracuse, N. Y.; **Arthur W. Schuster,** Rochester, N. Y.; Brookman-Hazel Associates, Buffalo; Herr-Harris Co., Pittsburgh; **P. O. Stribling Jr.,** Greensboro, N. C.; and Dorner Co., Milwaukee.

—o—

William Rodgers has been appointed assistant chief metallurgist, Republic Steel Corp., Cleveland. He was superintendent of the corporation's 98-inch hot strip mill in Cleveland. Mr. Rodgers came to Republic through Donner Steel Co., Buffalo, which was merged with Republic in 1930. He came to Cleveland in 1940, as chief metallurgist of the Cleveland district. **Raymond C. Gintert** has been appointed superintendent of the Cleveland hot and cold strip mills for Republic. Mr. Gintert had been

DAVID G. ANDERSON

Appointed acting head of the engineering staff, National Founders Association, Chicago, noted in STEEL, Oct. 14 issue, p. 100.

B. E. DRURY JR.

Appointed sales manager, Wilson Foundry & Machine Co., Pontiac, Mich., noted in STEEL, Oct. 14 issue, p .100.

superintendent of hot strip rolling in the company's Warren district. He joined Trumbull Steel Co. in Warren, O., in 1917. Trumbull Steel became part of Republic Steel Corp. in 1930. **William E. Boger** has been appointed assistant superintendent of the Cleveland strip mill. He had been assistant superintendent of the company's cold strip department in Warren. Mr. Boger joined Trumbull Steel Co. in 1923. **Emil G. McCauley** has been named superintendent of the Warren hot strip mills for Republic, succeeding Mr. Gintert. He joined Trumbull Steel in 1922, and became assistant superintendent of Republic's Warren hot strip mills in July, 1946.

—o—

Robert Henniger has been appointed special representative for Calco Machinery Co., Philadelphia. He was with Carlton Machine Tool Co., Cincinnati, for the last 12 years.

—o—

Russell J. Love has been appointed executive secretary, Pressure Vessel Research Committee, Welding Research Council. Mr. Love was chief engineer and assistant vice president, Southwest Welding & Mfg. Co., Alhambra, Calif. He recently took charge of the committee's new headquarters office at 30 Church St., New York.

—o—

Aaron Lewittes has been appointed general counsel, Office of Economic Stabilization. He has been in government work since 1936.

—o—

R. E. Newbauer has been appointed accountant for the Ft. Worth, Tex., district office, American Steel & Wire Co., Cleveland, subsidiary of United States Steel Corp. For the last 10 years, he was associated with the company's Cyclone Fence Division plant, North Chicago, Ill.

—o—

Frank I. Kilcline, Luntz Iron & Steel Co., Kokomo, Ind., has been re-elected for a year as president of Indiana Chapter, Institute of Scrap Iron & Steel Inc., Washington. **Maurice Epstein,** Epstein Bros., Indianapolis, has been elected vice president of the Institute, and **H. A. Alpert,** J. Solotken & Co. Inc., Indianapolis, has been elected the institute's secretary-treasurer.

OBITUARIES . . .

Harry W. Haggerty, 74, retired vice president of Corrigan-McKinney Steel Co., Cleveland, now a division of Republic Steel Corp., Cleveland, died in that city, Oct. 14. Mr. Haggerty had been vice president of the Corrigan-McKinney company 20 years at the time of his retirement in 1927.

—o—

Emil C. Ducommun, 68, president, Ducommun Metals & Supply Co., Los Angeles, died in that city, Oct. 8. The company was founded in 1849, by his father, Charles Ducommun.

—o—

George A. Comfield, 51, production manager, Illinois Coil Spring Co., Chicago, died in that city, Oct. 8.

—o—

Evan N. Lewis, 47, assistant superintendent, Buffalo plant, Bliss & Laughlin Inc., Harvey, Ill., died recently.

—o—

Robert S. Drummond, 62, president and founder, National Broach & Machine Co., Detroit, died in that city, Oct. 9. He worked for Detroit Steel Products Co., Detroit, and was in charge of manufacturing and sales for Gear Grinding Machine Co., Detroit, before he organized National Broach & Machine Co. in 1929.

—o—

L. Edward Lortz, 82, former executive vice president, Fulton Iron Works Co., St. Louis, died in that city recently.

—o—

Charles N. Markle, 58, founder of Markle Steel Co., Houston, Tex., died in that city recently. He headed the company until 1941, when he sold his interest.

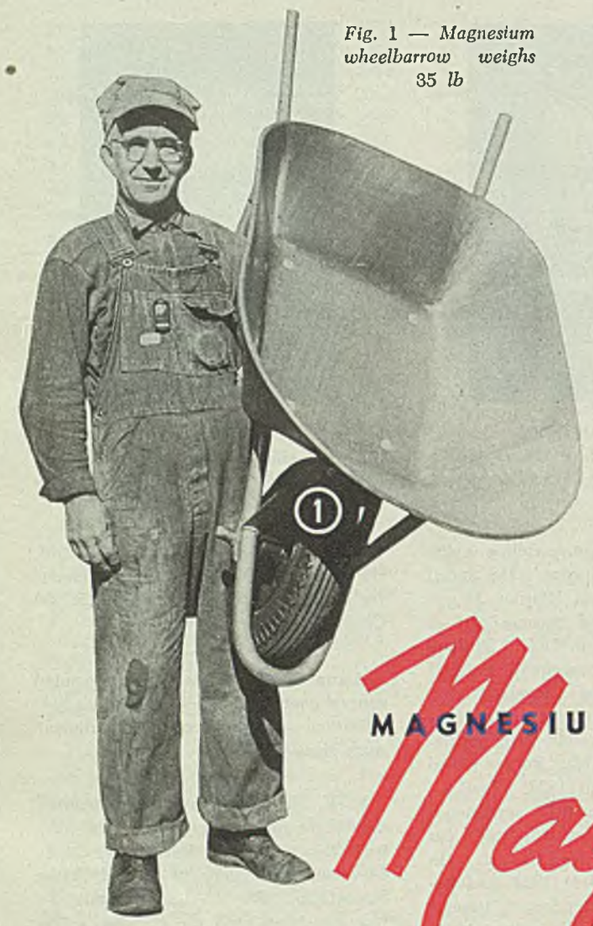

Fig. 1 — Magnesium wheelbarrow weighs 35 lb

MAGNESIUM AND Magnesium Alloys

In this first of a series of articles on the lightest structural metal, the author discusses some fundamental design considerations and applications, together with background data on the phenomenal development of present production facilities

By ALLEN G. GRAY
Consulting Editor, STEEL

PRODUCTION capacity for magesium has increased a hundred-fold in this country during the past 4 years and magnesium alloys now occupy an important position among the structural metals. During the period 1926-41 when Dow Chemical Co., Midland, Mich., was sole producer of magnesium metal in the United States, its capacity increased to 9 million pounds by 1938. Further expansion undertaken in 1939 brought it to 18 million in April, 1941.

That year saw the first commercial production of magnesium from sea water in a plant built by Dow at Freeport, Texas. This doubled the company's previous capacity, bringing the total to 36 million pounds.

During the same period Permanente Metals Corp. was organized by Henry J. Kaiser, who bought rights to the Hansgirg thermal reduction process and constructed a plant at Permanente, Calif. It was financed by an RFC loan of about $22 million and had a designed capacity of 24 million pounds annually, to bring privately planned capacity in the United States to 60 million pounds.

However, private facilities could not meet ever-increasing military needs. Immediate expansion of capacity as a government undertaking was regarded as a necessity. Accordingly, construction was started on thirteen magnesium plants with a rated capacity of 526 million pounds, including expansion of the Dow plant at Freeport. Table III gives capacity, investment in government-owned plants, and capacity of private plants. Fig. 4 shows the location of magnesium plants.

Utilizing the trained personnel of Dow Chemical Co., the government developed capacity of 222 million pounds at five plants. While this extension of production by the Dow process was underway, use of other methods was also planned. Among them was the magnesium Elektron process used in England and made available for the construction of a plant at Las Vegas, Nev. Built for 112-million-pound capacity it was by far the largest. The program also called for six ferrosilicon magnesium plants with a total capacity of 138 million pounds. Another plant, using an electrolytic process and a newly developed cell, was built for the government by Mathieson Alkali Works, at Lake Charles, La. This plant had a planned capacity of 54 million pounds.

By 1943 production had mounted to 324 million pounds, an increase of 224 million over 1942, Fig. 3. While output mounted rapidly, performance among plants varied. Nine plants exceeded planned capacity by 3 to 30 per cent. On the other hand, the plants at Lake Charles and Dearborn failed by wide margins to achieve expected capacity. In peak months they attained but 27 and 30 per cent of planned production, respectively. Both equipment difficulties and novel processes are said to have contributed to these results.

Earliest production from government capacity came from the Freeport plant in November, 1941. By May, 1943 all plants were in production, and monthly output reached a peak of 41 million pounds in January, 1944. This was equivalent to 84 per cent of rated capacity of all plants. Surplus ingots to the extent of 60 million pounds accumulated, and production continued to exceed demand. As a result, a series of cutbacks was ordered, beginning Feb. 1, 1944. These continued throughout the year and affected all government-owned plants except the facility at Freeport. By December, 1944 production was down to 8.5 million pounds or 17 per cent of designed capacity. Table V gives a record of operations.

Costs: Among government-owned plants, total costs ranged from 11.51 to 57.26 cents per lb for lowest cost month[1]. Weighted average costs for electrolytic plants was 18.24 cents, for ferrosilicon, 27.39. Actually the disparity exceeds these figures because crystals produced by the ferrosilicon process must be melted and cast into ingots, involving an additional cost of 3 cents a pound or more due to loss of metal and to other charges. Table I gives details on unit costs of production; lowest operating costs for electrolytic and ferrosilicon plants December, 1943, to October, 1944 are shown in Table VIII.

Fabrication Plants: Following through the program for magnesium production the Defense Plant Corp. invested in fabricating plants proper and in equipment for instal-

TABLE I UNIT COSTS OF PRODUCTION IN

	Electrolytic Process						
Rank in lowest cost for process	1	2	3	4	5	6	Total, six plants
Operator	Dow	Diamond	Basic	Dow	International	Mathieson	
Plant	Velasco	Painesville	Las Vegas	Marysville	Austin	Lake Charles	
Subprocess	Dow, sea water	Dow, dolomite	English (Farben), magnesite	Dow, brines	Dow, potash wastes, dolomite	Mathieson, dolomite	
Form of product	Ingot	Ingot	Cell metal	Ingot	Ingot	Ingot	
Capacity per mo.							
Designed, lb.	6,000,000	3,000,000	9,333,333	6,000,000	2,000,000	4,500,000	30,833,333
Max. attained, %	121.1	108.3	110.7	99.8	116.7	26.8	98.4
Production at lowest unit cost attained							
Period	May/44	Sept./44	July/44	April/44	Dec./43	Feb./44	
Volume, lb.	6,728,002	2,808,396	6,185,220	5,355,457	2,066,175	1,207,504	24,350,754
Operating rate, %	112.1	93.6	66.3	89.3	103.3	26.8	79.0
							1 Weighted Av.
Lowest unit cost†, cents per lb.							
Raw materials	1.14	5.19	4.36	2.62	6.88	17.88	4.07
Operating labor	2.31	1.74	2.76	2.31	2.02	14.83	2.95
Power (source)	1.58 (own plant, gas fuel)	4.77 (Cleveland electricity)	2.33 (Boulder Dam)	6.55 (Detroit Edison)	4.64 (Lower Colo. River)	1.11 (own plant, gas fuel)	3.47
Supplies							
Operating supplies	0.26	0.67	1.06	0.27	1.84	3.25	0.79
Fuel	0.20	0.38	0.12	0.99	....	2.91	0.49
Water, steam, air	0.27	0.48	0.10	1.40	....	0.64	0.50
	0.73	1.53	1.28	2.66	1.84	6.80	1.78
Repairs							
Labor	0.81	0.10	1.08	0.50	0.62	4.52	0.90
Supplies	0.42	0.04	0.76	0.07	0.37	3.84	0.55
Retort or cell	1.20	0.67	....	0.81	1.08	....	0.68
	2.43	0.81	1.84	1.38	2.07	8.36	2.13
Overhead and administration	1.88	0.95	3.34	1.45	1.46	5.03	2.17
Fees, taxes, miscellaneous							0.85
Management & royalties	1.17	0.93	0.59	1.00	0.67		0.56
Taxes, Social Security	0.15	0.16	0.81	0.21	0.08	2.09	
Insurance	0.02	0.04	0.52	0.03	....		0.17
Laboratory	0.03	0.10	0.19	0.09	0.25	1.16	0.09
Other expenses	0.07	0.17	....	0.08	0.38	....	0.67
	1.44	1.32	2.11	1.41	1.38	3.25	18.24
Total unit cost	11.51	16.31	18.02	18.38	20.29	57.26	

* The cost figures in this table are those reported by operators and are subject to final C.P.A. audits. All costs before depreciation.

MAGNESIUM PLANTS OPERATED FOR DPC

	Ferrosilicon Process									
1	2	3	4	5	6	Total, six plants		Total, All Processes	
Mg Reduction	Electro Met.	N. E. Lime	Permanente	Amco	Ford				
Luckey	Spokane	Canaan	Manteca	Wingdale	Dearborn				
Crystal	Crystal	Crystal	Crystal	Crystal	Crystal				
833,333	4,000,000	833,000	1,666,667	833,333	3,333,333	11,500.000		42,333,333	
126.1	54.5	103.4	115.3	77.9	30.0	66.6		89.8	
April/44	May/44	May/44	Feb./44	March/44	Feb./44				
1,043,408	2,081,288	660,419	1.763,007	639,230	1,000,870	7,188,222		31,538,976	
125.2	52.1	79.3	105.8	76.7	30.0	62.5		74.5	
						Weighted Cents per lb.	Av. % of total	Weighted Cents per lb.	Av. % of total
9.54	2.98	6.41	11.40	7.34	12.78	8.07	29.4	4.98	24.5
1.69	3.57	4.27	3.80	5.71	11.30	4.68	17.1	3.35	16.5
0.44 (Toledo Edison)	2.26 (Grand Coulee Dam)	0.86 (Conn. Power)	0.33 (Pacific Gas & Elec.)	1.12 (N. Y. Gas & Elec.)	1.89 (Ford, River Rouge)	1.24	4.5	2.96	14.6
0.61									
1.97	0.50	0.57	1.33	0.82	0.59	0.77		0.79	
0.01	1.02	3.90	1.20	3.86	6.69	2.51		0.95	
	0.71	....	....	0.15	....	0.22		0.43	
2.59	2.23	4.47	2.53	4.83	7.28	3.50	12.8	2.17	10.7
0.25									
0.19	0.96	0.74	0.91	1.51	3.79	1.27		0.98	
2.00	3.39	0.18	1.66	0.48	0.69	1.57		0.78	
....	....	2.29	4.20	3.50	0.25	1.87		0.95	
2.44	4.35	3.21	6.77	5.49	4.73	4.71	17.2	2.71	13.3
0.96	2.19	1.83	1.84	3.74	15.47	3.88	14.2	2.56	12.6
0.14									
0.21	1.04	0.38	0.43	....	1.10	0.62		0.80	
0.11	0.54	0.37	0.19	0.39	0.50				
0.05	0.07	0.05	0.10	0.17		0.45		0.54	
0.15	0.15	0.32	0.42	0.34	....	0.21		0.18	
....	0.02	....	0.01	....	....	0.03		0.08	
0.66	1.82	1.12	1.15	0.90	1.60	1.31	4.8	1.60	7.8
18.32	19.40	22.17	27.82	29.13	55.05	27.39	100	20.33	100

† Lowest total unit cost, not necessarily reflecting lowest component costs.
Courtesy *Ind. Eng. Chem.*

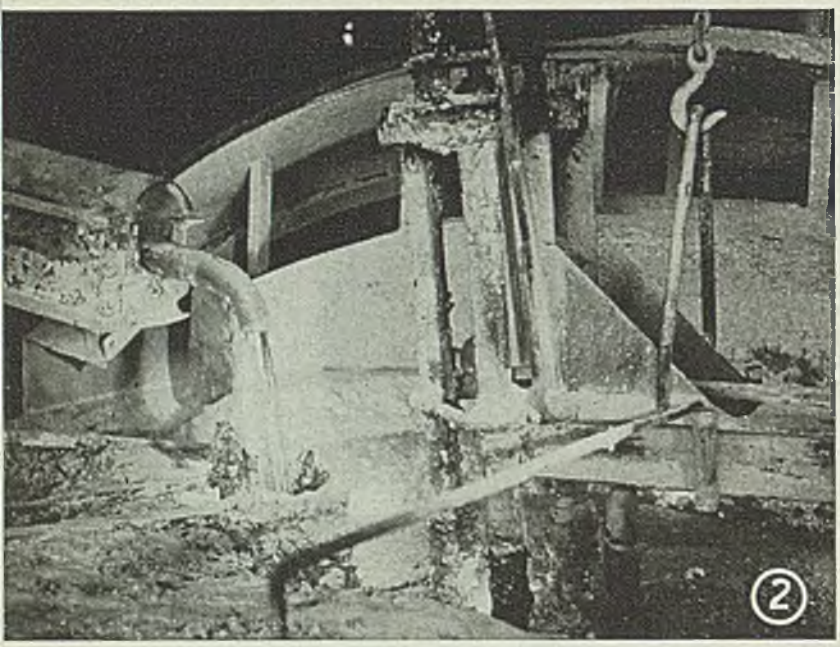

Fig. 2—Molten magnesium is pumped from reverberatory furnace to alloying pot. Pump at right transfers metal continuously to ingot casting machine

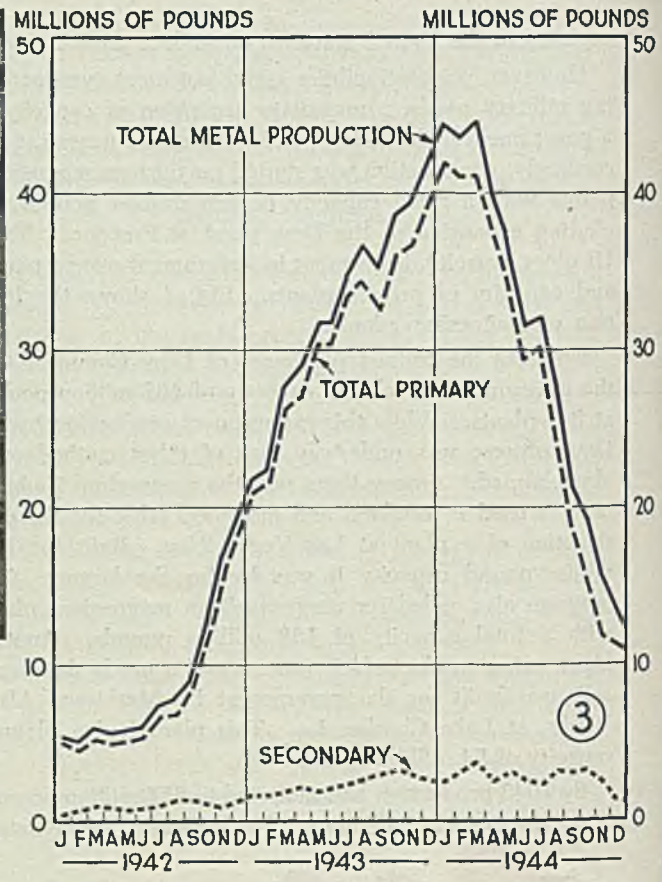

Fig. 3—Monthly production of magnesium, 1942-1944. Courtesy "Mining and Metallurgy"

lation in existing private plants, details of which are given in Table VI. Rated capacities and 1944 production for both private and government-owned fabricating plants are shown in Table VII.

Magnesium Alloys: Magnesium, a silvery white metal with a specific gravity of 1.74, is the lightest structural metal. Like other metals, it does not possess sufficient strength in the pure state for many commercial uses but, when alloyed with such elements as zinc, aluminum and manganese, strength is added to lightness to produce a strength-weight ratio which approaches any of the metals that are more commonly used.

Magnesium alloys can be produced in the form of ingots and billets, sand, permanent mold, and die castings, forgings, extruded bars, rods, shapes, and tubing, and rolled sheet, plate and strip. Because an ingot of pure magnesium is of limited use to anyone, it is in these fabricated forms of magnesium alloys that the engineer and many others are most interested.

TABLE II
COMPOSITION AND PROPERTIES OF COMMON MAGNESIUM ALLOYS

Dowmetal Alloy	Form	Nominal Composition Al	Mn	Zn	Condition	Typical Properties[a] Tensile Strength lb./sq. in.	Tensile Yield Strength lb./sq. in.	Elongation in 2 in.	Brinell Hardness 500 kg. Load 10 mm. Ball
H	Sand and	6.0%	0.2%	3.0%	As Cast	27,000	14,000	5%	50
H-HT	Permanent	6.0	0.2	3.0	Heat Treated	39,000	14,000	12	56
H-HTA	Mold Castings	6.0	0.2	3.0	Heat Treated and Aged	38,000	19,000	5	73
C	Sand and	9.0	0.1	2.0	As Cast	24,000	16,000	2	65
C-HT	Permanent	9.0	0.1	2.0	Heat Treated	39,000	16,000	10	63
C-HTA	Mold Castings	9.0	0.1	2.0	Heat Treated and Aged	40,000	23,000	2	87
R	Die Castings	9.0	0.2	0.6	As Cast	33,000	21,000	3	60
M	Forgings†	...	1.5	...	As Forged	36,000	26,000	7	47
J-1‡	Press Forgings	6.5	0.2	1.0	As Forged	42,000	27,000	12	57
O-1	Press Forgings	8.5	0.2	0.5	As Forged	46,000	32,000	10	65
O-1A	Press Forgings	8.5	0.2	0.5	Forged and Aged	48,000	34,000	6	72
M	Extrusions	...	1.5	...	As Extruded	38,000	26,000	7	42
FS-1	Extrusions	3.0	0.3	1.0	As Extruded	40,000	29,000	16	47
J-1	Extrusions	6.5	0.2	1.0	As Extruded	45,000	30,000	17	54
O-1	Extrusions	8.5	0.2	0.5	As Extruded	49,000	33,000	11	65
O-1A	Extrusions	8.5	0.2	0.5	Extruded and Aged	50,000	34,000	7	75
O-1HTA	Extrusions	8.5	0.2	0.5	Extruded and Aged§	53,000	39,000	7	86
Ma	Sheet	...	1.5	...	Annealed	33,000	18,000	17	48
Mh	Sheet	...	1.5	...	Hard Rolled	37,000	29,000	10	56
FS-1a	Sheet	3.0	0.3	1.0	Annealed	37,000	21,000	21	56
FS-1h	Sheet	3.0	0.3	1.0	Hard Rolled	43,000	33,000	10	73
J-1a	Sheet	6.5	0.2	1.0	Annealed	42,000	26,000	16	58
J-1h	Sheet	6.5	0.2	1.0	Hard Rolled	45,000	35,000	9	73

[a] Properties are on separately cast bars for castings, and on longitudinal bars cut from forgings, extruded bars and rolled sheet (1 lb./sq. in. = 0.07 kg./cm.²).
† Press or hammer forgings.
‡ "-1" indicates high purity material.
§ Especially processed to secure high tensile properties and high compressive yield strength (37,000 lb./sq. in.).

Some of the magnesium alloys which have been developed are characterized by their strength, others by their toughness, others by their formability and so on. However, their common outstanding characteristic is their lightness, the average specific gravity being 1.80, or only slightly heavier than the magnesium base.

The alloying constituents most generally used are[2]:

(1) Aluminum. Contributes hardness, yield strength, and tensile and compressive strength more than any other element in both cast and wrought conditions. Alloys containing 6 to 10 per cent aluminum can be solution heat-treated with increase in hardness and yield strength but with some loss of ductility. In the presence of salt water, magnesium-aluminum alloys are somewhat sensitive to iron and nickel impurities but can be stabilized by the addition of manganese and zinc.

(2) Zinc. Similar to aluminum but with slightly less effect on properties. Alloys are limited to less than 4 per cent Zn as higher amounts increase the hot shortness. Generally zinc is used in combination with aluminum to secure the best properties. Zinc improves the salt water resistance of magnesium alloys containing traces of iron and nickel.

(3) Manganese. Alloyability in magnesium is limited to about 2 per cent; less in the presence of aluminum. Increases yield strength slightly. Manganese is added to magnesium-aluminum and magnesium-aluminum-zinc alloys to improve the salt water resistance. A magnesium 1.5 per cent Mn alloy is surpassed in strength by other compositions, but it has good corrosion-resistance and working characteristics. It is used largely as sheet for tanks and articles requiring formability and weldability.

With the exception of the magnesium-manganese composition, magnesium alloys in commercial use all contain the constituents just described. In a few cases small amounts of tin or other elements are added also. The

TABLE III
CAPACITIES OF DPC AND PRIVATELY OWNED MAGNESIUM PLANTS

Operator	Location	Rated Ann. Capacity, 1000 Lb.	Disbursed to 1/1/45, Thousands
Government-Owned Electrolytic Plants			
Dow Chemical Corp.	Freeport, Tex.	18,000	$ 8,333
Basic Magnesium, Inc.	Las Vegas, Nev.	112,000	131,014
Dow Magnesium Corp.	Velasco, Tex.	72,000	56,401
Diamond Magnesium Co.	Painesville, Ohio	36,000	14,749
Mathieson Alkali Works, Inc.	Lake Charles, La.	54,000	47,736
Intern. Minerals & Chem. Corp.	Austin, Tex. & Carlsbad, N. Mex.	24,000	18,715
Dow Magnesium Corp.	Ludington & Marysville, Mich.	72,000	39,785
Total		388,000	316,733
Government-Owned Ferrosilicon Plants			
Ford Motor Co.	Dearborn, Mich.	40,000	9,981
Amco Magnesium Co.	Wingsdale, N. Y.	10,000	7,068
New England Lime Co.	Canaan, Conn.	10,000	4,889
Electro Metallurgical Co.	Mead, Wash.	48,000	16,121
Magnesium Reduction Co.	Luckey, Ohio	10,000	4,839
Permanente Metals Corp.	Manteca, Calif.	20,000	6,142
Total		138,000	49,040
Total rated capacity of all government-owned plants		526,000	365,773
Privately Owned Electrolytic Plants			
Dow Chemical Co.	Midland, Mich.	18,000	....
Dow Chemical Co.	Midland, Mich.	18,000	....
Privately Owned Carbothermic Plants			
Permanente Metals Co.		24,000	....
Total		60,000	....

TABLE IV
COMPARATIVE YIELD STRENGTHS OF METALS

Material	Yield strength, psi	Specific yield strength = Yield strength, Specific gravity
X-4130 steel	70,000	9,100
24S-T Aluminum	40,000	14,300
1025 Steel	36,000	4,700
Dowmetal O-IHTA shapes	30,000	16,600
Dowmetal FS-1h plate	24,500°	13,600

°Average of compression yield strength and tensile yield strength.

TABLE V
MAGNESIUM FACILITIES AND PRODUCTION DATA

Operator	Location	Basic Raw Material	Magnesium Product	Cost of Facilities to 12/31/44, Thousands	Capacities, Million Pounds: Contract or designed, annual	Capacities, Million Pounds: Attained maximum	Capacities, Million Pounds: Annual equivalent°	% Max. Capacity to Designed
					Electrolytic Process Plants			
Basic	Las Vegas & Gabbs, Nev.	Magnesite	Cell metal	$131,014	112	10.311(3/44)	124	111
Diamond	Painesville, Ohio	Dolomite	Ingot	14,749	36	3.250(1/44)	39	107
Dow	Freeport, Tex.	Sea water	Ingot	8,333	36§	3.905(1/43)	47	130
Dow	Midland, Mich.	Sea water	Ingot	.....	18	1.645(1/43)	19.75	110
Dow	Marysville, Mich.	Brines	Ingot	59,735	72	5.985(1/44)	72	100
International	Velasco, Tex.	Sea water	Ingot	56,401	72	7.263(3/43)	87	121
Mathieson	Austin, Tex.	Dolomite	Ingot	18,715	24	2.335(8/43)	28	117
	Lake Charles, La.	Dolomite	Ingot	47,736	54	1.208(2/44)	..	...
					Ferrosilicon Process Plants			
Amco	Wingdale, N. Y.	Dolomite	Crystal	7,068	10	0.649(4/44)	..	...
Electro Met.	Spokane, Wash.	Dolomite	Crystal	16,121	48	2.180(3/44)	..	...
Ford	Dearborn, Mich.	Dolomite	Crystal	9,981	40	1.001(2/44)	..	...
Mg Reduction	Luckey, Ohio	Dolomite	Crystal	4,839	10	1.050(4/44)	12.60	126
N. E. Lime	Canaan, Conn.	Dolomite	Crystal	4,889	10	0.861(12/43)	10.30	103
Permanente	Manteca, Calif.	Dolomite	Crystal	6,142	20	1.922(12/44)	23	115
Total				$365,773				
					Carbothermic Process Plant			
Permanente	Permanente, Calif.	Dolomite	Crystal-Dust	.....	24	1.619(6/43)	..	...

°Maximum month's production, multiplied by 12. †To convert cell metal and crystal costs to ingot equivalent, the cost of melting and melt losses must be added.
‡Not including interest on investment or depreciation. Costs as reported by operator; final figures to be determined on basis of C.P.A. audits.
§Only 50% of plant is owned by Government. ••97% complete. Courtesy *Ind. Eng. Chem.*

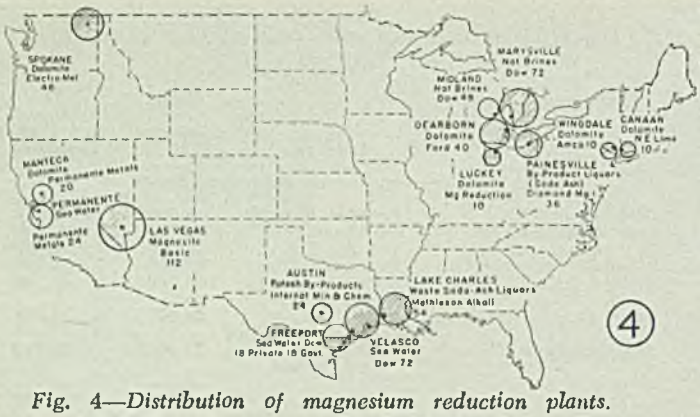

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Fig. 4—Distribution of magnesium reduction plants. Shaded circles indicate ownership by DPC; white circles, private ownership. Operators are given in small letters. Numbers show capacities in millions of pounds per year

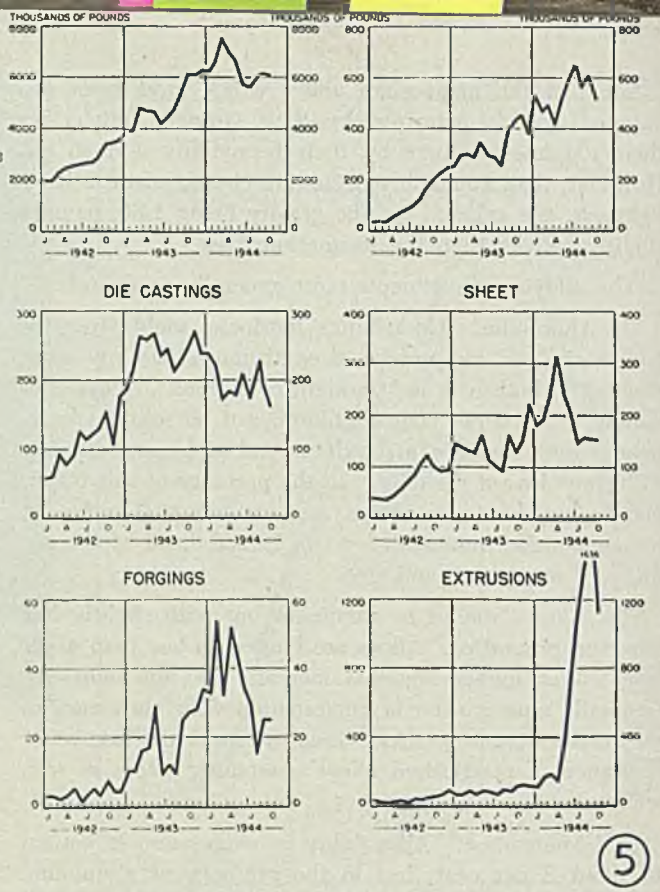

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Fig. 5—Monthly shipments of magnesium products, 1942-1944. Courtesy "Mining and Metallurgy"

nominal compositions, designations, properties and uses of the commercial alloys are given in Table II.

In making the alloys, a common procedure is first to melt the magnesium ingots in 4000 lb (1800 kg) capacity cast steel pots, approximately 56 in. in diameter and 42 in. deep, mounted in oil or gas-fired furnace settings. The aluminum and zinc are added in solid form by means of a perforated steel basket suspended in the batch which is at about 1300°F (704°C). Washing of the liquid magnesium through the basket dissolves the aluminum and zinc with little possibility of excessive concentrations of the heavier metals in the bottom of the pot. Manganese can be added as a metallic powder with low alloying efficiency, or in an aluminum-manganese alloy or, most commonly, by reduction of manganese chloride. Special fluxes are available for the latter purpose.

After thorough stirring to mix the batch completely, it is allowed to stand briefly to permit dross and impurities to settle to the bottom. After this, analysis samples are taken and the metal is hand-dipped or pumped into conveyorized ingot molds. The resulting conventional "four-notch" ingots weigh approximately 25 lb and are sold for remelting in various casting operations.

Traces of iron in magnesium alloys tend to promote corrodability in salt water. Fortunately this element is only slightly soluble in magnesium in the ordinary temperature range for alloying of 1200° to 1350°F (650° to 730°C) and is even less soluble in the usual alloys than in the pure metal. By carefully controlling the time of settling and the chemical conditions, it is possible to lower the iron content to 0.002 per cent or even less. In the absence of other significant impurities, magnesium alloys of this purity have extraordinarily good resistance; in fact, their life in sea water may be measured in years rather than months, as the (*Please turn to Page* 112)

TABLE VI
GOVERNMENT-OWNED MAGNESIUM FABRICATING PLANTS

Lessee	Location	Ann. Rated Capacity, 1000 Lb.	Approx. Cost, Thousands	Start of Production
	SAND CASTINGS			
Bendix Aviation	Teterboro & North Bergen, N. J.	3,600	$1200	1/15/42
Chrysler-Dodge°	Chicago, Ill.	18,000	7000	7/ 1/43
Dow Chemical	Bay City, Mich.	1,600	1700	4/26/43
Howard Foundry	Chicago, Ill.	7,200	2600	8/15/42
Maryland Sanitary Mfg.	Baltimore, Md.	6,000	2600	6/ 1/43
Wellman Bronze & Aluminum	Cleveland, Ohio	3,000	700	
Wright Aeronautical°	Lockland, Ohio	9,000	5000	4/ 1/41
	PERMANENT MOLD CASTINGS			
Metal-Mold Magnesium‡	Cedarbury, Wis.	2,200	200	2/25/44
	DIE CASTINGS (COLD CHAMBER)			
Precision Castings	Fayetteville, N. Y.	2,400	400	2/ 1/45
	EXTRUSIONS AND FORGINGS			
Revere Copper & Brass	Halethorpe, Md.	5,500† 1,800§	7500	6/15/44

DPC MAGNESIUM EQUIPMENT INSTALLED IN LESSEE'S PLANTS

Product	Lessee	Location	Approx. Cost Thousands
Sand casting foundries	Am. Radiator	Louisville, Ky.	$630
	Am. Radiator	Elyria, Ohio	580
	Am. Radiator	Litchfield, Ill.	480
	Ebaloy Foundries	Rockford, Ill.	130
	GM-Chevrolet	Saginaw, Mich.	600
	Hills-McCanna	Chicago, Ill.	220
	Humphreys Mfg.	Mansfield, Ohio	520
	Marshall Stove	Lewisburg, Tenn.	340
	Mich. Light Alloys	Grand Rapids, Mich.	1180
	U. S. Radiator	Geneva, N. Y.	700
			5380
Die castings	Hoover Co.	N. Canton, Ohio	50
Extrusions	Dow Chemical	Midland, Mich.	1600
Sheet & plate	Revere Copper & Brass	Baltimore, Md.	2000
		Grand total	9030

° Part of engine plant. ‡ Molds are owned by lessee. † Extrusions. § Forgings.
Courtesy *Ind. Eng. Chem.*

TABLE VII
RATED CAPACITIES AND 1944 PRODUCTION OF FABRICATING PLANTS

	Annual Rated Capacity Government owned Thousands of pounds	% of total	Privately owned Thousands of pounds	% of total
Sand casting	48,400	36.6	84,000	63.4
Permanent mold casting	2,200	1.2	176,000	98.8
Die casting	2,400	20.0	5,600	80.0
Forging	1,800	50.0	1,800	50.0
Extrusion	5,500	41.7	7,700	58.3
Sheet & Plate	....	00.0	8,300	100.0

Total, thousands of pounds	1944 Production Government owned Thousands of pounds	% of total	Privately owned Thousands of pounds	% of total	Total, thousands of pounds
132,400	14,600	19.4	60,600	80.6	75,200
178,700	1,000	4.0	23,900	96.0	24,900
12,000	.....	00.0	2,400	100.0	2,400
*3,600	.....	00.0	400	100.0	400
13,200	650	6.3	9,740	93.7	10,400
8,300	.....	00.0	2,300	100.0	2,300

Courtesy Ind. Eng. Chem.

Seen and Heard in the Machinery Field

By GUY HUBBARD
Machine Tool Editor

CANADIAN MACHINE TOOLS: My expedition to Montreal and Quebec on occasion of the 45th annual meeting, National Machine Tool Builders' Association more than came up to expectations. Incidentally, had it not been for the friendly interest of one of the Canadian machine tool dealers, I might have camped on Mont Real instead of sleeping in the Mount Royal. I won't mention his name—you will just have to make your Montreal reservations way ahead like you do here in the States.

It isn't generally realized south of the border that Canada has been building machine tools for more than 80 years and that recently this has developed into quite an industry. As the general manager of our National Machine Tool Builders' Association said to the president of the Canadian Machine Tool Builders' Association: "I had no idea that you fellows are building such a wide range of stuff. You must have snuck up on us when we weren't looking."

That last mentioned gentleman, E. Barker, president, Modern Tool Works, Ltd., Toronto, as guest speaker at the opening session of the NMTBA meeting at Chateau Frontenac in the ancient walled city of Quebec, said: "I am not trying to lull you into any false sense of security. Neither am I apologizing for Canada having a machine tool industry. I merely give you a factual picture of what has happened here during the past six years.

"As a result of the war, Canada now has:

(1) Expanded plant facilities, both in size and in modern equipment, giving increased production potential of high quality machines.

(2) An increased force of expert machinists and machine tool assemblers capable of handling quality work in quantity.

(3) A new crop of young, intelligent machine tool designers and engineers with experience necessary further to expand our lines both standard and special."

BLACKALL ON ENGINEERING: At the opening luncheon of the Fall Meeting of the American Society of Mechanical Engineers in Boston, Frederick S. Blackall, Jr., president and treasurer, Taft-Peirce Mfg. Co., Woonsocket, R. I., made some straight-from-the-shoulder statements regarding conditions faced by the engineering profession.

Vast technological advances in fields such as atomic fission, electronics, heat treatment and metallurgy, necessitate that tomorrow's engineer must cram more material into his cranium than can possibly be done in the short space of a four year college course. Therefore, said Mr. Blackall, engineering should be placed on a parity with medicine, the law and other learned professions.

Specifically, training should include three or four years of pre-engineering college work, with emphasis on the liberal arts and the humanities and with basic requirements in mathematics and science. This would be followed by two or three years of specialization in the chosen field of engineering, an engineering degree being given only at the end of the graduate work.

It is indeed a far cry from the timid soul with the black sateen coat and eye shade to the dynamic personage thus envisioned by Frederick Blackall:—"To an increasing extent the engineer will be called upon to exercise broader functions than those of pure research and design or direction of technical processes. As he reaches the higher echelons his duties increasingly will embrace management, economics, labor and social problems, finance, and above all the necessity for effective contact with all manner of people."

Like Ralph Flanders, Frederick Blackall has won success in engineering the hard way. When he talks about education it is the talk of a practical man—not of a theorist. Don't sell him short on these recommendations.

JUST THE SAME FLANDERS: When a Vermont Republican wins a senatorial nomination, he had better start looking for a place to live in Washington. Ralph E. Flanders, well known as a machine tool builder, as an economist, and recently as president of the Federal Reserve Bank of Boston, is in that situation. "We, the people," soon will have one more man in the Senate who understands industry's problems and potentialities.

I have seen Ralph Flanders under various conditions in the past three weeks. His feet are solidly on the ground and his head is not up in the clouds. One day he was in an ASME session in Boston, discussing the economics of production grinding—his theme being, "Think in terms of short floor-to-floor time on the work, rather than long life for the wheels."

Next day he was toastmaster at the ASME banquet, and a right good one he was with his Vermont wit and wisdom. The climax of the evening was the award to him of Honorary Membership in the American Society of Mechanical Engineers. All that one needs to do to realize what that means, is to take a look at the record of those to whom this award has been made.

Next time I encountered Ralph Flanders was on the afternoon of Friday, October 10, on the steps of Jones & Lamson Machine Co., Springfield, Vermont. As always throughout the 25 years that I have been acquainted with him, he was carrying his honors lightly but was taking his responsibilities seriously. That is exactly what he will continue to do in Washington. That is why he will be a good Senator.

High Speed FORGING

Increases Auto Parts Production

Connecting rods and other parts are forged, two at a time, at rate of 450 per hour on 2000-ton press. Other forgings produced on combination of upsetters, rolls and hammers

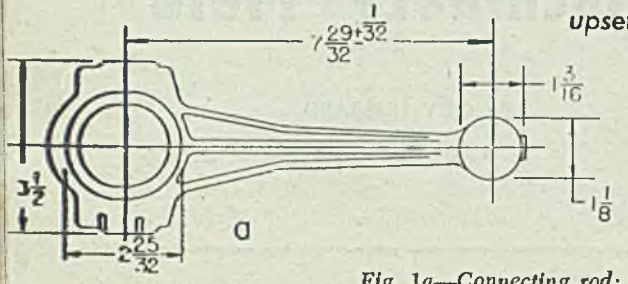


Fig. 1a—Connecting rod; 1b—steering knuckle; 1c—steering knuckle support; 1d—rear axle shaft

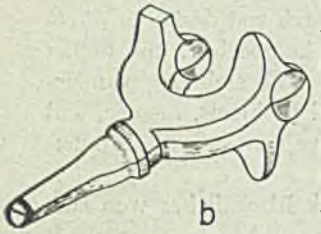
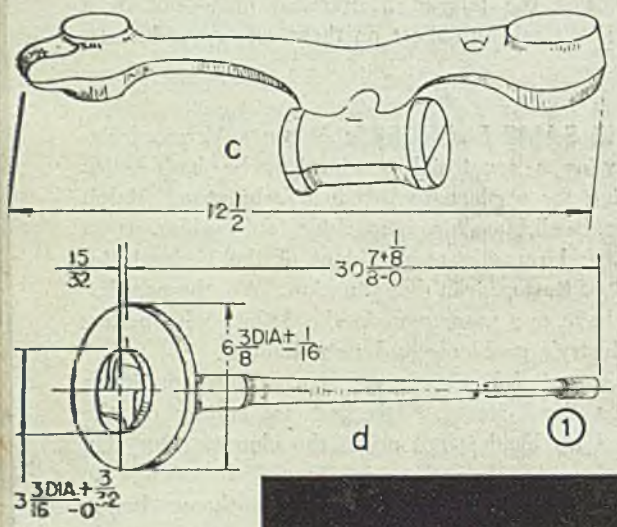


Fig. 2—After heating in a rotary furnace, connecting rods are descaled for few seconds in water at 2000 psi pressure



SUBSTANTIAL changes in forging practices recently made in the Oldsmobile forge plant at Lansing, Michigan, have resulted in marked output increases. Here, most of the forgings required in Oldsmobiles, as well as in other cars that are produced by General Motors Corp., are being manufactured on a basis that is increasingly efficient.

