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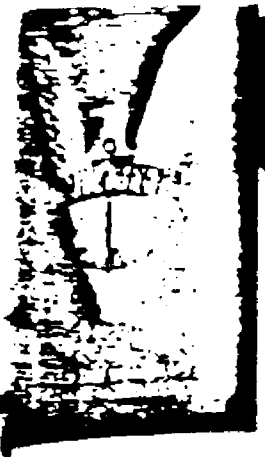

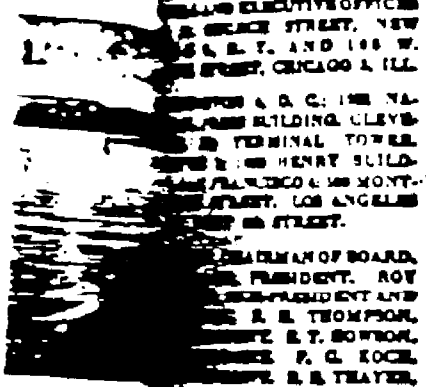

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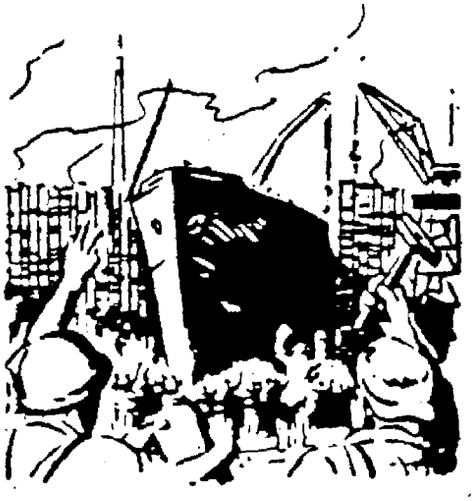

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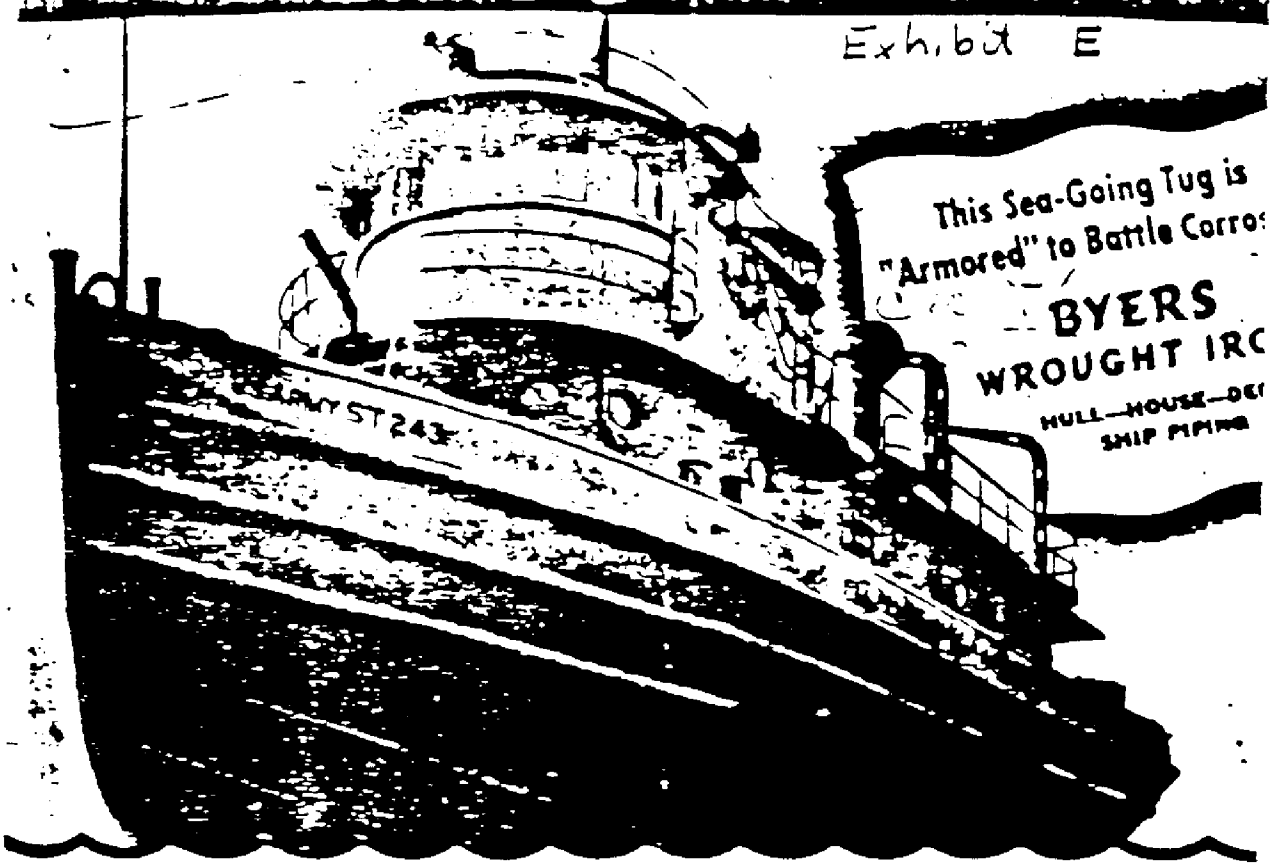