Typical of the accelerated production is connecting rods—the general shape and dimensions of which, in forged form, are as shown in Fig. 1. Using a 2000-ton press, forgings are now made two at a time, from X1335 steel blanks cut from 1½-in. square bars having rounded corners. Output of 450 pieces per hour was attained in the early stages of production, and a rate of 500 per hour is anticipated. Other operations in the forging line are arranged to keep pace with forging press.

Billets are heated in a 17-ft rotary furnace which, of course, turns at a speed sufficient to supply heated billets at the required rate. Furnace temperature is 2300° F, and billets leave the furnace at approximately 2250° F. As shown in Fig. 2, each billet is held for a few seconds in a descaler fed with water at 2000 psi; mechanical impact and slight surface chilling is highly effective in removing scale.

The forging die has three positions. In the first stroke, an edging operation and in the second a blocking operation are performed. Finishing is done in the third position Fig. 4 after which the two forgings formed are transferred to a No. 57 press for trimming, Fig. 3. Each forging is then restruck in a No. 4 press, using a die that gives the forging a final sizing. Forging is retrimmed in a second No. 57 press arranged with a stripper on the upper (*Please turn to Page* 134)

By HERBERT CHASE

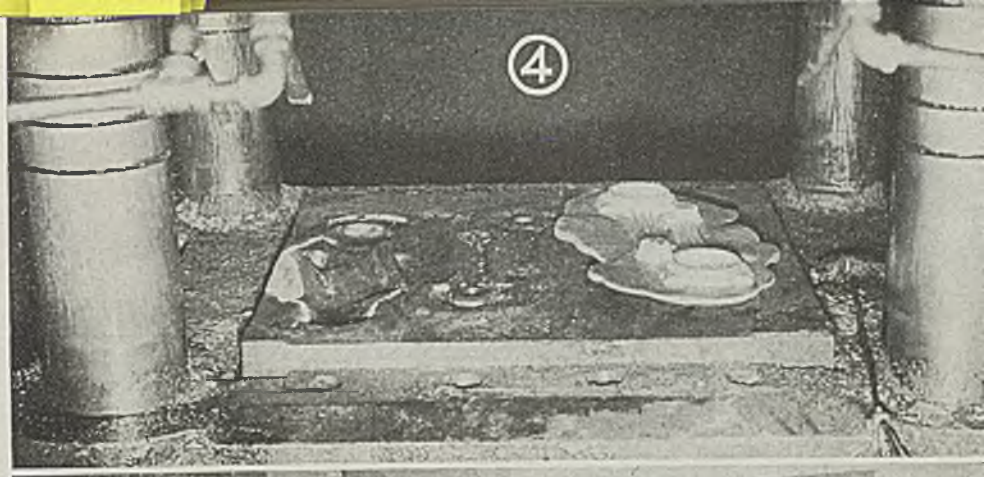


Fig. 3—First trimming operation on pair of connecting rods after they come from forging press

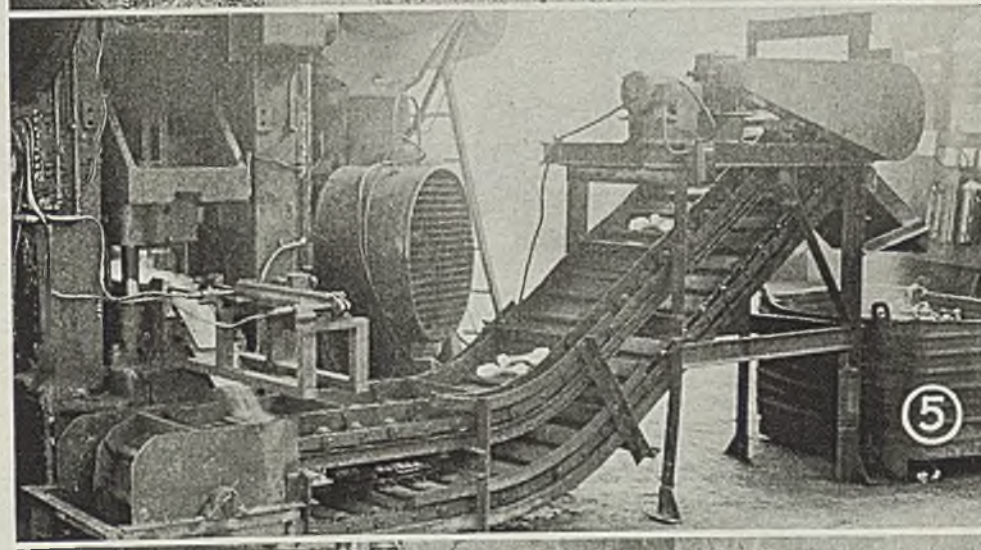


Fig. 4—Pair of connecting rods in third position of 2000-ton press die. Forging first passes through edging and blocking operations in cavities at left of die

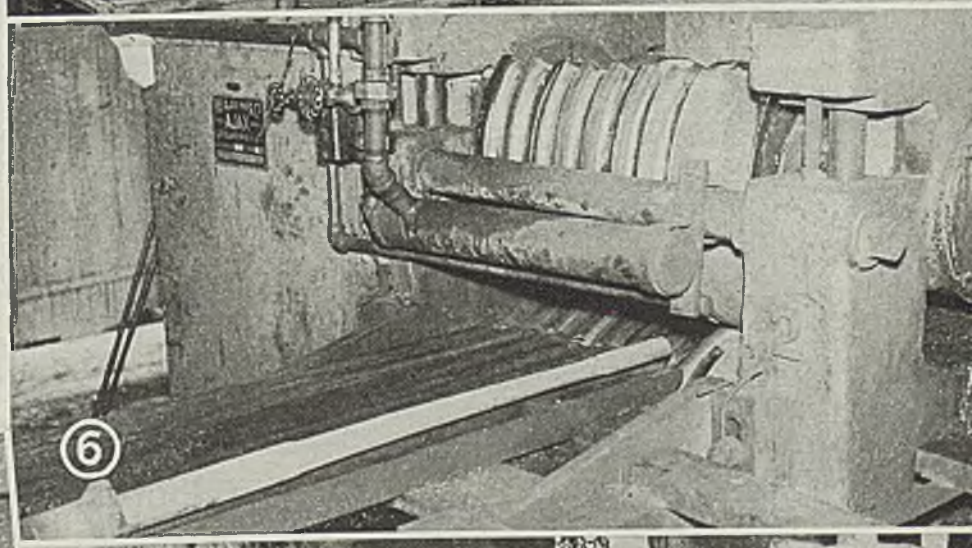


Fig. 5—Trim press and conveyor that delivers finished forgings into tote box at right

Fig. 6—Rear axle shaft forging is shifted with tongs successively through seven grooves of roll die to form tapered portion

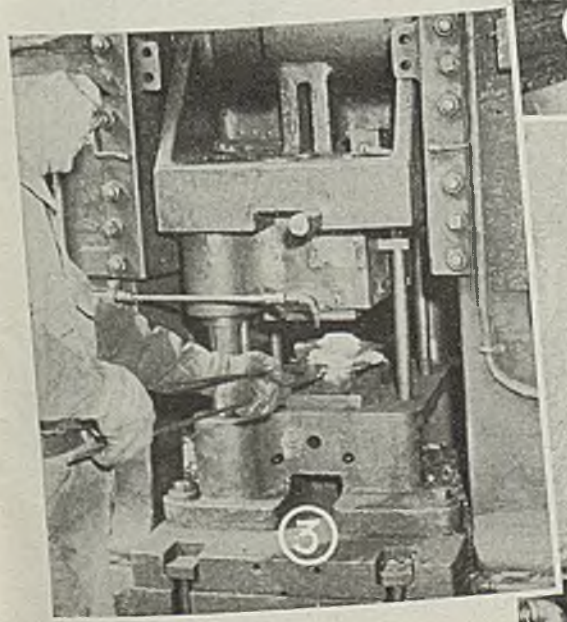


Fig. 7—Swaging for straightness or correction of improper size left by forging rolls is performed on this die in a 3000-lb hammer

Centrifugal Casting in Germany

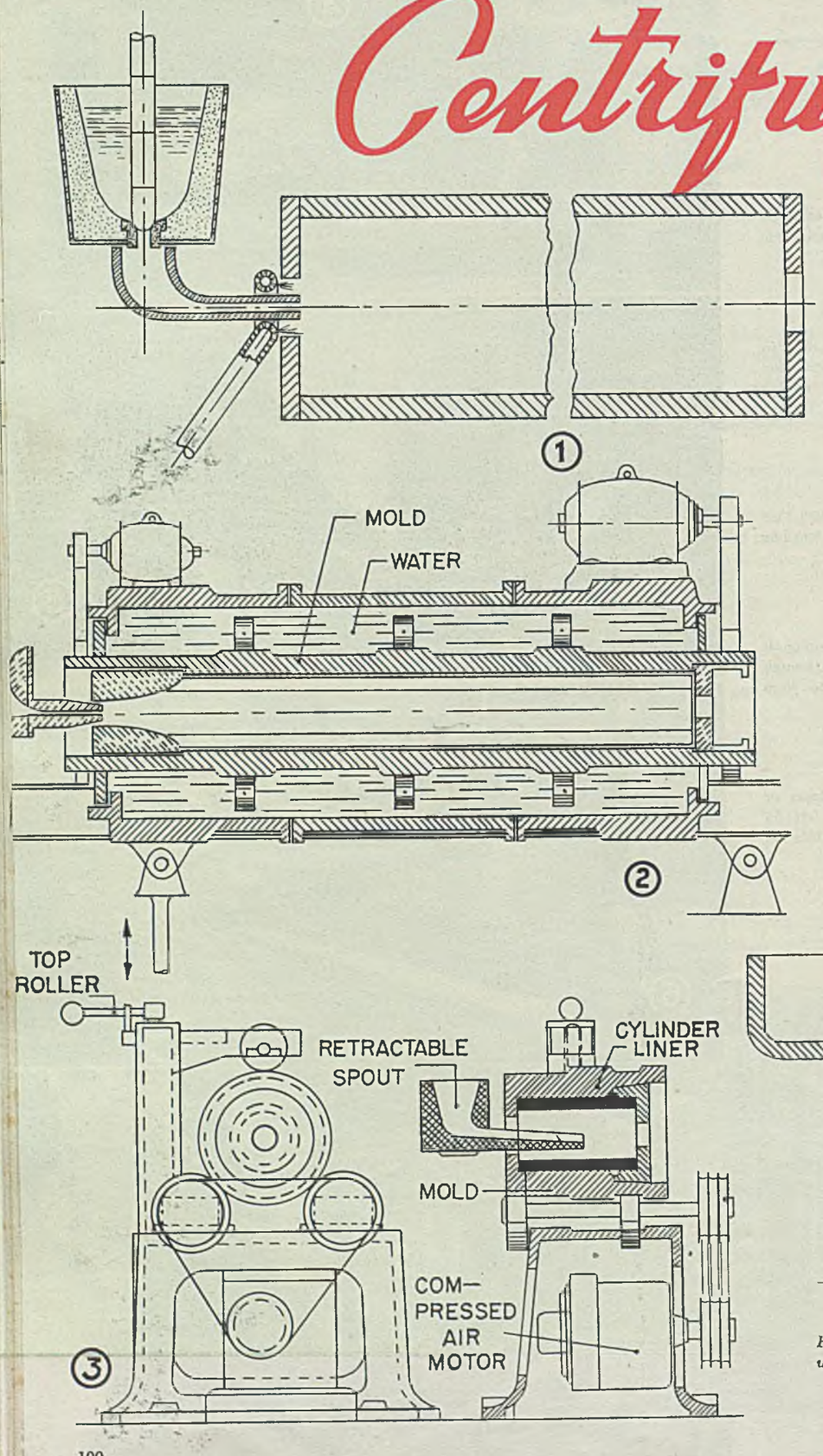


Fig. 1 — Machine used at Osnabrueck for large bronze tubing, showing graphite stopper and ring burner for filling mold with inert products of combustion before and during pouring

Fig. 2—Casting machine for steel tubing at the Annen plant of Ruhrstahl. Same layout was used for gun barrels at Bochumer Verein and several other plants

Fig. 4—Pouring trough for pouring vertically spun gun barrels at the Wetzler plant of Buderusche Eisenwerke

Fig. 5 — Arrangement for casting steel cylinder liners at Annen

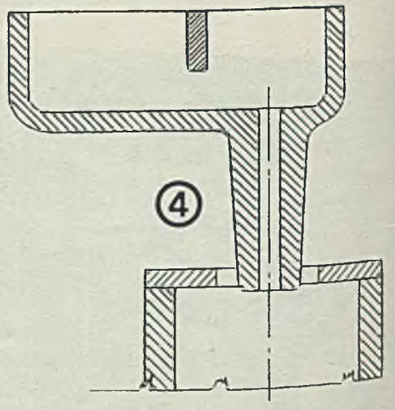
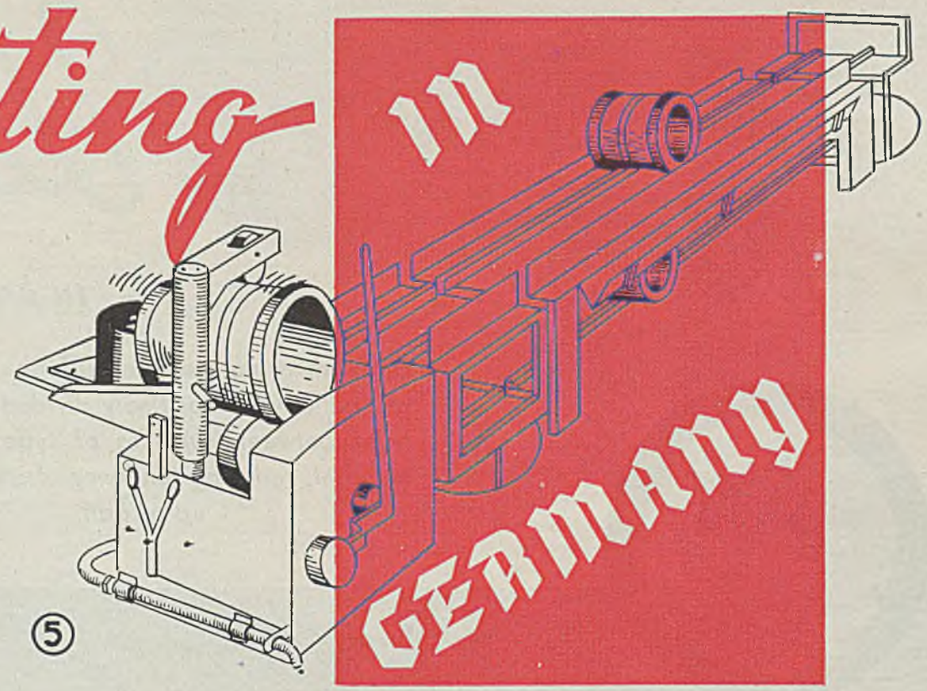


Fig. 3 — Casting machine used at Annen for cylinder liners



At V-E Day, German ferrous and nonferrous practice in general compared favorably to ours. Use of thin mold consisting of clean silica sand spun just before casting, may represent real advance in manufacturing heavy tubing

INVESTIGATION of the status of centrifugal casting of metals in Germany was made by U. S. Technical Field Information Agency, USFET to find out whether the Germans had made any significant developments in the art of centrifugal casting which might prove useful or suggestive of improvement in the wide-spread application of this method of casting in the United States and in the United Kingdom.

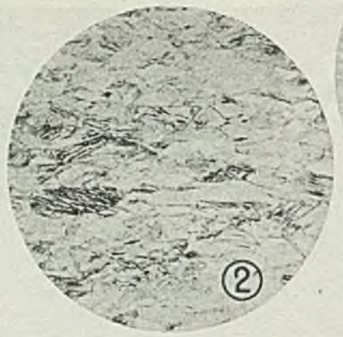
The survey included the following plants: (1) Kupfer and Drahtwerk at Osnabrueck, casting a variety of nonferrous metals and alloys; (2) Bochumer Verein at Bochum, casting steel-lined gun barrels in sand-lined molds; (3) Hochfrequenz Tiegelstahl, A.G. at Bochum, casting aircraft engine cylinder liners, bimetallic tubing, and other hollow cylindrical bodies in induction furnace steel; (4) Schalker Verein, Devision of Vereinigte Stahlwerk at Gelsenkirchen, large manufacturers of cast iron pipe in metal molds; (5) F. Krupp at Essen, discontinued centrifugal casting at Essen early in the war; (6) Annener Gusstahlwerk of Ruhrstahl, A.G. at Annen (near Bochum) casting steel tubing mostly high chromium, in sand-lined metal molds, using electric furnace steel. Also, aircraft engine cylinder liners in refractory-coated metal molds, using induction furnace steel, as well as ball races and brake drums, cast vertically in cement-sand molds. (7) Alfred Teves, Maschinen u. Armaturen Fabrik at Frankfurt a.M., casting automobile cylinder liners of gray cast iron in metal molds of cupola iron; (8) Buderusche Eisenwerke at Wetzlar, casting gun barrels vertically in metal molds of electric furnace steel. Also a plant for the manufacture of cast iron pipe in metal molds, and (9) Halberger Huette at Saarbruecken, manufacturing cast iron pipe in sand molds of cupola iron, direct metal treated and kept hot in a mixer.

While these are only 60 or 70 per cent of the plants making centrifugal castings, conversation with the Germans indicated they represent all the types of casting in use in Germany, Austria, and Czechoslovakia.

At V-E day, centrifugal casting of metals was developed in Germany to a degree comparable to American practice, and rather beyond Great Britain's methods. No significant developments were made in the manufacture of cast iron pipe, the largest tonnage item; methods and machines were in common use for some time before the war. One of the largest and newest plants, Buderus at Wetzlar, was shut down early in the war because sufficient production was available from other plants.

Manufacture of automotive cylinder liners and barrels was on about the same plane of technical development as in the United States and Great Britain. Use of the thin silica sand lining as developed by Poltzguter was new and may eventually be an important contribution. For cast iron liners the machines and methods used were the same as developed by Hurst in England. For steel liners the machines were nearly the same as the newest machines in the United States, such as those in use at the Ford Motor Co. and at the American Cast Iron Pipe Co. Chief advantage of these machines is the simple cylindrical shape of the mold, which eases the thermal stresses, and the removal of the mold from the machine after each cast which provides for better control over mold temperatures and allows better dressing.

Casting of steel gun barrels was highly developed and the use of the thin sand mold consisting of clean silica sand (about 30 to 70 mesh) spun in the mold just before casting may represent a real advance in casting heavy tubing. Molds, run in water, were of chromium steel, only 1 to 1½-in. thick. Method of placing this lining is to put the necessary amount of sand in a trough the same length as the mold. This is mounted on (*Please turn to Page* 130)

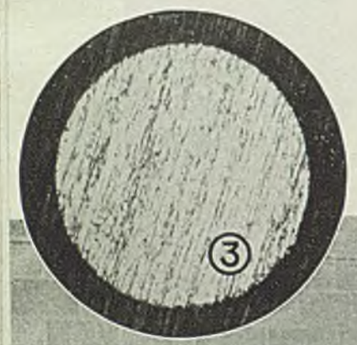


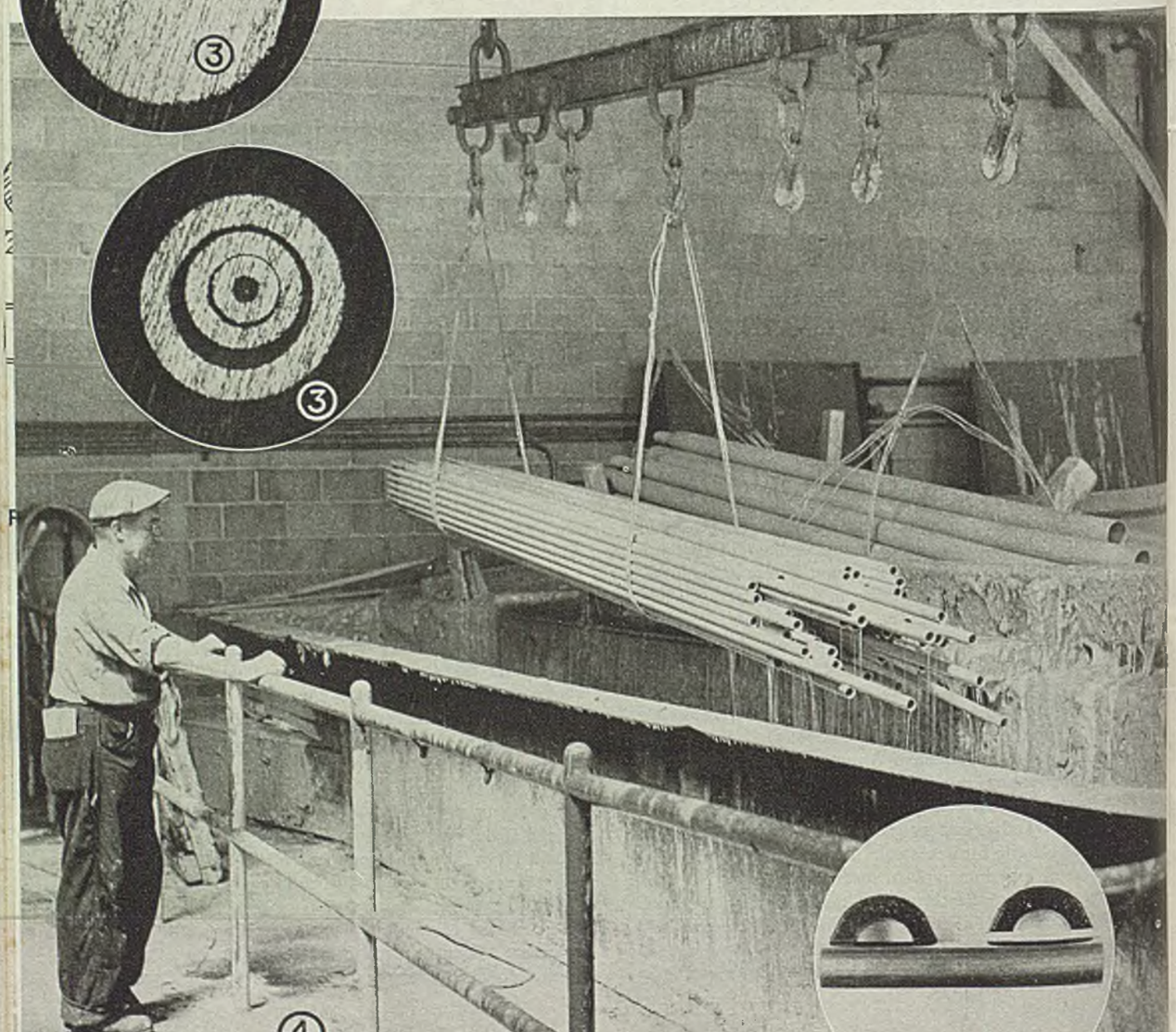
Use of Adhesives

IN COLD DRAWING

STAINLESS STEEL TUBING

Under drawing pressures as high as 200,000 psi, adhesive keeps finely divided solid particles between surfaces of tube, die and mandrel, reducing tendency of steel to pick up or gall





By HARRY K. IHRIG
Director of Laboratories
Globe Steel Tubes Co.
Milwaukee

MANUFACTURE of stainless steel tubing started in the United States about 25 years ago—approximately a decade after two Germans, Benno Straus and Edward Maurer, in the development of better thermocouple protection tubes, discovered the now widely used stainless steel analysis of 18 per cent chromium and 8 per cent nickel.

Although tonnage of stainless tubing produced today is still small compared to that of carbon and low alloy steels, its value is substantial, since it sells for about ten times the price of common steel. Industry is using increasing amounts of stainless each year primarily because of its corrosion and heat resistance. Such tubing is in use under a wide variety of conditions. For example, some stainless steels are in service exposed to temperatures as low as minus 300° F and as high as 2100° F.

Stainless tubing is available in both seamless and welded forms. Seamless tubing is pierced and hot rolled down to about 2 in. OD and 3/16-in. wall thickness. When thinner walls or smaller diameters are desired, it is necessary to cold draw the hot finished tubes. Since most stainless steel tubing is used with thin walls because it is not necessary to allow extra metal for corrosion losses, practically all stainless tubing is sold in the cold drawn state. Welded tubes often are cold drawn both to reduce them in dimensions and to remove the weld bead.

Carbon steel tubing can be cold drawn quite easily at relatively high speeds and reductions. Fat-soap emulsions are usually used as lubricants. Such methods are unsuccessful in the cold drawing of stainless steel tubing.

Methods of Drawing Stainless Tubing: Stainless steels tend to pick up or gall when subjected to high pressures in the die and on the mandrel. These pressures are often as high as 200,000 psi and hence any ordinary oil film is squeezed out. Even the sulphonated and chlorinated oils known as the extreme pressure lubricants cannot be used successfully[1].

Metallic lead is widely used for drawing stainless tubing. The hot finished tubes are dipped in molten lead with a suitable flux. The lead coating prevents metal to metal contact and subsequent welding action between the tube and the die which causes pick up and galling.

Use of lead for this purpose has several objections. It is expensive and in some instances it is a health hazard. Many stainless tubes are used for food and dairy processing and any trace of lead remaining on the finished tube would be dangerous. If lead is left on the tube when it is annealed, it penetrates the stainless steel metal inter-granularly and the tubes fail under pressure or corrosion.

Adhesive Drawing Process: A number of years ago a new method of drawing stainless steel was devised[2]. To assure the separation of the surfaces of the tube and the die and mandrel a finely divided solid is placed between them. Such solid particles if suspended in oils or other liquids used as coatings on the tubes will be scraped off as the tube enters the die. To be effective in preventing metal to metal contact of die and tube, solid particles must remain between die and tube during drawing. This is done by making particles adhere to the tube metal.

It is believed that the adhesive keeps the solid particles on the tube surfaces after it enters the die. As it continues through the die, the coating becomes more compact as the pressure increases. The adhesive film probably finally ruptures and the particles act as miniature ball bearings between the stationary and moving surfaces. Since they are solids, particles cannot be squeezed out as a liquid film.

Fig. 9 illustrates this action. The bottom view shows a cross section of a tube and a die with the mandrel inside. The upper view is an enlarged section showing the finely divided solid held on the surface by the adhesive. The tube is being reduced in outside and inside diameters and also in wall thickness by being pulled to the right through the die and over the mandrel.

Various adhesives were used with a number of finely divided solids suspended in them. Glue, sodium silicate, synthetic resins, varnish and many other adhesives were used with lime, chalk, mica, rouge, lithopone and numerous other solids suspended in them.

Fig. 6 is photograph of section of stainless tube stopped in the die. It was pulled to the right, and the die and mandrel were about in the middle section of the picture when it was stopped. Tube was a type 304 stainless 3 in. OD with a 0.250-in. wall thickness, and was drawn to 2.625-in. OD by 0.175-in. wall for a wall reduction of 30

Fig. 1—Photomicrograph of metal taken from left, or annealed end of sample shown in Fig. 6. X 100

Fig. 2—Photomicrograph of drawn portion on right of Fig. 6. X 100

Fig. 3—Cross section of three small telescoped stainless tubes, bottom, compared to cross section of pin, top. These small tubes are used for hypodermic needles

Fig. 4—Bundle of stainless tubing leaving the adhesive dope tank

Fig. 5—Illustrating magnetic properties of austenitic grades of stainless steels, this piece of type 321 stainless tubing is strongly magnetic on unannealed end, right, and nonmagnetic on annealed portion, left

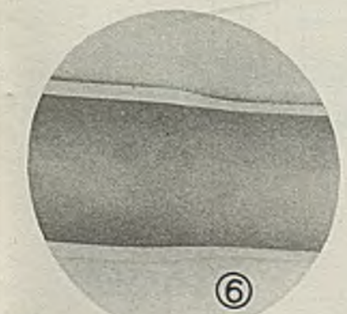


Fig. 6 — Longitudinal cross section of stainless tube stopped in die. Tube is pulled to right through die and over mandrel in center of photograph

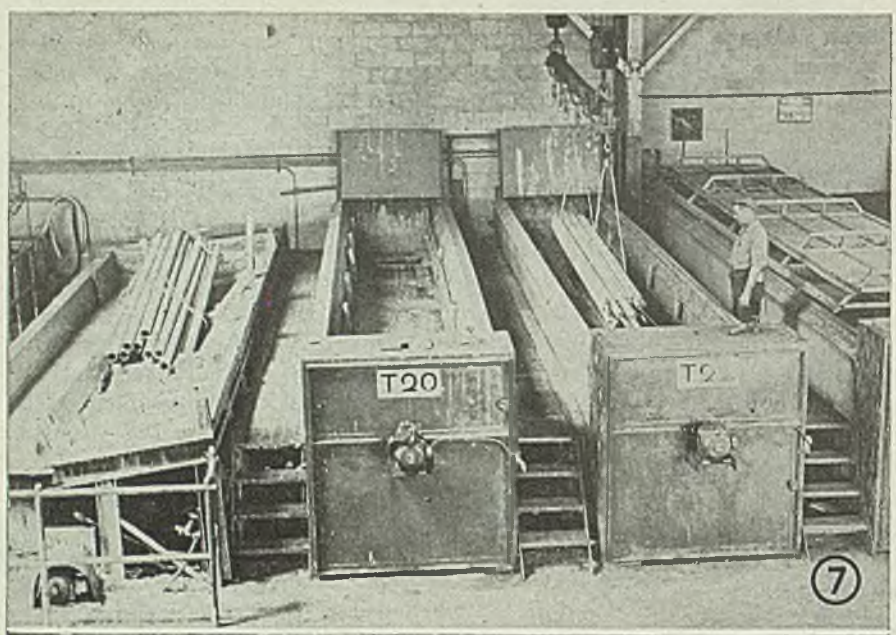


Fig. 7—Driers for drying adhesive dope have steam heated unit heaters in each end. Tubes are dried for about 2 hours at 180° F

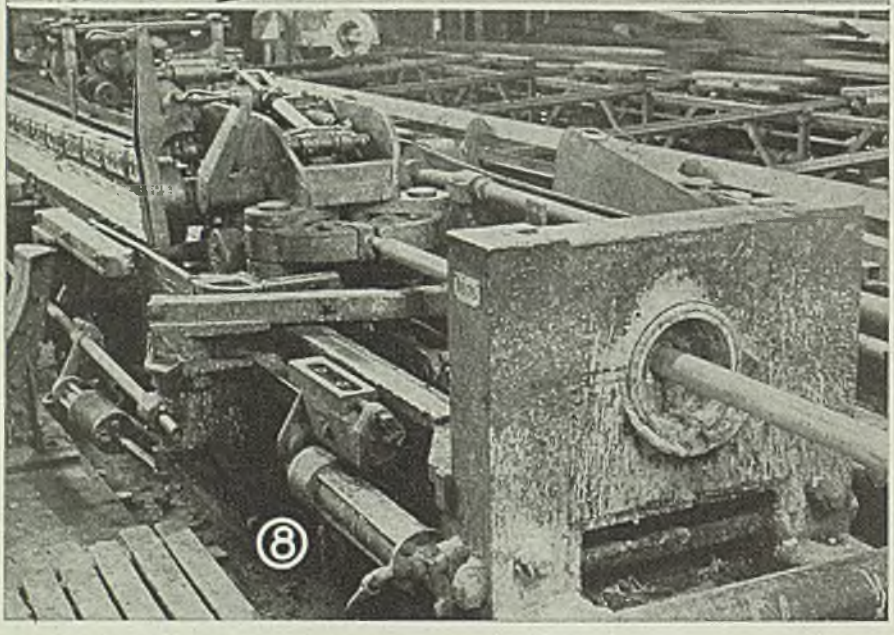


Fig. 8—Drawbench for cold drawing stainless tube. Reductions of from 30 to 50 per cent in cross sectional area are taken in a single pass at speeds of 5 to 15 fpm

per cent and a 37.6 per cent reduction in cross sectional area. Reductions of the three dimensions can be seen plainly.

Fig. 1 is a photomicrograph of the annealed portion of the left and Fig. 2 is a similar photomicrograph of the drawn portion on the right. Distortion of grains is very evident; slip planes are shown in the cold worked sample also.

It is well known that the austenitic grades of stainless steels are nonmagnetic when in the annealed state if their analyses are properly balanced. Upon cold working, they become magnetic. Fig. 5 is a photograph of a piece of type 321 stainless tubing which has been cold drawn by the adhesive method. It was then annealed on one end with a torch while the other end was kept cool. It is strongly magnetic on the unannealed end at the right and nonmagnetic on the annealed end on the left.

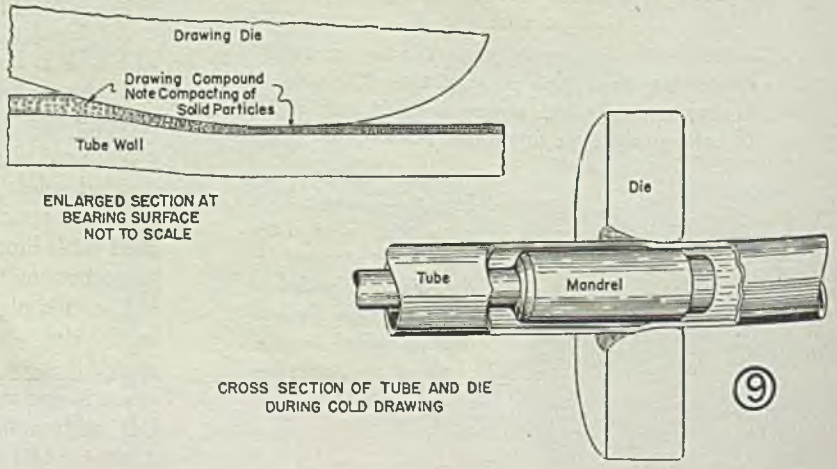


Fig. 9—Upper view, enlarged section showing finely divided solid held on surface by adhesive used in cold drawing stainless tubing. Bottom view is cross section of tube and die with mandrel inside

Large Scale Use of Adhesive Method: The adhesive drawing process has been in use in Globe Steel Tubes' plant for a number of years. Several hundred tons of stainless tubes per month are drawn by this method.

The hot finished tube from the rolling mill is annealed by quenching it in water from 1950° F; it is then pickled and inspected. All imperfections are removed by grinding. Tube is then "doped" by dipping it in a solution containing 30 per cent shellac, 55 per cent alcohol, and 15 per cent lithopone, the latter suspended in the shellac solution.

Fig. 4 is a photograph of a bundle of tubes being withdrawn from the dope tank. Tubes are allowed to drain and then are placed in the dryers shown in Fig. 7. Dryers are simply rectangular boxes with steam heated unit-heaters in each end. The doped tubes are dried for about 2 hours at a temperature of about 180°F . The dried coating is from 0.001 to 0.002-in. thick.

After drying, tubes are drawn on a bench as shown in Fig. 8. Reductions of from 30 to 50 per cent in cross sectional area are taken in a simple pass at speeds of 5 to 15 fpm. After drawing, the residual dope left on the tubes is removed by washing in an alkaline bath of trisodium phosphate solution to prevent any possibility of carbon pick-up from the shellac during annealing.

The tubes are annealed by quenching from 1950°F and then pickled in a hydrochloric acid solution and passivated in nitric acid. This cycle of doping, drawing, washing, annealing, and pick-

(*Please turn to Page* 116)

Engineering News *at a Glance*

HIGH nitrogen content of basic bessemer steel can best be reduced by maintaining low temperatures in the converter and by reducing the duration of the blow, according to a Department of Commerce report, quoting metallurgists at August-Thyssen Huett in Hamborn, Germany. At that plant cold steel scrap was added after 70 to 80 per cent of the blow, and air blasts were enriched with oxygen to speed conversion of iron and steel. According to the Washington report, efforts also were made to reduce the nitrogen content of the iron and coke used in steelmaking. Additions of aluminum, titanium, silicon, and zirconium also were considered as a means of removing nitrogen from the steel by flux of the nitrides during the blow.

SEARCHING for a satisfactory method of cleaning aluminum prior to welding with the inert-arc process, General Electric engineers discovered that dips in sodium hydroxide and sulphuric acid produce mirror-bright, fine-contoured beads as welded. The aluminum is first degreased briefly in a 5 per cent solution of sodium hydroxide to remove grease, oil or wax, then washed quickly in water. It is next dipped in a 50 per cent sulphuric acid bath which removes the oxide skin and restores most of the surface brightness. A hot water bath removes the acid leaving the aluminum clean and dry.

FEATURE at the comprehensive lightplane conference held by the National Advisory Committee for Aeronautics at Langley Field, Va. recently, was a demonstration of a new design for propellers which reduces noise greatly at no sacrifice in performance. It was revealed that by using as many as eight blades, turning at one-third the speed of a 2-bladed propeller of equivalent power, the many bladed fan type can be made virtually silent.

ASIDE from the cleaning cycle which follows along normal lines, only one chemical solution is used in making aluminum and aluminum alloy articles suitable for plating using a process developed by Krome-Alume Inc., Lockport, N. Y. The process, which is used for plating aluminum and its alloys with nickel, chromium, silver copper, brass and cadmium, employs no special equipment, all preplating preparation being effected in one ordinary tank. Work to be plated, says the company, requires only 2 min of preplating treatment. In plating nickel, a direct deposit is made, a flashing of copper being unnecessary.

DEVELOPMENT of a rocket-propelled torpedo dubbed the "hydro-bomb" for launching into water from a plane was revealed recently by Westinghouse Electric Corp. at Pittsburgh with the approval of the Army Air Forces. Resembling a submarine torpedo, it is slightly shorter and has a diameter about 2 in. greater than most torpedoes. It carries about 600 lb of high explosives in its warhead and travels through water at 40 knots. Impact of the torpedo striking the water throws a switch that ignites the rocket motor's solid fuel. Electrical controls with a gyroscope keep the bomb on the path in which it was aimed, and other controls regulate the depth of its operation under water. The torpedo was nearly ready for combat use when the Japs capitulated.

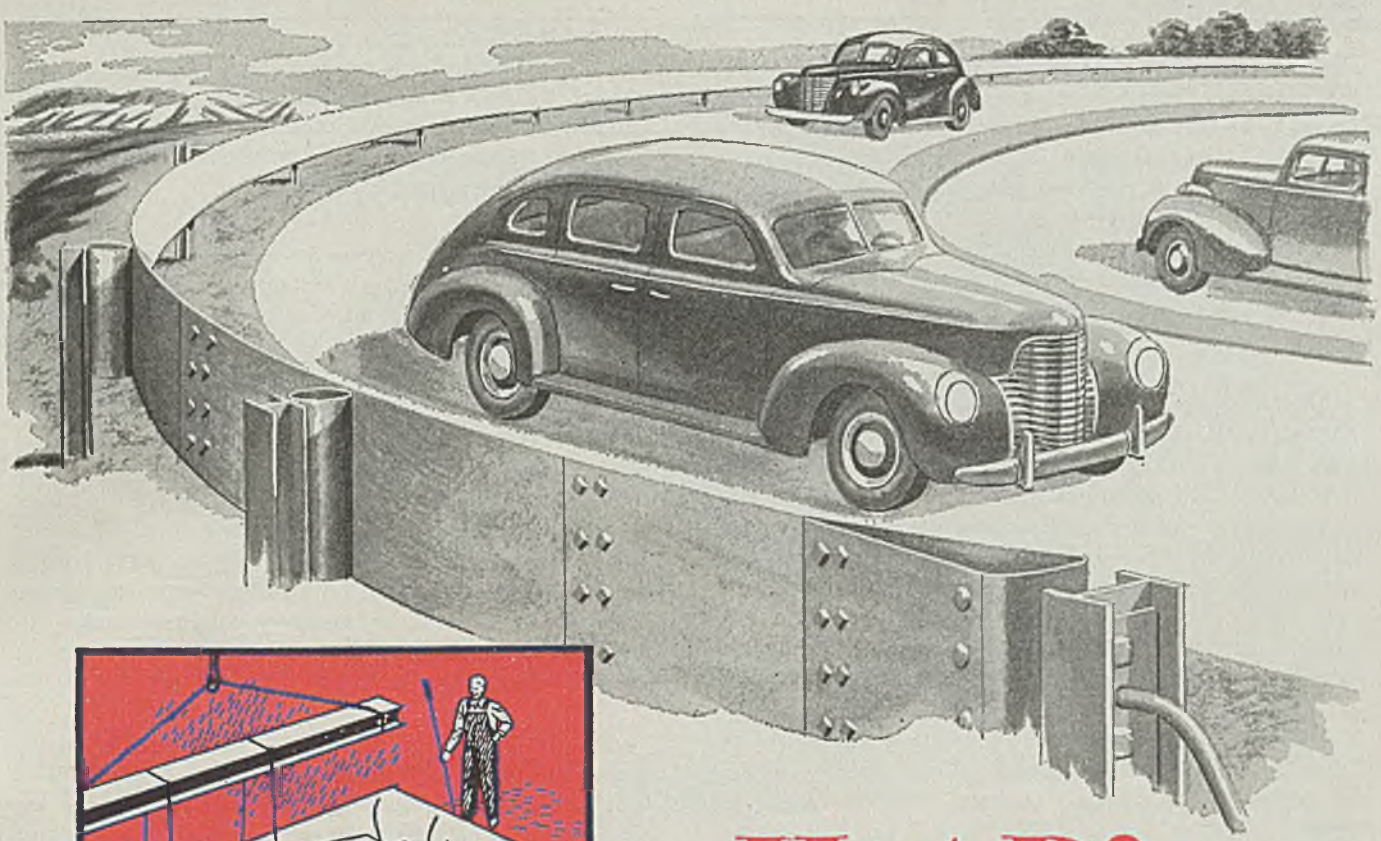
HUSH conversations may be carried on in the middle of a busy office by means of a phone being manufactured in New York by Hush-A-Phone Corp. The development, it was learned, enables one to discuss confiidential matters over the phone without being overheard by "unconscious" eavesdroppers; it eliminates disturbance caused by those who shout into the mouthpiece and keeps out of the transmitter surrounding factory or office noises. By a novel acoustical arrangement, important tones of the voice are guided directly into the transmitter, while tones that produce distortion are conducted into an absorbing chamber. Latter is filled with millions of glass fibers each with a diameter less than 100th that of the human hair.

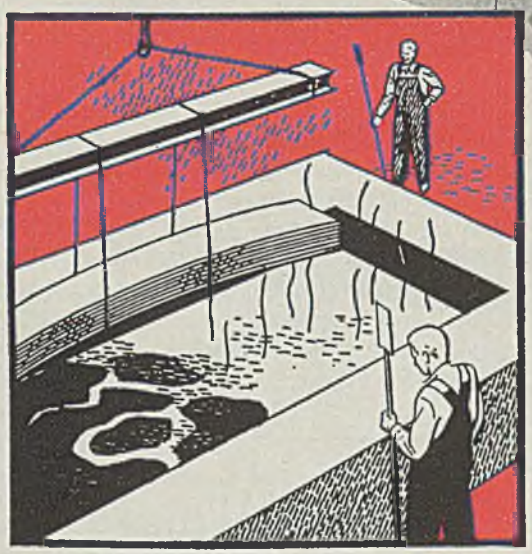
MANUFACTURERS overlaying machine parts and equipment to provide resistance to frictional and abrasive wear will be interested to learn the research lab of Eutectic Welding Alloys Corp., New York, now is in process of developing two new alloys for hard overlaying purposes. One is a combined product containing fluxing and hard metallic elements that can be applied to ferrous and nonferrous parts at extremely low temperatures—from 940 to 1300°F. The other is an alloy which will provide an extremely hard thin overlay on ferrous parts, and will be highly resistant to corrosion and heat.

SOME 25,000 tons of air per hour will be moved to ventilate the Brooklyn-battery vehicular tunnel now under construction under the East river in New York harbor. Approximately 53 large fans are to be used to change the air in the tube every 90 sec. Twenty-seven of them will blow in fresh air, the other 26 will exhaust stale air.

"ICEMEN" may someday supply ordnance departments with small arms propellents. An Illinois manufacturer, "Compressed Air Magazine" reports, is preparing to produce a rifle that is designed to "fire" with carbon-dioxide gas generated by dry ice in the magazine. It is said that ½-lb of dry ice produces enough gas for firing 1000 rounds from a .22 caliber weapon. At room temperature, the gas develops a pressure of 1200 psi; but it is proposed to obtain greater pressures by heating the magazine, thus developing a muzzle velocity comparable to that of conventional rifles. Expansion of the gas induces cold, and the rifle can be fired at a rapid rate without overheating.

TESTS made by British engineers show that tank armor seams welded with austenitic electrodes used by the Germans during the war, resist hot cracking tests equally as well as the seams welded with British electrodes, a





Hot-Dip Galvanized Guard Rail *Lasts Longest*

Hot-Dip Galvanizing by the Hanlon-Gregory method provides the utmost in rust prevention for any exposed iron or steel installations.

Hot-Dip Galvanizing will give *your* product or installations greater uninterrupted service. The Hanlon-Gregory method will save you expensive replacement and maintenance costs.

The World's Largest Job Galvanizing Plant—located in the very heart of the steel industry—is prepared to provide the best *proved* protection against rust for your products in any quantity.

THE WORLD'S LARGEST *and Fastest* JOB GALVANIZING PLANT

HANLON-GREGORY GALVANIZING COMPANY

Pittsburgh, Pennsylvania

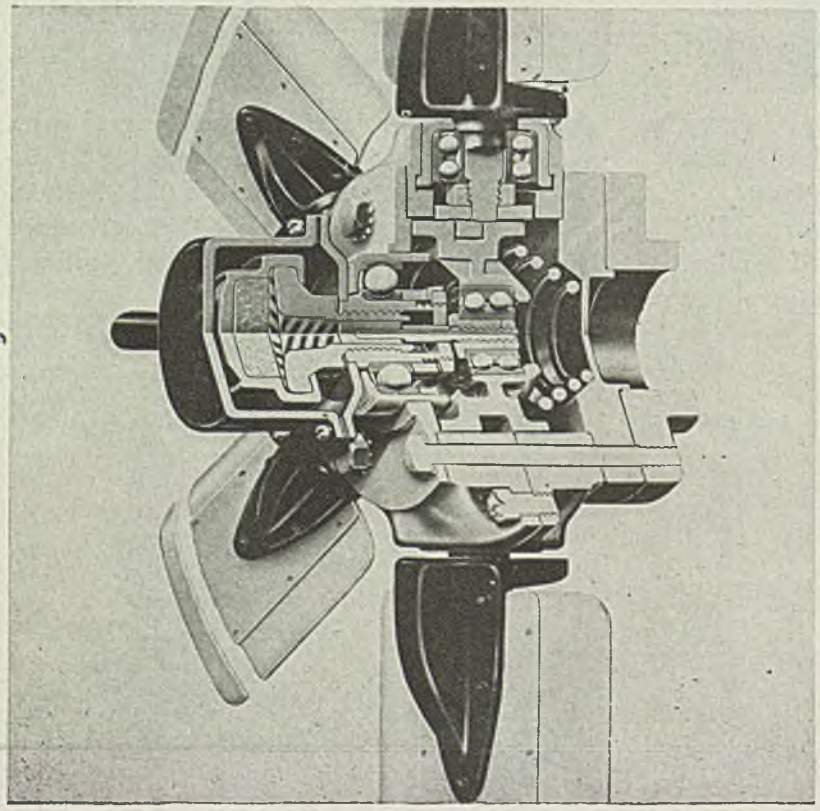
report held by the Office of Technical Services, Washington, reveals. German success with austenitic rods is believed to be due to the higher manganese content of the rods. They contain about 18 per cent chromium, 8 per cent nickel and 6 per cent manganese. The Germans also are reported to have developed a ferritic electrode with very good properties by concentrating on basic lime fluorspar coatings. The electrode involved a minimum use of chromium, nickel, manganese and other scarce materials.

AMONG captured Japanese machines recently exhibited by the Army Engineering Board at Fort Belvoir, Va., was an air compressor of unusual design. Minus flywheel, crankshaft and connecting rods, it consists of a single cylinder with a central combustion chamber. Diesel fuel ignited in the chamber drives two opposed pistons outward simultaneously, compressing air at the ends of the cylinder. The compressor delivers 3000 cfm of air at a pressure of 300 lb. It is said to operate with so little vibration that the Japs set it up without foundation.

ANOTHER case of one accomplishment leading to another is reported by Dow Chemical Co. When arc welding magnesium on aircraft contacts using the high frequency argon gas method, White Aircraft Corp. of Palmer, Mass., noticed that jumping of the arc to either side of the weld was causing burned spots in the metal resulting in rejects. Ionization of the gas and resulting increase in conductivity caused the high frequency arc to jump for distances up 1¼-in. particularly when welding started or stopped. This led to development by White of a magnetic switch control that corrected the situation. Interest aroused through its magnesium welding experiences culminated in the company's recent announcement of the initial production of welded magnesium ladders in addition to the new magnetic switch control.

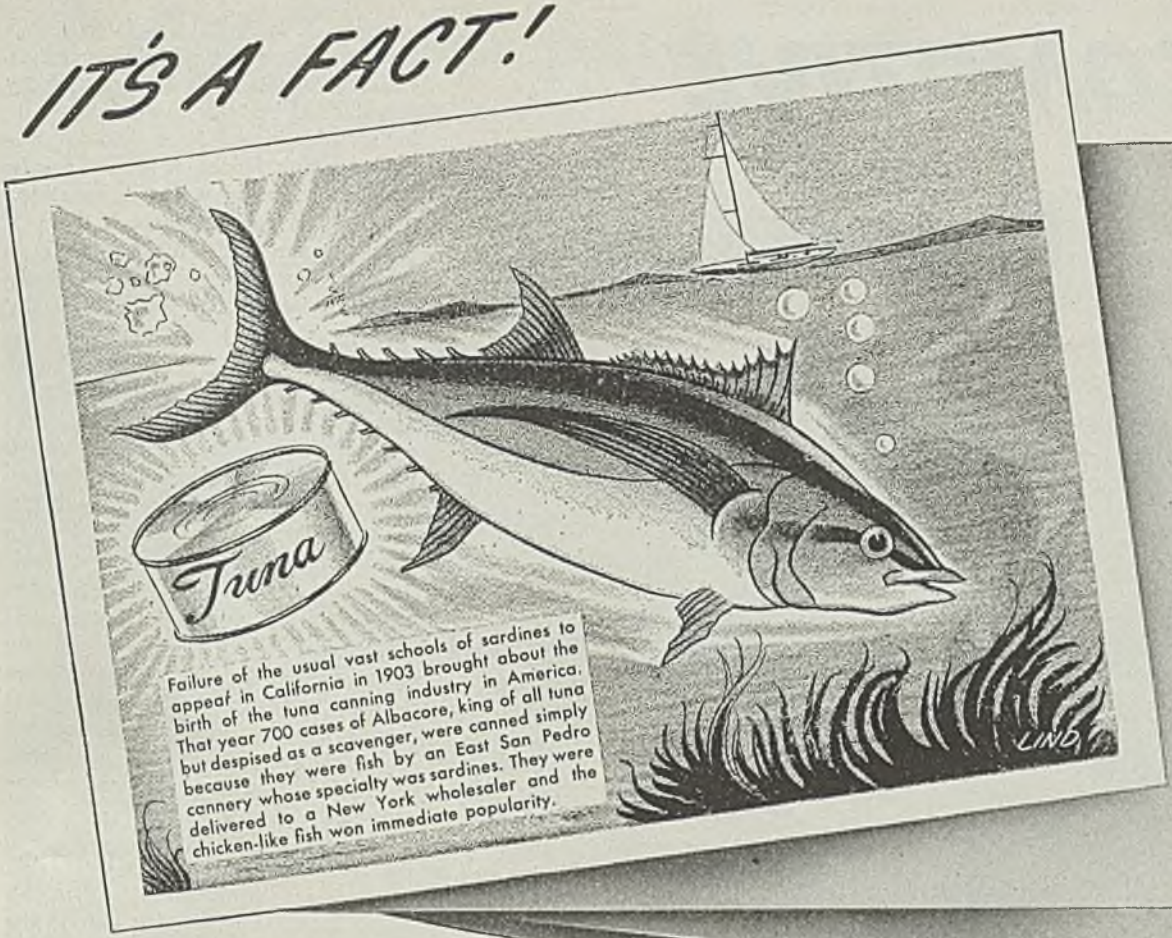
TIMESAVER for busy individuals wishing to convey their ideas quickly and accurately is a 9 x 12-in. scale drawing pad currently introduced by Jiffy Scales Co., Cleveland. It enables one to make properly proportioned drawings without use of a ruler, drafting board or T-square, and may be used almost anywhere. Pad consists of tracing tissue enclosed within a cover jacket formed by four cardboard flaps. Various scales are printed on three of the flaps. To use pad, cover flap is folded back and a tissue sheet placed over scale desired. Drawing is then made quickly with aid of printed lines showing through tissue. Included on the back of each flap are basic mechanical drafting standards, electrical and welding symbols in addition to mathematical equivalents to assist the user.

ONLY domestic iron ores available in Germany are low grade, according to investigators for the Department of Commerce, Washington. The Salzgitter reserves, for example, contain only 20 to 30 per cent iron. Large stocks of Swedish ores were laid up during the 1930's, and exploitation of low-grade native ores was actively encouraged by the German government. Many clever methods were devised to process the low-grade ores, and to meet shortages of critical alloying materials. Wartime imports came largely from France, Luxemburg, Sweden, Norway.



INSTALLATION of Thermo-control fans in existing truck, bus, diesel-electric locomotive and other engine mounts where necessary clearances are available is simplified by means of a front-operating adapter design of a thermal power element developed recently by Evans Products Co., Detroit. According to A. R. Lintern, manager of the company's Thermo-Aire Division, the newly designed element makes it necessary to remove only the old fan from the hub and remount the Thermo-control fan with correct mounting flange to fit the hub. Fan is a variable pitch self-adjusting unit controlled by the thermal power element in adjusting itself to changes in engine temperatures. Cutaway view shows front-operating adapter design of thermal power element and ball bearings used to insure smooth functioning of variable pitch fan blades.

IT'S A FACT!



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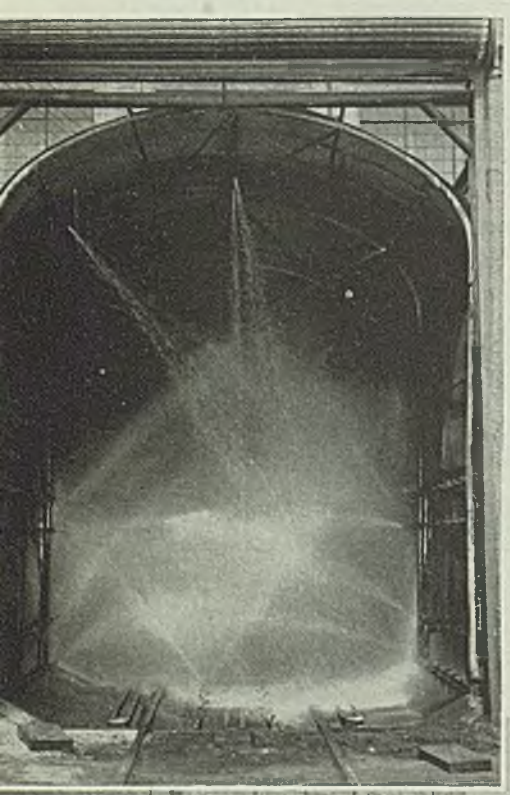
LOCOMOTIVE Cleaning

Chemical shower bath strips grease and paint from dirty engines for one third the cost of previous cleaning method

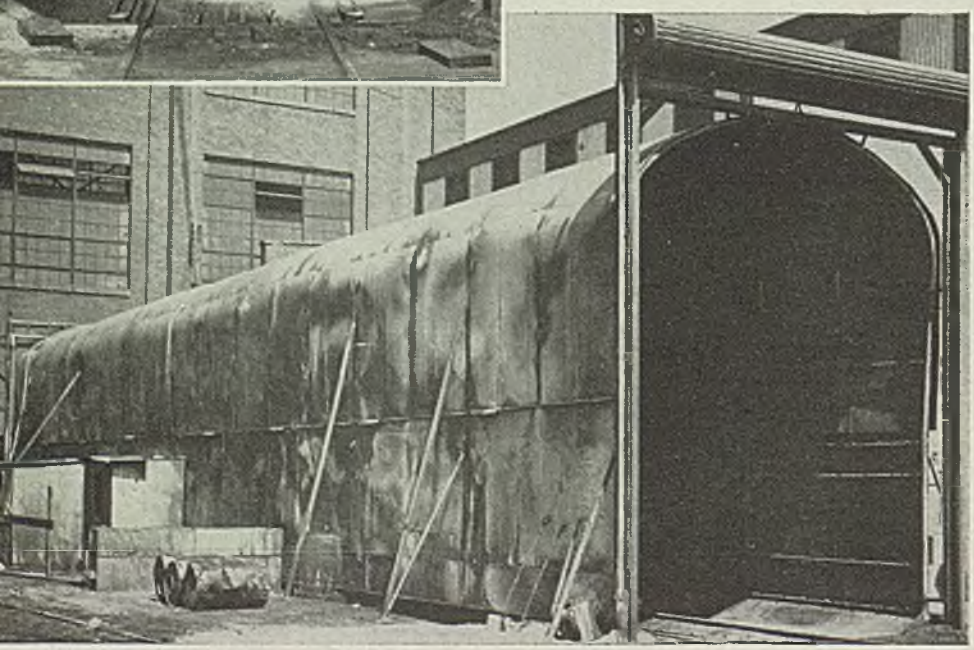


BY the turn of a valve, locomotives of Union Pacific railroad are chemically cleaned at Denver and Cheyenne, Wyo., in about 3 hours as compared to approximately 192 manhours previously expended. Cleaning is performed in a long metal shed equipped with 1350 ft of pipe studded with 860 nozzles through which a cleaning solution is pumped.

Building, designed by two Union Pacific men, J. R. Frohoff and K. J. Glasmann, is constructed entirely of reclaimed materials. It is 90 ft long—large enough to hold any one of the line's locomotives. Cleaning agent is a 4000-gal solution of water and basically caustic soda washing powder stored in a 5000-gal subterranean tank. Mixture is 10 oz of powder for each gallon of water. A centrifugal pump forces solution through the pipe system at a rate of 2400 gpm at 50 lb pressure. Pump is operated by an 80 hp motor turning at 1800 rpm.

Fig. 1 (left)—Building is equipped with 1350 ft of pipe and 860 nozzles through which caustic soda cleaning solution is sprayed from all angles

Fig. 2 (below)—One locomotive can be cleaned, paint stripped and rinsed in about 2 hours in this 90-ft shed



One hour and twenty minutes under the shower, Fig. 1, generally strips all grease and paint from the locomotives. The drain into the solution tank is blocked and the engine is rinsed for approximately 35 min with clear water pumped through the pipe system or sprayed from a hose. Rinse water drains off through regular sewage system.

Grease and paint drain into the storage tank with the solution, but a series of stationary screen baffles and a rotating screen prevent them from being pumped back through the pipes. When the operation is completed, solution is pumped into a temporary storage tank, permitting cleaning of the screen baffles and permanent tank.

On each stripping job approximately 500 gal of solution are lost through normal attrition. Remainder of the solution is tested and sufficient water and powder are added to bring the mixture up to the 4000 gal level.

In preparing a locomotive for cleaning, it is cut loose from its tank, special tin coverings are placed over the headlight, dynamo and sand box to prevent moisture from entering the machinery, and firebox is permitted to cool.

Prior to introduction of the present process, engine was dismantled into several major components which were bathed in a solution of caustic soda and oil distillate from a portable spray powered by steam pressure. After allowing the solution 15 to 20 min to soften the hard coating of engine grease, dismantled parts were rinsed in hot water and steam. Dismantled locomotive was then placed in a lye vat which in 6 to 8 hours stripped the paint from the metal.

Estimated cost of cleaning one locomotive under the old method was $250 as compared to $75 for the shower bath system. Figures include expenditures for both labor and materials.

—o—

A gun oil said to combine the qualities of a penetrating oil, rust preventative and general duty lubricant is being introduced under the name of Ol' Sarge by Universal Engineering Co., San Diego, Calif., its manufacturer. It reportedly will withstand high or low humidity, extreme heat and assures lubrication in temperatures of 50° below zero.

8,640 holes per hour with

CLE-FORGE HIGH SPEED DRILLS

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The production schedule on these coaster brake hubs calls for 240 pieces per hour—36 holes in each hub. Here is one of the many routine jobs where CLE-FORGE High Speed Drills are demonstrating their exceptional ability to produce more holes per grind at lower cost.

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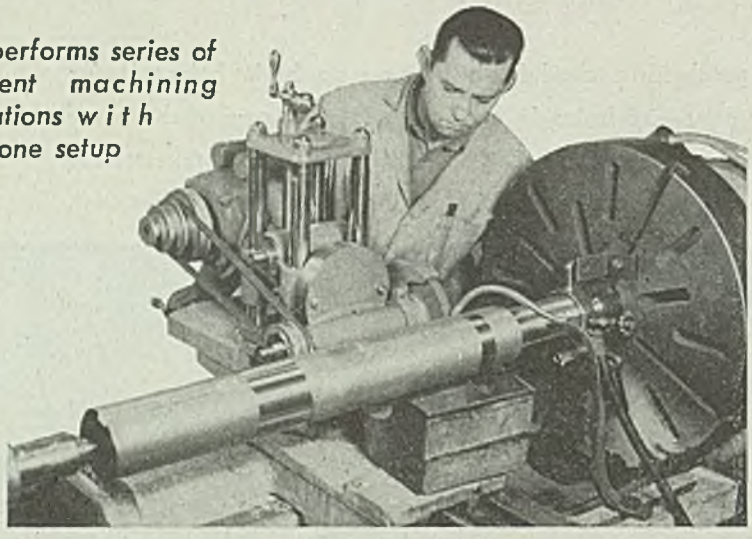
Lathe Converter

. . . performs series of different machining operations with only one setup



VIRTUALLY all operations performed in a complete machine shop are said to be possible on a lathe equipped with a lathe converter—new universal milling and grinding unit complete with interchangeable heads. The converter, developed by Master Mfg. Co., Hutchinson, Kans., is able to do a series of different machining operations with only one set-up of the work piece.

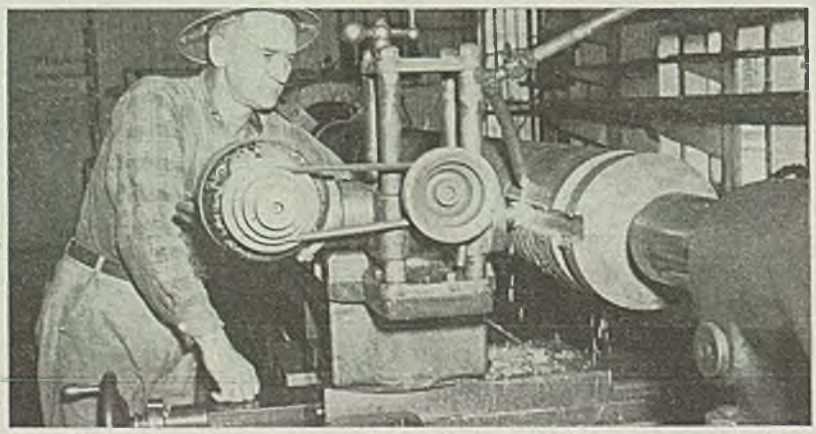
The basic unit is mounted on the lathe carriage in the tool post position, either on the compound or directly on the cross slide. It is attached to the compound by means of an adapter bar which slides into the T-slot, to which the converter is fastened by two cap screws bolted through holes in the base. An angular adjustment of 360 degrees in horizontal plane is possible.

Interchangeable heads are attached to the face plate of the basic milling unit. Face plate and head are calibrated to provide angular adjustment of the head at any point within 60 degrees in the face plate plane.

Available speeds range from 45 rpm for heavy milling cuts to 14,000 rpm for accurate finish grinding. Higher spindle speeds are obtained by making minor changes. Cuts can be held to 0.001-in. tolerances, and grinding to 0.0001-in. Because the unit carries its own power, it allows full use of all the normal functions of the lathe. Flexibility attained by the lathe's carriage, compound and spindle is augmented by the converter's vertical movement, power-driven spindles and angular head adjustments.

Fig. 1 (above)—External grinding operation using lathe converter

Fig. 2 (below)—Both ends of this 9⅞-in. by 22-ft shaft are milled for keyways (one is tapered) on a 36-in. lathe without changing the setup



Magnesium Alloys

(*Continued from Page 96*)

corrosion rate may not exceed a penetration of 0.010-in. per year.

Wrought materials of this type were used throughout World War II. Protective chemical surface treatments and recommended paint systems are available for protecting magnesium alloys against the corrosive effects of normal weathering and many corrosive atmospheres. In making sand castings, special equipment and procedures are necessary to retain the desired purity; and rather high melting temperatures are common.

As an alternative to the melting of the pure magnesium ingot in the alloying pot, considerable premelting is now being done in oil or gas-fired reverberatory furnaces in which a continuously available supply of molten magnesium is kept "on tap," ready for the alloying pot, Fig. 2. By means of a pump, it is possible to transfer 3500 lb of metal in 3 to 4 min. a tremendous saving over the time required to melt down a solid ingot. At least two alloying pots can be fed in this way from one reverberatory furnace.

Design Considerations: Wartime poll taken among most of the nation's magnesium fabricators revealed that with few exceptions they intended to stay in the business after the war was over[3]. Because of magnesium's light weight (approximately one-quarter that of steel) these manufacturers anticipated fairly widespread use in the construction of commodities which have to be moved, such as manually handled tools and equipment, reciprocating and revolving machinery, transportation vehicles, Fig. 1, and containers, appliances, toys, and wheeled vehicles.

This physical property is, in most cases, the primary reason for using magnesium. There is a wide range of applications in which the saving of weight is of economical importance. In most cases these applications are such that the lighter weight is of distinct advantage. Ordinarily static structures or equipment not continuously handled or moved do not justify the added expense of the lighter weight.

In addition to the applications taking advantage of its light weight, there are certain others where the chemical or metallurgical properties peculiar to magnesium are utilized[4]. Among these special properties are the following:

1. Nonsparking—which makes magnesium desirable for conveyors, hand trucks, or other equipment for handling powder, munitions, or other materials.
2. Nonmagnetic—making the element suitable for, or near, navigation instruments on aircraft.
3. Etching qualities—metal is suitable

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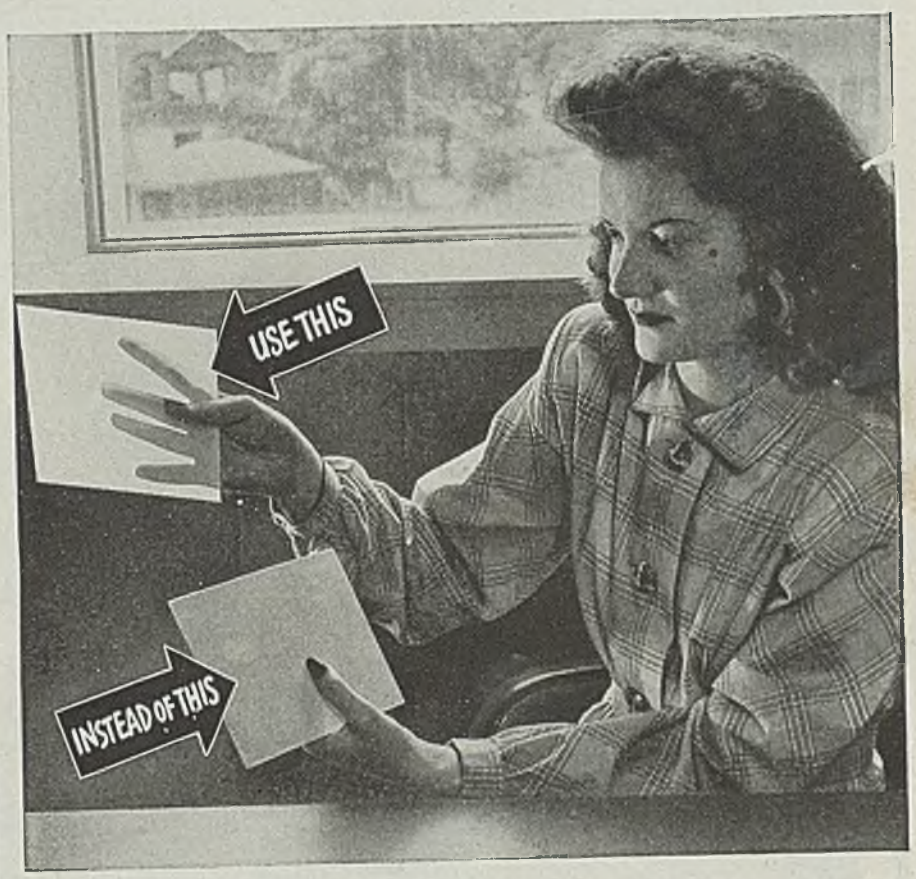

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CARBIDE ALLOYS DIVISION, Ferndale (Detroit) Michigan

W&D—624

TABLE VIII
LOWEST OPERATING COSTS FOR ELECTROLYTIC AND FERROSILICON MAGNESIUM PLANTS FROM DECEMBER, 1943, TO OCTOBER 1944

Rank	Plant—Operator	Location	Process	Product°	Capacity Million Lb./Mo.	Lowest Unit Cost — Single month — Operating rate, %	Single month — Cents/lb.	3-mo. moving av. — Operating rate, %	3-mo. moving av. — Cents/lb.
1	Dow	Velasco	E	Ingot	6.00	112	11.51	109	12.10
2	Diamond	Painesville	E	Ingot	3.00	94	16.31	93	16.50
3	Dow	Marysville	E	Ingot	6.00	89	18.38	74	18.86
4	International	Austin	E	Ingot	2.00	103	20.29	102	21.27
5	Mathieson	Lake Charles	E	Ingot	4.50	27	57.26	23	73.28
1	Basic	Las Vegas	E	Cell Metal	9.33	66	18.02	104	18.70
1	Mg Reduction	Luckey	FS	Crystal	0.83	125	18.32	120	18.92
2	Electro Met.	Spokane	FS	Crystal	4.00	52	19.40	49	20.21
3	N. E. Lime	Canaan	FS	Crystal	0.83	79	22.17	77	25.09
4	Permanente	Manteca	FS	Crystal	1.67	106	27.83	111	28.53
5	Amco	Wingdale	FS	Crystal	0.83	77	29.13	75	29.44
6	Ford	Dearborn	FS	Crystal	3.33	30	55.05	27	64.78

° To convert cell metal and crystal costs to ingot equivalent, the cost of melting and melt loss must be added.

for photoengraving plates which etch more rapidly and print as clearly as the more commonly used metals.

4. Machinability—magnesium is economical for engraving plates where the mechanical routine constitutes the major costs.

5. Electrical properties—because of its specific resistance, magnesium is suitable for certain types of diecast rotors.

6. Elastic properties—because of its low modulus, magnesium is suitable for certain applications where the resultant high energy-absorption capacity is advantageous.

These miscellaneous uses, however, do not constitute the major potential demand for magnesium as an engineering material. Such major uses deal primarily with the design of magnesium as a structural metal, the principal purpose of which is to save weight.

Experience in the war industries during World War II demonstrated that magnesium can be handled in machine shops the same as other metals. It can be machined, welded, riveted, bent, and rolled. Magnesium alloys are available to industry in all the commonly used fabricated forms, including sand castings, permanent mold castings, die castings, forgings, rolled sheets and plates, extruded bars and tubing, and extruded structural shapes. In considering the design of magnesium parts or assemblies it is well to consider the basic qualities of the metal in order to arrive at the best design. The properties of which advantage should be taken are as follows:

(1) Excellent mechanical properties on a specific weight basis, and in cast form on an equal volume basis; (2) is readily fabricated and exceptionally easy to machine. (3) Lowest specific gravity of any structural metal. (4) Good stability in normal atmospheres.

In order to utilize these favorable properties to the fullest, the design should compensate for the somewhat lower shear strength and modulus of elasticity of magnesium alloys by proportioning and distributing the metal to best advantage. The somewhat greater sensitivity to notch effects and stress concentrations requires that details tending to cause them to be avoided, particularly under conditions of dynamic loading or fatigue.

It is also good practice to insulate properly surfaces of contact with dissimilar metals to avoid galvanic corrosion under conditions of moisture and wetting. The proper consideration of all of these factors will result in a design showing substantial weight savings and a part or assembly that will stand up in service.

Castings: At present the largest use of magnesium alloys is in sand castings because it is in this form that mechanical properties compare most favorably with other metals and maximum weight saving is obtained. Ordinarily, most sand castings are fairly stocky so that the lower modulus of elasticity of magnesium is not a problem. The design of magnesium sand castings is essentially the same as aluminum practice, although somewhat more attention should be given to details on castings subjected to high stresses and fatigue. For the general run of castings, the shrinkage is so nearly the same that, except for extremely long castings, the same patterns are often used interchangeably for the two metals.

Magnesium die castings have the same fundamental advantages as are obtained with die casting of other metals, such as, (1) low cost per piece, (2) elimination of machining by casting to close tolerances, and (3) minimum weight by casting sections as thin as 0.050-in. In general, magnesium die castings have properties comparable to those of aluminum or zinc and, because of the general use of high pressure machines, are usually much sounder than ordinary castings made on the goose-neck type.

Magnesium alloy castings are used where lightweight, high strength, resistance to shock, and good machinability are required. These castings found widespread wartime use in aircraft engines and aircraft landing wheels. In high speed rotating and reciprocating parts, lightweight magnesium castings are used for smoother and more efficient operation and to reduce starting inertia. Examples of such uses may be found in the printing and textile industries. Portable tools and manually handled equipment of all kinds such as vacuum cleaners, portable grinders, polishers, typewriters, business machine parts, couplings and pulleys and foundry flasks have always presented an excellent outlet for cast magnesium alloys. The good machining characteristics of magnesium sand castings provide a reason for using magnesium where parts that require machining are being produced.

Forgings, Sheet and Structural Shapes: If magnesium alloys follow the pattern of the other two structural metals, steel and aluminum, having the same ratio of modulus of elasticity to specific gravity, their maximum application will be found in the form of sheet, structural shapes, or other wrought products. There is no reason why this should not be the case, because various designs to date show that significant weight savings are possible through the use of magnesium for structural assemblies. The design of structural parts is not so simple as with castings, nor are the weight savings obtained quite so large, for two fundamental reasons: (1) The mechanical properties of wrought magnesium do not compare so favorably with the other metals as do the properties of castings and, (2) the low modulus of elasticity becomes a significant factor because structural components are, as a class, much more slender and less stocky than castings. Thus the effect of the low modulus must be considered not only to limit deflections to a reasonable magnitude but because allowable stresses, in compression members particularly, are greatly influenced by the stability of the member as a unit as wel as locally. Table IV illustrates comparative yield strengths of some commonly used materials.

Typical uses which magnesium alloy forgings have found include aircraft engine bearing caps, bearing housings,

rocker arm supports, door and aileron hinges, engine mountings, cylinder heads, valve and pump bodies, hydraulic cylinders, supercharger parts, horn disks, miscellaneous control levers, brackets, fittings and many other applications that are similar.

Magnesium alloy extrusions have been used extensively in the aircraft, textile, and transportation industries. They have also been used in the manufacture of portable equipment where light weight is an advantage. Acceptable machining characteristics make extrusions suitable screw machine stock. Other uses of magnesium extrusions include such applications as floor beams, moldings, stiffener elements in aircraft structures, the framework of bus and airplane seats, bus and trailer body frames and structural members in a wide variety of such parts.

Magnesium alloy sheet and plate have been used in such aircraft parts as wings, wing tips, ailerons, fairings, oil and fuel tanks, floor plates, ducts, seats; and in venetian blinds, bus and trailer bodies, dock boards and conveyors. In general, magnesium alloy sheet can be arc, gas, and spot welded; formed, drawn, spun, and riveted.

Although the metal has gained wide recognition during the war for its service in aircraft and other military equipment, many engineers, designers and manufacturers are not aware of the purely industrial applications that had been established before 1941. These include textile equipment, portable tools, foundry flasks and patterns, and business machines, where the light weight of the metal and its strength are most advantageous.

The volume of magnesium castings and wrought products sold for these and other uses was increasing steadily and rapidly. More and more foundries and fabrication shops were being equipped to furnish magnesium products. Supplies of the metal for these civilian uses were cut off by the war, but production and fabricating facilities were expanded tremendously to meet military demands. For some time sufficient ingot magnesium has been available. With the end of the war with Japan, fabricators formerly tied up with war contracts were in a position to meet the needs of civilian industry for magnesium products at reasonable cost to the consumer.

The portable tool industry has been using magnesium successfully for over 11 years. Designers of portable power tools intend to furnish the highest power in the lowest weight tool. They have found that magnesium housings and handles enable them to obtain light weight without any sacrifice in strength. Their customers range from farmer to automobile manufacturer, lumberman to shipbuilder. Thousands of different tool models are furnished, some to be used for very specialized purposes, others that are suitable for a large variety of uses.

Materials are extremely significant in the successful operation of machines which have rapidly moving and reciprocating parts. These parts must have sufficient strength, yet weight must be kept low in order to eliminate unnecessary inertia and vibration which would be detrimental to efficient operation and wasteful of power. The combination of strength and lightness in magnesium makes it particularly adaptable to such requirements. Lightweight moving parts have other advantages, such as reducing noise and wear on adjacent parts. Greater stiffness can be obtained by using slightly thicker sections, while still maintaining a substantial weight saving, since stiffness increases as the cube of the thickness, while weight increases with the first power of the thickness. Often cast or extruded magnesium shapes of simple design can be substituted for complicated formed steel assemblies which must be stiffened with ribs and braces in order to obtain rigidity. Lightness is also important in units which have to be manually handled, or shipped from one plant to another[5].

The designer contemplating the use of magnesium has available a wide variety of alloys and forms as listed in Table II. The use of magnesium castings developed more rapidly than that of wrought forms, probably because they were more readily available at the start and because little special technique was needed for further fabrication. The development of the current high strength extruded shapes and sheet has opened the way for the use of magnesium in new stressed structural applications, many of which are undergoing development at this time. A wide interest in the use of magnesium in the development of peacetime products is evidenced by numerous inquiries reported by Dow Chemical Co.[6] as received from manufacturers anxious to utilize the light weight of magnesium in many of their products[5].

These proposed applications fall into four general types: Industrial equipment, transportation, consumer goods, business and professional equipment. Roughly, Dow reports, industrial equipment, where magnesium had its widest commercial application before the war, accounts for 40 per cent of the inquiries, with the other three fields accounting for 20 per cent each. Fig. 5 shows monthly shipments of magnesium products, 1942-44.

(*Continued in a later issue*)

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6. The author is indebted to Dow Chemical Co., Midland, Mich., for much of the material presented in this article.

Use of Adhesives

(*Concluded from Page* 104)

ling is repeated until the desired diameter and wall thickness of the tube is reached.

If higher physical strengths are desired, tubes may be furnished without a final anneal. Such stainless steel tubes are not so corrosion resistant as fully annealed ones. Stainless tubes may be polished on outside or inside or both.

Uses of Stainless Tubing: Stainless steel tubing is used in thousands of applications in food, chemical, petroleum, paper, aircraft, and other industries. Practically all types except high carbon grades can be cold drawn.

The original photograph of Fig. 3 was a 33 magnification of the cross section of three small telescoped tubes right, with the cross section of a common pin, left, for comparison. Sizes of the pin and tubes are as follows:

Pin— 0.033-in. diameter
Inner Tube—0.009in. OD by 0.003-in. wall
Middle Tube—0.016-in. OD by 0.003-in. wall
Outer Tube—0.028-in. OD by 0.004-in. wall

These small tubes are produced for hypodermic needles and often require from 30 to 50 cycles of doping, drawing, and annealing to reduce them from the original 2 in. hot finished tube. Fine piano wire mandrels are used in the smaller sizes.

In the production of butylene by the catalytic dehydrogenation of butane for the manufacture of high octane aviation gasoline and synthetic rubber, tubes were required to withstand alterante oxidizing and carburizing conditions at high temperatures. Type 446 cold drawn stainless tubing was used in many plants for the manufacture of these products.

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ACKNOWLEDGMENT

The author wishes to acknowledge assistance of E. Gammeter, H. Hoffman, W. Dickinson and R. Molitor of Globe Steel Tubes laboratories, in preparation of diagram, samples and photographs.

4610

ROCKFORD Hy-Draulic MACHINE TOOLS

Over sixteen years ago the Rockford Machine Tool Co. introduced the first hydraulic reciprocating machine tool. Today our belief in the superiority of hydraulic design stands justified, for Rockford Hy-Draulic Machine Tools have proved themselves wherever and however employed. The exclusive and highly specialized engineering experience that has been ours is fully applied in each machine tool we build.

Every Rockford Hy-Draulic Machine Tool offers such basic advantages as:

1. Ease of control for quick set-up and fast operation.
2. Stepless Speeds . . . infinitely adjustable throughout a wide specified range. Hy-Draulic tool-head feeds similarly adjustable.
3. Efficient, smooth hydraulic pressure . . . maintains cutting speed as set, no matter how work resistances vary.
4. Smooth, fast reversals and high return-stroke ratios. Oil flow through Hy-Draulic System reverses instantly. Simplicity of Hy-Draulic System holds inertia factors to a minimum.
5. Fine finish and long tool life. Smoothness of Hy-Draulic drive, free of mechanical play and vibration, protects work and cutter.

Rockford Hy-Draulic Machine Tools assure quality work with speed at minimum cost. Let the Rockford sales engineer give you complete information.

Hy-Draulic

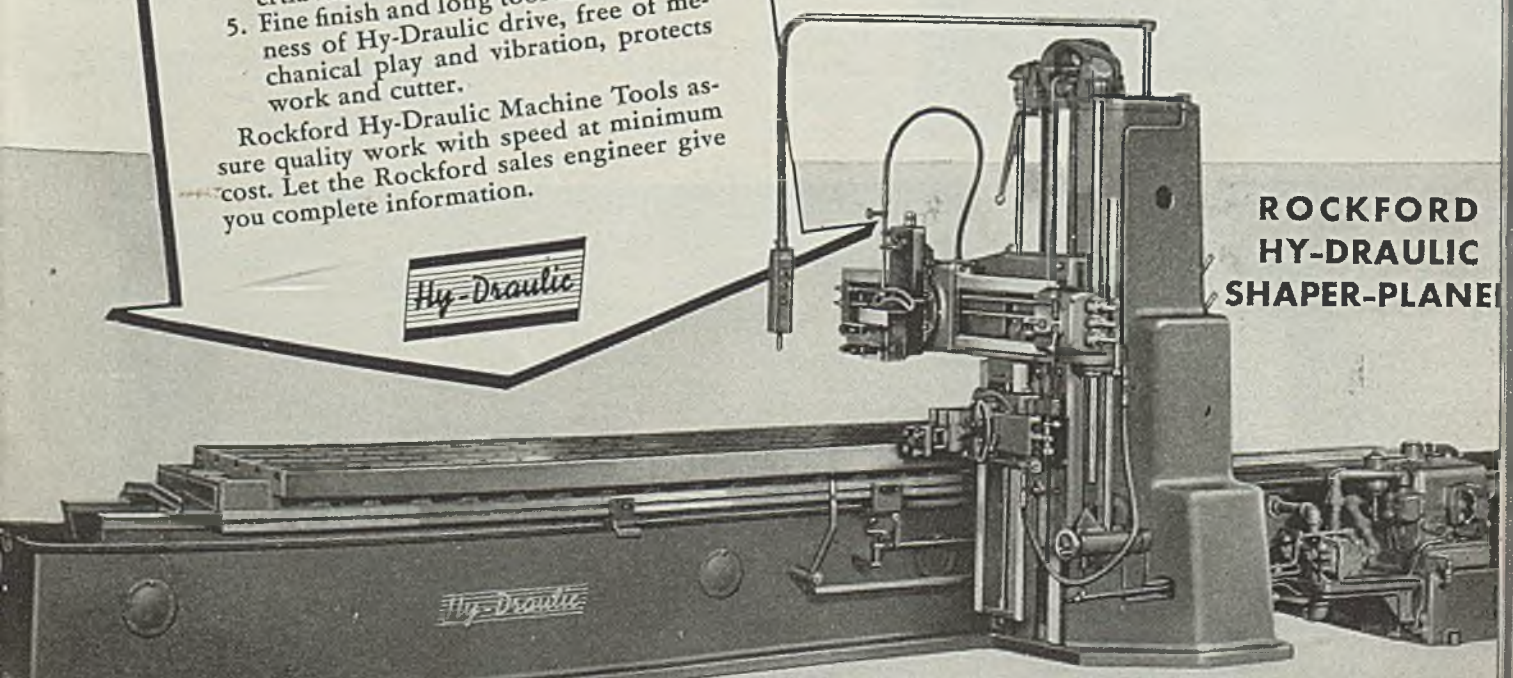
speed plus smooth power

Rockford Hy-Draulic Shaper-Planers provide the operating speed and ease of control for doing the job fast. Rugged construction and smooth hydraulic drive assure quality work whatever the type of cut. Illustrated above is a Shaper-Planer in use at the Universal Engineering Corporation plant, Cedar Rapids, Iowa. Manufacturers of rock and gravel crushers and related equipment, Universal has found the Shaper-Planer a highly productive machine for a wide variety of work; a typical application is shown here, where a rough cut is being made on a cast steel pitman to a depth of $\frac{1}{2}$″ at a 3/32″ feed. Work such as this is performed quickly because cutting and return stroke speeds are high, infinitely adjustable, and may be independently set as desired. Rockford Hy-Draulic Shaper-Planers are built in five sizes with rated stroke lengths from 42″ to 144″. For complete information write for Bulletin 2919.

ROCKFORD MACHINE TOOL CO.

ROCKFORD, ILLINOIS

SHAPERS • PLANERS • SLOTTERS • SHAPER-PLANERS



Hot-Dip Galvanizing Practice

By WILLIAM H. SPOWERS JR.
President
Spowers Research Laboratories Inc.
New York

Pickling and Galvanizing Procedure(7)

CLEANING is the first step in the process of galvanizing. The steel is immersed in diluted sulphuric acid, until all the dirt, rust or oxide is removed. Then it is thoroughly washed, dipped in a fluxing acid and brought to the galvanizing kettle. Upon the thoroughness of the cleaning process depends to a great extent the successful results. The work must be presented to the galvanizer as virgin metal uncontaminated by any foreign substance.

The work is slowly immersed in the zinc and permitted to remain until it "thaws out", or comes to the same temperature as the zinc. It is then slowly removed.

The building housing the galvanizing shop at the Navy Yard, Portsmouth, N. H., is 60 x 200 ft. The sandblasting equipment is housed in one end and the pickling and galvanizing equipment at the other end. All equipment has been placed for straight line technique in such manner that the work will travel in a straight line, to, through and out of the pickling equipment and galvanizing kettle, as shown in Fig. 32. The first tub contains caustic soda; the second and third, sulphuric acid; the fourth, running water; and the fifth, the flux wash.

The technique of operation in the sulphuric tank is as follows: This tank should be heated and maintained at a strength of from 8 to 10 per cent, by weight, at a temperature of approximately 150° F and included in this tank an inhibitor for economical operation for the protection of the surface of the steel against over-pickling and the elimination of acid fumes.

Additions of free acid are made to this tank continuously to maintain the desired strength until such a time as the iron concentration reaches 4 per cent when no further additions are made. At this point the temperature of the bath is raised somewhat for a short period of time without further additions of acid so that when the tank is emptied it will be rid of free acid.

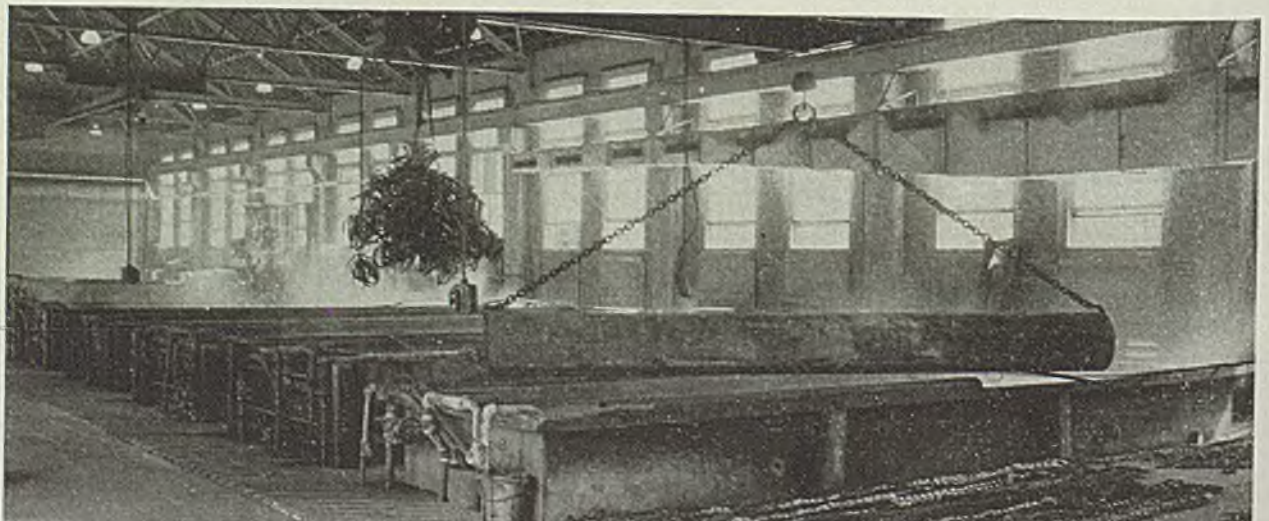
A study on sulphuric acid cleaning is outlined in the investigation appended to this installment.

If it is found necessary to strip any material for regalvanizing, such pieces are

Fig. 31—Galvanizing kettle working on small material

Fig. 32 — Pickling tanks served by floor-operated overhead cranes

(7) From a paper entitled "Galvanizing," by Commander W. H. Spowers Jr., U.S.N.R., *Journal* of the American Society of Naval Engineers, vol. 57, Feb. 1945.

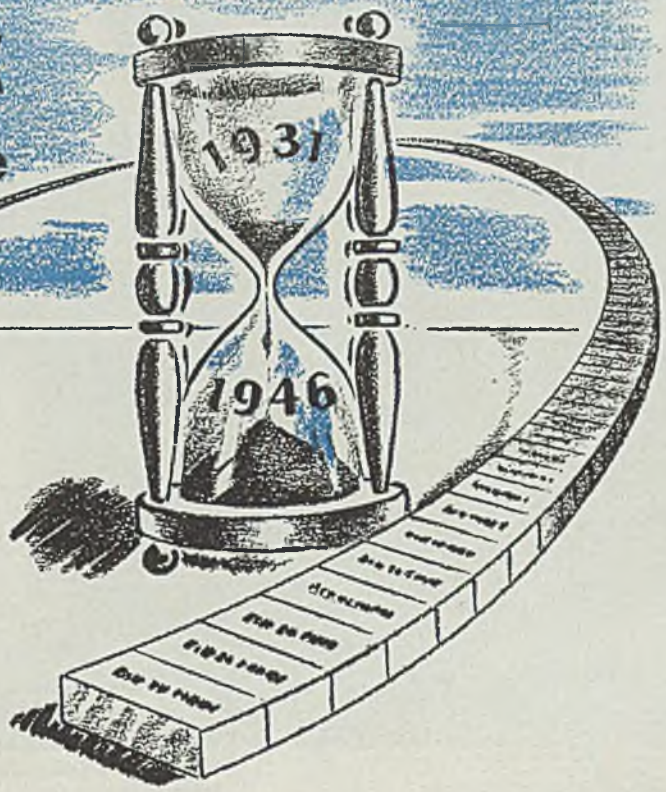


Another case study:

Installed 15 years ago . . .

B&W 80 FIREBRICK

are still in service



A steel furnace is a proving ground where the ability of a refractory to stand up under severe service is truly evident.

So, in one of our periodic field studies, we checked the history of a Round Mill Furnace at one of the country's large steel plants.

We found that in June, 1931, a B&W Refractories engineer was called in to discuss the means of overcoming refractory shrinkage in this furnace's ordinary first-quality firebrick. He recommended and installed B&W 80 Firebrick. Yes, that was 15 years ago—and some of this same brick is *still in service!*

Such unusual performance of B&W 80's is possible, because of these three reasons:

1. No Shrinkage—B&W 80's will not permanently expand or shrink though temperatures rise to 2900°F.

2. Minimum Spalling—B&W 80 Firebrick contain absolutely no free quartz. Spalling, therefore, is reduced to a minimum.

3. B&W 80's Stand Up Longer—Actual service records prove that B&W 80's have higher hot load strength—stand up longer under heavy loads, even when installed in roofs of furnaces operated as high as 3000°F.

For complete data about B&W 80—the sturdy, dependable, low-cost firebrick—write today for Bulletin R-12-E. Or, if it is more convenient, call in your local B&W Refractories engineer.

R-237

Water-Tube Boilers, for Stationary Power Plants, for Marine Service . . . Water-Cooled Furnaces . . . Superheaters . . . Economizers . . . Air Heaters . . . Pulverized-Coal Equipment . . . Chain-Grate Stokers . . . Oil, Gas and Multifuel Burners . . . Seamless and Welded Tubes and Pipe . . . Refractories . . . Process Equipment.

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THE BABCOCK & WILCOX CO.
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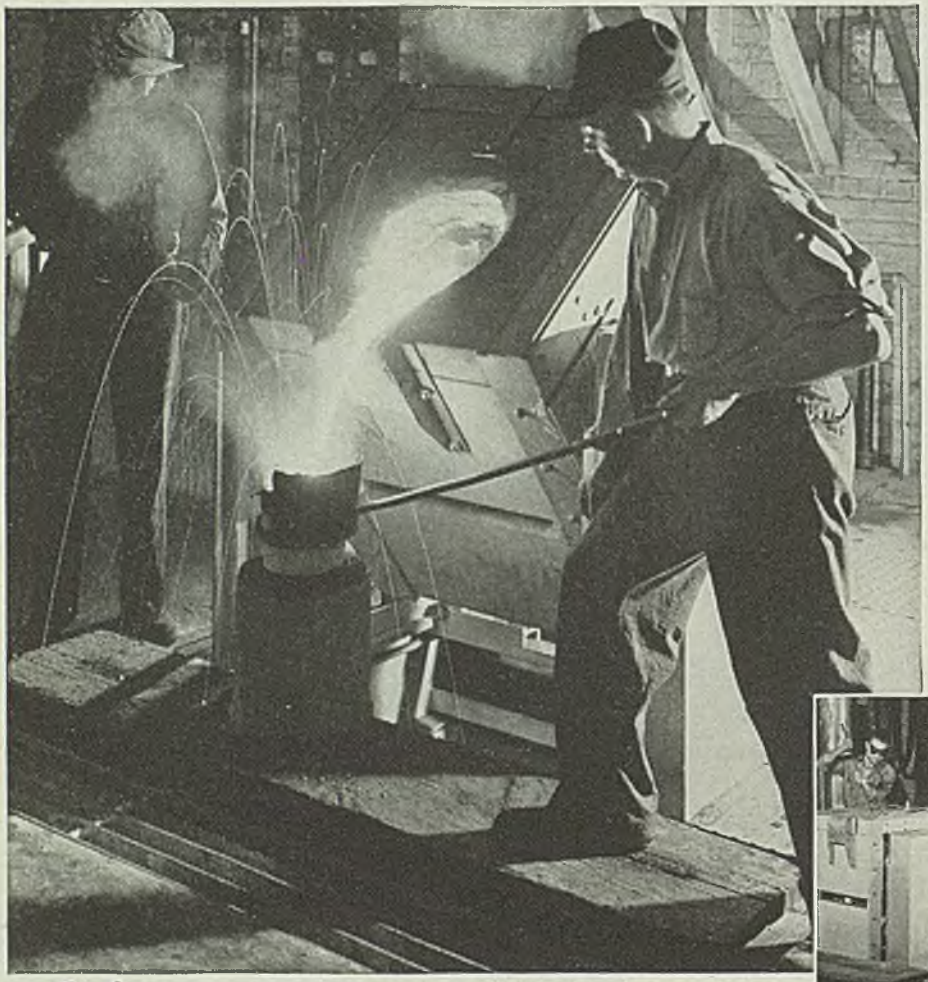
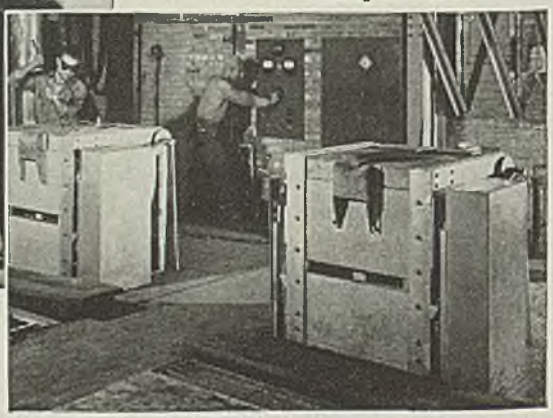


Metal pouring from one of new Induction Melting Furnaces.

For Improved Quality and Tonnage of Low Carbon STAINLESS STEEL and Similar Alloys

Two New Allis-Chalmers High Frequency Induction Melting Furnaces.

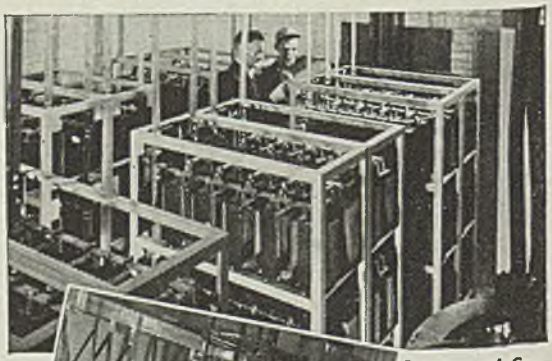


New Induction Melting FURNACES AT MICHIANA

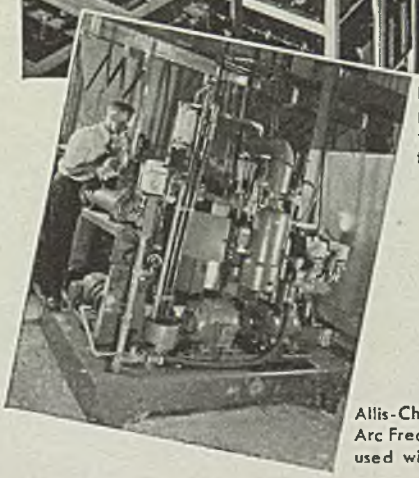
Induction Melting Furnaces of the most advanced type have been put into operation adding not only to capacity available—but for the express purpose of producing higher uniform quality alloy castings such as stainless steel where low carbon content is essential.

The two furnaces of 600 to 1000 pounds capacity each are shown above—while behind the scenes are the capacitors, mercury arc frequency converters, transformers, control cubicles and switchgear. Convenient control panels are located directly back of the furnaces for operation.

MICHIANA thus offers enlarged and most modern facilities for better service to the host of longtime users of Michiana Alloy Castings.



Portion of Capacitor Bank of furnace installation.



Allis-Chalmers Mercury Arc Frequency Converter used with new furnaces.

MICHIANA PRODUCTS CORPORATION

Michigan City, Indiana

reserved until the time arrives for dumping the sulphuric tank. The temperature is then raised slightly and these pieces immersed for stripping. The action resulting from this process will kill the acid so that it cannot be used for further pickling. Therefore, any work which needs be stripped should be so stripped just prior to the release of the acid.

Stripping of the work need only be done if the work has been galvanized for a sufficient length of time to have oxidized heavily, or if the work has originally been incompletely cleaned. Regalvanizing work just done, because of improper surface coating, needs simply dipping in the flux tank prior to regalvanizing.

Water: Next in line is the water rinse tank. This tank is maintained full of clear clean running water and is a most important step in the cleaning operation because it must remove from the surface of the work all the iron salts resulting from the pickling action of the sulphuric acid and present to the flux wash tank material in an absolutely clean condition. This tank may be maintained hot or cold as exigencies of technique may require.

Flux Wash: This last tub contains a solution of zinc salts known as No. 20 galvanizing flux. This is a neutral flux that will not contaminate and form dross in the galvanizing kettle as does a muriatic acid flux wash.

The use of neutral fluxes for galvanizing is becoming very popular where the proper technique is thoroughly understood. Proper preparation and use of this new flux is a relatively simple operation and one which will effect, in almost every case, great economies in dross losses in the galvanizing bath. In the use of this flux, wherever the operation is sufficiently continuous, no volatile flux additions to the top of the bath such as sal ammoniac or zinc ammonium chloride is necessary. The carryover of No. 20 from the flux wash tank will maintain any required surface volatile flux blanket desired.

Fig. 33 (right)—Galvanizing kettle served by centrifuge when working on small parts

Fig. 34 (below)—A 2-ton piece being removed from molten zinc by crane

It must be understood that the greatest manufacturer of dross in galvanizing is the salts resulting from the pickling acid. These salts are high in iron and are of such a nature as to rapidly contaminate the fluid zinc and turn it to dross. As a matter of fact, fully 50 per cent of the dross made in the galvanizing operation, where active fluxes are used, is because of these iron salts; 25 per cent of the dross manufactured in many instances, comes from the boiling of the dross because of too low firing, too intense or overfiring of the kettle resulting in a boiling effect in the zinc; 15 per cent of the dross manufactured comes from the work itself passing through the zinc and 10 per cent from the contamination from the sides of the kettle.

It can then be readily seen that if the iron salts resulting from the pickling action are eliminated the dross consumption will be very materially reduced.

These iron salts effect also a widening or thickening of the interlining alloys between the zinc coating and the base iron which results in an improper bond between the zinc and iron, producing an easily flaked or broken coating.

In the use of this neutral flux a very effective reduction in the width of these alloy layers has been found because of the elimination of these iron salts.

All steel on which a tight ductile bond is desired should be ordered fully silicon killed. This is one of the most important items to be remembered in obtaining tight bond. No aluminum should be used at the open hearth. This demand will probably meet with some resistance from the open-hearth department, but if the desired result is to be obtained it must be insisted upon. The day is past, when any old stock, which cannot be used elsewhere, can be shipped to the galvanizer.

Details for the use of No. 20 flux are as follows:

The base metal after pickling must be well washed to remove the iron salts resulting from the pickle. The work must then be promptly immersed in the flux bath before there is a chance for it to rust or dry.

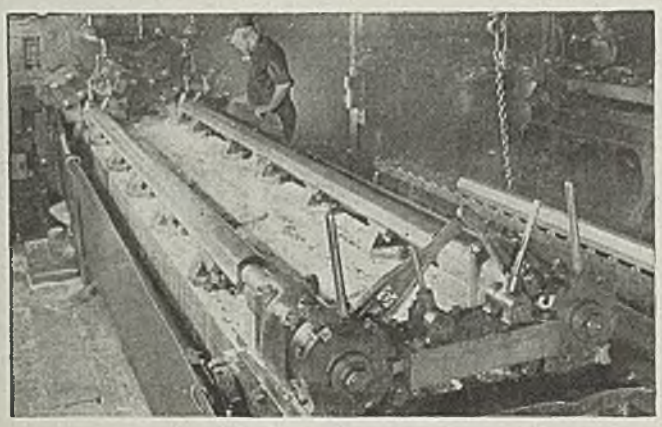
The flux bath should be prepared as follows:

A solution of No. 20 crystals should be made in this manner: Figure the gallonage capacity of the tub and add 3 lb of No. 20 per gallon of water. Then add sufficient No. 20 to bring the reading on a Baume hydrometer to 28 at 150° F. This temperature and strength should be kept by additions of water and No. 20.

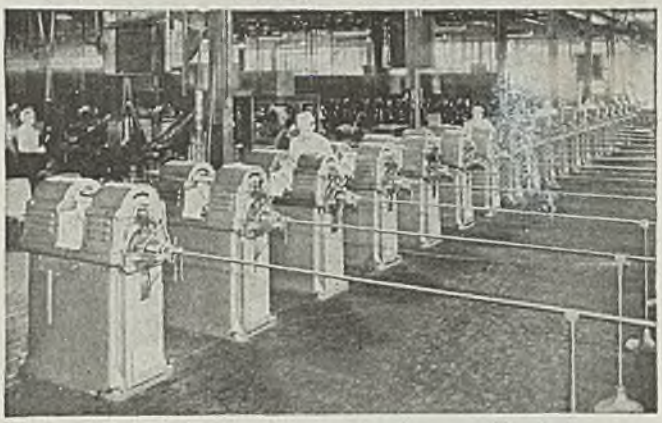
It will be found that nearly sufficient

(*Please turn to Page* 137)

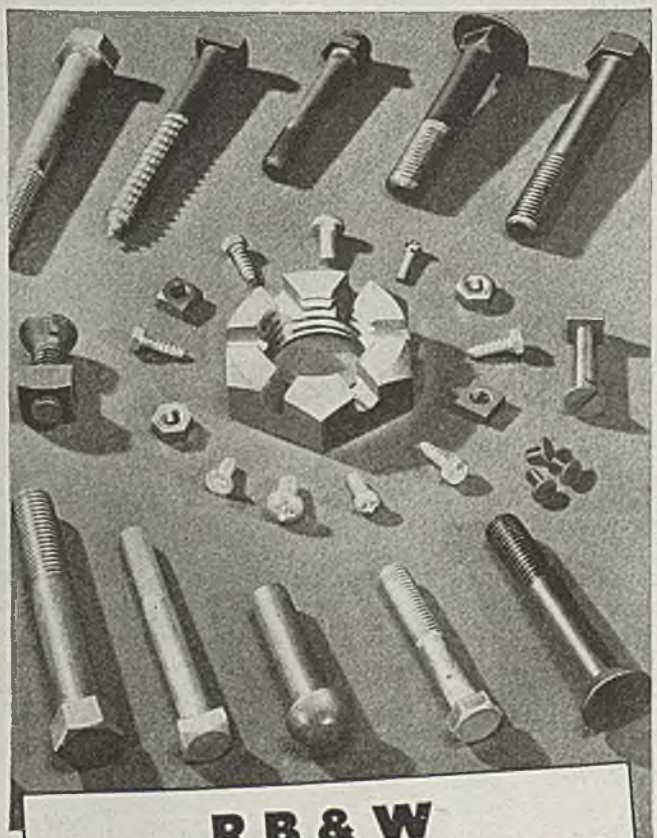

Unusual Nuts
with RB&W'S usual quality
Here are RANGE, FLEXIBILITY, CAPACITY . . . all available from one source . . . unequalled in the fastener industry.
When you require a nut (or almost any fastening products) of *unusual* characteristics, remember RB&W's versatility and its unsurpassed reputation for engineering into all of its products the close dimensions, holding power, finish and dependability demanded by discriminating users.



RB&W HAS EQUIPMENT for handling nuts of almost any size. This immense machine planes hot-forged round bars down to hexagonal shape for fabrication of some of the largest nuts.



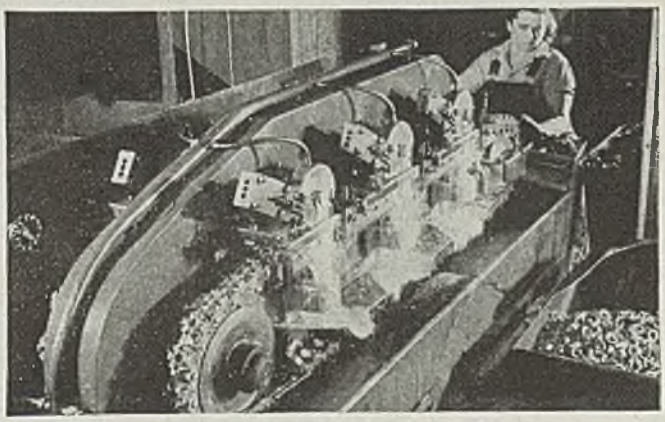
A GLIMPSE OF ONE SECTION of the Screw Machine Department at RB&W's Coraopolis plant. Here are made nuts of extra thickness or special material — nuts to specifications which make efficient cold-punching impractical.



RB&W

THE COMPLETE QUALITY LINE

For the utmost in uniformity and dependability, rely upon RB&W's complete line of bolts, nuts, screws, rivets and allied fastening products . . . the result of 101 years of continuous advancement in machinery, methods and quality control.



THIS SLOTTER ILLUSTRATES the efficiency of RB&W's secondary equipment. Many new machines round out facilities for producing nuts for a wide variety of applications — to highest standards of quality.

THESE CARBURIZING FURNACES for surface-hardening are one of many types of equipment in which nuts and other products receive specialized treatment dictated by the customer's individual requirements.

101 YEARS *Making strong the things that make America strong*

Plants at: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill. *Sales Offices at:* Philadelphia, Detroit, Chicago, Chattanooga, Los Angeles, Portland, Seattle. *Distributors* from coast to coast. By ordering through your distributor, you can get prompt service for your normal needs from his stocks. Also, the industry's most complete, easiest-to-use catalog.

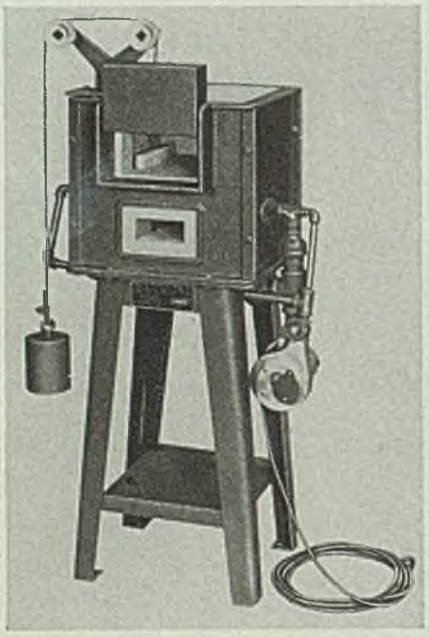
AND ALLIED FASTENING PRODUCTS · SINCE 1845

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

Industrial Equipment

Precision Burning Tool

Problem of cutting intricate shapes in plate is solved by a precision burning tool attachment which increases utility of any flame-cutting torch. Manufactured by Scientific Research Co., 1618 North Vancouver avenue, Portland, Oreg., device, top left, is proficient in any position, vertical or horizontal. A square radius bar prevents twisting or clocking; head is shielded for protection from slag or heat. By means of an adaptor, tracking wheel can be set at a distance behind the head to allow circle burning to edge of plate.
Steel 10/21/46; *Item No.* 9872

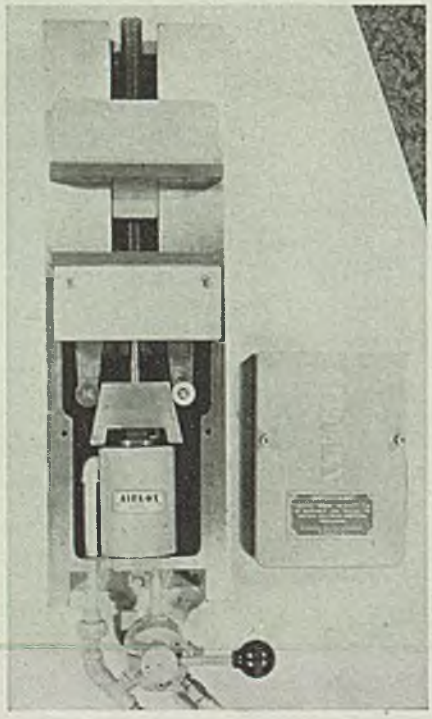


Heat Treating Unit

Reflecting design changes made for convenience of operation, the 3-chamber pedestal-type heat treating furnces, immediate left, is a product of Barkling Fuel Engineering Co., Chicago 22. Lower fire box develops 2500° F in 5 min, while center fire box develops 1800° F in 14 min and will hold low heat of 600° F. Furnace made of welded steel, also has specially constructed hot plate roof for tempering.
Steel 10/21/46; *Item No.* 9875

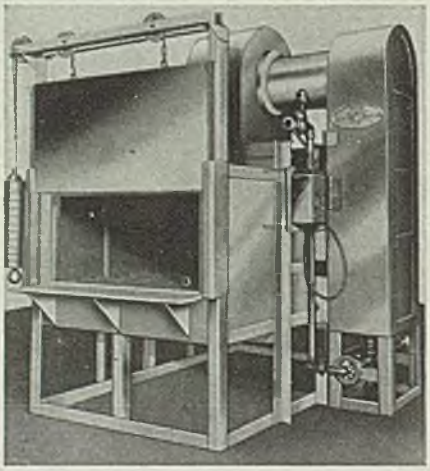
Batch Type Furnace

Used for heat treating aluminum alloys, batch type furnace, directly below, is produced by Bellevue Industrial Furnace Co., 2917 Bellevue, Detroit. Atmospheric type burner is mounted on lower end of duct which is used for recirculating air back into the furnace. Mounting burner in duct eliminates need for extra heating unit.
Steel 10/21/46; *Item No.* 9871



Horizontal Broacher

Designed for easy set up for wide variety of jobs, the horizontal hydraulic broaching machine, third from top left, is made by Acme Broach Corp., East Third street at Delaware, Lexington, Ky. Machine can be shifted from one job to another by changing to the proper size face plate or work horn, and inserting and aligning the correct broaching tool. Motor, hydraulic pump and control valve are mounted on common base which can be removed from machine for inspection and servicing as a single unit.
Steel 10/21/46; *Item No.* 9873



Pneumatic Vise

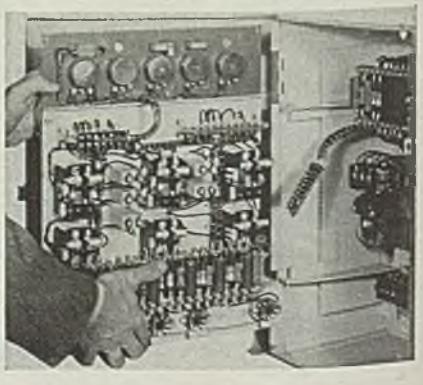
Designed to operate hydraulically on 600 lb of oil line pressure, the hydraulic vise manufactured by Production Devices Inc., Whitehall, N. Y., will deliver a 10,000-lb squeeze at the jaw. Illustration at bottom left, shows hydraulic cylinder and valve, piping hook-up and inline wedge and lever linkage. Hydraulic line pressure is taken from the pump on machine with which vise is used.
Steel 10/21/46; *Item No.* 9870

Drill-Jig Bushing

Supplied in standard drill sizes up to ⅜-in., the new type drill jig bushing consists of a formed steel anchor into which a hardened steel bushing is pressed. Bushing, product of Hi-Shear Rivet Co., 1559 Sepulveda boulevard, Hermosa Beach, Calif., can be quickly spotwelded to any flat or curved template and does not require a heavy fixture. It saves up to 75 per cent in manhours on lofting and tool-making time.
Steel 10/21/46; *Item No.* 9876

Welding Sequence Timer

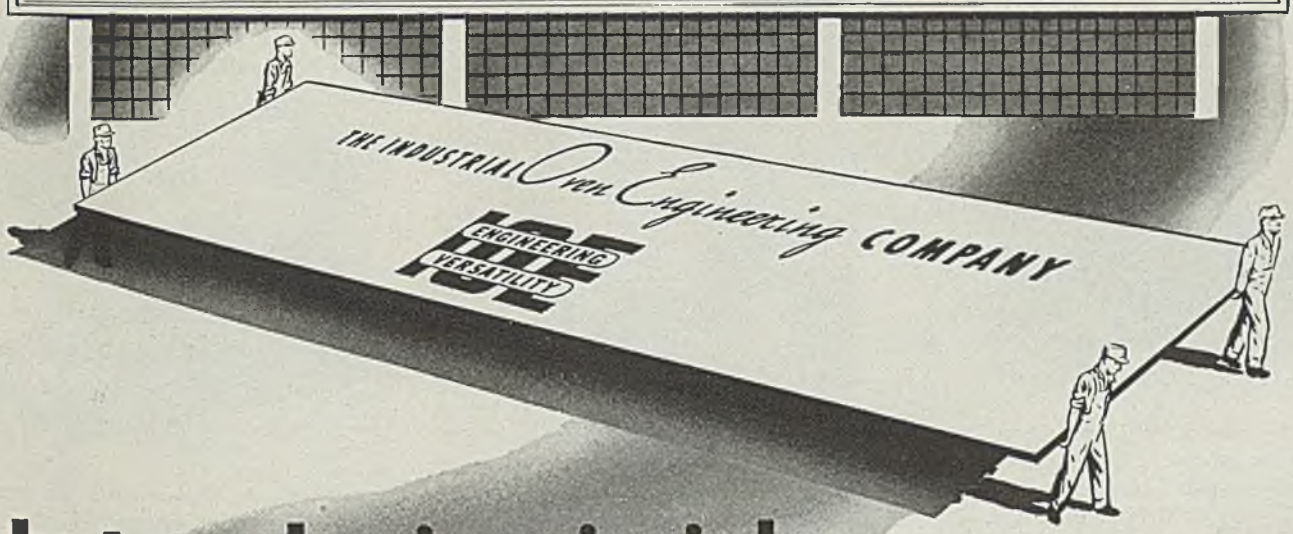
Quick change of welding sequence, remote operation and easy inspection and maintenance are some of the features of the redesigned welding-sequence timer manufactured by General Electric Co.,



(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 129.)

We've changed our name to

INDUSTRIAL IOI OVENS, INC.



but our basic principle is the SAME –

We've changed our name to Industrial Ovens, Inc. to define more clearly the scope of our service to industry. That service consists of the engineering, design and installation of systems and equipment for oven treating and processing operations.

As the Industrial Oven Engineering Company this organization has been responsible for increasing and speeding up production and lowering production costs in a wide range of industries—wire, rubber, textile, plastic, ceramic, metal finishing and many others.

If you have a production problem involving oven treating or processing, *the engineered application of heat in continuous material-handling operations* can help you—and that means Industrial Ovens, Inc. can help you. Write today for literature describing IOI installations in your field.

INDUSTRIAL IOI OVENS, INC.

13825 TRISKETT ROAD CLEVELAND 11, OHIO

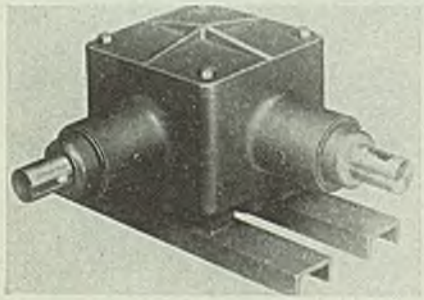
ASSOCIATED COMPANY: JAMES DAY MACHINERY LTD., LONDON W 1, ENGLAND

Schenectady, N. Y. Sequence timer, shown here, co-ordinates the mechanical operation of an air or fluid-operated welder with the flow of welding current, as determined by a synchronous-precision weld timer. New design includes improved electronic timing circuit which makes possible consistent welding speed essential to high-production welding with short timing intervals.

Steel 10/21/46; *Item No.* 9874

Angle Drive Unit

Developed particularly for intermittent operation at low speed and high torque, this new angle drive unit is used for control of oven doors, shafting at right angles, and valves. Unit shown here,



manufactured by Payne Dean & Co., Madison, Conn., has straight bevel gears with 1 to 1 ratio and is available in 1000 and 4000 in-lb capacities. It has no feet but is drilled at four points in base for bolting to channel iron.

Steel 10/21/46; *Item No.* 9859

Collet Indexing Fixture

Collet indexing fixture announced by G & H Mfg. Co., 327 Elm street, Fitchburg, Mass. is constructed to hold work for milling, grinding, drilling, and shaper operations. It is especially useful where accuracy of work location, and convenience of loading and unloading work are important factors.

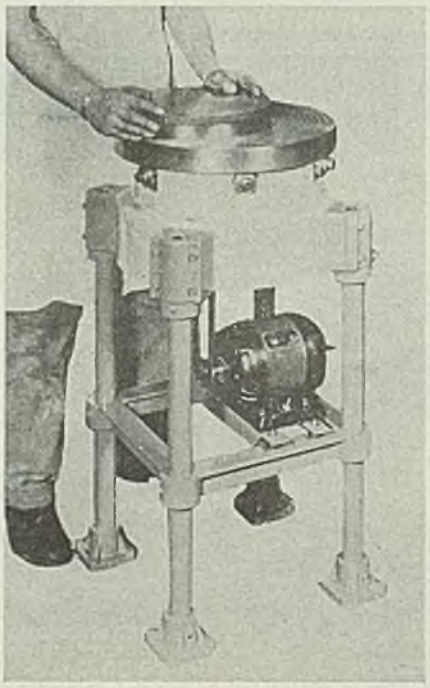
Removable screw-insert stop buttons are used to block out undesired indexing stations in a particular set-up. Index plates are likewise removable. A chip clearance hole extends through entire depth of fixture offering a ready exit for chips, preventing them from clogging working parts in fixture.

Collets commonly used in Brown & Sharpe automatics and wire feed screw machines are often specified for fixture, but other types of draw-in and push-out collets can be used, providing fixture is equipped with correct closing piece.

Steel 10/21/46; *Item No.* 9689

Flat Lapping Machine

Flat lapping machine for high-speed precision lapping of single parts or production runs of hardened steel, quartz, glass and parts is being offered by Spitfire Tools Inc., 2933 North Pulaski road, Chicago 41. It provides a surface finish as fine as 2 microinches rms.



Single pieces ordinarily require no holders, chucks or collets, operator merely lays piece on revolving circular lapping plate and directs its motion with his hands. Production lapping of large quantities of small parts is done rapidly by use of standard or special holders.

All gears and bearings of the machine are factory sealed in lubricant for life of machine. Lapping plate revolves on a number of sealed and greased for life ball bearings.

Steel 10/21/46; *Item No.* 9691

Oxyacetylene Attachment

Development of an attachment which makes it easy to adapt any standard oxyacetylene welding torch for body soldering, tinning and light brazing with an acetylene-air flame, is announced by the Acet-A-Tip Co., 5069 West Madison street, Chicago 44.

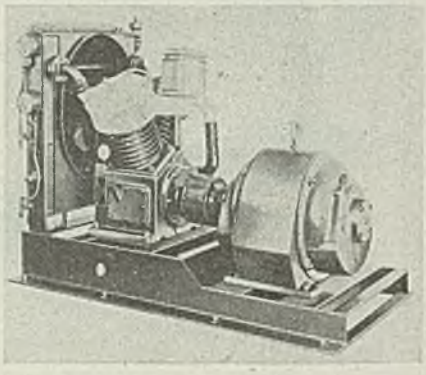
Adapter is attached to welding torch tip by means of a base, fitted with a 2-in. length of heavy-duty 2-ply hose. Hose is forced over the welding torch tip, providing quick attachment. Available in three sizes tips are machined from solid brass bar stock.

For use, acetylene pressure is set at approximately 5 lb and flame is adjusted by torch valve. Oxygen is not used with these tips.

Steel 10/21/46; *Item No.* 9666

Air Compressor

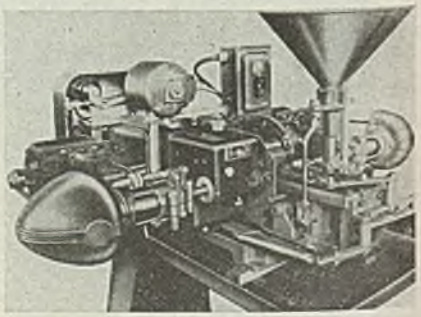
Production of a line of industrial departmental compressors is reported by Davey Compressor Co., Kent, O. New units are available in 60 (illustrated), 105, 160, 210 and 315 cfm sizes and designed for installation in individual plant departments as replacements for large central compressor systems. Each operates independently but several units may be connected together to provide a power reserve for overpeak loads, or maintain service in case of breakdowns.



Steel 10/21/46; *Item No.* 9688

Control Unit

Combined secondary operations such as drilling, tapping, riveting, grinding, end-milling and others are controlled automatically by Operator 600, an automatic control unit developed by Pond Engineering Co., 15 Park street, Springfield, Mass. Individual handling of the work is eliminated by hopper feed; positioning and holding of the part are also entirely automatic.



Control unit is powered by a 1/3 hp mo-

(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 129.)

HOW TO STOP WASTING STAINLESS STEEL...

"The most significant pickling house development in decades is the descaling of alloy steels, especially stainless steels, without loss of the underlying metal—through use of the Du Pont sodium hydride process."

—says THE IRON AGE (Nov. 8, 1945)

NO PITTING OR PICKLING LOSSES—Bath action stops as soon as scale is reduced. No underlying metal is removed if work is left in bath longer than required. Gives better quality at lower cost.

POSITIVE DESCALING—one trip through removes all the scale in substantially less time than most commercial methods. Gives fewer rejects.

HANDLES WIDE RANGE OF WORK—Alloy steels, stainless steels, cobalt, copper, chrome, silver, etc.—any material not affected by carrier bath of fused caustic soda at 700°F.—small or large work—bars, rods, wire, castings, forgings, stamps, strip, sheet—complicated fabricated parts and finished products with inner surfaces, etc.—different metals, sizes and shapes may be handled in the same basket or rack.

HANDLES LARGE VOLUME OF WORK in small space. Simple, compact, low-cost equipment. Bath tank of low-carbon steel, with a heater. Quench tank with exhaust fan. May be installed in a corner of the usual pickle house.

CALL OR WRITE FOR PLAN TO MEET YOUR REQUIREMENTS

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Dept., Wilmington 98, Del.

POSITIVE DESCALING with New Du Pont SODIUM HYDRIDE PROCESS

DU PONT CHEMICALS *and* **PROCESSES** *for Metal Treating*

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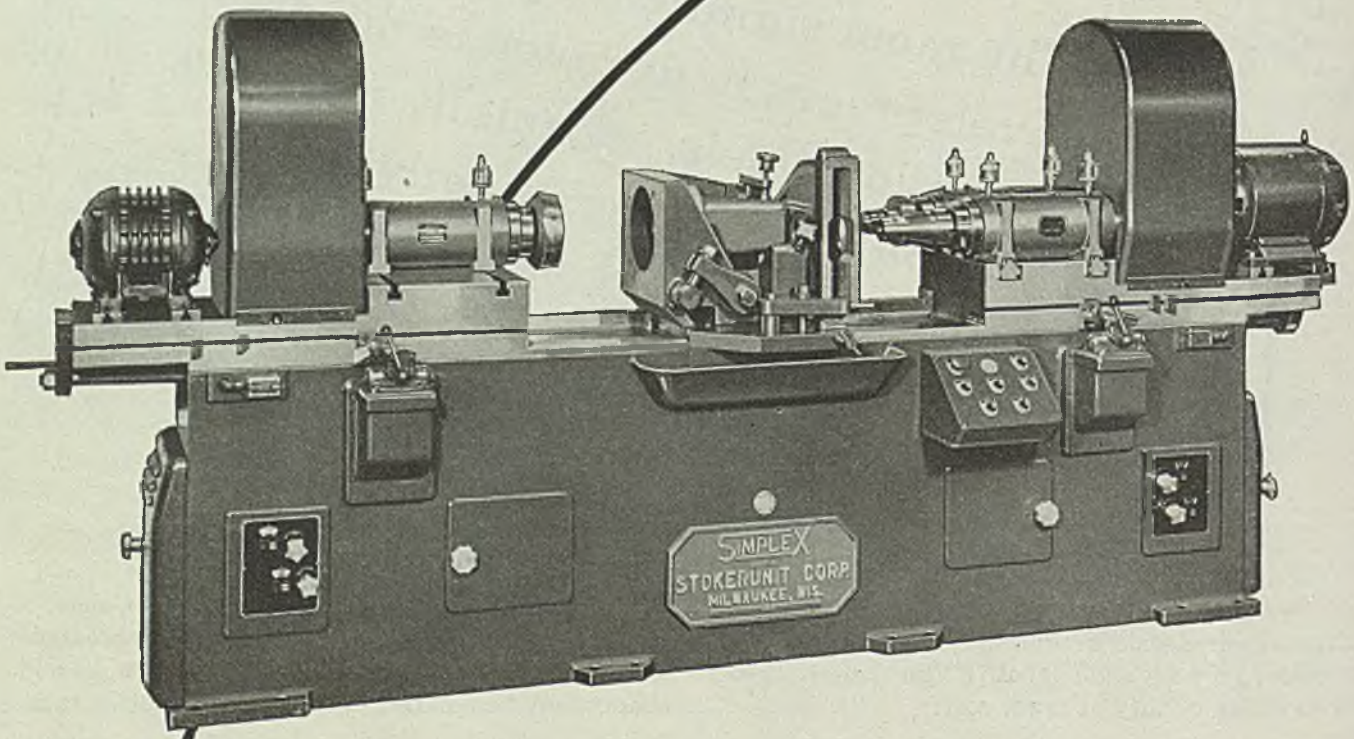
BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

SIMPLEX

A tractor gear housing is an awkward piece to handle. Gear centers and alignment must be maintained. Simultaneous boring of all bearing holes insures accuracy while delivering fast and economical production.



A SIMPLEX 2U 2-way Precision Boring Machine with two #3 heads on one end, each carrying multiple tools, and one #3 head on the opposite side, carrying tandem tools, roughs and finishes the piece at one clamping of the fixture, thus establishing accuracy of the important bearing and locating elements. This method provides a minimum of handling and a means for accurately and quickly locating the piece in the fixture. The machine is flexible and can easily be adapted to handle changes in the job as they develop.

Precision Boring Machines

STOKERUNIT CORPORATION

SIMPLEX Machine Tools Division

4532 West Mitchell Street, Milwaukee 14, Wisconsin

Precision Boring Machines, Planer Type Milling Machines and Special Machine Tools

tor, and a minimum of 70 lb air pressure is required. Four air valves are included as standard equipment, but additional air valves or mechanical cams may be added by extending cam shaft. Air valve cams are adjustable for frequency and duration of impulses per cycle, and the cycle speed is adjustable from 2 sec to 1 min, controlled by an adjusting knob.

Steel 10/21/46; *Item No.* 9700

Dial Indicator

Three new A size dial indicators were recently placed on market by Federal Products Corp., Providence, R. I. Overall bezel diameter of these models is only 1¼ in. Movement has low friction full-jeweled features of regular indicators. Model A½Q is graduated 0.0001-in., model A3Q is graduated 0.0005-in., and model A6Q-2, 0.001-in.

Steel 10/21/46; *Item No.* 9586

Soldering Tool

With two power unit models and choice of eight basic single or double carbon electrodes, the resistance type soldering tool shown here will do any soldering job from fine precision work to heavy industrial operations. Luma Electric Equipment Co., Toledo 1, O, manufactures four ranges of power units; two single and two multi-stage. Two single stage tools have a range of from 1050 to 1225 w and two multi-stage, from 1575 to 2500 w.

Multi-stage (illustrated) is equipped with a selector switch that gives temperature control at six different settings to suit soldering job. Electrodes, equipped with 5 ft extra flexible cables, range in size from 3/32-in. to ½ in. diameter. Fibre glass insulation separates tubes holding carbons.

For heavier operations, the 5/32-in. single and double carbon electrode is

best suited. For spot soldering and work involving seams and large terminals, the 3/8 and ½-in. single carbon or roller type is recommended.

Steel 10/21/46; *Item No.* 9684

Permanent Magnet

Homer Mfg. Co. Inc., Lima, O., announces an addition to their line of tramp metal extractors, the triple air gap permanent magnet for use with al types of free flowing solid or fluid m terials. Built in six sizes, it is adaptable to stokers, processing or sorting of ferrous and nonferrous pieces, and many other industrial uses where tramp metal presents a hazardous condition to plant or equipment.

Magnet exerts a 12-lb pull on a 1-in. annealed steel ball at an angle of 45 degrees. It is compact and requires little space for application. A cast aluminum frame makes is possible to attach magnet to any equipment without the use of insulating materials.

Steel 10/21/46; *Item No.* 9676

Low Inertia Motor

Compact, low inertia 60 cycle, 2 phase motor for remote control applications has been developed by Transicoil Corp., 114 Worth street, New York, N. Y. Designated as model 2A Servo-motor, this unit does not run single phase, and fixed phase may be continuously energized. It can be wound to operate from 10 to 80 v, or more; 60 cycles.

Impedance is practically constant from full speed to stall, and the standard stall torque, 1½ oz in. can be changed as required. Stack length may be changed plus or minus 50 per cent to suit torque requirements Motor is furnished with separate leads for each phase and terminal board may be attached to rear of motor, if required.

Steel 10/21/46; *Item No.* 9665

Machine Tool Conduit

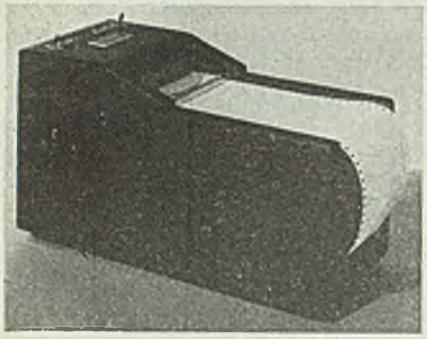
Chicago Metal Hose Corp., Maywood, Ill., has just added a synthetic-covered shielding conduit to its line of flexible metal hose. New product, designated Rex machine tool conduit RT-25, was built to new machine tool electrical standards in co-ordination with joint industry committee of plant and electrical engineers in co-operation with the National Machine Tool Builders Association.

Extremely flexible and durable, conduit features a galvanized steel flexible metal hose liner and synthetic cover. It is liquid tight externally, usable with both standard and water-tight conduit boxes. It also is furnished with fittings which are attach-

able and reattachable by user or which can be permanently attached at factory.
Steel 10/21/46; *Item No.* 9630

Profilometer Recorder

Operating as an attachment to the Profilometer made by the company, the Profilometer reading recorder recently developed by Physicists Research Co., 321 South Main Street, Ann Arbor, Mich., provides a continuous chart record of the



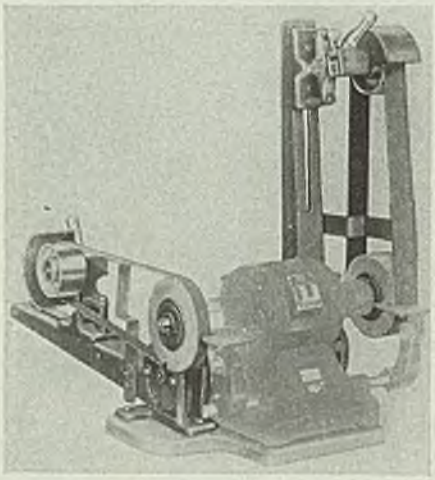
average roughness of the surface being measured.

Charts are read in microinches like the Profilometer microinch meter. Recorder is attached at the meter jack provided on all Profilometers. No other adaptations of existing quipment are necessary.
Steel 10/21/46; *Item No.* 9710

Belt Grinder Attachment

Porter-Cable Machine Co., Syracuse, N. Y. announces a light, narrow Type N-2 belt attachment for all kinds of light burring and grinding operations. It is suited for light grinding of flats, arcs, angles, gear burring, weld grinding and cleaning up operations. A wide variety of composition and plastic materials also may be ground and surfaced.

Attachment is furnished without motor and is quickly aligned and attached to the familar bench type wheel grinder, to which a resilient contact roll has been fitted. Complete unit assembly stands 27 in. high with a width of 2½ in. A T-shape base allows convenient mount-



ing to bench or work table. Platen size for flat grinding is 2 x 4 in. Resilient contact rolls 2 x 6 in. or 1 x 6 in. can be furnished. Using an endless abrasive belt 2 x 48 in. the attachment can be used either in the vertical, horizontal or any angle between 90 degrees.
Steel 10/21/46; *Item No.* 9690

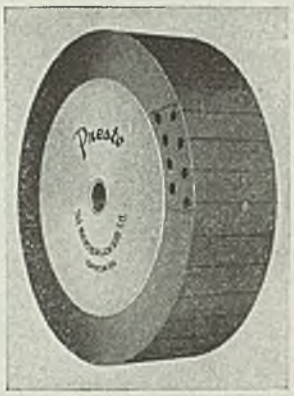
Air Hose Coupling

Guaranteed leakproof under working pressures up to 1000 psi, the quick connect air hose coupling produced by E. B. Wiggins Oil Tool Co., 3424 East Olympic boulevard, Los Angeles 23, eliminates wasteful leakage of air generated at substantial power cost. An important feature is its greater ease of service. Changing gaskets takes only a minute.

Besides air, coupling will handle oxygen, oil, aromatic fuel and kerosene. Coupling body has ¼-in. female pipe threads and is available with or without self-sealing valve. A choice of two nipples is provided—one with ¼-in. male, the other with ¼-in. female pipe threads. Entire unit is of solid aluminum bar stock.
Steel 10/21/46; *Item No.* 9628

Belt Contact Wheels

Presto contact wheels for abrasive belt polishing announced by Manderscheid Co., 810 Fulton street, Chicago 7, do not clog, thus increasing production and offering longer belt life. Made of Neoprene rubber vulcanized to a metal core,



the wheels afford uniform yielding quality for conformation to the work.

Design of wheels snaps belt as it leaves the work, beating it clean with 72 hammer strokes per revolution of the wheel. Abrasive belt is thereby kept clean and cuts effectively until abrasive is worn off rather than clogged up.

Wheels are 14 in. in diameter with 2, 3, and 4-in. faces. Diameters are uniform so that two or more wheels can be used together in forming any desired width. They are offered in three degrees of resiliency.
Steel 10/21/46; *Item No.* 9706

(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 129.)

Centrifugal Castings

(*Continued from Page* 101)

a car and the sand is put in place by dumping the trough after the mold reached full speed.

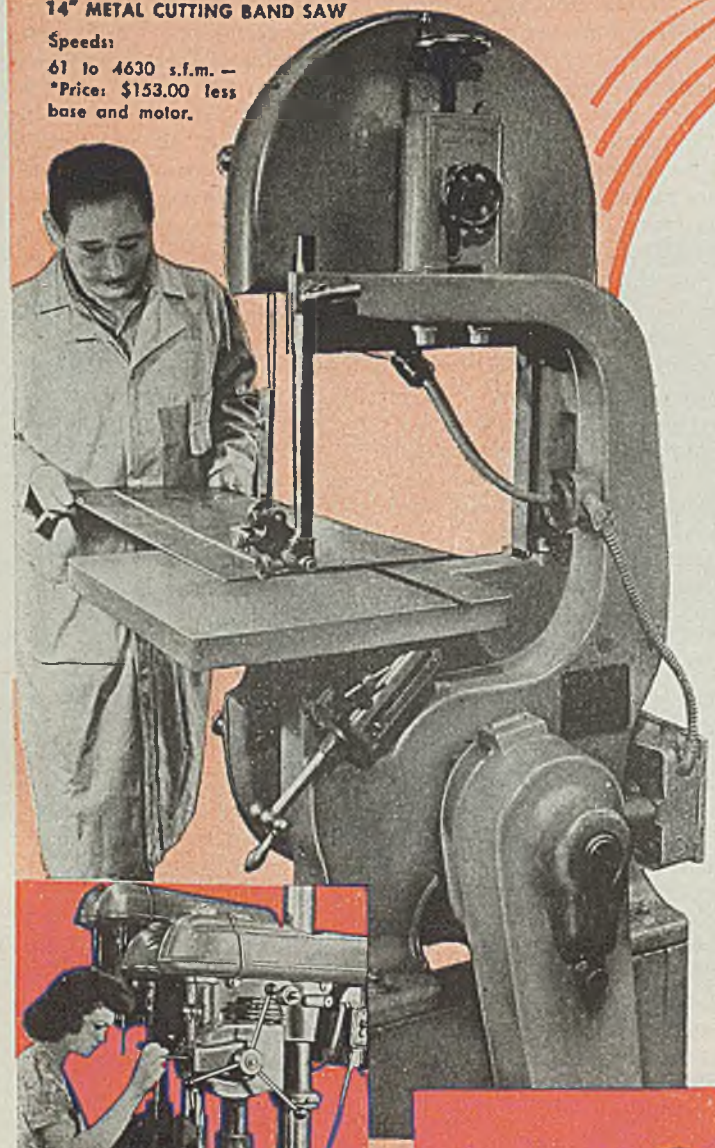
For gun barrels, the optimum thickness was given as 5 mm and it was stated that if the sand were too thin, for example 3 mm, the casting would crack longitudinally, whereas if it were too thick, such as 7 mm, it would show a tendency to wash and produce swells. There is some penetration of the sand by the molten steel but this does not result in a lifting of the sand. Sand comes off very readily in the heat treatment that follows.

Vertical method in use at Buderus and Skoda does not appear to be as good as the horizontal method at Bochum and Roechling-Buderus, or as effective as the horizontal method in the United States. A weighed amount of steel is poured into a heavy cast iron mold spinning at about 200 rpm, care being taken that the stream does not strike the mold wall. When all metal is in, the speed is increased to 1400 rpm for the 88 mm (3.46 in.) and up to 2000 for the 60 mm (2.36 in.) barrels.

The vertical method of spinning actually produces an ingot with the piping and segregation accentuated and highly localized so that on boring the barrel only good steel is left. The paraboloidal cavity in the 88 mm gun extends only 3 or 4 ft down from the top as cast; a foot or so of this is removed in machining. Physical properties of the barrel, however, were reported to be as good as the horizontally cast. Impressions given were that the breech of the long guns is not cast as thick as the U. S. guns; practice was to shrink another tube on these guns.

The thin-lined sand mold was also used very successfully for the horizontal spinning of high chromium steel tubing. This operation utilized a water-cooled metal mold with the thin sand lining using a sand thickness of only 2 mm, which appeared to produce a good surface. However, the high chrome steel

14" METAL CUTTING BAND SAW
Speeds:
61 to 4630 s.f.m. —
*Price: $153.00 less base and motor.



"Paid in Full"

Each of the Walker-Turner Machines shown on this page has long since "paid in full" its low initial cost in savings due to its increased production over the heavier and less flexible tools which they replaced.

In fact, the investment is so low that it is profitable to employ them as part time workers on jobs that were not completely mechanized before.

Used by the thousands on 24-hour day schedules for volume production during the past ten years, they are now being purchased to tool up for low costs in the competitive markets to come.

Plan your operations to speed up production in many directions with Walker-Turner Machine Tools—and use the guidance of your nearest Walker-Turner Distributor in helping you with the know-how.

20" 4-spindle, power feed Drill Press. Spindle travel 6". Speeds: 260 to 2600 R.P.M. with standard motors. 85 R.P.M. with special gear reduced motor. *Price: $1314.00 less motor. Available with 1 to 6 spindles, hand or power feed.

RADIAL CUT-OFF MACHINE
21½" ram travel. *Price: $446.00 with 2 or 3 h.p. geared motor, less base.

*F.O.B. Plainfield—slightly higher west of the Rockies and in Canada

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METAL-CUTTING BAND SAWS • POLISHING LATHES • FLEXIBLE SHAFT MACHINES
RADIAL CUT OFF MACHINES FOR METAL • MOTORS • BELT & DISC SURFACERS

tubing wall thickness was very much less than that of the gun barrel. This steel would be difficult to oxidize in heat treatment if it penetrated the sand like the carbon steel, but it did not seem to do so. These tubes are cast up to 500 mm (approximately 19.7-in.) in 3½ m (approximately 10.6 ft) lengths, with a wall thickness of 1 to 2 in.

Vertical spinning in cement sand molds or oil sand cores is apparently on a par with similar production in the United States. The general method is to pour while the mold is stationary and then to spin at about 300 rpm. Principles of directional solidification are carefully observed. Excellent ball races, brake drums, and gear blanks were being produced by this method in steel and bronze.

Casting of brass and bronze was carried out in quite large sizes. Tubes up to 2½ m (8 ft) diameter were spun up to 3 or 4 m in length, and tubing of 1 m OD was being made up to 12 m long (40 ft). Limiting factor in length or thickness was furnace capacity, 22 tons.

One feature of considerable interest was the use of a thin copper sheet as a lining for the cast iron mold. This is cut exactly to size and slipped into the mold just before casting. German practice also calls for filling the mold with coke oven gas before pouring, and keeping the gas on until after the bronze is set. This was reported to eliminate pinholes and to add greatly to the life of the mold. Indications are that very high speeds are used on castings involving nonferrous work.

Unit for Producing Tubing

The Osnabrueck machine for the production of large brass and bronze tubing is shown in Fig. 1. Tubes up to 2½ m (8 ft) in diameter and in 1 m diameter up to 12 m (40 ft) in length are produced. Melting equipment consists of one rocking furnace, using powdered coal, of 22 tons capacity brass or bronze and one large crucible of about 1 ton. The casting machine was made up of two sets of four rollers. The flask has a raised section, around which the driving belt runs to a motor, set fairly close to one set of rollers. Flask water is sprayed during casting and spinning.

The pouring device consists of a small ladle with a bottom orifice using a graphite stopper to hold the metal until the ladle is full. The orifice varies with the weight. Speed of casting 22 tons was given as 5 min. Spinning speed on 1 m tubing was 600 to 800 depending on thickness. Spinning time used is such that four tubes are made in 8 hours, the tubes being 12 m long, 1000 mm. OD and 900 mm ID.

Molds used in the Osnabrueck machine are of cast iron, very little thicker than the casting, and on the heavier tubing somewhat thinner. Facing is a thin sheet of copper cut to fit inside the mold with enough slack to take expansion due to heat from the gas flame which is used just before and during pouring to displace air in the mold. It was reported this combination prevents pin holes which occur when bare molds are used. Machining allowance ranges from 5 to 8 mm on the outside radius and from 10 to 15 mm on the inside radius when perfect surfaces are required.

Machine used to cast steel tubing at Ruhrstahl and gun barrels at Bochumer Verein and other plants is shown in Fig. 2. This is a very heavy machine with three sets of four rollers. The flask is directly driven through a train of gears by a motor on the side of the machine, and runs totally immersed in water. The ends are sealed by flat rubber gaskets. The machine tilts to an angle of 12 to 15 degrees during casting.

Melting Equipment Used

The melting equipment used with this casting machine consists of one 6-ton and one 12-ton basic electric direct-arc furnace. During the last years of the war the Germans used a steel consisting of 0.44 to 0.52 per cent carbon; 0.2 to 0.4 per cent silicon; 1.0 to 1.2 per cent manganese; 0.033 per cent maximum phosphorus and sulphur; 1.0 per cent chromium; 0.08 to 0.12 per cent vanadium; and approximately 0.3 per cent nickel (residual). Indications were that a steel was preferred, when the alloys were available, same as the above except 0.6 to 0.8 per cent manganese; 1.6 to 1.8 per cent chromium; and 0.10 to 0.15 per cent vanadium.

Pouring device used with the machine consisted of a ladle with side outlet at the bottom. The ladle was roughly 14 in. ID at the top, 12 in. ID at the bottom, and somewhat rounded off so as to drain. It is also 14 in. high and the orifice 14 in. long. The orifice varied from 28 mm on the 60 mm gun to 45 mm on the 150 mm. It was formed with three pieces of tile, a flanged piece on the inside, the main tube and a short nose piece. Nose piece was renewed after four or five casts but the other two pieces lasted about 15 casts.

The molds consisted of 2 per cent chromium steel and only about 1 in. wall thickness. For facing, enough clean round grain silica sand (grain size 0.2 to 0.8 mm) is put in, with a trough running the full length of the mold, to form a layer about 5 mm thick. Thickness of 3 mm was reported to give hot cracks. Thickness of 7 mm gave a wavy surface with a tendency for the sand to wash. The sand was put in while spinning. One particular item of interest with this machine was the use of the sand facing which permits a very thin mold as compared to American practice.

This same general type of machine was being used (Ruhrstahl) for production of steel tubing up to 500 mm OD and 3½ m long, steel cylinder liners, brake drums, and ball races, all cast centrifugally. Steel tubing consisted principally of 14 per cent chrome-iron for heat and corrosion resistance applications.

Battery of six machines of the type shown in Fig. 3 was used at Bochum for casting motor cylinder liners. This is a simple three-roller type machine driven by air motors, in which the cylindrical flask lifts out, as in the Ford and American Cast Iron Pipe units in this country. A 90 degree funnel-type pouring device was used with the machine. Two heavy lathe-type machines, formerly used for experimental work, were utilized for casting steel mill and other rolls, and for bimetallic tubing, which was being cast in lengths of 3 ft with approximately 12 in. OD and 9 in. ID. The outside of this tubing consisted of 14 per cent chromium steel, and the inside of plain carbon steel.

Machine for Casting Steel Liners

This type machine was also used at the Annen plant of Ruhrstahl for steel liners for automotive engines. Fig. 5 shows the arrangement used at the Annen plant for casting steel liners and steel ball races and brake drums in the machine illustrated in Fig. 3.

The pouring device used at Buderusche Eisenwerke for producing steel gun barrels and cast iron pipe is shown in Fig. 4. This is quite similar to an ordinary foundry pouring basin with a slag dam set-in. The orifice is carefully centered by a rig like a wall crane, and the base must be truly vertical so that the falling steel hits the bottom plate and not the mold wall. The orifice is 18 to 20 mm in diameter and 200 mm long. Same size orifice is used for all castings produced in this machine.

At the Frankfurt plant, in the manufacture of gray iron automotive cylinder liners it was reported that for facing, about 1 oz of graphite powder was thrown into the mold just before casting. An ordinary high carbon gray iron mold was used, with claims of 1000 castings per mold. A suction system collects the graphite after the extraction of the casting, cleans it of iron by means of a magnet, and returns it for reuse. It was asserted that the graphite worked better after use than before, and that no heat treatment of the cylinder liners was necessary as no chill was experienced.

Based on personal observations of Dr. J. T. MacKenzie, chief metallurgist, American Cast Iron Pipe Co., Birmingham, in an investigation for the U. S. Technical Field Information Agency, USFET.

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—for users of High Speed Tool Steels

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Write for your copy—today.

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DESEGATIZED HIGH SPEED STEELS

5

LESCO

LATROBE ELECTRIC STEEL COMPANY • LATROBE, PENNSYLVANIA

High Speed Forging

(*Continued from Page 98*)

die. This causes the work piece to fall on an interconnected reciprocating inclined plate which is automatically advanced to deflect the ejected forging onto a slat conveyor that elevates the forgings and then discharges them into a tote box as shown in Fig. 5. Flash from the two trim presses is removed with hand tongs.

An identical setup is employed in producing steering knuckle forgings, (Fig. 1b) two at a time from a 19½-lb blank of SAE 1340 steel flattened at each end. Finished forgings weigh 6.53-lb each, and the same type 2000-ton press mentioned above is used. Again, the forging rate approximates 500 pieces per hour.

Still another forging made in a similar setup is the Oldsmobile steering knuckle support, (Fig. 1c). For this too, a 2000-ton press is used to produce two forgings at a time from SAE 1340 steel.

Forging Produced on Upsetters

Still other types of forgings are produced to best advantage on upsetters and on rolls or, in some cases, using a combination of these and hammer work. A case in point is a rear axle shaft forging, (Fig. 1d). This is produced from 1¾-in. round SAE 1330 steel bar blanks. A 6⅜-in. flange is upset at one end and has a pierced recess of irregular shape at the center.

After the bars are heated to 2350° F in a hand-fed slot furnace, the first operation is performed on forging rolls equipped with a seven-pass die. The furnace man pulls the heated bar over a half-round descaling knife before passing it to the forging roll operator who shifts the bar with tongs successively through the seven grooves of the roll die shown in Fig. 6, that forms the tapered portion. This operation is performed at the rate of 125 pieces per hour.

While still at forging temperature, the bars are dropped onto a chain in a trough and are carried by this conveyor to a swaging die (Fig. 7) in a 3000-lb hammer some 10 ft away. There, each forging is shifted into the die and given the final size, except at the flanging end, by striking several light blows as the hammerman turns the piece through a 90 degree angle between strokes. Swaging is a sizing operation and corrects for any lack of straightness or improper size left by the forging rolls. The neck radius at the small end of the taper is also formed by swaging. No reheating is required before swaging which is done at the same rate as the roll forging.

After swaging, the shaft is dropped on an inclined rack connected to a conveyor.

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PROPERTIES	INSULATING BRICK			INSULATING FIRE BRICK AND FIREBLOK			
	Sil-O-Cel Natural	Sil-O-Cel C-22	Sil-O-Cel Super	JM-1620	JM-20	JM-23	JM-26
Density—lb. per cu. ft.	30	38	40	29	35	42	48
Transverse Strength—lb. per sq. in.	140	115	90	60	80	120	125
Cold Crushing Strength—lb. per sq. in.	400	700	300	70	115	170	190
Linear Shrinkage—Percent	1.4 @ 1600F	0.8 @ 2000F	2.0 @ 2500F	0.0 @ 2000F	0.0 @ 2000F	0.3 @ 2300F	1.0 @ 2600F
Reversible Thermal Expansion—Percent	0.1 @ 1600F	0.7 @ 2000F	1.3 @ 2000F	0.5—0.6 @ 2000F	0.5—0.6 @ 2000F	0.5—0.6 @ 2000F	0.5—0.6 @ 2000F
Conductivity at Mean Temperature	∥ ⊥						
500F	1.01 .67	1.67	1.70	.77	.97	1.51	1.92
1000F	1.13 .79	1.88	1.95	1.02	1.22	1.91	2.22
1500F	1.24 .90	2.08	2.19	1.27	1.47	2.31	2.52
2000F	— —	—	2.45	—	1.72	2.70	2.82
Recommended Service							
Back Up	1600F	2000F	2500F	2000F	2000F	2300F	2600F
Exposed	—	—	—	1600F	2000F	2300F	2600F
Recommended Mortar for Setting Brick	Sil-O-Cel Mortar	Sil-O-Cel Mortar	Sil-O-Cel Super Brick Mortar	J-M No. 1626 Cement	J-M No. 1626 Cement	J-M No. 1626 Cement	J-M No. 1626 Cement

Notes: 1. Above tests are in accordance with ASTM tentative standards.
2. Conductivity is expressed in Btu in. per hr per sq ft per deg F at the designated mean temperatures.
3. ∥ —with heat flow parallel to brick strata.
⊥ —with heat flow perpendicular to brick strata.

No one brick can perform properly under all steel mill service conditions. That's why Johns-Manville makes seven types of Insulating Brick and Insulating Fire Brick. Each is designed for a specific job . . . and *engineered* to do its job with maximum efficiency.

The three J-M Insulating Brick provide great structural strength; the four J-M Insulating Fire Brick combine strength with exceptional resistance to spalling. All offer the advantages of light weight and low conductivity. They are recommended as back-up insulation or insulating fire brick for all industrial requirements.

For complete details, write Johns-Manville, Box 290, New York 16, N.Y.

JOHNS-MANVILLE *First in* **INSULATIONS**

This carries the shaft to a mechanical press where the tong-hold is removed. One trim press receives shafts from two swaging hammers. Then the forgings are permitted to cool before being shifted to an upsetter. A battery of four induction furnaces capable of accommodating bars up to 3 in. in diameter is located at the upsetter. Furnaces are loaded by a helper who uses them in rotation. It requires about 2 min for each bar to attain the 2310° F temperature suitable for upsetting.

Upsetting is performed in a four-stage die which, of course, has a heading tool at each stage. In the final position, the tool produces the recess at the center and gives the flange its final size and thickness. Again, the rate is 125 pieces per hour, hence the heater keeps pace with the roll forging and swaging operations. Upsetting completes the forging on this part.

Forging operations described here are typical of many others in the same plant. As each new job is planned, it is given careful study, not only to insure its production in minimum time but to use a minimum of stock. Induction heating has proved highly economical and new furnaces for such heating are to be installed where their use will contribute to overall economy in production.

Self-Locking Mandrels Will Not Slip or Jam

A new mandrel with roller clutch expansion, which is said to be self-locking, self-expanding and contracting, is being manufactured by Young Arbor Co., 3257 Bradford road, Cleveland Heights, O. Reported to maintain concentricity in low ten-thousandths of an inch, it will not slip or jam as cutting pressure results in tighter holding.

A sleeve protects work from damage, nicks or mars, and eliminates any tendency to cloverleaf. The heat-treated mandrel requires no auxiliary power to expand and, according to the manufacturer, cannot be sprung or damaged under normal use.

Inexpensive Midget Capacitors Introduced

Inexpensive midget capacitors, said to offer a reliable component for use with low capacities, are being manufactured by Electronic Components Division, Stackpole Carbon Co., St. Marys, Penna.

Reported easy to install, and having great stability, better insulation resistance and higher breakdown voltage, they have leads securely anchored and tinned for easy soldering.

Standard capacities include 0.68; 1.0; 1.5; 2.2; 3.3; and 4.7 micro-microfarads.

Hot Dip Galvanizing

(*Continued from Page* 137)

of this flux will carry over on the work to maintain a volatile flux on the top of the bath. However, in some cases because of the interrupted nature of the work some small additions of No. 20 will have to be made on the bath.

Bonding: In every zinc coating operation there forms between the base metal and the pure zinc layer a series of alloy layers. Micro-photographs of the zinc coatings show three of these distinct layers. The one nearest the base metal is very high in iron, the middle one still high in iron but somewhat less, and the outer layer considerable lower in iron. These layers, it has been shown, are present in every coating of zinc even though the immersion be for so short a period as 1/20th sec. These alloy layers are extremely brittle and will fracture the zinc coat upon bending very easily.

The particular type of structure of the alloy layers is of importance also. Microphotographic examination of these structures leads to the definite conclusion that the layers must be applied in such a manner as to reveal an even or smooth line of demarcation. If the alloy layers prove to be irregular or tree-like in appearance this irregularity will invariably lead to an easy fracture. The method of introduction of the work into the zinc has much to do with this and is an important reason for the use of a neutral flux as a flux wash.

It is also invariably the case that the thinner the alloy layers the more perfect will be the bond between the pure zinc coating and the base metal. The procedure of producing thin alloy layers on zinc coatings is as follows:

1. The work must be free from iron salts at time of immersion in zinc.
2. The work after being washed should be protected from any oxidation by the use of a neutral flux.
3. This flux must be protected from the burning which results from sudden quench in hot bare spelter by the use of a proper introducing agent (provided for in No. 20 flux).
4. The work must be immersed for as short a time as is possible to effect the weight of coating desired and at as low a temperature as is possible.
5. The work must be galvanized in pure zinc absolutely uncontaminated by floating dross.

Galvanizing: It is important that all galvanizing be done in clear zinc, uncontaminated in any way with dross, and for this purpose it is recommended that the galvanizing kettle be heated on the sides well above a determined line which may be the part allotted for the accumulation of zinc dross.

Formation of zinc dross is important because of its influence on the interlining layers, tightness of bond, and life of equipment. The steel kettle in which

TABLE V

TIME REQUIRED FOR REMOVING OXIDE WITH SULPHURIC ACID

Acid strength, % by wt	Pickling temperatures and time				
	77°F Min	105°F Min	120°F Min-Sec	150°F Min-Sec	180°F Min-Sec
1	80	24	14	8	2-30
2	45	15	8	4-30	1-30
3	40	15	5	4	1-30
4	35	14	6	3	1-15
5	30	13	4	3-30	1-15
6	28	12	5	3	1-15
7	25	11	4	3	1-15
8	22	12	4	2-30	1-15
9	20	12	4	2-30	1-15
10	20	11	5	2-30	1-10
11	20	11	5	2	1
12	20	9	5	2	1
13	18	8	5	2	0-55
14	16	8	4	2	0-45
15	15	8	4	1-30	0-45
20	9	7	5	1-30	0-30
25	8	6	4	1-30	0-25
30	12	7	4	1-30	0-20
40	13	6	5-30	2	1
50	30	18	17	25	8

the zinc is melted must not be placed in the furnace in such a way as to restrict to a limited area the heat application. Likewise the kettles must not be installed in a furnace in which the heat is applied from below or too low a point on the sides of the kettle so as to effect a boiling action in the dross. It is also important in any molten metal operation of this kind that sufficient capacity be provided for in the body of the metal itself so that there is not too rapid a transfer of heat.

As the zinc becomes contaminated by iron it settles of its own gravity to the bottom of the kettle and in order to galvanize in pure zinc the furnace must be so designed as to not only allow but to assist this natural precipitation of contaminated zinc to the bottom of the kettle without interference.

By applying heat to the bottom of the kettle or producing a heat input over too restricted an area, there will be an interference with the natural settling of the dross, with the result that it floats the dross again and places back upon the work a considerable quantity of drossy zinc. This drossy zinc affects materially the formation of the alloy layers and places upon the work a coating of poor quality.

Accepting then, the fact that the heat should be applied constantly and evenly over a wide area of the sides of the kettle and not from the bottom or concentrated upon too restricted an area, the designer must not stop there. The greatest amount of heat, as a matter of fact, should be applied to the upper portion of the sidewalls of the kettle where the greatest heat is taken out. Less heat at the lower portions and little or no heat below a determined line allowed for the accumulation of zinc dross.

In this connection it may be noted that at the Navy Yard, Norfolk, Va., a conversion from a small under fired, under capacitied galvanizing kettle using an active flux wash and resulting in a 59 per cent dross loss over pure zinc added, to a furnace of proper design and using neutral flux resulted in a reduction in dross loss to 14 per cent. In other words, out of every 100 lb of pure zinc added to the old furnace 59 lb had to be dug out of the bottom of the furnace as dross and sold at a loss, but in the new furnace only 14 lb was lost.

A correctly designed galvanizing setting is shown in Fig. 31. The steel kettle itself is built of 1¼ in. fire box steel plate and is of welded construction. It is 20 ft long 44 in. wide and 48 in. deep and holds approximately 140,000 lb of pure zinc.

The furnace surrounding the kettle (Fig. 33) is lined with 4½ in. first quality firebrick, the insulation is of 2½ in. 1600° F insulating brick and the casing is 4 in. of standard red brick reinforced with structural steel shapes.

Firing is accomplished by a series of tunnel type impact burners designed for propane gas at 6 to 7 in. 10 C pressure. Air for combustion is supplied by a blower complete with motor and starter to supply a constant pressure at 1 lb.

Temperature control is accomplished by 2-zone automatic equipment consisting of two indicating and controlling pyrometers hooked to two iron angle-type thermocouples encased in special protecting tubes.

This furnace controlled in this manner will maintain the zinc at 860° F under any reasonable conditions.

Equipment thus outlined galvanized in five months over 2,000,000 lb of work with a complement of 13 men. The work was classified as follows:

Work	Pounds
Fabricated sheet metal	170,519
Plates and shapes, both fabricated and plain	1,519,197
Nuts, bolts, studs and forgings	225,773
Pipe, bent and cut to shape ..	153,266
Total	2,068,773

Centrifugal Galvanizing: One of the

most successful and satisfactory features of the modern galvanizing plant is the production of high-grade centrifugal work through the use of a well-designed centrifuge. Such equipment in use at the Navy Yard, Portsmouth, N. H., is shown in Fig. 33.

The centrifuge galvanizer operates at 900 rpm and reaches a maximum speed in 10 sec. It receives a 160 lb gross basketful of material every 90 sec, and throws off in 30 sec, all excess material from threaded parts that must remain movable.

Besides threaded nuts and bolts and various small articles otherwise difficult to handle, much of the work centrifugally galvanized consists of various parts going into the construction of blocks manufactured by the Yard. These parts consist of assemblies of single, double and treble blocks of various sizes from 4 to 24 in. all of which contain snatch block fittings, swivel hooks and swivel fork shackles, one to five in number, needing to turn freely after galvanizing.

Formerly a long and expensive hand operation was necessary to free frozen zinc, involving the use of four men to burn, swing sledge hammers and manipulate with crowbars the movable parts. The result was chipped and burned surfaces and the galvanized coating was nullified. Manhours, oxygen gas and zinc were wasted.

Strict technique of operation in centrifugal galvanizing must be followed.

As will be seen in Fig. 33, perforated steel baskets are used as a container for the material. After loading, the baskets are slowly lowered into the zinc through a volatile bath blanket. One basket follows the other to the out-go end.

The volatile blanket is then skimmed back and the basket quickly swings to the centrifugal. Only the shortest possible time must be consumed between the exit of the basket from the zinc to the full speed of the centrifugal so as to permit little or no setting of the zinc before the machine attains full speed.

After completion of the spinning operation the basket is again quickly lifted from the centrifugal and transferred to the tilter shown at the left of Fig. 33 where it is upset and the work quenched in water covered with a light film of a good grade of quenching oil.

The installation of modern, adequate galvanizing equipment at various Navy Yards has effected a concrete contribution to efficiency and economy. Rush orders are handled immediately, urgent materials can be turned out in 15 to 20 min. Large quantities of rush material move to the head of the work list for the day and in no instance do more than a few hours elapse between receipt and delivery.

The following investigation was con-

ducted for the purpose of determining the effect of the concentration of sulphuric acid on the time of pickling.

Sheets of 20 gage standard enameling steel measuring 4 x 6 in. were annealed at 1400° F for 2 min in an electric furnace. Three samples of each were then pickled in sulphuric acid of the following concentration: 1 to 15 per cent inclusive, 20, 25, 30, 40, and 50 per cent and at temperatures of 77, 105, 120, 150, and 180° F.

Time required for complete removal of the oxide by the action of the acid itself was recorded. Average results of three different samples in each test are shown in Table V which appears on page 138.

At 77° F the acid concentrations requiring the least time for pickling are between 20 and 40 per cent. These concentrations pickle in 13 min or lower. The 25 per cent solution at this temperature pickles in the quickest time which is 8 min. The 50 per cent acid gave a rapid rise in the time of pickling increasing from 13 min at 40 per cent to 30 min at 50 per cent strength.

At 105° F the acid concentrations requiring the least time are those between 12 and 40 per cent which require 9 min or less for pickling.

The 25 per cent solution again pickles in the least time which is 6 min. With 50 per cent acid the time of pickling increases to 18 min.

At 120° F the best concentration appears to be between 8 and 30 per cent. The time of pickling being 5 min or lower. The best practical concentration at this temperature appears to be about 5 per cent which requires 4 min time for pickling. Above 30 per cent concentration the time of pickling begins to increase.

At 150° F the most rapid acting concentrations are from 4 to 40 per cent inclusive, all of which pickle in 3½ min or less. With concentrations above 30 per cent a black scum was left on the sheets.

At 180° F the time for pickling at all concentrations was 2½ min or lower except in the 50 per cent concentration where the time required for pickling greatly increased as was the case with all other concentrations. At 30 per cent higher concentrations scumming occurred as at 150° F. Much fuming occurred at all concentrations at this temperature which rendered such temperature undesirable.

The time required for pickling at all concentrations of 40 per cent or lower is rapidly diminished with increase in temperature especially up to 120° F.

Time of pickling is accelerated much more by rise in temperature than by increase in acid concentration, i.e. at 120°

F 5 per cent acid pickles just as rapidly at all concentrations up through 30 per cent, whereas at room temperature only between 20 and 25 per cent acid concentration is there any proximity in pickling time.

Increased time of pickling above 40 per cent acid strength is due to the decreased ionization and probably partially due also to the oxidizing effect of the hot concentrated sulphuric acid both of which retard the solution of iron and the formation of hydrogen gas which forces the scale off the plate. That the hot concentrated acid has an oxidizing effect is shown by the change of color of the scale to a bright red in the 40 to 50 per cent concentration at 180° F.

Acids above 30 per cent concentration at 150 and 180° F left a scum on the ware which is objectionable, so that a more diluted acid is desirable for pickling.

The best temperature for the most rapid and practical pickling appears to be between 120 and 150° F. Below 120° F the time of pickling is greatly increased and at 180° F the fumes are excessive.

The best, most practical and most economical concentration appears to be 5 per cent sulphuric acid from 120 to 150° F.

Slight fluctuations on the curves in the time required for pickling need not be considered seriously since the end point is not sharp.

Loss in weight of sheets in the acid showed that pickling time increased more with the per cent of steel dissolved than it did with increase of acid concentration, e.g. sheets at 77° F lost 3.2 per cent by weight with 1 per cent acid requiring 80 min; at 6 per cent acid concentration and 28 min time, the loss was 2.5 per cent; at 10 per cent acid concentration and 20 min time, the loss in weight was 2.1 per cent.

A test showed that a piece of steel which has been annealed four times required 10 per cent more time to pickle at room temperature after the fourth annealing than it did to pickle the same after the first annealing.

(To be continued)

Shallcross Adds to Resistor Line

A new hermetically-sealed Akra-Ohm resistor rated at 1.5 is offered by Shallcross Mfg. Co., Jackson and Pusey avenues, Collingdale, Pa. Known as type 1105, resistor measures 2 1/16 in. long and 7/8-in diameter, and its maximum ratings, wound with nickel chromium wire, are 1 meghom resistance, 1000 v.

Resistance winding element and protective ceramic shell form an integral unit without internal leads, which the manufacturer says offers complete protection against severe vibration.

Industrial Pace Slowed By Supply Shortages

INSUFFICIENCY of supplies of sheet and strip steel is a principal factor in the current slowing down of production in numerous manufacturing plants. Although the steel ingot production rate for the past four months has been around 90 per cent of capacity, the demand for finished steel is so great that the current supply still spreads out thinly over the consuming market.

One example of production being curtailed because of shortages of steel, as well as other supplies, is the automobile industry which, after setting a new postwar production record of 91,925 cars, trucks, and busses in the week ended Oct. 5, could turn out only 84,421 units in the week ended Oct. 12.

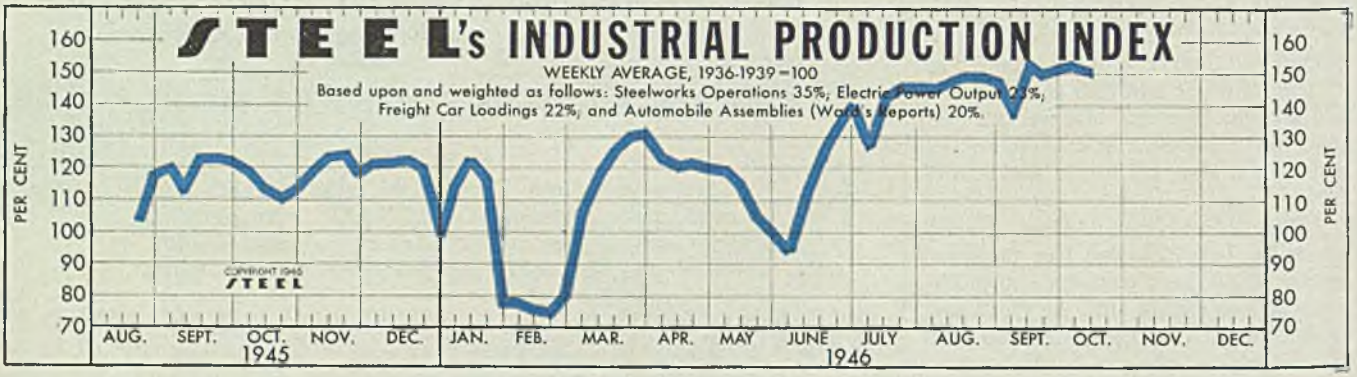
This decline was largely responsible for the lowering by 2 points of STEEL's industrial production index to 152 per cent (preliminary) for the week ended Oct. 12. Postwar high mark was 154 per cent in the weeks ended Sept. 14 and Oct. 12.

COAL—Output of bituminous coal continues at a high level, with production in the week ended Oct. 5 estimated at 12,110,000 tons.

LABOR COSTS—Rising wage rates, not offset by increases in labor productivity, have forced unit labor costs sharply higher than before the war, a National Industrial Conference Board survey shows. While no precise tabulation of the amount of increase in unit labor costs is available, some manufacturers report increases of more than 50 per cent in these costs. Average increase falls into the 30 to 40 per cent range. Largest single increase factor reported was the rise in wage rates, often accompanied by a drop in labor efficiency. Labor rates will continue upward over the next year, in the opinion of the executives who co-operated in the Conference Board survey. However, only slightly over half of the companies expect unit labor costs to show further increases. About a quarter of the firms surveyed hope to hold their present unit labor costs level, while the remaining quarter expect to reduce labor costs per unit through improved and more efficient operation.

TRUCK LOADINGS—Added weight to predictions that tonnage hauled by motor carriers in 1946 would exceed that of 1945 and approach, if not exceed, the all-time record set in 1943 was given by a report from the American Trucking Associations Inc. that August volume increased 13.9 per cent over August of last year. This marked the third straight month that 1946 tonnage has exceeded substantially the volume hauled in the corresponding month of 1945. Tonnage in August exceeded that of any other previous month in 1946.

PRICES—Lifting of various price controls last week will undoubtedly be reflected soon in the U. S. Bureau of Labor Statistics weekly index of wholesale prices. For the week ended Oct. 5 the index was at 125.1 per cent of the 1926 average of 100, up 0.6 per cent over the preceding week.



The Index (see chart above): Latest Week (preliminary) 152 Previous Week 154 Month Ago 154

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)§	90	90.5	89.5	73.5
Electric Power Distributed (million kilowatt hours)	4,495	4,478	4,521	3,934
Bituminous Coal Production (daily av.—1000 tons)	2,018	2,100	1,860	1,361
Petroleum Production (daily av.—1000 bbls.)	4,737	4,737	4,773	3,781
Construction Volume (ENR—Unit $1,000,000)	$81.9	$133.7	$86.2	$33.2
Automobile and Truck Output (Ward's—number units)	84,421	91,925	88,888	11,825

*Dates on request. §1946 weekly capacity is 1,762,381 net tons. 1945 weekly capacity was 1,831,636 net tons.

TRADE				
Freight Carloadings (unit—1000 cars)	900†	906	907	755
Business Failures (Dun & Bradstreet, number)	25	28	31	12
Money in Circulation (in millions of dollars)‡	$28,608	$28,526	$28,499	$27,962
Department Store Sales (change from like wk. a yr. ago)‡	+14%	+23%	+49%	+11%

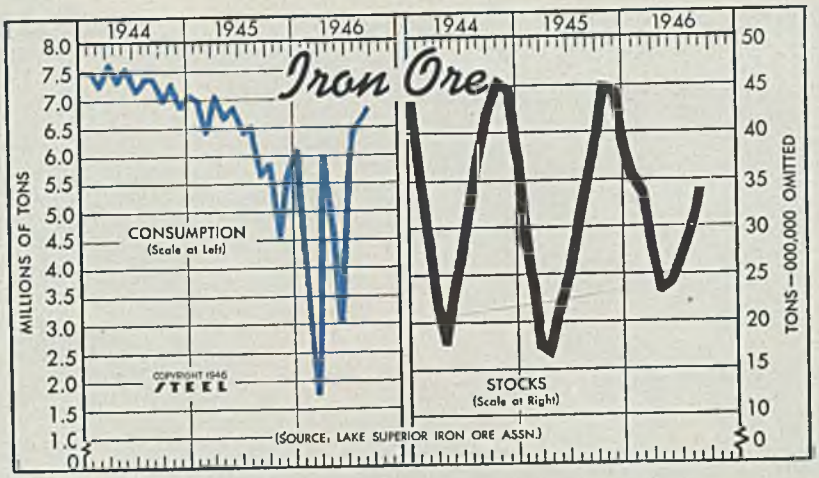
†Preliminary. ‡Federal Reserve Board.

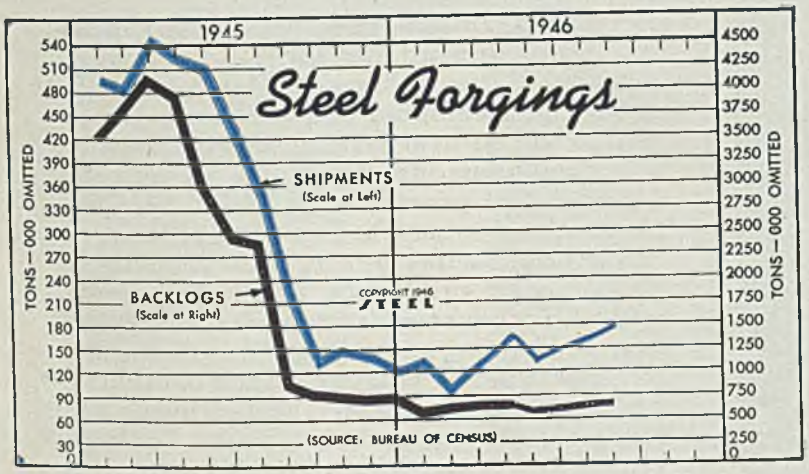
Iron Ore

(Lake Superior Iron Ore Assn.)

Gross tons—000 omitted

	Consumption		Stocks at Lake Erie Docks and furnaces	
	1946	1945	1946	1945
Jan.	3,719	6,983	35,342	30,889
Feb.	1,748	6,371	33,647	24,577
Mar.	6,021	7,082	27,601	17,304
Apr.	4,769	6,642	23,079	16,429
May	2,990	6,872	23,905	20,715
June	4,995	6,397	26,265	24,847
July	6,460	6,532	30,439	29,485
Aug.	6,738	5,658	34,067	34,781
Sept.	....	5,837	.....	39,549
Oct.	....	4,491	.....	45,090
Nov.	....	5,611	.....	44,706
Dec.	....	6,099	.....	39,059
Total	....	74,576	.....	.....





Steel Forgings

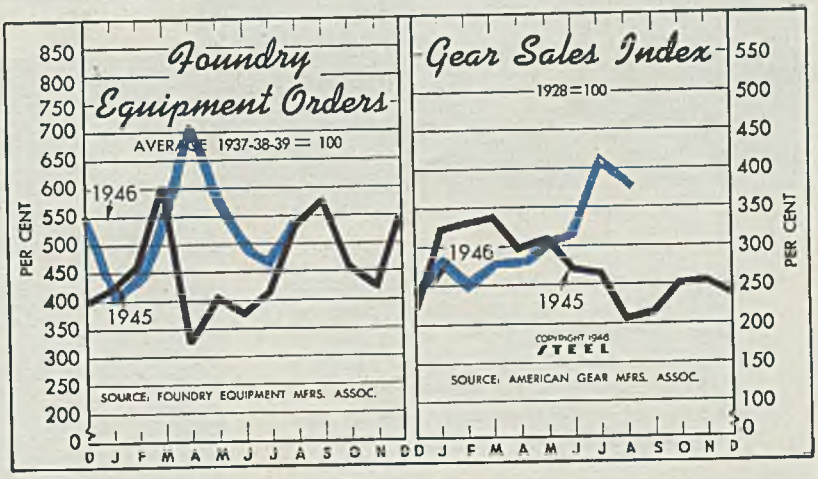
Tons—000 omitted

	Shipments		Unfilled orders°		Consumption of steel	
	1946	1945	1946	1945	1946	1945
Jan.	130	498	561	3,502	182	644
Feb.	93	483	596	3,826	125	628
Mar.	123	549	612	4,139	164	718
Apr.	155	524	604	3,961	208	666
May	139	510	599	2,989	197	655
June	147	430	610	2,420	204	548
July	154	345	624	2,356	214	438
Aug.	171	227	639	841	243	293
Sept.	....	126	....	745	....	172
Oct.	....	145	....	735	....	197
Nov.	....	135	....	708	....	185
Dec.	....	119	....	724	....	156

° Forgings for sale.

Foundry Equipment Orders and Gear Sales

	Foundry Equipment Orders—Index (1937-38-39=100)			Gear Sales—Index (1928=100)		
	1946	1945	1944	1946	1945	1944
Jan.	392.8	422.4	378.3	269	323	246
Feb.	432.8	465.3	456.8	253	331	214
Mar.	536.6	604.7	498.4	275	339	485
Apr.	701.2	325.0	385.7	284	296	308
May	577.3	404.7	503.9	313	309	305
June	491.7	375.4	466.1	321	271	328
July	453.4	411.7	375.8	407	264	242
Aug.	538.7	532.2	450.5	368	205	247
Sept.	....	577.2	388.0	....	213	248
Oct.	....	457.8	526.5	....	251	293
Nov.	....	416.6	369.5	....	255	209
Dec.	....	547.6	397.4	....	239	219
Ave.	....	461.7	433.1	....	275	279



FINANCE

	Latest Period°	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$11,862	$12,432	$11,409	$10,146
Federal Gross Debt (billions)	$263.7	$263.8	$265.7	$262.3
Bond Volume, NYSE (millions)	$27.6	$24.0	$41.8	$26.2
Stocks Sales, NYSE (thousands)	7,911	5,115	12,723	6,672
Loans and Investments (billions)†	$58.1	$59.1	$59.1	$61.0
United States Gov't. Obligations Held (millions)†	$39,088	$39,990	$40,492	$45,143

†Member banks, Federal Reserve System.

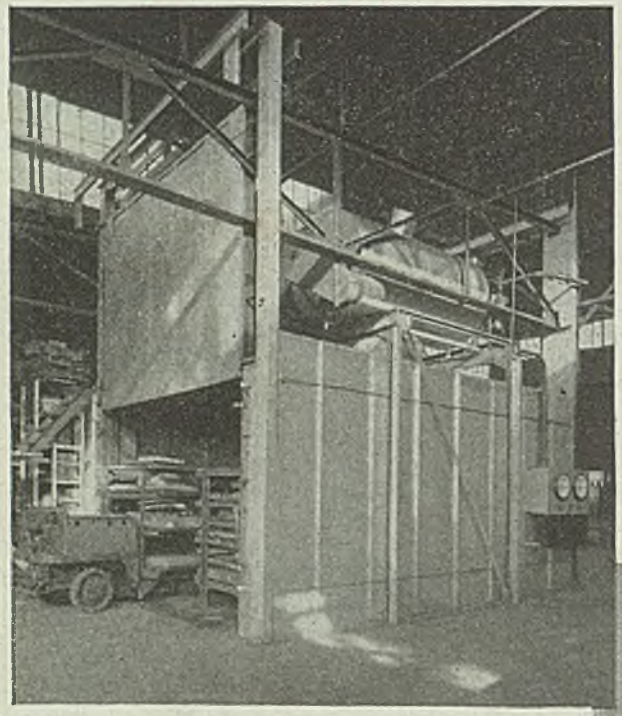
PRICES

STEEL's composite finished steel price average	$64.45	$64.45	$64.45	$58.27
All Commodities†	125.1	124.4	122.0	105.2
Industrial Raw Materials†	144.5	143.6	137.5	116.3
Manufactured Products†	118.1	117.5	116.9	101.8

†Bureau of Labor Statistics Index, 1926 = 100.

INDUSTRIAL OVENS and FURNACES...

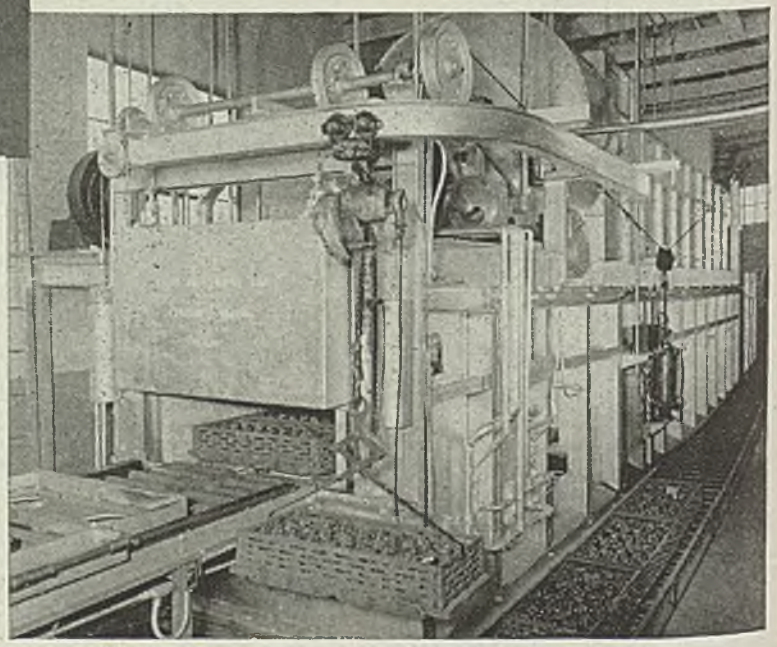
"Tailored" to your requirements



For 53 years Maehler engineers have specialized in designing and building industrial ovens and furnaces to meet industry's specific needs. In developing and perfecting the recirculating air heat system The Paul Maehler Company offers industry a line of ovens and furnaces that provide a degree of heat uniformity hard to match. This kind of temperature control assures the user of lower operating costs, greater production and better results.

Whatever your requirements are...heat treating, core baking, enameling, etc.... remember Maehler builds a complete range of oil fired, gas-fired and electrically heated ovens and furnaces to fit your particular needs. For higher production and lower operating costs call a Maehler engineer. There is no obligation.

The photo above shows a typical Maehler Lift Door Core oven installation. This oven means better cores, baked faster and at lower cost. The view at the right shows a Maehler-engineered air draw furnace used to anneal gray iron castings at the Chambers, Bering Quinlan Co.



MAEHLER

THE PAUL MAEHLER COMPANY

2208 W. Lake Street Chicago 22, Illinois

Industrial Ovens and Furnaces for Core Baking, Mold Drying, Heat Treating, Enameling, etc.

Pouring an "M.C." ROLL

UNITED... *Announces* the NEW *"M.C." ROLL

(Identified by Dark Blue Wabbler)

One of the most difficult to obtain and yet highly desired specifications demanded of a maker is to produce a roll with sufficient wear resistant depth for deep section rolling, and for finishing and semi-finishing work on bar mills and rod mills.

UNITED has satisfied this demand by the development of the "M.C." Roll, a truly *Master Chilled* Roll with a chill that *shows no mottle* at any reasonable working depth. Combined with the desired feature of depth, "M.C." Rolls, through special alloying and a carefully controlled melting practice, give the user added assurance of strength and long service life.

"M.C." Rolls are made in one grade only. The hardness range is from 60 to 65, and *this hardness structure is maintained through the entire working depth.*

"M.C." Rolls are a proven product—an answer to the demand for rolls with deep chilled structure and strength, especially in the small and medium diameter range.

Specific recommendations for their application will be gladly furnished at your request.

* One of A Complete Line of 16 UNITED ROLLS Individually Color-Branded for Type Designation

The 16 principal classifications comprising the UNITED ROLL LINE . . . each one a roll type successfully used in modern industry . . . are individually and distinctively *color-branded* to designate *type, composition* and *service application.* Roll selection is thereby made easy and accurate.

UNITED ROLLS are the product of advanced metallurgical research and more than 40 years experience in roll design and manufacture.

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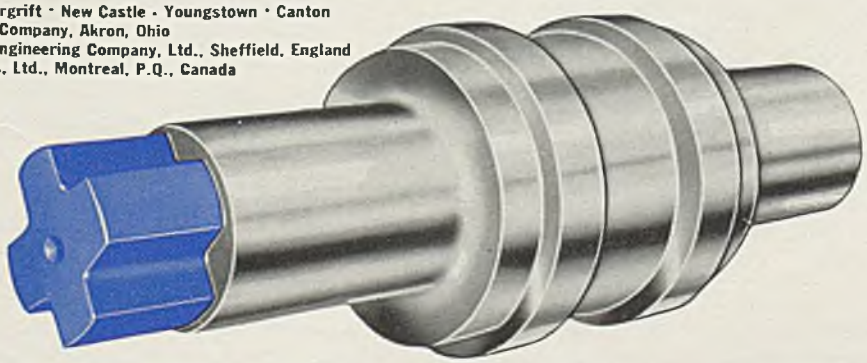


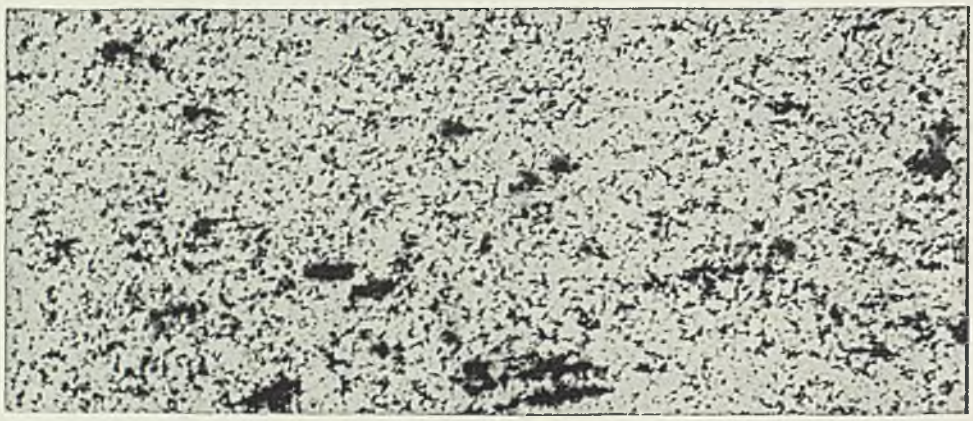
*THE WORLD'S LARGEST DESIGNERS AND MAKERS OF ROLLS AND ROLLING MILL EQUIPMENT

Look at the Reduction of Stringers in Steel Forgings when treated with

FERROCARBO-S

UNTREATED CARBON STEEL

Taken near the top of the ingot, this sulphur print shows the extent and poor distribution of sulfide inclusions in untreated steel. Poor transverse physical properties result from such a stringer-like arrangement.



TREATED WITH FERROCARBO-S

A print of the same steel taken from comparable ingot position illustrates remarkable reduction of stringers. Increased yields and improved physical properties are daily proving the dependability and consistency of action provided by FERROCARBO-S.

Equally Effective for Open Hearth and Electric Furnace Steels

FERROCARBO-S is phenomenal in its reduction of segregations in steel ingots and forgings. Write our metallurgical staff, Dept. J-106, for complete facts on its use in your plant. The Carborundum Company, Refractories Division, Perth Amboy, New Jersey.

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Steel Price Decontrol May Come in Near Future

Mills and buyers would welcome return to normal market despite probable price rise . . . Conservatism expected to prevent runaway

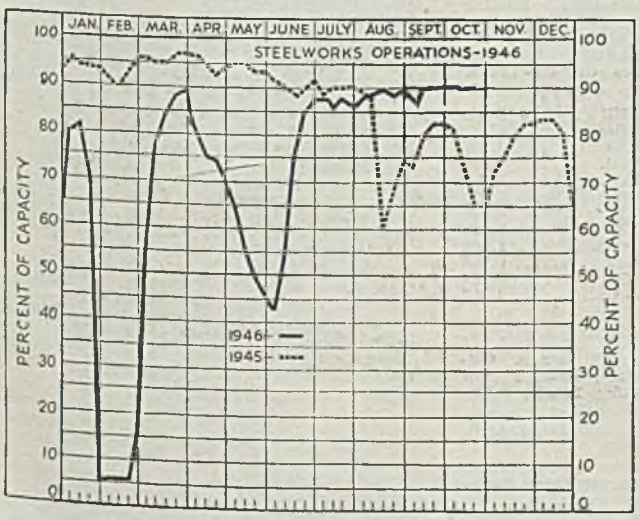
POSSIBILITY decontrol of iron and steel prices may come sooner than recently had generally been expected is cause for speculation among producers and consumers. Some relatively minor products may be relieved of control in the immediate future but steelmakers are in the dark as to just when OPA will effect broad decontrol.

So marked, apparently, has been the change in administration stabilization policy within the past week general lifting of price regulations on steel may come before the yearend, in fact, before completion of conversations recently initiated by the industry with OPA in a move for higher ceiling prices on certain products.

Precise immediate effect should steel prices be decontrolled is difficult to gage. The industry is not pressing for a broad overall increase, indicating conservatism in price policy, which undoubtedly would be extended to a free market. Removal of ceilings on steel, however, probably would be accompanied by similar action on raw materials, including scrap, and by cost increases in other directions, with the result considerations underlying present appeals might have to be revised. In turn, this might lead to a broader increase and possibly to a greater rise on some products than now contemplated.

Whatever the developments, steel producers may be expected to hold prices as stable as circumstances will permit through the period of readjustment to normal marketing. Further, the competitive element should become more pronounced despite shortages in supply, particularly light flat products, since under high operations, supply and demand should strike a reasonable balance in many lines within a few months.

Ability of mills to maintain high production is of greatest concern at the moment. Scrap, pig iron and coke are short of needs; steel production could go still higher with more adquate supplies. No stocks of scrap are being accumulated for winter, however, and ore supply may be lighter than usual. With return of a free market some of these threats to high production may become less menacing, particularly with regard to scrap.



DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Oct. 19	Change	Same Week 1945	Same Week 1944
Pittsburgh	97.5	+ 2.5	49	92
Chicago	90	— 1	75	98.5
Eastern Pa.	78	None	71	93
Youngstown	91	+ 1	47	88
Wheeling	89	— 4.5	84	92
Cleveland	89.5	+ 2	76	95.5
Buffalo	90.5	None	60.5	88.5
Birmingham	99	None	95	90
New England	92	None	79	92
Cincinnati	84	None	71	84
St. Louis	51	—21.5	68	75
Detroit	79	+19	84	84
Estimated national rate	90.5	+ 0.5	65	96.5

Based on weekly steelmaking capacity of 1,762,381 net tons for 1946; 1,831,636 tons for 1945; 1,791,287 tons for 1944.

Currently an easing tendency in demand is noted which may be accentuated by uncertainty over future prices. In some consumer products pipe lines are filling up and in others, particularly heavier manufactured items, less pressure for steel is being experienced because of unbalanced inventories of materials and components. Uncertainties in material supply and labor are resulting in revisions of important expansion programs.

Despite prospects of higher raw material prices in event of decontrol, lifting of restrictions may assure higher steelmaking operations, which, combined with easing in demand, may bring supply and consumption in closer balance and serve as a check on advancing prices.

Hovering close to a level of 90 per cent of capacity the estimated national steelmaking rate last week gained ½-point to 90½ per cent, mainly as result of an increase at Detroit where a Ford strike was settled, giving a rise of 19 points to 79 per cent in that area. Other changes were small. Cleveland gained 2 points to 89½, Youngstown 1 point to 91 and Pittsburgh 2½ points to 97½ from a revised rate of 95 the prior week. St. Louis dropped 21½ points to 51 per cent as a result of failure of two open hearths, Chicago receded 1 point to 90 and Wheeling went down 4½ points to 89. Other rates were unchanged as follows: Cincinnati 84, eastern Pennsylvania 78, Buffalo 90½, Birmingham 99, New England 92 and West Coast 84.

In absence of any changes in Office of Price Administration ceilings average composite prices of steel and iron products are unchanged at recent levels. Finished steel composite is $64.45, semifinished steel $40.60, steelmaking pig iron $27.50 and steelmaking scrap $19.17.

COMPOSITE MARKET AVERAGES

	Oct. 19	Oct. 12	Oct. 5	One Month Ago Sept., 1946	Three Months Ago July, 1946	One Year Ago Oct., 1945	Five Years Ago Oct., 1941
Finished Steel	$64.45	$64.45	$64.45	$64.45	$64.45	$58.27	$56.73
Semifinished Steel	40.60	40.60	40.60	40.60	40.60	37.80	36.00
Steelmaking Pig Iron	27.50	27.50	27.50	27.50	27.50	24.19	23.00
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	19.17

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

Finished Material

	Oct. 19, 1946	Sept., 1946	July, 1946	Oct., 1945
Steel bars, Pittsburgh	2.50c	2.50c	2.50c	2.25c
Steel bars, Philadelphia	2.86	2.86	2.86	2.57
Steel bars, Chicago	2.50	2.50	2.50	2.25
Shapes, Pittsburgh	2.35	2.35	2.35	2.10
Shapes, Philadelphia	2.48	2.48	2.48	2.215
Shapes, Chicago	2.35	2.35	2.35	2.10
Plates, Pittsburgh	2.50	2.50	2.50	2.25
Plates, Philadelphia	2.558	2.558	2.558	2.30
Plates, Chicago	2.50	2.50	2.50	2.25
Sheets, hot rolled, Pittsburgh	2.425	2.425	2.425	2.20
Sheets, cold-rolled, Pittsburgh	3.275	3.275	3.275	3.05
Sheets, No. 24 galv., Pittsburgh	4.05	4.05	4.05	3.70
Sheets, hot-rolled, Gary	2.425	2.425	2.425	2.20
Sheets, cold-rolled, Gary	3.275	3.275	3.275	3.05
Sheets, No. 24 galv., Gary	4.05	4.05	4.05	3.70
Hot-rolled strip, over 6 to 12-in., Pitts.	2.35	2.35	2.35	2.10
Cold-rolled strip, Pittsburgh	3.05	3.05	3.05	2.80
Bright basic, bess. wire, Pittsburgh	3.05	3.05	3.05	2.75
Wire nails, Pittsburgh	3.75	3.75	3.75	2.90
Tin plate, per base box, Pittsburgh	$5.25	$5.25	$5.25	$5.00

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$38.00	$38.00	$38.00	$36.00
Slabs, Pittsburgh, Chicago	39.00	39.00	39.00	36.00
Rerolling billets, Pittsburgh	39.00	39.00	39.00	36.00
Wire rods, No. 5 to ⅜-inch, Pitts.	2.30c	2.30c	2.30c	2.15c

Pig Iron

	Oct. 19, 1946	Sept., 1946	*July, 1946	Oct., 1945
Bessemer del. Pittsburgh	$29.77	$29.77	$27.69	$26.35
Basic, Valley	28.00	28.00	26.00	24.65
Basic, eastern del. Philadelphia	29.93	29.93	27.93	26.53
No. 2 fdry., del. Pgh. N. & S. sides	29.27	29.27	27.19	25.85
No. 2 foundry, Chicago	28.50	28.50	26.50	25.19
Southern No. 2, Birmingham	24.88	24.88	22.88	21.57
Southern No. 2, del. Cincinnati	28.94	28.94	26.94	25.50
No. 2 fdry., del. Philadelphia	30.43	30.43	28.43	27.03
Malleable, Valley	28.50	28.50	26.50	25.15
Malleable, Chicago	28.50	28.50	26.50	25.19
Charcoal, low phos., fob Lyles, Tenn.	33.00	33.00	33.00	33.00
Gray forge, del. McKees Rocks, Pa.	28.61	28.61	28.61	25.49
Ferromanganese, fob cars, Pittsburgh	140.00	140.00	140.00	140.26

Scrap

Heavy melting steel, No. 1, Pittsburgh	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	25.00	23.75	20.00	20.00

Coke

Connellsville, furnace ovens	$8.75	$8.75	$8.75	$7.50
Connellsville, foundry ovens	9.50	9.50	9.50	8.25
Chicago, by-product fdry., del.	15.10	15.10	15.10	13.75

* $2 higher on bessemer, basic, foundry and malleable on adjustable pricing contracts.

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Delivered prices do not include the 3 per cent federal tax on freight. Pricing on rails was changed to net ton basis as of Feb. 15, 1946.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, $33, fob mill; forging quality, $38, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown.

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, Coatesville, uncrop, $48.69.

Rerolling, Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $39; Detroit, del., $41.50; Duluth (bill.), $41; Pac. ports (bill.), $51.50. (Andrews Steel Co., carbon slabs, $41; Northwestern Steel & Wire Co., $41, Sterling, Ill.; Granite City Steel Co., $47.50 gross ton slabs from D.P.C. mill. Geneva Steel Co., $58.64, Pac. ports.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $47; Detroit, del., $49.50; Duluth, billets, $49; forging billets fob Pac., ports, $59.50.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points; Follansbee Steel Corp., $49.50 fob Toronto, O.; Geneva Steel Co., $64.64, Pacific ports.)

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $58.43; del. Detroit $60.93; del. eastern Mich. $61.93.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $38. (Empire Sheet & Tin Plate Co., Mansfield, O., carbon, sheet bars, $39, fob mill.)

Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb, 2.05c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—⅜ in. inclusive, per 100 lb, $2.30. Do., over ⅜—$\frac{11}{32}$-in., incl., $2.45; Galveston, base, $2.40 and $2.55, respectively. Worcester add $0.10; Pacific ports $0.535.

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham base, 20 tons one size, 2.50c; Duluth, base, 2.60c; Detroit, del., 2.635c; eastern Mich., 2.685c; New York, del., 2.86c; Phila., del., 2.86c; Gulf ports, dock, 2.885c; Pac. ports, dock, 3.185c. (Sheffield Steel Corp. may quote 2.75c, fob St. Louis; Joslyn Mfg. & Supply Co., 2.55c, fob Chicago.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.921c; Detroit, del., 3.056c. (Texas Steel Co. may use Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.108	4300	$1.839
2300	1.839	4600	1.298
2500	2.759	4800	2.326
3000	0.541	5100	0.379
3100	0.920	5130 or 5152	0.494
3200	1.461	6120 or 6152	1.028
3400	3.462	6145 or 6150	1.298
4000	0.487	8612	0.703
4100 (.15-.25 Mo)	0.757	8720	0.757
(.20-.30 Mo)	0.812	9830	1.407

* Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 20,000-39,999 lb, 3.10c; Detroit, 3.15c; Toledo, 3.25c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 3.625c; Detroit, del., 3.76c; eastern Mich., 3.79c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.35c; Detroit, del., 2.485c; eastern Mich. and Toledo, 2.535c; Gulf ports, dock, 2.735c; Pacific ports, dock, 2.785c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo, base, 2.35c; Detroit, del., 2.485c; eastern Mich. and Toledo, del., 2.535c; Gulf ports, dock, 2.735c.

Iron Bars: Single refined, Pitts., 4.76c; double refined, 5.84c; Pittsburgh, staybolt, 6.22c; Terre Haute, single ref., 5.42c; double ref., 6.76c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base, 2.425c; Granite City, base, 2.525c; Detroit, del., 2.56c; eastern Mich., del., 2.61c; Phila., del., 2.615c; New York, del., 2.685c; Pacific ports, 3.01c. (Andrews Steel Co. may quote hot-rolled sheets for shipment to the Detroit area on the Middletown, O., base; Alan Wood Steel Co., Conshohocken, Pa., may quote 3.00c on hot carbon sheets, Sparrows Point, Md.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.275c; Granite City, base, 3.375c; Detroit, del., 3.41c; eastern Mich., del., 3.46c; New York, del., 3.615c; Phila., del., 3.635c; Pacific ports, 3.96c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base, 4.05c; Granite City, base, 4.15c; New York, del., 4.31c; Phila., del., 4.24c; Pacific ports, 4.635c.

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29-gage, per square, 3.73c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16-gage not corrugated, copper alloy, 4.15c; Granite City, 4.25c; Pacific ports, 4.635c; copper iron, 4.50c; pure iron, 4.50c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh, 4.60c.

Aluminized Sheets, 20 gage: Pittsburgh, hot-dipped, coils or cut to lengths 9.00c.

Enameling Sheets: 10-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.20c; Granite City, base 3.30c; Detroit, del., 3.335c; eastern Mich., 3.385c; Pacific ports, 3.885c; 20-gage: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 3.80c; Detroit, del., 3.935c; eastern Mich., 3.985c; Pacific ports, 4.485c.

Electrical Sheets No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.90c	4.685c	4.00c
Armature	4.25c	5.035c	4.35c
Electrical	4.75c	5.535c	4.85c
Motor	5.425c	6.21c	5.525c
Dynamo	6.125c	6.91c	6.225c
Transformer			
72	6.625c	7.41c	.....
65	7.625c	8.41c	.....
58	8.125c	8.91c	.....
52	8.925c	9.71c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary Cleveland, Birmingham, Youngstown, Middletown, 6-in. and narrower: Base, 2.45c; Detroit, del., 2.585c; eastern Mich., del., 2.635c; Pacific ports, 3.135c. (Superior Steel Corp. may quote 3.30c, Pitts.)

Over 6-in.: Base, 2.35c; Detroit, del., 2.485c; eastern Mich., del., 2.535c; Pacific ports, 3.035c. (Superior Steel Corp. may quote 3.20c, Pitts.)

Cold-Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less, 3.05c; Chicago, base, 3.15c; Detroit, del., 3.185c; eastern Mich., del., 3.235c; Worcester, base, 3.25c. (Superior Steel Corp. may quote 4.70c, Pitts.)

Cold-Finished Spring Steel: Pittsburgh, Cleveland base, 0.26-0.50 carbon, 3.03c. Add 0.20c for Worcester.

Tin, Terne Plate

(OPA ceiling prices announced March 1, 1946.)

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb base box, $5.25; Granite City, Birmingham, Sparrows Point, $5.35.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb base box 0.25 lb tin, $4.60; 0.50 lb tin, $4.75; 0.75 lb tin, $4.90; Granite City, Birmingham, Sparrows Point, $4.70, $4.85, $5.00, respectively.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29-gage and lighter, 3.30c; Granite City, Birmingham, Sparrows Point, 3.40c; Pacific ports, boxed, 4.335c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted, 4.05c; Pacific ports, 4.835c.

Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, 100-base box, $4.55; Granite City, Birmingham, Sparrows Point, $4.65.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I. C. 8-lb $12.50; 15-lb $14.50; 20-lb $15.50 (nom.); 40-lb $20.00 (nom.).

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.50c; Geneva, Utah, 2.65c; New York, del., 2.71c; Phila., del., 2.558c; St. Louis, del., 2.74c; Boston, del., 2.86c; Pacific ports, 3.085c; Gulf ports, 2.885c.

(Granite City Steel Co. may quote carbon plates 2.65c fob DPC mill; Central Iron & Steel Co., Harrisburg, Pa., 2.80c, basing points; Lukens Steel Co., Coatesville, Pa., 2.75c, base; Worth Steel Co., Claymont, Del., 2.60c, base; Alan Wood Steel Co., Conshohocken, Pa., 2.75c base.)

Floor Plates: Pittsburgh, Chicago, 3.75c; Pacific ports, 4.435c; Gulf ports, 4.135c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.787c; Gulf ports, 4.308c; Pacific ports, 4.525c.

Clad Steel Plates: Coatesville, 10% cladding: nickel-clad, 18.72c; inconel-clad, 26.00c; monel-clad, 24.96c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.35c; New York, del., 2.54c; Phila., del., 2.48c; Pacific ports, 3.035c; Gulf ports, 2.735c.

(Phoenix Iron Co., Phoenixville, Pa., may quote the equivalent of 2.60c, Bethlehem, Pa., on the general range and 2.70c on beams and channels from 4 to 10 inches.)

Steel Piling: Pittsburgh, Chicago, Buffalo, 2.65c; Pacific ports, 3.235c.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham, per 100 pounds)

Wire to Manufacturers in carloads

Bright, basic or bessemer	*$3.05
Spring (except Birmingham)	*$4.00

Wire Products to Trade

Nails and staples

Standard and cement-coated	†$3.75
Galvanized	‡$3.40

Wire, Merchant Quality

Annealed	§$3.50
Galvanized	§$3.85

(Fob Pittsburgh, Chicago, Cleveland, Birmingham, per base column)

Woven fence, 15½ gage and heavier	72
Barbed wire, 80-rod spool	**79
Barbless wire, twisted	**79
Fence posts	74
Bale ties, single loop	72½

*Add $0.10 for Worcester, $0.05 for Duluth and $0.535 for Pacific ports.

†Add $0.30 for Worcester, $0.535 for Pacific ports. Nichols Wire & Steel may quote $4.25; Pittsburgh Steel Co., $4.10.

‡Add $0.535 for Pacific ports.

§Add $0.10 for Worcester; $0.735 Pacific ports.

**Pittsburgh Steel Co. may quote 89.

Tubular Goods

Welded Pipe: Base price in carloads, threaded and coupled to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Welded

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
⅛	53	30	½	21	0½
¼ & ⅜	56	37½	¾	27	7
½	60½	48	1-1¼	31	13
¾	63½	52	1½	35	15½
1-3	65½	54½	2	34½	15

Lap Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
2	58	46½	1¼	20	0½
2½-3	61	49½	1½	25½	7
3½-6	63	51½	2	27½	9
7-8	62	49½	2½-3½	28½	11½
9-10	61½	49	4	30½	15
11-12	60½	48	4½-8	29½	14
			9-12	25½	9

Boiler Tubes: Net base prices per 100 feet fob Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O.D. sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Elec. Weld— Hot Rolled	Cold Rolled
1"	13	....	$9.90	$9.36	$9.65
1¼"	13	....	11.73	9.63	11.43
1½"	13	$10.91	12.96	10.63	12.64
1¾"	13	12.41	14.75	12.10	14.37
2"	13	13.90	16.52	13.53	16.19
2¼"	13	15.50	18.42	15.06	18.03
2¼"	12	17.07	20.28	16.57	19.83
2½"	12	18.70	22.21	18.11	21.68
2¾"	12	19.82	23.54	19.17	22.95
3"	12	20.79	24.71	20.05	24.02
3½"	11	26.24	31.18	25.30	30.29
4"	10	32.56	38.68	31.32	37.52
4½"	9	43.16	51.29	....	....
5"	9	49.96	59.36	....	....
6"	7	76.71	91.14	....	....

Pipe, Cast Iron: Class B, 6-in. and over, $60 per net ton, Birmingham; $65, Burlington, N. J.; $62.80, del., Chicago; 4-in. pipe, $5 higher, Class A pipe, $3 a ton over class B.

Rails, Supplies

Standard rails, over 60-lb, fob mill, net ton, $43.40. Light rails (billet), Pittsburgh, Chicago, Birmingham, net ton, $49.18.

Relaying rails, 35 lb and over, fob railroad and basing points, $31-$33.

Supplies: Track bolts, 6.50c; heat treated, 6.75c. Tie plates $51 net ton, base, Standard spikes, 3.65c.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago. Additional discounts: 5 for carloads; 10 for full containers, except tire, step and plow bolts.

(Ceiling prices advanced 12 per cent, effective July 27, 1946; discounts remain unchanged.)

Carriage and Machine

½ x 6 and smaller	65½ off
Do., ⅞ and ⅝ x 6-in. and shorter	63½ off
Do., ¾ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
Step bolts	56 off
Plow bolts	65 off

Stove Bolts

In packages, nuts separate, 71-10 off, nuts attached, 71 off; bulk, 80 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts

Semifinished hex	U.S.S.	S.A.E.
⅞-in. and smaller	..	64
½-in. and smaller	62	..
1/16-in.-1-in.	..	60
⅝-in.-1-in.	59	..
1⅛-in.-1½-in.	57	58
1⅝-in. and larger	56	..

Additional discount of 10 for full kegs.

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset 1-in. and smaller	71 off
Headless, ¼-in. and larger	60 off
No. 10 and smaller	70 off

Rivets

Fob Pittsburgh, Cleveland, Chicago, Birmingham

Structural	4.75c
⅞-inch and under	*65-5 off

*Plus 12 per cent increase on base prices, effective July 26.

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl ..... $2.75-$3.00 off

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; reg. carbon 15.15c; extra carbon 19.48c; special carbon 23.80c; oil-hardening 25.97c; high carbon-chromium 46.53c.

W	Cr	V	Mo	Base, per lb
18.00	4	1	....	72.49c
1.5	4	1	8.5	58.43c
....	4	2	3	58.43c
6.40	4.15	1.90	5	62.22c
5.50	4.50	4	4.50	75.74c

Stainless Steels

Base, Cents per lb

CHROMIUM NICKEL STEELS

	Bars	Plates	Sheets	H.R. Strip	C.R. Strip
302	25.96c	29.21c	36.79c	23.93c	30.30c
303	28.13	31.38	38.95	29.21	35.71
304	27.05	31.38	38.95	25.45	32.46
308	31.38	36.79	44.36	30.84	37.87
309	38.95	43.28	50.85	40.03	50.85
310	53.02	56.26	57.35	52.74	60.59
312	38.95	43.28	53.02	....	....
*316	43.28	47.61	51.94	43.28	51.94
§321	31.38	36.79	44.36	31.65	41.12
†347	35.71	41.12	48.69	35.71	45.44
431	20.56	23.80	31.38	18.94	24.35

STRAIGHT CHROMIUM STEEL

403	23.93	26.51	31.92	22.99	29.21
**410	20.02	23.93	28.67	18.39	23.80
416	20.56	23.80	29.21	19.75	25.45
††420	25.96	30.84	36.25	25.70	39.49
430	20.56	23.80	31.38	18.94	24.35
‡‡430F	21.10	24.35	31.92	20.29	26.51
440A	25.96	30.84	36.25	25.70	39.49
442	24.35	27.59	35.17	25.96	34.62
443	24.35	27.59	35.17	25.96	34.62
446	29.76	33.00	39.19	37.87	56.26
501	8.66	12.98	17.04	12.98	18.39
502	9.74	14.07	18.12	14.07	19.48

STAINLESS CLAD STEEL (20%)

(Fob Pittsburgh and Washington, Pa., plate prices include annealing and pickling.)

304	....	19.48	20.56	....	....
410	....	17.31	18.39	....	....
430	....	17.85	18.94	....	....
446	....	19.48	20.56	....	....

* With 2-3% molybdenum. § With titanium. † With columbium. ** Plus machining agent. †† High carbon. ‡‡ Free machining.

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*$8.75
Connellsville, foundry	9.25- 9.75
New River, foundry	10.25-10.50
Wise county, foundry	9.00- 9.50
Wise county, furnace	8.50- 9.00

By-Product Foundry

Kearney, N. J., ovens	14.40
Chicago, outside delivered	14.35
Chicago, delivered	15.10
Terre Haute, delivered	14.85
Milwaukee, ovens	15.10
New England, delivered	16.00
St. Louis, delivered	†15.10
Birmingham, delivered	12.25
Indianapolis, delivered	14.85
Cincinnati, delivered	14.60
Cleveland, delivered	14.55
Buffalo delivered	14.75
Detroit, delivered	15.10
Philadelphia, delivered	14.65

* Operators of hand-drawn ovens using trucked coal may charge $9.35; retroactive to May 17, 1946, on adjustable pricing.

† 15.68 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal, freight allowed east of Omaha.	
Pure and 90% benzol	15.00c
Toluol, two degree	22.00c
Industrial xylol	22.00c
Per pound fob works	
Phenol (car lots, returnable drums)	11.25c
Do., less than carlots	12.00c
Do., tank cars	10.25c
Eastern plants, per pound	
Naphthalene flakes, balls, bbl, to jobbers, "household use"	9.00c
Per ton, bulk, fob plants	
Sulphate of ammonia	$30.00

WAREHOUSE STEEL PRICES

Base delivered prices, cents per pound, for delivery within switching limits, subject to established extras. Quotations based on mill prices announced March 1, 1946

	Hot-rolled bars	Structural shapes	Plates	Floor plates	Hot-rolled sheets (10-gage base)	Hot-rolled strip (14-gage and lighter, 6-in and narrower)	Hot-rolled strip (12-gage and heavier, wider than 6-inch)	Galvanized flat sheets (24-gage base)	Cold-rolled sheets (17-gage base)	Cold finished bars	Cold-rolled strip
Boston	4.356[1]	4.203[1]	4.203[1]	6.039[1]	4.050[1]	5.548[1]	4.418[1]	5.725[14]	5.031[14]	4.656[21]	4.965
New York	4.134[1]	4.038[1]	4.049[1]	5.875[1]	3.856[1]	4.375[1]	4.275[1]	5.501[12]	4.838[14]	4.584[21]	5.075
Jersey City	4.155[1]	4.018[1]	4.049[1]	5.875[1]	3.856[1]	4.375[1]	4.275[1]	5.501[12]	4.890[14]	4.605[21]	5.075
Philadelphia	4.114[1]	3.937[1]	3.875[1]	5.564[1]	3.774[1]	4.664[1]	4.554[1]	5.499[16]	5.139[25]	4.564[21]	5.064
Baltimore	4.093[1]	4.05[1]	3.865[1]	5.543[1]	3.64[1]	4.293[1]	4.193[1]	5.365[17]	5.118[20]	4.543[21]	....
Washington	4.232[1]	4.22[1]	4.067[1]	5.632[1]	3.842[1]	4.432[1]	4.332[1]	5.667[17]	5.007[24]	4.532[21]	....
Norfolk, Va.	4.377[1]	4.303[1]	4.262[1]	5.777[1]	4.037[1]	4.927[1]	4.477[1]	5.862[17]	4.552[24]	4.677[21]	....
Bethlehem, Pa.*	....	3.70[1]	....	....	....	....	....	....	....	....	....
Claymont, Del.*	....	....	3.70[1]	....	....	....	....	....	....	....	....
Coatesville, Pa.*	....	....	3.70[1]	....	....	....	....	....	....	....	....
Buffalo (city)	3.60[1]	3.65[1]	3.92[1]	5.55[1]	3.575[1]	4.21[1]	4.11[1]	5.20[15]	4.625[16]	4.20[21]	4.96
Buffalo (country)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.475[1]	3.85[1]	3.750[1]	5.10[15]	4.525[16]	4.10[21]	4.60
Pittsburgh (city)	3.60[1]	3.65[1]	3.65[1]	5.25[1]	3.575[1]	3.95[1]	3.850[1]	5.327[13]	4.625[24]	4.20[21]	4.70
Pittsburgh (country)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.475[1]	3.85[1]	3.750[1]	5.10[13]	4.525[24]	4.10[21]	4.60
Cleveland (city)	3.60[1]	3.88[1]	3.65[1]	5.48[1]	3.575[1]	3.95[1]	3.850[1]	5.347[13]	4.625[24]	4.20[21]	4.70
Cleveland (country)	3.50[1]	....	3.55[1]	....	3.475[1]	3.85[1]	3.750[1]	....	4.525[24]	4.10[21]	4.00
Detroit	3.735[1]	3.987[1]	3.935[1]	5.607[1]	3.710[1]	4.085[1]	3.985[1]	5.526[15]	4.760[24]	4.25[12]	4.985
Omaha (city, del.)	4.32[1]	4.37[1]	4.37[1]	5.97[1]	4.045[1]	4.52[1]	4.42[1]	6.00[15]	5.72[24]	4.945[21]	....
Omaha (country)	4.22[1]	4.27[1]	4.27[1]	5.87[1]	3.945[1]	4.42[1]	4.32[1]	5.90[15]	....	....	....
Cincinnati	3.902[1]	3.983[1]	3.952[1]	5.583[1]	3.671[1]	4.046[1]	3.946[1]	5.296[15]	4.271[24]	4.602[21]	....
Youngstown*	....	....	....	....	....	....	....	4.85[13]	....	....	....
Middletown, O.*	....	....	....	....	3.475[2]	3.85[1]	3.750[1]	5.10[16]	....	....	....
Chicago (city)	3.75[1]	3.80[1]	3.80[1]	5.40[1]	3.475[1]	3.95[1]	3.850[1]	†5.40[15]	4.425[24]	4.20[21]	4.90
Milwaukee	3.908[1]	3.958[1]	3.958[1]	5.558[1]	3.633[1]	4.108[1]	4.008[1]	†5.558[15]	4.583[24]	4.358[21]	5.058
Indianapolis	3.83[1]	3.88[1]	3.88[1]	5.48[1]	3.743[1]	4.118[1]	4.018[1]	5.368[15]	4.793[24]	4.43[21]	5.060
St. Paul	4.092[2]	4.142[2]	4.142[2]	5.742[2]	3.817[2]	4.292[2]	4.192[2]	5.666[15]	4.767[24]	4.852[21]	5.398
St. Louis	3.918[1]	3.968[1]	3.968[1]	5.568[1]	3.643[1]	4.118[1]	4.018[1]	5.622[15]	4.593[24]	4.522[21]	5.222
Memphis, Tenn.	4.296[1]	4.346[1]	4.346[1]	6.071[1]	4.221[1]	4.596[1]	4.496[5]	5.746[15]	....	4.821[21]	....
Birmingham	3.75[1]	3.80[1]	3.80[1]	6.153[1]	3.675[1]	4.05[1]	4.05[1]	5.20[15]	5.077[24]	4.99[21]	5.465
New Orleans (city)	4.358[1]	4.408[1]	4.408[1]	6.329[1]	4.283[1]	4.658[1]	....	5.808[15]	5.304[24]	5.079[21]	....
Houston, Tex.	4.00[3]	4.50[1]	4.50[1]	5.75[3]	3.988[2]	4.668[2]	4.563[6]	5.763[24]	5.819[10]	4.10[21]	....
Los Angeles	4.65[4]	4.70[4]	5.80[4]	7.05[4]	4.95	5.30[4]	5.200[4]	6.55[12]	6.60[6]	6.105[21]	5.868
San Francisco	4.20[7]	4.15[7]	4.15[7]	5.85[7]	4.125[7]	5.85[1]	4.50[1]	6.35[15]	6.875[15]	5.783[21]	7.588
Portland, Oreg.	4.70[27]	4.70[27]	5.00[27]	6.75[27]	4.875[27]	6.65[27]	5.000[27]	6.20[15]	6.825[15]	5.983[15]	....
Tacoma, Wash.	4.60[6]	4.70[6]	5.00[6]	6.75[6]	4.87[6]	5.80[6]	4.60[6]	6.40[15]	6.55[15]	6.23[21]	....
Seattle	4.60[6]	4.70[6]	5.00[6]	6.75[6]	4.87[6]	5.80[6]	4.60[6]	6.40[15]	6.55[15]	6.23[21]	....

*Basing point cities with quotations representing mill prices, plus warehouse spread; †open market price.

BASE QUANTITIES

[1]—400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 8999 pounds; [6]—300 to 9999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [20]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [24]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [26]—1000 to 1999 pounds; [25]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base; [27]—300 to 4999 pounds.

ORES

Lake Superior Iron Ore

Gross ton, 51.5% (Natural) Lower Lake Ports

Old range bessemer	$5.45
Mesabi nonbessemer	5.05
High phosphorus	5.05
Mesabi bessemer	5.20
Old range nonbessemer	5.30

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	13.00

Foreign Ore

Cents per unit, cif Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mn.	Nom.
N. African low phos.	Nom.
Swedish basic, 60 to 68%	13.00
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro	7.50–8.00

Tungsten Ore

Chinese Wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Oreg., or Tacoma, Wash. (S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African

48% 2.8:1	$39.75
48% 3:1	41.00
48% no ratio	31.00

South African (Transvaal)

44% no ratio	$27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80

Brazilian—nominal

44% 2.5:1 lump	$33.65
48% 3:1 lump	43.50

Rhodesian

45% no ratio	$28.30
48% no ratio	31.00
48% 3:1 lump	41.00

Domestic (seller's nearest rail)

48% 3:1	$43.50

less $7 freight allowance.

Manganese Ore

Sales prices of Office of Metals Reserve, cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85c; Fontana, Calif., Provo, Utah, and Pueblo, Colo., 91c; prices include duty on imported ore and are subject to established premiums, penalties and other provisions. Price at basing points which are also points of discharge of imported manganese ore is fob cars, shipside, at dock most favorable to the buyer. Outside shipments direct to consumers at 15c to 17c per unit less than Metal Reserve prices.

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Basic open-hearth Electric furnaces

Designation	Chemical Composition Limits, Per Cent — Carbon	Mn	Si	Cr	Ni	Mo	Bars per 100 lb	Billets per GT	Bars per 100 lb	Billets per GT
NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	$0.812	$16.230	$1.353	$27.050
NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.812	16.230	1.353	27.050
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.866	17.312	1.407	28.132
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.703	14.066	1.244	24.886
NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.298	25.968	1.677	33.542
NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.298	25.968	1.677	33.542

Extras are in addition to a base price of 2.921c, per pound on finished products and $58.43 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

PIG IRON

Maximum prices per gross ton fixed by OPA schedule No. 10, last amended July 27, 1946; $2 increase may be charged on adjustable pricing contracts made between May 29 and July 27. Delivered prices do not include 3 per cent federal tax, effective Dec. 1, 1942.

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$29.50	$29.00	$30.50	$30.00
Newark, N. J., del.	31.20	30.70	32.20	31.70
Brooklyn, N. Y., del.	32.28	....	....	32.78
Birdsboro, Pa., base	29.50	29.00	30.50	30.00
Birmingham, base	24.88	23.50	29.50	....
Baltimore, del.	30.22	....	....	....
Boston, del.	29.68	....	....	....
Chicago, del.	28.72	....	....	....
Cincinnati, del.	28.94	28.06	....	....
Cleveland, del.	28 62	27.74	....	....
Newark, N. J.	30.82	....	....	....
Philadelphia, del.	30.05	29.55	....	....
St. Louis, del.	28.62	29 54	....	....
Buffalo, base	28.50	27.50	29.50	29.00
Boston, del.	30.06	29.56	31.06	30.56
Rochester, del.	30.03	....	31.03	30.53
Syracuse, del.	30.58	....	31 58	31.08
Chicago, base	28.50	28.00	29.00	28.50
Milwaukee, del.	29.73	29.23	30.23	29.73
Muskegon, Mich., del.	32 05	....	....	32.05
Cleveland, base	28.50	28.00	29.00	28.50
Akron, Canton, del.	30.04	29.54	30.54	30.04
Detroit, base	28.50	28.00	29 00	28.50
Saginaw, Mich., del.	30.81	30.31	31.31	30.81
Duluth, base	29.00	28.50	29.50	29.00
St. Paul, del.	31.13	30.63	31.63	31.13
Erie, Pa., base	28.50	28.00	29.50	29.00
Everett, Mass., base	29.50	29.00	30 50	30.00
Boston, del.	30.06	29 56	31.06	30.56
Granite City, Ill., base	28.50	28.00	29.00	28.50
St. Louis, del.	29.00	28.50	....	29.00
Hamilton, O., base	28 50	28.00	....	28.50
Cincinnati, del.	29.68	29.18	....	29.68
Neville Island, Pa., base	28.50	28.00	29.00	28.50
*Pittsburgh, del., N.&S. sides	29 27	28.77	29.77	29.27
Provo, Utah, base	28.50	26.00	....	....
Sharpsville, Pa., base	28.50	28.00	29.00	28.50
Sparrows Point, base	29.50	29.00	....	....
Baltimore, del.	30.60	....	....	....
Steelton, Pa., base	....	29.00	....	....
Swedeland, Pa., base	29.50	29.00	30.50	30.00
Philadelphia, del.	30.43	29.93	....	30.93
Toledo, O., base	28 50	28.00	29.00	28.50
Youngstown, O., base	28.50	28.00	29 00	28.50
Mansfield, O., del.	30.66	30.16	31.16	30.66

* To Neville Island base add: 61c for McKees Rocks, Pa.; 93c Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa; 97c (water), Monongahela; $1.24, Oakmont, Verona; $1.38, Brackenridge.

Exceptions to above prices: Struthers Iron & Steel Co., Struthers, O., may charge 50 cents a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable pig iron. Republic Steel Corp. may quote $2 a ton higher for foundry and basic pig iron on the Birmingham base.

High Silicon, Silvery

6.00-6.50 per cent (base)	...$34.00		
6.51-7.00	$35.00	9.01- 9.50	40.00
7.01-7.50	36.00	9.51-10.00	41.00
7.51-8.00	37.00	10 01-10.50	42.00
8 01-8.50	38.00	10.51-11.00	43.00
8.51-9.00	39.00	11.01-11.50	44.00

Fob Jackson county, O., per gross ton. Buffalo base $1.25 higher. Buyer may use whichever base is more favorable.

Electric Furnace Ferrosilicon: Si 14.01-14.50%, $50, Jackson, O.; $53.25 Keokuk, Iowa; $51.25, Niagara Falls, N. Y. Add $1 a ton for each additional 0.50% Si up to and including 18%. Add $1 a ton for low impurities not to exceed 0.05% P, 0.04% S, and 1% C.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Charcoal Pig Iron

Semi-cold blast, low phosphorus.

Fob furnace, Lyles, Tenn. $33.00 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $28.00
Valley base 28.00

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Buffalo, N. Y., $34.00 base; $35.38, del., Philadelphia. Intermediate phosphorus, Central Furnace, Cleveland, $31.00.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge not to exceed 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge not to exceed 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Refractories

Per 1000, fob shipping point
Net prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky. $81.00

High Heat Duty

Pa., Ill., Md., Mo., Ky.	65.00
Ala., Ga.	65.00
N. J.	70.00

Intermediate Heat Duty

Ohio	57.00
Pa., Ill., Md., Mo., Ky.	59 00
Ala., Ga.	51.00
N. J.	62.00

Low Heat Duty

Pa., Md., Ohio 51.00

Malleable Bung Brick

All bases 75.00

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry Press	42.00
Wire Cut	40.00

Silica Brick

Pennsylvania	65.00
Joliet, E. Chicago	74.00
Birmingham, Ala.	65.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.

Bulk	22.00
Bags	26.00

Basic Brick

Net ton, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	54.00
Chem. bonded chrome	54 00
Magnesite brick	76 00
Chem. bonded magnesite	65.00

Fluorspar

Metallurgical grade, fob shipping point in Ill., Ky., net ton, carloads, effective CaF_2 content, 70% or more, $33; 65% to 70%, $32 60% to 65%, $31; less than 60%, $30.

Open Market Prices of Leading Ferroalloy Products

Spiegeleisen: 19-21% carlot per gross ton, Palmerton, Pa., $36; Pittsburgh, $40.50; Chicago, $40.60.

Ferromanganese, standard: 78-82% c.l. gross ton, duty paid, $135 fob cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer, Rockdale or Rockwood, Tenn. (where Tennessee Products Co. is producer), Birmingham, Ala. (where Sloss-Sheffield Steel & Iron Co. is producer); $140 fob cars, Pittsburgh (where Carnegie-Illinois Steel Corp. is producer); add $6 for packed c.l., $10 for ton, $13.50 for less ton; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%.

Ferromanganese, low carbon: Eastern zone: Special, 21c; regular, 20.50c; medium, 14.50c; central zone: special, 21.30c; regular, 20.80c; medium, 14.80c; western zone: Special, 21.55c; regular, 21.05c; medium, 15.75c. Prices are per pound contained Mn. bulk carlot shipments, fob shipping point, freight allowed. Special low-carbon has content of 90% Mn, 0.10% C, and 0.06% P.

Ferromanganese Briquets: (Weight approx. 3 lb and containing exactly 2 lb Mn) per lb of briquets. Contract, carlots, bulk 0.0605c, packed 0.063c, tons 0.0655c, less 0.068c, eastern, freight allowed; 0.063c, 0.0655c, 0.0755c and 0.078c, central; 0.066c, 0.0685c, 0.0855c and 0.088c, western; spot up 0.25c.

Ferrotungsten: Spot 10,000 lb or more, per lb contained W, $1.90; contract, $1.88; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb contained Ti; ton lots $1.23; less-ton lots $1.25; eastern. Spot up 5c per lb.

Ferrotitanium, High-Carbon: 15-20% contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C $142.50; 3-5% C $157.50.

Ferrovanadium: V 35-55%, contract basis, per lb contained V, fob producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Ferromolybdenum: 55-75% per lb. contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% P content with unitage of $3 for each 1% of P above or below the base; gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Contract, lump, packed; eastern zone quotations: 90-95% c.l. 12.65c, ton lots 13.10c, smaller lots 13.50c; 80-90% c.l. 10.35c, ton lots 10.85c, smaller lots 11.35c; 75% c.l. 9.40c, ton lots 9.95c, smaller lots 10.45c; 50% c.l. 7.90c, ton lots 8.50c, smaller lots 9.10c. Prices are fob shipping point, freight allowed, per lb of contained Si. Spot prices 0.25c higher on 80-90%, 0.30c on 75%, 0.45c on 50%. Deduct 0.85c for bulk carlots.

Ferro-Boron: (B 17.50% min., Si 1.50% max., Al 0.50% max. and C 0.50% max.) per lb of alloy contract ton lots $1.20, less ton lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Ferrocolumbium: 50-60% per lb contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, $2.25; less-ton lots $2.30. Spot prices up 10 cents.

Ferrochrome: Contract, lump, packed: high carbon, eastern zone, c.l. 15.05c, ton lots 15.55c; central zone, add 0.40c and 0.65c; western zone, add 0.5c and 1.85c; high carbon, high nitrogen, add 5c to all high carbon ferrochrome prices. Deduct 0.55c for bulk carlots. Spot prices up 0.25c.

Low carbon, eastern zone, bulk, c.l., max. 0.06% C 23c; 0.1% 22.50c, 0.15% 22c, 0.2% 21.50c, 0.5% 21c, 1% 20.50c, 2% 19.50c, add 1c for 2000 lb to c.l.; central zone, add 0.4c for bulk, c.l., and 0.65c for 2000 lb to c.l.; western zone, add 0.5c for bulk, c.l., and 1.85c for 2000 lb to c.l.; carload packed differential 0.45c. Prices are per pound of contained Cr, fob shipping points. **Low carbon, high nitrogen:** Add 2c to low carbon ferrochrome prices. For higher nitrogen low carbon, add 2c for each 0.25% of nitrogen over 0.75%.

Ferrochrome, Special Foundry: (Cr 62-66%, C about 5-7%): Contract, lump packed, eastern zone, freight allowed, c.l. 15.60c, ton lots 16.10c, less than ton 16.75c; central zone, add 0.40c for c.l. and 0.65c for smaller lots; western zone, add 0.5c for c.l. and 1.85c for smaller lots. Deduct 0.55c for bulk carlots.

S. M. Ferrochrome, high carbon (Cr 60-65%, Si, Mn and C 4-6% each): Contract, lump, packed, eastern zone, freight allowed, c.l. 16.15c, ton lots 16.65c, less ton 17.30c; central zone, add 0.40c for c.l. and 0.65c for smaller lots; western zone, add 0.5c for c.l. and 1.05c for smaller lots. Prices are per lb of contained chromium; spot prices 0.25c higher. Deduct 0.55c for bulk carlots.

S. M. Ferrochrome, low carbon: (Cr 62-66%, Si 4-6%, Mn 4-6% and C 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.15c ton lots 21.00c, less ton lots 22.00c eastern, freight allowed, per pound contained chromium, 20.40c, 20.50c 20.95c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up 0.25c.

Ferrochrome Briquets: Containing exactly 2 lb. Cr, packed eastern zone, c.l. 9.50c, ton lots 9.50c less than ton 10.10c, central zone, add 0.3c for c.l. and 0.5c for smaller lots; western zone, add 0.70c for c.l. and 2c for smaller lots. Deduct 0.30c for bulk carlots. Prices per lb of briquets; spot prices 0.25c higher.

Chromium Metal: 97% min chromium, max. 0.50% carbon, eastern zone, per lb contained chromium bulk, c.l., 79.50c, 2000 lb to c.l. 80c, central 81c and 82.60c; western 82.25c and 84.75c fob shipping point, freight allowed.

Chromium-Copper: (Cr 8-11%, Cu 88-90%, Fe 1% max., Si 0.50% max.) contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Calcium metal; cast: Contract ton lots or more $1.35, less, $1.60, pound of metal; $1.36 and $1.61

central, $1.40 and $1.65, western; spot up 5c.

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%), per lb. of alloy. Contract, carlots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.00c, 17.35c, and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up 0.25c.

Calcium - Silicon: (Ca 30-35%, Si 60-65% and Fe 3.00% max.), per lb. of alloy. Contract, carlot, lump 13.00c, ton lots 14.50c, less 15.50c eastern, freight allowed; 13.50c, 16.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up 0.25c.

Silicon Metal: Min. 97% Si and max. 1% Fe, eastern zone, bulk, c.l., 12.90c; 2000 lb to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 96% Si and max. 2% Fe, eastern, bulk; c.l., 12.50c, 2000 lb to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c, fob shipping point, freight allowed. Price per lb contained Si.

Silicomanganese, containing exactly 2 lb. Mn and about ½ lb. Si, eastern zone, bulk, c.l. 5.80c, ton lots 6.35c; central zone, add 0.25c for c.l. and 1c for ton lots; western, add 0.55c for c.l. and 0.20c for ton lots. **Ferrosilicon,** weighing about 5 lb. and containing exactly 2 lb. Si, or about 2¼ lb. and containing exactly 1 lb. Si, packed, eastern zone, c.l. 3.90c, ton lots 4.15c, less ton lots 4.45c; central zone, add 0.15c for c.l. and 0.40c for smaller lots; western zone, add 0.30c for c.l. and 0.45c for smaller lots. Prices are f.o.b. shipping point, freight allowed; spot prices 0.25c higher. Deduct 0.30c for bulk carlots.

Manganese Metal: (Min. 96% Mn, max. 2% Fe), per lb of metal, eastern zone, bulk, c.l., 30c, 2000 lb to c.l., 32c, central, 30.25c, and 33c; western, 30.55c and 35.05c.

Electrolytic Manganese: 99.9% plus, fob Knoxville, Tenn., freight allowed east of Mississippi on 250 lb or more: Carlots 32c, ton lots 34c, drum lots 36c, less than drum lot 38c. Add 1½c for hydrogen-removed metal.

Manganese-Boron: (Mn 75% approx., B 15-20%, Fe 5% max., Si 1.50% max. and C 3% max.) per lb of alloy. Contract ton lots, $1.89, less $2.01, eastern; freight allowed; $1.903 and $2.023, central, $1.935 and $2.055 western; spot up 5c.

Nickel-Boron: (B 15-18%, Al 1% max., Si 1.50% max., C 0.50% max., Fe 3% max., Ni, balance), per lb of alloy. Contract, 5 tons or more, $1.90, 1 ton to 8 ton, $2.00, less than ton $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Borosil: 3 to 4% B, 40 to 45% Si, $6.25 lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: B 1.5-1.9%, ton lots, 45c lb; less-ton lots, 50c lb.

Carbortam: B 0.90 to 1.15% net ton to carload, 8c per lb fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%), per lb of alloy contract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed, 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up 0.25c.

Silvaz Alloy: (Si 35-40%, Va 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%), per lb of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern freight allowed; 58.50c, 59.75c and 60.75c, central; 60.50c, 61.90c and 62.90c, western; spot up 0.25c.

SMZ Alloy: (Si 60-55%, Mn 5-7%, Zr 5-7% and Fe approx. 20%) per lb of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c central zone; 14.05c, 14.60c and 15.10c, western; spot up 0.25c.

CMSZ Alloy 4: (Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75% and C 3.00-4.50%). Contract carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c, 14.75c, 15.25c, western; spot up 0.25c.

CMSZ Alloy 5: (Cr 50-56%, Mn 4-6%, Si 13.50-16.00%, Zr 0.75-1.25%, C 3.50-5.00%) per lb of alloy. Contract, carlots, bulk, 10.75c, packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c, 12.50c and 13.00c, central; 13.25c and 13.75c, 14.50c and 15.00c, western; spot up 0.25c.

Zirconium Alloy: 12-15%, per lb of alloy, eastern contract, carlots, bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads, bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot up $5 per ton.

Zirconium Alloy: Zr 35-40%, eastern, contract basis, carloads in bulk or package, per lb of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot up ¼c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) contract basis fob Niagara Falls, N. Y., lump per lb 5.88c; ton lots 6.38c; less 6.88c. Spot up ½c. **Simanal:** (Approx. 20% each Si, Mn, Al) Packed, lump, carload 9c, ton lots 9.25c, less-ton lots 9.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Tungsten Metal Powder: Spot, not less than 97%, $2.50-$2.60; freight allowed as far west as St. Louis.

Grainal: Vanadium Grainal No. 1 87.5c; No. 6, 60c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

Vanadium Pentoxide, technical grade: Fused, approx. 89-92% V_2O_5 and 5.84% NA_2O; or air dried, 83-85% V_2O_5 and 5.15% NA_2O, $1.10 per lb contained V_2O_5, fob plant, freight allowed on quantities of 20 lb and over to St. Louis.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, delivered at consumer's plant except where noted. For complete OPA price schedule refer to MPR-4

OPEN HEARTH AND BLAST FURNACE GRADES

	—Heavy Melting—		No. 1	—Bundles—			Machine Shop	Mixed Borings,	Short Shovel	Cast Iron
	No. 1	No. 2	Busheling	No. 1	No. 2	No. 3	Turnings	Turnings	Turnings	Borings
‡New York	15.33	15.33	15.33	....	15.33	13.33	10.33	10.33	12.33	....
Philadelphia	18.75	18.75	18.75	18.75	18.75	16.75	13.75	13.75	15.75	14.75
*Boston	14.06	14.06	14.06	14.06	14.06	....	9.06	9.06	11.06	....
Cleveland	19.50	19.50	19.50	19.50	19.50		14.50	14.50	16.50	13.50-14.00
Pittsburgh	20.00	20.00	20.00	20.00	20.00	18.00	15.00	15.00	17.00	16.00
Valley	20.00	....	....	20.00	....	....	15.00	....	17.00	16.00
Mansfield	....	....	....	....	....	....	15.00	....	....	....
Chicago	18.75	18.75	18.75	18.75	18.75	16.75	13.75	13.75	15.75	14.75
Buffalo	19.25	19.25	19.25	19.25	19.25		14.25	14.25	16.25	15.25
‡Detroit	17.32	....	17.32	17.32	17.32	15.32	12.32	12.32	14.32	13.32
St. Louis	17.50	....	....	....	....	....	10.50	....	12.50	....
Cincinnati	19.50	19.50	....	19.50	19.50	....	10.50-11.00	10.50-11.00	12.50-13.00	11.50-12.00
Birmingham	17.00	17.00	17.00	....	17.00	15.00	....	....	12.00	13.00
San Francisco	17.00	17.00	17.00	17.00	17.00	9.00	7.00	....	....	....
Seattle	14.50	14.50	....	....	....	....	....	....	....	....
Los Angeles	14.00	13.00	....	12.00	12.00	....	5.50	5.50	....	....

ELECTRIC FURNACE, FOUNDRY AND SPECIAL GRADES

	Bar Crops and Plate	Cast Steel	Punchings and Plate Scrap	Electric Furnace Bundles	Heavy Turnings	Alloy Free Turnings	Cut Structural and Plate Scrap 1 ft and under	Cut Structural and Plate Scrap 2 ft and under	No. 1 Chemical Cast Iron Borings	Tin Can Bundles
Philadelphia	21.25	21.25	21.25	19.75	18.25	....	21.25	....	*16.51	....
‡New York	....	....	17.83	16.33	....	....	17.83	17.33	14.33	....
*Boston	....	....	....	....	....	....	....	....	13.31	....
Cleveland	22.00	....	22.00	20.50	....	....	....	....	....	....
Pittsburgh	22.50	22.50	22.50	21.00	19.50	18.00	22.50	22.00	19.00	16.00
Chicago	....	....	21.25	....	....	....	....	....	....	....
‡Detroit	....	....	19.82	18.32	....	....	....	....	....	....
Birmingham	15.50	....	....	....	....	....	....	....	....	....
San Francisco	15.50	15.50	....	....	....	7.00	19.00	18.50	....	14.50
							18.00	17.50	....	....

STEEL GRADES OF RAILROAD ORIGIN

	No. 1 Heavy Melting R.R. Steel	Railroad Malleable	Axles	Rails — Rerolling	Random Lengths	Cut 3-ft and under	Cut 18-in. and under	Railroad Specialties	Uncut Tires	Angles, Splice Bars
Pittsburgh	21.00	22.00	26.00	23.50	21.50	23.50	24.75	24.50	23.50	23.50
Valley	21.00	....	....	....	....	....	....	....	....	....
‡Chicago	19.75	22.00	....	22.25	20.25	22.25	23.50	22.75	....	22.25
St. Louis	....	22.00	24.50	21.00	19.00	21.50	....	....	21.00	21.00
Cincinnati	....	....	....	....	20.50-21.00	....	....	....	....	....
Birmingham	....	....	24.00	20.50	18.50	....	....	....	....	20.50
San Francisco	....	....	24.00	....	18.50	....	....	....	20.50	....
Seattle	14.50	....	....	....	....	....	....	....	....	....

CAST IRON GRADES

	No. 1 Cupola Cast	Charging Box Cast	Heavy Breakable Cast	Stove Plate	Unstripped Motor Blocks	Malleable	Brake Shoes	Clean Auto Cast	No. 1 Wheels	Burnt Cast
‡New York	25.00	21.00	20.00	23.00	20.00	24.00	....	....	....	....
*Philadelphia	25.00	21.00	20.00	....	20.00	24.00	17.75	27.00	22.00	....
*Boston	25.00	....	20.00	23.00	....	....	....	27.00	....	....
Buffalo	25.00	21.00	20.00	23.00	20.00	24.00	17.75	27.00	22.00	17.75
Cleveland	25.00	....	20.00	....	....	....	....	....	....	....
*Pittsburgh	25.00	21.00	20.00	23.00	20.00	24.00	17.75	27.00	22.00	17.75
Los Angeles	25.00	....	....	....	....	....	....	....	....	....
*Chicago	25.00	....	....	....	....	24.00	....	....	....	....
‡Detroit	25.00	....	20.00	....	....	....	....	27.00	....	....
*St. Louis	25.00	21.00	20.00	23.00	....	....	17.75	27.00	22.00	17.75
Cincinnati	25.00	....	20.00	23.00	....	....	....	....	....	....
Birmingham	25.00	....	20.00	23.00	20.00	....	17.75	....	22.00	....
*Seattle	25.00	....	....	....	....	....	....	....	....	....

* Fob shipping point; ‡ fob tracks; † dealers buying prices.

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 14.37½c, del. Conn.; less carlots 14.50c, refinery. Dealers may add ¾c for 5000 lb to carload; 1c, 1000-4999 lb; 1½c, 500-999 lb; 2c, 0-499 lb. Casting, 14.12½c, refinery, 20,000 lb or more; 14.37½c, less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 15.50c; 88-10-2 (No. 215) 18.75c; 80-10-10 (No. 305) 18.25c; No. 1 yellow (No. 405) 12.50c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than 20 tons.

Zinc: Prime western 9.25c, select 9.35c, brass special 9.50c, intermediate 9.75c, E. St. Louis; high grade 10.25c, del., carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

Lead: Common 8.10c, chemical 8.20c, corroding, 8.20c, E. St. Louis for carlots; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland - Akron - Detroit area, New Jersey, New York state, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston - Worcester, Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 13.75c; No. 12 foundry alloy (No. 2 grade) 13.75c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 15.25c; grade 2 (92-95%) 14.25c; grade 3 (90-92%) 13.50c; grade 4 (85-90%) 13.00c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lb) 20.50c per lb, carlots; 22.50c 100 lb to c.l. Extruded 12-in. sticks 27.50c, carlots; 29.50c 100 lb to c.l.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1¼c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 51.87½c; Grade C, 99.65-99.79% incl. 51.62½c; Grade D, 99.50-99.64% incl., 51.50c; Grade E, 99-99.49% incl. 51.12½c; Grade F, below 99% (for tin content), 51.00c.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50c; 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 15.00c. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 9999-224 lb; and 2c for 223 lb and less; on sales by dealers, distributors and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.5%, fob refinery 35.00c lb; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c.

Mercury: Open market, spot, New York, $96-$99 per 76-lb flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25%-Be, $14.75 per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms $1.25 lb, del.; anodes, balls, discs and all other special or patented shapes, $1.30.

Cobalt: 97-99%, $1.50 lb, for 550 lb (bbl.); $1.52 lb for 100 lb (case); $1.57 lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Indium: 99.9%, $2.25 per troy ounce.

Silver: Open market, N. Y. 90.12½c per ounce.

Platinum: $72 per ounce.

Palladium: $24 per troy ounce.

Iridium: $125 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 14.37½c, Conn., for copper. Freight prepaid on 100 lb or more.)

Sheet: Copper 25.81c; yellow brass 23.67c; commercial bronze, 95% 26.14c, 90% 25.81c; red brass, 85% 24.98c, 80% 24.66c; best quality 24.38c; phosphor bronze, grade A 4% or 5%, 43.45c; Everdur, Duronze or equiv., hot rolled, 30.88c; naval brass 28.53c; manganese bronze 31.99c; muntz metal 26.78c; nickel silver 5% 32.38c.

Rods: Copper, hot rolled 22.16c, cold drawn 23.16c; yellow brass 18.53c; commercial bronze, 95% 25.83c, 90% 25.50c; red brass, 85% 24.67c; 80% 24.35c; best quality 24.07c; phosphor bronze, grade A 4% or 5% 43.70c; Everdur, Duronze or equiv. cold drawn, 29.82c; naval brass 22.59c; manganese bronze 25.93c; muntz metal 22.34c; nickel silver 5% 34.44c.

Seamless Tubing: Copper 25.85c; yellow brass 26.43c; commercial bronze 90% 28.22c; red brass 85% 27.64c, 80% 27.32c; best quality brass 26.79c; phosphor bronze, grade A 5% 44.70c.

Copper Wire: Bare, soft, fob eastern mills, carlots 19.89c, less carlots 20.39c; weatherproof, fob eastern mills carlot 22.07c, less carlots 22.57c; magnet, delivered, carlots, 23.30c, 15,000 lb or more 23.55c, less carlots 24.05c.

Aluminum Sheets and Circles: 2s and 3s flat mill finish, base 30,000 lb or more del.; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 11.25c; cut sheets 11.50c; pipe 9.90c, New York, 10.00c Philadelphia, Baltimore, Rochester and Buffalo, 10.50c Chicago, Cleveland, Worcester and Boston.

Zinc Products: Sheet fob mill, 14.15c, 36,000 lb and over deduct 7%, Ribbon and strip 13.25c; 3000-lb lots deduct 1%, 6000 lb 2%, 9000 lb 3%, 18,000 lb 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 12.00c; 1-3 tons 13.00c; 500-2000 lb 13.50c; 100-500 lb 14.00c; under 100 lb 15.00c. Hull plate (over 12") add 1c to boiler plate prices.

PLATING MATERIALS

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lb to 1 ton 17.75c; under 400 lb 18.25c.

Copper Anodes: In 500-lb lots, fob shipping point, freight allowed, cast oval over 15 in., 25.125c; curved, 20.375c; round oval straight, 19.375c; electro-deposited, 18.875c.

Copper Carbonate: 52-54% metallic Cu, 250 lb barrels 20.50c.

Copper Cyanide: 70-71% Cu, 100-lb kegs or bbls 34.00c, fob, Niagara Falls.

Sodium Cyanide: 96%, 200-lb drums 15.00c; 10,000-lb lots 13.00c fob Niagara Falls.

Nickel Anodes: 500-2999 lb lots; cast and rolled carbonized 47.00c; rolled depolarized 48.00c.

Nickel Chloride: 100-lb kegs or 275-lb bbls 18.00c lb, del.

Tin Anodes: 1000 lb and over 58.50c del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400 lb bbls 39.00c fob Grasselli, N. J.; 100-lb kegs 39.50c.

Sodium Stannate: 100 or 300-lb drums 36.50c, del.; ton lots 35.50c.

Zinc Cyanide: 100-lb kegs or bbls 33.00c fob Niagara Falls.

Scrap Metals

Brass Mill Allowances: Prices for less than 15,000 lb fob shipping point. Add ⅝c for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	12.000	12.000	11.250
Yellow brass	9.875	9.625	9.125
Commercial bronze			
95%	11.250	11.000	10.500
90%	11.125	10.875	10.375
Red Brass			
85%	10.875	10.625	10.125
80%	10.875	10.625	10.125
Best quality (71-79%)	10.500	10.250	9.750
Muntz metal	9.250	9.000	8.500
Nickel silver, 5%	10.500	10.250	....
Phos. br., A, B, 5%	12.750	12.500	11.500
Naval brass	9.500	9.250	8.750
Manganese bronze	9.500	9.250	8.750

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are fob shipping point; add ¾c for shipment of 60,000 lb of one group and ½c for 20,000 lb of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper and copper borings 11.50c; No. 2 copper wire and mixed heavy copper, copper tuyeres 10.50c.

(Group 2) Soft red brass and borings, aluminum bronze 10.75c; copper-nickel solids and borings 11.00c; lined car boxes, cocks and faucets 9.50c; bell metal 17.25c; babbitt-line brass bushings 14.75c.

(Group 3) Admiralty condenser tubes, brass pipe 8.75c; muntz metal condenser tubes 8.25c; old rolled brass 8.25c; manganese bronze solids; (lead 0%-0.40%) 8.00c; (lead 0.41%-1%) 7.00c; manganese bronze borings, 7.25c.

Aluminum Scrap: Price fob point of shipment, truckloads of 5000 pounds or over; Segregated solids, 2S, 3S, 5c lb, 11, 14, etc., 3 to 3.50c lb. All other high grade alloys 5c lb. Segregated borings and turnings, wrought alloys, 2, 2.50c lb. Other high-grade alloys 3.50c, 4.00c lb. Mixed plant scrap, all solids, 2, 2.50c lb borings and turnings one cent less than segregated.

Lead Scrap: Prices fob point of shipment. For soft and hard lead, including cable lead, deduct 0.75c from basing point prices for refined metal.

Zinc Scrap: New clippings 8.00c, old zinc 6.50c, fob point of shipment, add ½c for 10,000 lb or more. New die cast scrap 5.70c, radiator grilles 5.70c, add ½c for 20,000 lb or more. Unsweated zinc dross, die cast slab 6.55c, any quantity.

Nickel, Monel Scrap: Prices fob point of shipment; add ½c for 2000 lb or more of nickel or cupro-nickel shipped at one time and 20,000 lb or more of monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 23.00c; 90-98% nickel, 23.00c per lb nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb contained nickel, plus 8.00c per lb contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clipping 20.00c; solder sheet 18.00c.

Sheets, Strip . . .

Producers still far behind commitments, with backlogs well into next year, delaying furthur booking

Sheet & Strip Prices, Page 148

New York — Sheet sellers are still far behind on current commitments and have difficulty appraising their position for first quarter and consequently relatively little tonnage is being accepted for shipment beyond the end of the year. Some mills are going on a month to month basis for the remainder of this year, no longer attempting to make definite promises for the quarter as a whole on hot and cold-rolled sheets. On stainless sheets, however, schedules are better organized and producers are able to see their way ahead sufficiently to accept tonnage for first quartetr shipment.

Electric range manufacturers have been turned down by CPA on their requests for priorities or other special aid in obtaining steel. Administrator John D. Small explained that extra steel for one industry can only come by taking it away from others who need it just as much. He estimated, however, that the electric range manufacturers would still receive enough steel to match 1941 production or better it.

St. Louis — Production of sheets and plates here dropped 50 per cent last week when two open hearths, lighted two weeks ago in spite of incomplete repairs due to a shortage of bricklayers, buckled and were shut down. A labor dispute also briefly shut down a slab mill. A shortage of pickling acid has been remedied by a strike settlement in a chemical plant, but steel mills' zinc reserves are nearing the danger point. At capacity operation, expected to be resumed soon, the stockpile would be under six weeks, as compared to the three-month normal. Demand for steel of all kinds is undiminished and pressure on cold-rolled and galvanized sheets is especially great. Capacity is booked through first half. Schedules are being upset somewhat by preference ratings for railroad car steel.

Cincinnati — District sheet mills will delay definite calculations on first quarter schedules until next month when figures on rated tonnages are at hand. Because of the prospective carryover, it is unlikely quotas can be increased. In spite of general recognition of the tight situation in sheets mills are besieged constantly by appeals for more liberal allotments.

Philadelphia — At present the situation is so congested that sheet and strip producers have been able to do little toward acceptance of new tonnage for next year. Some producers have put off opening of books for first quarter to the general trade from week to week for almost a month and at least two large interests now believe it will be near the first of November before they can set up schedules with any assurance.

Cleveland — No progress has been made in reducing the heavy order backlog in most flat-rolled carbon steel products and in many instances the carryover has increased substantially. Rated orders have displaced more business than had been expected and production at

some mills has fallen behind schedule due mainly to scattered work stoppages and lack of steel. Producers are preparing to open 1947 books on principal products but it now appears that no space will be available on many mills until third quarter. Few orders can be accepted for first half on galvanized sheet and cold-rolled strip and sheet. Part of the inability of mills to fill demands arises from the fact that most customers specify light gage material. Distributors now may pass on HHH and HH rated orders to the wholesaler.

Pittsburgh — Efforts of galvanized sheet products to obtain price relief have been given added impetus because of the increase of a cent a pound on zinc. Unless steel shipments to the West Coast are increased steel producers expect CPA to institute a plan which would require them to ship more tonnage into that area. Due to heavy freight absorption necessary on such shipments and the fact that finished steel output has fallen far short of filling demand from markets much nearer production points some producers have drastically reduced shipments to the West Coast. However, some sellers report substantial tonnage of sheets is being shipped into that area under directives for the housing program. Most of these are on a dislocated tonnage basis for which no freight adjustments have been granted, as was the case during the war.

Boston — More fabricators of flat-rolled steel have about reached end of the rope on sheet and strip and ambitious programs planned earlier are curtailed, postponed or abandoned. Metalworking shops are generally getting enough steel to operate; but at levels below those planned earlier. Relatively little firm volume has been entered for first quarter and, with carryovers due to be heavy in most grades, productive capacity will be limited. Stainless is an exception; most users of this grade have comfortable inventories and suppliers' schedules are not as jammed as in carbon sheets. Electrical and enameling stock is tight with most consumers, use of both being substantially heavier in New England. Tightness in hot-dipped galvanized has opened a broader field for electrolytically coated zinc sheets, but meeting demand is difficult, notably in lighter gages, due to capacity required for tin mill products.

Starting first of the year, largest producer of tack plate will sell direct; for years this hot-rolled sheet grade, which is slit for tack machines, has been sold through a distributor. This is a tonnage item in New England, about 15,000 tons annually, although in the past a low margin product. For this reason most mills formerly making the grade have withdrawn.

Chicago — Confronted by unbalanced inventories of steel and lacking various types of components to keep production lines running, many manufacturing companies are curtailing or suspending operations. Because of this, they are accepting shipments of reduced quotas of sheet and strip with less complaint than mills had anticipated. By virtue of reducing quotas of these products in fourth quarter, mills are hoping to come up to yearend with carryover of considerably reduced proportion. Except for one producer, which took action recently, books have not been opened for first half.

Steel Bars . . .

Mills booking orders for first quarter, with backlogs of smaller sizes still tight; demand continues strong

Bar Prices, Page 148

New York — Orders for hot carbon bars for first quarter are being entered by most mills, but on a highly selective basis, at least until they are able to strike a fair balance of schedules. On some sizes, particularly smaller, ranging 1½ inches and under, the situation remains exceedingly tight, and with substantial arrearages indicated in these sizes it is doubtful if most mills will be able to add much tonnage for shipment in that period.

On cold-drawn bars the outlook is a little easier, and on alloy bars very definitely so. In fact, most producers of hot alloy bars can still promise deliveries before the end of this year.

Cleveland—Carbon bar producers are not optimistic regarding improvement in availability of popular sizes and shapes before the latter part of 1947. Even if the products are decontrolled early next year, production can not be increased much above present levels, due to necessity of continuing present allocations of steel finishing mills, some of which will require more tonnage when present expansions are completed. Rated orders have displaced more business than had been expected, adding to the large carryover. Few orders can be accepted when books are opened for first half on small rounds and hot-rolled bars. Some space will be available for March on wide flats and a few other bar shapes.

Boston — Except in smaller sizes, under one inch, carbon bar deliveries are in better volume, with indications some mills are making progress against backlogs. Alloy inventories are in balance, including warehouses, with hot-rolled deliveries in December. Depending on size, cold-drawn alloys extend through first quarter, the smaller range being most extended. Rated volume is not interfering with bar mill shedules to the extent flat-rolled is affected. Numerous fabricators use both carbon and alloy bars and most are well fixed on alloys, including antifriction bearing plants. Demand for alloys has been below expectations, but most users have returned to old specifications, broach makers to mention one. Buying by machine tool shops has dropped far from the peak.

Chicago — All carbon bar products, particularly lighter sizes, are extremely tight. Despite the fact that fourth quarter quotas to customers have been reduced to limit year end carryover, a substantial tonnage must necessarily go over to 1947. Alloys, on the other hand, are in much easier position, and a small amount of rolling capacity for December still is open.

Pittsburgh — Cold-finishing operations continue well below capacity and due to unbalanced inventory little progress has been made against backlogs. Active demand is noted through the full range of specifications, heaviest in two-inch and under. Production by a few automotive parts suppliers have been revised downward because of unbalanced inventories of other critical parts going into automotive production. Some steel interests

believe the present scramble for steel may settle to a more normal basis as expected production by many metalworking industries are readjusted to a more realistic level, resulting in orders involving only replacement tonnage. Sellers are booked solidly for the remainder of the year on all except alloy items, on which November shipment is available.

Philadelphia — Sellers of hot carbon bars are accepting an increasing volume of tonnage for next year. Relatively few have capacity left for first quarter on smaller sizes. Sellers have fairly ample capacity, however, for most sizes of cold-drawn carbon bars and considerable space for alloy bars.

St. Louis — Demand for merchant bars continues to increase, with little prospect of improvement. On the contrary mills are faced with the threat of scrap and zinc shortages. Output is fair, but fluctuates according to bar sizes. A changeover from large to small sizes, due soon, will reduce the district's finished tonnage. Another deterrent is the prospect of another CPA diversion of steel to housing. The housing industries are pressing ever harder for bars, wire and pipe. All are in extremely tight supply. Small bars are in heavy demand and schedules are booked through first half. Books have been closed for several weeks to all but steel for identified projects.

Seattle — Bar and other rolling mills are operating at capacity, faced by heavy backlogs which will take months to clear. New business is not sought, efforts being directed to completing current commitments. Producers have been forced to decline much new business. Only small lots or emergency orders from regular customers are being accepted. Heavy labor turnover and lack of efficiency are holding back production. Pending projects include a Washington state reinforced concrete pile and flat slab bridge in Skagit county, bids Oct. 29.

Steel Plates . . .

Light plate demand continues strong for railroad cars and water craft, with producers limiting orders

Plate Prices, Page 149

Pittsburgh — Plate producers continue under pressure to meet heavy requirements of freight car builders, and for tank, barge and heavy machinery fabrication. Fabricators, however, have been unable to make much headway against large order backlogs on basis of their restricted mill allotments. Until the nearly depleted inventories of fabricators can be increased somewhat, relatively little headway is expected to be made. Overall plate demand has held up exceptionally well since end of war and no decline is indicated for many months. Producers here have been able to maintain practical capacity operations despite the power strike.

Philadelphia — While district plate mills have been able to sustain ingot production during the past week volume is still well short of requirements and certain producers have had to further curtail rolling schedules. Most producers are well behind on current commit-

ments and have enough business on hand to carry them through first half at normal rate of operations. One district mill is accepting some tonnage for delivery in third quarter of next year.

New York — Demand for light gage plates continues far in excess of supply, with certain producers having so much business on hand, in addition to the heavier gages, that they are still refusing to accept orders for next year. Those who are taking orders for next year are booked well into second quarter and in certain instances are fully booked up for first half. No contracting for second half of next year is reported.

Contributing to increasing arrearages is continued curtailment in production due to lack of raw materials, particularly scrap.

Seattle — Small shops report demand for items involving plates has dropped noticeably, one plant placing the decline at 75 per cent. This is attributed in some degree to the government's freezing order on building. Material shortages are handicapping output, February delivery being the best now offering. Portland will soon call bids for a ½-million gallon steel water tank for Selwood park. Eugene, Oreg., plans $600,000 water pipe extension in 1947, involving unstated tonnage of 42 and 45-inch steel pipe. Seattle will open bids Oct. 18 for steel plate specials for the Eighth Ave. S. W. pump station. Henshaw Bros., Portland, are low to West Linn, Oreg., for a 75,000-gallon steel tank.

Structural Shapes . . .

Steel shortage and CPA restrictions limit fabrication, while increased costs cause deferment

Structural Shape Prices, Page 149

New York — Outstanding among local structural awards are 6000 tons for a plant addition for the Consolidated Edison Electric Co. and 1100 tons for a 19-story apartment at 55th St. and Sutton Place. The former went to American Bridge Co., Pittsburgh, and the latter to Utica Structural Steel Co., Utica, N. Y.

General buying, however, continues restricted by CPA limitations and by rapidly increasing construction costs. Meanwhile, construction work already under way in this city is being seriously retarded by rail embargoes resulting from the waterfront strike and also more directly by the trucking tie-up. An easing is indicated but it will require time for operations to get back to normal.

Because of sharply rising costs New York City proposes to reduce its capital outlay budget for 1947 materially. Indications are that numerous projects will be dropped, including schools, hospitals and subway work.

Pittsburgh — Despite dearth of construction awards in recent weeks, fabricators report backlogs are sufficient to sustain active operations well into 1947. Shortage of structurals has delayed completion of many projects. Mills expect substantially to reduce carryover on standard shapes before close of year, but there is little prospect of clearing up carryover on wide flange beams this quarter. Most sellers are not yet scheduling first quarter tonnage. Leading producer here expects to be producing shapes at its Geneva plant by early next month, which should ease the delivery situation somewhat for eastern customers.

Philadelphia — Shape specifications are being accepted freely for first quarter and while a substantial carryover of arrearages is expected at the end of the year, most mills are now able to accept fairly large tonnage for first quarter shipment. Meanwhile there is further slackening in new construction, with various programs being curtailed or dropped completely for the time being and with continuance of important cancellations in some instances.

Chicago — Of new structural fabrication awarded, only a small portion is in this immediate area. Inquiry also continues light as it has for many weeks. A definite trend appears to be developing toward suspending or postponing jobs because of high costs, and in a few instances jobs already awarded are being held up. One railroad is understood to be delaying three jobs previously placed. Lack of sizes of shapes retards fabricators in completing shop work in progress and some improvising or substituting is being done where the shortages involve only a small number of pieces.

Seattle — Fabricators continue in a critical position, handicapped by lack of steel, many shipments being afloat on strike-bound steamers. Plants have cut deeply into inventories. Many contracts have been refused as completion dates cannot be guaranteed. What new business

has been taken is subject to uncertain delivery. Pacific Car & Foundry Co. has been awarded 400 tons involved in the Bow Lake, Seattle, Northwest Air Lines hangar. Washington state is planning a $1,750,000 four-lane steel bridge, 1203 feet in length over the Columbia river near Wenatchee. Preliminary work is under way but contracts, involving an unstated tonnage, will not be placed until 1947 when the material shortage is easier. Joshua Hendy Co., Sunnyvale, Calif., is low at $67,027 for two high pressure gate assemblies for Cascade dam, Boise project, and Horsetooth dam, Colorado, tonnage unstated.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 149

New York — Not only is little new reinforcing work being placed, because of shortage of material, but little that has been placed is going ahead, because of the disturbed trucking situation. Various jobbers are being tied up at this time.

Philadelphia — Reinforcing bar demand is featured by placing of 2000 tons by McCloskey Houses Inc., Philadelphia, for the Whitemarsh housing project nearby. This business went to American Steel Engineering Co., Philadelphia. Other awards are small and scattered, reflecting in particular the difficulty in obtaining reinforcing steel.

Chicago — Lack of reinforcing steel is restricting building activity more each week. Some prospective jobs are being held in abeyance, partly from inability to obtain steel and partly because of high costs. Reinforcing suppliers currently speak of 25 or 50-ton commitments as they once referred to hundreds of tons. Overcommitted for the balance of this year, reinforcing interests display little interest in new business until next year.

Wire . . .

Wire Prices, Page 149

Cleveland — Members of the Steel Labor Advisory Committee have pledged support to a proposed National Housing Agency premium payment plan on nails of housing sizes. Under this plan, a premium of $20 a ton would be paid on all output over established quotas. In answer to industry reports that a shortage of skilled operators was impeding nail production, labor representatives said that union men were willing to work overtime under plant-by-plant arrangements between labor and management. Heretofore, the industry has been unable to reach an agreement with unions at several mills for overtime work and in some instances this was not deemed practical from an economic standpoint.

The labor committee expressed confidence that production could be increased to 78,000 or 80,000 tons monthly with present facilities, compared with current production of about 65,000 tons. This could be accomplished, they said, by use of nail machinery reconverted from large-sized nails, by utilization of trained nail mill operators and by overtime operations. The committee said that a majority of nail mills are now on a five-day week, with many machines operating less than three shifts a day.

Chicago — Substantial demand is de-

veloping for hoops, aggregating a total far ahead of production. Unable to obtain regular types of tacks, consumers are switching to wire variety. Farmers have heavy need for wire fabric in which to store corn and unable to get it in satisfactory volume are turning to improvised methods of constructing bins.

Tubular Goods . . .

Tubular Goods Prices, Page 149

New York — A contract for 4500 tons of 36 and 42-inch steel fabricated pipe for the Idlewild Municipal Airport, this city, has been placed with Alco Steel Products Co., New York.

Seattle — Cast iron pipe dealers report decreased demand, due primarily to inability to make prompt deliveries. At Kelso, Wash., contractors have been waiting weeks to begin work due to lack of cast iron pipe. Tacoma opened tenders Oct. 14 for four local projects involving 1900 tons of cast iron pipe. No deliveries have been made here for a month because of the seamen's strike, much tonnage being afloat.

Rails, Cars . . .

Track Material Prices, Page 149

New York — Featuring passenger car demand is the award of 400 subway cars by the New York Board of Transportation to the American Car & Foundry Co., New York. Freight car buying includes 600 for the Lehigh Valley.

Domestic freight car awards in September amounted to 12,737, against 9530 in August and 15,236 in July, according to the American Railway Car Institute. This brings the total for the first nine months, including orders placed with both commercial and railroad shops, up to 56,545, compared with 38,346 in the corresponding period of last year. Further comparisons follow:

	*1946	1945	1944	1943
Jan.	2,050	7,200	1,020	8,365
Feb.	2,403	1,750	18,240	350
March	4,516	2,500	6,510	1,935
April	3,764	1,120	4,519	1,000
May	3,025	1,526	1,952	870
June	3,334	670	1,150	50
July	15,236	3,500	795	4,190
Aug.	9,530	7,240	3,900	8,747
Sept.	12,737	12,840	400	6,820
Oct.	.....	1,320	2,425	5,258
Nov.	.....	1,650	1,065	870
Dec.	.....	4,116	16,245	2,919
Total	.....	45,432	53,221	41,355

* American Railway Car Institute.

Deliveries during the first nine months amounted to 31,719, according to the Car Institute, which also stated that as of Oct. 1, railroad shops and car builders had 66,097 cars on order and undelivered.

CPA is considering issuance of directives on car steel but at the expense of the French car program now under way. Before final action, however, CPA has promised to give car builders a hearing and this may take place in the week beginning Oct. 21.

Pig Iron . . .

Preference tonnage cuts into foundry supply for nonrated melters; output shows some improvement

Pig Iron Prices, Page 151

Pittsburgh — Temporary curtailment of operations, resulting from the power strike, has permitted many foundries here to accumulate moderate inventories of scrap, coke and pig iron. However, these remain in critically short supply and no significant improvement is indicated. Pig iron consumption showed some improvement last week, although foundry operations continue well below capacity. The local merchant iron producer is not expected to increase output of foundry and malleable iron materially this quarter. This interest has relatively little basic iron on its books, while the furnace has been operating at practical capacity since the end of the steel strike. Volume of certified tonnage is expected to show little change through remainder of this year, which means that 90 per cent of the merchant producer's customers will have to be satisfied with about 50 per cent of the foundry iron produced. Relighting of the Struthers furnace recently should help relieve the tight pig iron supply, particularly for automotive foundries.

New York — While not hit as badly as last month, local consumers of pig iron are still adversely affected by disturbances in the trucking industry. These disturbances more than any one thing, even including the general scarcity of pig iron and coke, are restricting the

melt. However, indications are that the month's castings production will exceed that of September, notwithstanding individual declines at some foundries engaged in non-rated work.

Seattle — The foundry situation in this area has been stabilized by a labor agreement extending to April, 1947. Plants are generally busy with industrial and miscellaneous contracts. Recent increase in cast iron scrap ceiling price has stimulated the movement of that commodity to plants. Pig iron is also available in desired tonnages. Present consumption is back to normal, approximately one-third pig iron and two-thirds cast iron scrap.

Cleveland—Recent relighting of DPC blast furnaces has relieved some of the tightness in pig iron suppy in this district, although output is still far short of demand. The premium price plan in effect for several weeks has also resulted in larger supply. Producers of merchant pig iron have until Nov. 15 to file certifications in connection with bonuses they pay to steel grade iron producers during September. Premium Payments Regulation No. 9 provides that if a merchant pig iron producer reduces shipments of steel grade pig iron in order to increase production of merchant pig iron, he may pay any producer of steel grades a bonus of $2 a ton for taking over his orders for such grades. He must file with Housing Expediter Wilson W. Wyatt a certification regarding transfer by the fifteenth of the month following shipment of such transferred orders. The 30-day extension was granted because of delay in printing of the necessary forms.

Chicago — Already handicapped seriously by shortage of pig iron, foundries are beginning to be pinched for coke. Order books for castings are loaded for months and no progress can be made in working down backlogs. Bringing in of more blast furnaces through the bonus plan of the National Housing Administration holds some promising possibilities, but so far little benefit is observed in this district. WAA has not yet announced whether it will accept the offer of Inland Steel Co. for the DPC blast furnace plant it operated during the war, but favorable action would provide from 20,000 to 24,000 tons of merchant iron per month as aid to the housing program.

Philadelphia — While preference consumers are receiving ample pig iron, nonrated buyers, including nonintegrated steelmakers, are being pinched considerably. Another complication for the latter is increasing shortage of coke. Requirements of foundries doing preference work have increased greatly, several times greater than those specified a year ago in many instances, in addition to an unusual run of poorly prepared coal and the fact that relatively so much blast furnace capacity is going into foundry grades, which require a greater ratio of coke than basic iron, is cutting considerably into needs of nonpreference consumers. One large by-product oven operation is prorating tonnage among these consumers, the second time that prorating has been resorted to this year, the first being about the time of the spring coal strike.

Boston — Larger consuming plants without ratings are relatively the hardest hit by lack of iron. Although spread thin, several furnaces are shipping to New England this month not less than the average of July and August or slightly more tonnage than last month. Under this arrangement one car means much to a small shop, but the larger users benefit slightly. Some of the malleable foundries in Connecticut and others with ratings have more iron than for months, but in the end at the expense of those not qualified for preferment. Not until Mystic is producing and Troy production of foundry grades filters in will any easing in the pig iron shortage be likely.

Cincinnati — The foundry melt, keyed to unchanged allotments of pig iron and the continuing scarcity of scrap, is on a level with September. In this district the pinch in northern iron seems more severe than in southern iron. An oddity developed when a melter, on priority because of requirements for veterans' housing, cut back the iron requirements because his products were not moving, fewer homes being completed than anticipated. Inventory could be moved to non-veteran buyers but is not permitted. Coke supplies are tight.

Buffalo — With producers shipping increased tonnages to distant sections, which are usually covered by sellers here, foundries in the area are getting less iron and complaints of lighter melts have increased. With iron being distributed more widely, the margin between preference allotments and available free iron has been narrowed.

Scrap . . .

Tight supply shows no sign of improvement under present price plan; melters receive only part of needs

Scrap Prices, Page 152

Boston — Prospective breakdown of OPA is no help for the movement of scrap at current ceiling prices. Sharp advance in prices is foreseen if the demise occurs; this happened before during the recess and is likely to be repeated. Already talk of behind-the-scenes dealings is rampant. Shipments are light in all categories, including low phos. With one exception, steel works are pressed for scrap and foundries are combing the area for cast. With the ratio of scrap going into melts higher than ever and the visible supply low, how some foundries continue even at current levels is a mystery. Industrial scrap shipments are below normal. Higher prices might release some yard scrap, but supply regardless of prices is limited.

Chicago — Pessimism is growing over the steelmaking scrap outlook for winter. Intake runs only a scant margin over consumption, which prevents reduction of inventories, but substantial building up is necessary to guarantee full winter steel output. Consumers and sellers alike discount CPA's inventory control plan. Little country scrap is available, and manufacturers' material is not expanding to the degree hoped for. Railroad offerings are sizable, but fall short of making up deficiencies. Steel mills are losing no opportunity to line up whatever supplies they can through their own initiative. Cast scrap remains scarce, and reports of black market operations increase.

Calumet Iron & Supply Co., East Chicago, Ind., has negotiated a purchase from the Navy of 80,000 tons of iron and steel war scrap at Pearl Harbor, representing an accumulation over four and one-half years. John S. Gray, vice president, and Harold Weinstein, secretary, are now abroad in connection with the transaction, and until they return in about a week full details as to where the material will be prepared, the area in which it will be offered or the time of arrival in this country will not be known.

Pittsburgh — Relatively insignificant tonnage of scrap is being shipped by dealers and brokers and shows no sign of increasing under present price regulation. Mills continue to rely heavily on dwindling inventories, although considerable tonnage is shipped direct from customers. Steel producers are pessimistic over the scrap outlook for winter despite indications the government's scrap collection efforts are gradually gaining momentum. Substantial farm scrap tonnage is believed available but collecting it is difficult. While considerable time must elapse before the shipbreaking program will bring results it is expected a large proportion of 13.5 million square feet of steel landing mat tonnage to be offered by WAA will be bought for scrap.

Buffalo — Unexpected trouble which forced the shutdown of a blast furnace relighted recently after a relining job, threw a further scare into the tightening scrap market this week. With reserve stocks of the affected mill at a low point, an intercompany allocation setup brought three boatloads of iron here from lake ports. All the iron was for open-hearth consumption. Scrap dealers report yard receipts continue light. One mill received a 5,000-ton boatload over the weekend, and hopes to squeeze in another similar load before the navigation season ends.

Philadelphia—One leading eastern steel producer who had been granted permission to buy low phos scrap for open hearths has canceled all such contracts because of dissatisfaction with the quality of material being received. In general, flow of scrap in this district is being further retarded as sellers weigh the prospect of early lifting of price controls, which may result from decontrolling prices on many commodities in the near future.

New York — General movement of scrap out of this area is slightly better than a month ago, although volume is still far short of requirements. Most of the scrap is moving at the low phos premium for basic open hearths.

St. Louis — Scrap shipments remain 80 to 90 per cent under normal in this district, with railroad metal comprising most of the tonnage. Consumption continues to outstrip receipts, with the result that the favorable position mills built up during a summer-long strike is beginning to be seriously impaired. Stockpiles now average under 30 days. Except for cast, foundries are in fair condition. Brokers profess to see no signs of better shipments in the future unless higher prices are granted.

Cincinnati — Some district melters are in a desperate position on iron and steel scrap. Appeals for tonnage are now accompanied by statements that prompt shipments are necessary to avoid shutdowns. At least one major melter was kept in production by emergency diversion of tonnage. Reports of upgrading, and of scrap swapping are more frequent.

Geneva, Utah, Established As Basing Point on Plates

Geneva Steel Co. has established Geneva, Utah, a basing point applying to its sales of sheared steel plates within the range of sizes, grades, finishes and specifications currently produced at Geneva. This action became effective Oct. 14.

The company's base price at Geneva for sheared plates will be $2.65 per 100 pounds in carload lots. The base price at West Coast ports is $3.085 per 100 pounds which means that on shipments into that area the company will have to absorb 18.5 cents. Present freight rate from Geneva to West Coast is 62 cents per 100 pounds but there is some prospect that this rate may be reduced to about 41 cents.

The new base price at Geneva is subject to seller's current list of extras, standard conditions of sale and are subject to change without notice. Shipments will be invoiced at prices and extras in effect at time of shipment, but such prices shall not exceed the applicable maximum prices lawfully established by OPA and in effect at time of shipment.

Warehouse . . .

Warehouse Prices, Page 150

Philadelphia — Notwithstanding dropping of the direction order which regulated distribution of steel to warehouses in third quarter most jobbers report they are receiving tonnage from mills in generally satisfactory volume. In fact, they estimate that this month may be one of the best months so far this year, if not the best, as there is continued good demand and sufficient tonnage coming in from producers to enable them to meet much of it, at least to the extent of accounting for a generally high volume. Heaviest demand continues in sheets and strip and jobbers cannot anywhere near meet requirements.

Pittsburgh — CPA has asked steel producers to do everything possible to help warehouse interests meet record demand by increasing mill shipments to distributors, particularly of sheets, strip and small sizes of hot and cold-finished bars. Some distributors pin hopes on mill promises that some tonnage promised for third quarter will be shipped in addition to currently scheduled orders. Although mill shipments of nails have been in fairly large volume, withdrawals from jobbers' stocks are increasing under pressure of priority orders for the housing program. Jobbers report mill shipments also are being maintained on standard pipe, but demand is increasing. Steel distributors are carefully allocating limited inventories on basis of normal distribution pattern, the same as mills.

Nonferrous Metals . . .

Nonferrous Prices, Page 153

New York — Effective Oct. 14 increases of $2 to $4 a ton apply as premiums and toll charges for converting or casting refined copper into special shapes.

The increases follow: Where toll charge premiums in effect Aug. 11, 1941, and premiums in effect in March, 1942, were $1 to $3.50 per ton, now increased by $2 and where over $3.50 per ton increased by $4 per ton.

Price increases for special shapes were requested by refineries producing 90 per cent of the special shapes required in the operations of brass mills on the basis that former maximum charges did not cover the total cost of casting special shapes. As a result some refineries either reduced or stopped production of these shapes so that brass mills have been unable to obtain sufficient supplies of these essential shapes.

About 25 per cent of the total refined copper sold in the country is in the form of special shapes, the total selling price of which will be raised an estimated one per cent. In general refineries which cast copper into special shapes do it on a toll basis for copper producers to meet requirements of their customers. Toll charges are based on premiums for special shapes paid by the customer, a brass mill, to the copper seller, which were formerly frozen at the ceiling prices for standard shapes plus the premiums in effect Aug. 11, 1941. However, the toll charges were formerly covered by the services pricing schedule (Revised Maximum Price Regulation No. 165) and were at the seller's March, 1942, freeze prices. Today's action brings toll charges under the general copper pricing schedule (Revised Price Schedule No. 15) and at the same time raises

these charges to cover total costs.

Because the toll charges are based under contracts upon the premiums paid by the brass mill consumer premiums paid by consumers also had to be raised to enable refineries to increase their toll charges, OPA explained. About 90 per cent of the casting of special shapes is on a toll basis and the remaining 10 per cent is part of refineries own integrated production.

Since the increases are averages and some services may still result in losses, OPA may grant individual adjustments for casting services under toll agreements. These will be given only when it appears that the new ceiling prices for standard or special shapes made under toll agreements impede these services and the services are essential. However, when individual increases are granted, they will be limited to amounts sufficient to cover total costs, OPA said.

Production of crude and refined copper was up slightly last month over August; crude totaled 69,689 tons compared with 64,462 tons and refined 67,803 tons against 59,591 tons. Refined stocks starting Oct. 1 were 98,619 tons, up from 94,669 tons the month previous. Oct. 1, last year stock aggregated 76,512 tons.

Slab Zinc Ceiling Price Advances 1 Cent a Pound

Ceiling price for primary slab zinc advanced 1 cent a pound, effective Oct. 14, as required by the "world price" amendment of the Price Control Extension Act of 1946. The base price is now 9.25c, East St. Louis, for prime western.

Office of Price Administration also announced the following price advances: Secondary slab zinc continues to retain the same ceiling prices as primary slab zinc by being raised the same amount, 1 cent a pound.

Zinc scrap materials raised ¾-cent a pound.

Leaded zinc oxides raised to 8.00c a pound. Maximum price was formerly 7.00c a pound for zinc oxides containing 35 per cent or more lead and 7.125c for those containing less than 35 per cent lead. Lead-free zinc oxides increased ¾-cent per pound over their previous March, 1942, "freeze" price levels.

Rolled zinc products raised 1 cent a pound.

Dealer premium differentials on sales of less than carload lots of primary and secondary slab zinc were increased the same percentage for each quantity bracket as producers' prices for the products were raised.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

6000 tons, addition, waterside station, Consolidated Edison Electric Co., New York City, to American Bridge Co.

5200 tons, subway extension at Jamaica, Long Island, for New York City Board of Transportation, to Bethlehem Steel Co., Bethlehem, Pa., through Van Wagner Co., 32 East 149th St., New York.

2200 tons, plant, Muskegon, Mich., for Consumers Power Co., to American Bridge Co., Pittsburgh.

2000 tons, generating plant for Pennsylvania Electric Co., Warren, Pa., to American Bridge Co., Pittsburgh.

1600 tons, store for Maas Bros., St. Petersburg, Fla., to Lehigh Structural Steel Co., Allentown, Pa.

1500 tons, gantry trestles, Davis dam, Kingman, Ariz., for U. S. Bureau of Reclamation, to Consolidated Steel Corp., Los Angeles.

1200 tons, trash racks, Spec. 1291, Grand Coulee dam, Odair, Wash., for U. S. Bureau of Reclamation, to Southwest Welding & Mfg. Co., Alhambra, Calif.

1100 tons, 19-story apartment, 55th St. and Sutton Place, New York City, through George A. Fuller Co., New York, to Utica Structural Steel Co., Utica, N. Y.

635 tons, warehouse, Champion Paper Co., Pasadena, Tex., to American Bridge Co., Pittsburgh.

600 tons, platform extensions, New York City Board of Transportation, to American Bridge Co., Pittsburgh.

435 tons, two bridges, Idlewild Municipal airport, New York City, to American Bridge Co., Pittsburgh.

400 tons, Northwest Air Lines hangar, Bow Lake, Seattle, to Pacific Car & Foundry Co., Seattle.

400 tons, coffer dam, Shasta dam, Central Valley, Calif., to Consolidated Steel Corp., Los Angeles.

355 tons, state bridge, Passaic, N. J., through Union Building & Construction Co., to American Bridge Co., Pittsburgh.

350 tons, factory building, Skokie, Ill., for James P. Marsh Corp., to Joseph T. Ryerson & Son Inc., Chicago; A. L. Jackson Co., Chicago, contractor.

310 tons, coal loading facilities, Scranton, Pa., to Lasker Boiler & Engineering Corp., Chicago.

250 tons, warehouse building for Stahleker Steel Corp., Cambridge, Mass., to American Bridge Co., Pittsburgh.

245 tons, alterations to bus terminal, Omaha, for Interstate Transit Co., to Gate City Iron Works, Omaha.

180 tons, state bridge in Montgomery County, Pennsylvania, to American Bridge Co., Pittsburgh.

150 tons, building, Flushing, L. I., through John W. Ryan, general contractor, to Schacht Steel Construction Co. Inc., New York.

135 tons, building No. 6, American Cyanamid Co., Wallingford, Conn., to American Bridge Co., Pittsburgh.

100 tons, 167th St. grade separation, Chicago, for Cook county, to American Bridge Co., Pittsburgh; Arcole Midwest Corp., Chicago, contractor.

STRUCTURAL STEEL PENDING

1700 tons, reconstruction bridge A-307, Redland, Okla., for Kansas City Southern Railroad.

600 tons, compressor unit, Whiting, Ind., for Standard Oil Co. (Indiana).

450 tons, addition to welding and machine shop, Whiting, Ind., for Standard Oil Co. (Indiana).

320 tons, theater building, Laredo, Tex., for Warner Bros.

300 tons, continuous beam bridge, Green River, Utah, for state.

250 tons, factory building for J. S. Thorn, Bustleton, Pa.

250 tons, state bridge in Cambria County, Pennsylvania; bids Nov. 8.

120 tons, state bridge in Cambria County, Pennsylvania; bids late in November.

100 tons, highway shop, Viroqua, Wis., for state.

Unstated, $5 million expansion of E. I. duPont

de Nemours River Road plant, Tonawanda, N. Y.

Unstated, $1,750,000, a four-lane, arch cantilever bridge Columbia river near Wenatchee, Wash.; bids to state highway commission, Olympia, early 1947.

REINFORCING BARS . . .

REINFORCING BARS PENDING

320 tons, store building, Evanston, Ill., for Maurice L. Rothschild.

Unstated, Washington state bridge, Skagit county; bids to Olympia, Oct. 29.

PLATES . . .

PLATES PENDING

Unstated, 42 and 45-inch water supply pipe, estimated at $600,000, for Eugene, Oreg.; bids planned for early 1947.

Unstated, ½-million gallon elevated steel tank for Sellwood Park, Portland, Oreg.; bids soon.

PIPE . . .

STEEL PIPE PLACED

4500 tons, 36 and 42-inch steel pipe, Idlewild Municipal Airport, New York City, to Alco Steel Products Co., New York.

CAST IRON PIPE PENDING

1900 tons, four local improvement projects, Tacoma, Wash.; bids Oct. 14.

RAILS, CARS . . .

RAILS PLACED

Pennsylvania Railroad, 130,000 tons minimum, with Carnegie-Illinois Steel Co., Pittsburgh, receiving 65,000 to 87,500 tons; Bethlehem Steel Co., Bethlehem, Pa., 57,200 to 77,000; and Inland Steel Co., Chicago, 7800 to 10,000 tons; in addition orders for track fastenings covering a minimum of 65,000 tons and a maximum of 87,500 tons having been placed. Originally the railroad asked for 200,000 tons of rail plus accessories with the full amount of rail tonnage subsequently erroneously reported placed.

RAILROAD CARS PLACED

Central Railroad of Pennsylvania, 8 seventy-ton ore cars, to Harlan & Hollingsworth Co., Wilmington, Del.

Lehigh Valley, 500 fifty-ton steel box cars to Pullman-Standard Car Mfg. Co., Chicago, and 100 seventy-ton gondolas to Bethlehem Steel Co., Bethlehem, Pa.

RAILROAD CARS PENDING

Chesapeake & Ohio, 247 light weight passenger cars, including 112 sleepers; bids asked.

Chicago, Indianapolis & Louisville, 525 freight cars, including 200 box cars, 100 hoppers, 100 gondolas, 100 flat cars and 25 stock cars.

Louisville & Nashville, 300 fifty-ton flat cars; bids asked.

New York, New Haven & Hartford, 27 sleepers; bids asked.

LOCOMOTIVES PLACED

Chicago, Indianapolis & Louisville, one 1500-horsepower diesel-electric switcher, to American Locomotive Co.

LOCOMOTIVES PENDING

Indian State Railways, sixteen or fifty 4-6-2 type locomotives; bids asked.

Mozambique Railways, Africa, eight 4-8-2 type locomotives; bids asked.

New York, New Haven & Hartford, 15 diesel-electric locomotives, permission requested of federal court for purchase, hearing set for Oct. 18.

South African Railways, 100 steam locomotives of either the 4-8-2 or 2-8-4 type.

Lake Fleet Racing To Build Adequate Winter Stockpiles

(*Concluded from Page 64*)

tons a month. Should this rate of consumption be maintained through the winter, it is obvious that stockpiles would be virtually exhausted by next May 1, not allowing for April shipments. Ordinarily, the industry has a comfortable carryover at the opening of the lake shipping season, which usually occurs in April. For example, on May 1 this year, stocks amounted to 23 million tons at docks and furnaces. These were unusually large due to the steel strike and the resultant lapse in consumption. On May 1, 1945, stocks were 16½ million tons.

In the event high blast furnace operations are maintained through the winter months and no work stoppages occur, it is possible that unbalances in ore supply would show up long before even an early opening of the lake shipping season. This might necessitate trading of ore among furnace operators and possibly all rail shipments from the mines.

Should the winter bring a repetition of last winter's labor difficulties, either in steel or supplying industries, such as coal, ore stocks would be more than ample.

CONSTRUCTION AND ENTERPRISE

ALABAMA

DECATUR, ALA.—Calumet & Hecla Consolidated Copper Co., Wolverine Tube Division, H. Y. Bassett, general manager, Detroit, has let contract to Foster & Creighton, American National Bank Bldg., Nashville, Tenn., for a copper fabricating plant near here, estimated to cost about $12 million, covering about 250,000 square feet of floor space, for manufacture of copper tubing.

CALIFORNIA

ALAMEDA, CALIF. — Kieckhefer Container Co., 2 Pine St., San Francisco, plans a fiberboard plant here, to cost about $600,000.

HUNTINGTON LAKE, CALIF. — Southern California Edison Co., 601 West Fifth St., Los Angeles, has let contract to Robert E. McKee, 4700 San Fernando Rd., Los Angeles, for a 62 x 89-foot shop addition and crane runway at Big Creek plant, to cost about $150,000.

OAKLAND, CALIF.—General Electric Co., 5411 East Fourteenth St., plans erection of a magnet wire, cable and lamp ballast manufacturing plant, to cost about $130,000.

CONNECTICUT

WATERBURY, CONN.—Scoville Mfg. Co., 99 Mill St., has let contract to Turner Construction Co., 38 Newbury St., Boston, for brass rolling mill addition, to cost about $55,000.

DELAWARE

NEWARK, DEL.—Chrysler Corp., engineering division, Highland Park, Mich., plans an assembly and parts plant here to cost about $2 million.

INDIANA

CENTERTON, IND.—Indianapolis Power & Light Co., Electric Bldg., Indianapolis, H. T. Pritchard, president, is having plans prepared by Gibbs & Hill, 450 Seventh Ave., New York, for a 40,000-kva generating plant, boiler house and 132,000-volt transmission line, to cost about $7 million.

LOUISIANA

GRETNA, LA.—Southern Cotton Oil Co. will receive bids Nov. 12 through Graham, Anderson, Probst & White, 1417 Railway Exchange Bldg., Chicago, for a four-story refinery plant building.

MARYLAND

SPARROWS POINT, MD.—Bethlehem Steel Co., Bethlehem, Pa., is having plans prepared by United Engineers & Contractors Inc., 1401 Arch St., Philadelphia, for a power station, to cost about $15 million.

MASSACHUSETTS

CAMBRIDGE, MASS.—Stahleker Steel Corp., 66 Binney St., plans a one-story warehouse 200 x 900 feet on plans by Anderson Nichols Associates, 53 State St., Boston.

MICHIGAN

ADRIAN, MICH.—Howard A. Hayden & Associates Inc., 1632 East Maumee St., has been incorporated with $100,000 capital to manufacture cutting tools, by Howard A. Hayden, 16167 Warwick Rd., Detroit.

BAY CITY, MICH.—National Light Metals & Plastics Co., 1937 Woodside Ave., has been incorporated with $25,000 capital to manufacture plastics, metals and metal parts, by R. C. Swisher, 303 Fillmore Place.

DETROIT—F & G Industries Inc., 19048 Roslyn Rd., has been incorporated with $50,000 capital to manufacture machinery and design tools, by Leonard Friedman, same address.

DETROIT—Becker Mfg. Co., 19395 Sherwood Ave., has been incorporated with $100,000 capital to manufacture metal stampings, by Joseph Jurges, same address.

DETROIT—Chevrolet Force Division of General Motors Corp., 3044 West Grand Ave., will let contracts soon for an addition to its bumper plant, to cost about $100,000. Albert Kahn Associated Architects & Engineers Inc., 345 New Center Bldg., is engineer.

DETROIT—Hawthorn Metal Products Co., 13850 Hawthorne St., will let contract soon through Christian W. Brandt & Associates, architects, 1418 Woodward Ave., Royal Oak, Mich., for a metal stamping plant and office, to cost about $250,000.

PINCKNEY, MICH.—Doll & Watters Mfg. Co. has been incorporated with $50,000 capital to manufacture internal combustion engines, by John L. Doll, 16239 Muirland Ave., Detroit.

JACKSON, MICH.—Triangle Mfg. Co., 506 North Mechanic Ave., has been incorporated with $50,000 capital to manufacture press and screw machine parts, by Ernest J. Palmer, 1814 North Fayette Ave., Saginaw, Mich.

MUSKEGON, MICH. — Centrifugal Foundry Co., Glenside and Sherman Sts., has been incorporated with $625,000 capital to manufacture centrifugal castings, by William M. Hall, 1415 Palmer Blvd.

MUSKEGON HEIGHTS, MICH. — Anderson Pattern Inc., 500 West Sherman Blvd., has been incorporated with $150,000 capital to manufacture metal and wood patterns, by Clifford D. Anderson, 1684 Randolph Ave., Glenside, Muskegon, Mich.

PELLSTON, MICH.—Castmaster Products Inc., Stimpson and State Sts., has been incorporated with $6000 capital to manufacture die casting machinery, by Kenneth D. Stowell, Box 6, Oden, Mich.

ROYAL OAK, MICH.—R & H Machine Co.,

322 Washington Square Bldg., has been incorporated with $40,000 capital to manufacture automotive and machine parts, by R. Ronald Evans, 16509 Twelfth St., Detroit.

ST. JOSEPH, MICH.—Bridgman Castings Inc., State Bank Bldg., has been incorporated with 2000 shares preferred and 5000 shares common stock, all no par value, to manufacture metal and plastic castings, by Victor W. Peterson, 621 South Kolmar Ave., Chicago.

VASSAR, MICH.—Vassar Electroloy Products Inc., 988 West Huron Ave., has been incorporated with $100,000 capital to manufacture metal and alloy products, by Otto J. Nickodemus, 407 West Huron Ave.

MISSOURI

KANSAS CITY, MO.—Great Lakes Carbon Co., 333 North Michigan Ave., Chicago, will build a rock wool insulation plant, to cost about $70,000.

ST. LOUIS—American Packing Co. has let contract to Willingham Construction Co., 5701 Vernon Ave., for alterations and reconstruction of its plant at 3858 Garfield Ave. Plans are by Neal J. Campbell, 911 Locust St.

SUGAR CREEK, MO.—Standard Oil Co., 910 South Michigan Ave., Chicago, has let contract to Stone & Webster Engineering Corp., 33 South Clark St., Chicago, for a one-story 100-octane plant, cracking plant and research building, to cost, with equipment, an estimated $20 million.

NEW HAMPSHIRE

DOVER, N. H.—Kidder Press Co. plans a one-story 100 x 242-foot plant costing about $100,000. M. E. Witmer, 2 Hillside Dr., Portsmouth, N. H., is architect.

NEW YORK

WOODSIDE, N. Y.—Eagle Precision Mfg. Corp., 35 36th St., Long Island City, N. Y., will build a plant for manufacture of metal products at 56-07 Northern Blvd., to cost about $100,000.

NORTH CAROLINA

GASTONIA, N. C.—Textile Parts & Machine Co. has been incorporated with $100,000 capital to manufacture iron and metal parts, by L. W. Cloniger and associates.

HICKORY, N. C.—Hickory Springs Mfg. Co. has been incorporated with $100,000 capital to manufacture springs, by P. C. Underdown and associates.

OHIO

AKRON—Machinery Terminals Inc. has been incorporated with 100 shares no par value to manufacture machinery, by Edward J. Rabb, New Weisberger Bldg., Barberton, O. Frank C. Thompson, 27 South St., Akron, is statutory agent.

CLEVELAND—United Screw & Bolt Corp., 3590 West 58th St., C. E. Cramer, vice president, will build a one-story 50 x 59-foot addition to its plant, to cost about $15,000.

CLEVELAND—Midland Steel Products Co., 10608 Madison Ave., E. J. Kulas, president, will build a one-story 81 x 456-foot press building costing about $200,000, including a 10-ton crane runway.

CLEVELAND—Adams Engineering Co., 1969 East 119th St., William P. Adams, manager, manufacturer of jigs and machinery, plans erection of a one-story office and manufacturing plant early in 1947.

CLEVELAND—Sheffield Bronze Powder & Stencil Co., A. H. Gross, president, 12405 Euclid Ave., plans erection of a one-story 50 x 170-foot office building, 120 x 260-foot factory and 60 x 150-foot storage building on Waterloo Rd., to cost about $200,000.

CLEVELAND—Republic Brass Co., 1623 East 45th St., has let contract to D. W. Rankin, 1836 Euclid Ave., for a one-story 100 x 190-foot plant addition, to cost about $75,000. Christian, Schwartzenberg & Gaede, 1836 Euclid Ave., are architects.

DEFIANCE, O.—General Motors Corp., General Motors Bldg., Detroit, has plans for a foundry plant at Defiance, to cost about $8 million.

NEW PHILADELPHIA, O.—A. L. Schwab Industries Inc. has been incorporated by A. L. Schwab, president and treasurer, to manufacture iron and steel products. Plant will include electric steel foundry.

WARREN, O.—Warren Stamping Co. has been incorporated with 250 shares no par value, by James H. Shinn, 390 Griswold St.

PENNSYLVANIA

BURNHAM, PA.—Baldwin Locomotive Works, Standard Steel Works Division, Burnham, has let contract to American Bridge Co., Broad Street Station Bldg., Philadelphia, for two one-story plant buildings, 75 x 100 and 100 x 100 feet, to cost over $100,000.

MEADVILLE, PA.—Talon Inc. is expected to let contract soon for a plant addition to cost about $250,000. Wilbur Watson & Associates, 4614 Prospect Ave., Cleveland, are architects.

PHILADELPHIA—American Pulley Co., 4200 Wissahickon Ave., has let contract to Barclay White Co., 22 North 36th St., for additions to manufacturing plant, to cost about $55,000.

SOUTH CAROLINA

CHARLESTON, S. C.—American Agricultural Chemical Co., 50 Church St., New York, will build a brick and steel sulphuric acid plant, estimated to cost about $60,000.

CLARK HILL, S. C.—United States Engineers, Savannah, Ga., have plans completed for a hydroelectric power plant near Clark Hill, to cost approximately $26 million. C. T. Main Inc., 201 Devonshire Pl., Boston, are engineers.

TEXAS

HOUSTON, TEX.—Wyatt Metal & Boiler Works, Washington St., has let contract to Tellepson Construction 3900 Clay St., for a plant addition, to cost about $55,000.

HOUSTON, TEX.—B. & J. Spring Co., 1513 Austin St., plans a one-story 100 x 100-foot shop building, to cost about $60,000. McKie & Kamrath, 2017 West Gray St., are engineers.

PORT NECHES, TEX.—Jefferson Chemical Co. Inc., Port Neches, has let contract to Lummus Co. and E. B. Badger & Sons Co., Port Neches, for a chemical plant, to cost about $10 million.

UTAH

SALT LAKE CITY—Armco Drainage & Metal Products Inc., 631 South Third St., R. Grant, district manager, plans two plants costing about $200,000, one for manufacture of metal pipe and the other for reinforced concrete pipe.

VIRGINIA

RICHMOND, VA.—E. I. du Pont de Nemours & Co., Du Pont Bldg., Wilmington, Del., has let contract to Leonard Construction Co., 37 South Wabash Ave., Chicago, for a sulphuric acid plant, to cost about $500,000.

WISCONSIN

MILWAUKEE—Heil Co., 3000 West Montana St., has let contract to Klug & Smith Co., 111 East Wisconsin Ave., for a one-story 125 x 175-foot machine shop addition, to cost $60,000.

MILWAUKEE—Cutler-Hammer Inc., 315 West Twelfth St., has let contract to H. Schmitt & Son Inc., 930 East Burleigh St., for a plant addition to cost about $80,000. Eschweiler & Eschweiler, 720 East Mason St., are architects.

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20-Ton P&H 39'6" Span
20-Ton Shaw 76'4" Span
20-Ton Shepard Niles 49'6" Span
15-Ton Alliance 50' Span
15-Ton Alliance 35' Span
15-Ton Cleveland 55'6" Span
15-Ton Cleveland 35' Span
15-Ton Morgan 77' Span
15-Ton Niles 32' Span
15-Ton Northern 53' Span
15-Ton Shaw 82' Span
15-Ton Shaw 77' Span
15-Ton Toledo 82' Span
15-Ton Whiting 74'8½" Span
12-Ton Morgan 56' Span
10-Ton Alliance 58'9" Span
10-Ton "American" 27' Span
10-Ton Case 31'9" Span
10-Ton Cleveland 36' Span
10-Ton Cleveland 50' Span
10-Ton Lane 50 Span
10-Ton Morgan 39'5" Span
10-Ton Morgan 77' Span
10-Ton P&H 57' Span
10-Ton Northern 34' Span
10-Ton P&H 37'4" Span
10-Ton P&H 48'10½" Span
10-Ton P&H 60' Span
10-Ton P&H 80' Span
10-Ton P&H 87'6" Span
10-Ton Toledo 36' Span
10-Ton Manually Operated
7½-Ton Erie 70' Span
7½-Ton P&H 30 6" Span
7½-Ton Shepard 36' Span
6-7-Ton Milwaukee 70' Span
6-Ton Shaw 23' Span
5-Ton "American" 10' Span
5-Ton Champion 37'6" Span
5-Ton Euclid
5-Ton Milwaukee 39'8" Span
5-Ton Milwaukee 66'9" Span
5-Ton Milwaukee 70' Span
5-Ton Northern 49'6" Span
5-Ton P&H 45' Span
5-Ton Shaw-Box 26' Span
5-Ton Shepard 40' Span
5-Ton Toledo 96' Span
5-Ton Whiting 80' Span
3-Ton P&H 40'4" Span
3-Ton Shaw 33' Span
3-Ton Whiting 57'3" Span
2-Ton Detroit 28' Span
2-Ton Louden 19'2" Span
2-Ton P&H 46'4" Span
2-Ton Shep. Niles 18' Span
2-Ton Shep. Niles 14' Span
1½-Ton Cleveland 25' Span
1½-Ton P&H 22'8" Span 34' Span
1-Ton Curtis 24' Span
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ENGINEER, AGE 37, TECHNICALLY TRAINED, 11 years of Engineering Experience, 15 years of broad contacts with aircraft. Capable in research, design, liaison. Good references. C. E. Kahlke, Jr., 34 Grant St., Jamestown, N. Y.

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Help Wanted

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WANTED: ASSISTANT SHOP MANAGER FOR a plant doing general repair work of heavy construction equipment and building new equipment; must be a competent machinist and familiar with modern welding techniques and shop practices. Age 35 to 45. Applicants should give education and experience in detail, and state present and expected salary. Location near New York City. Address Box 710, STEEL, Penton Bldg., Cleveland 13, O.

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For shop producing 400 tons carbon and alloy steel, 400 tons electric iron and 150 tons brass pressure vessel castings per month. Must have broad and extensive experience in foundry operations, proven administrative ability, and good practical and technical background. Excellent opportunity with long established company of best reputation. Address Box 731, STEEL, Penton Bldg., Cleveland 13, O.

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