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Built by Lexington Shipbuilding Company and owned by Transportation Corps, War Department, this 85-foot tug is equipped to fight an ever present enemy—corrosion. Hull, deck, deck-house and many important ship piping services are Byers Wrought Iron. The tug is an all-welded job, has a gross tonnage of 140, and is powered with a 720 SHP Diesel.

During the past few years, the spotlight has been on the construction of cargo and war vessels . . . but this does not mean that smaller craft are any less important, or that durability is any less essential. The records of service of 50 years and more show that wrought iron is one of the surest means of getting long durability.

A survey of vessels with wrought iron hulls, made a few years ago, showed the dredge "Chinook" still working after 48 years; the ice breaker "T. C. Latrobe" operating in the Chesapeake after 62 years; the "Uncle," built in 1878, still plying the Gulf. These are only a few of many.

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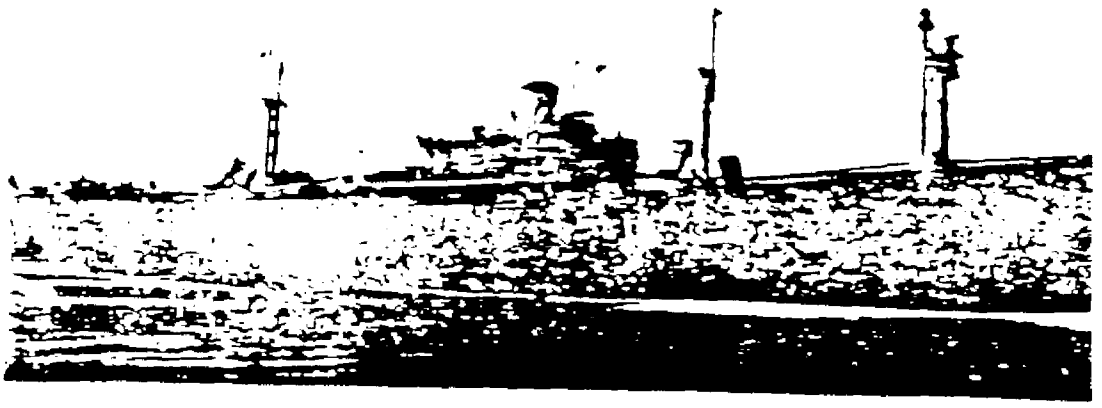

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The whole world marvels—and the Axis trembles—as American Liberty Ships keep sliding down the ways, joining the great multitude of cargo vessels carrying war supplies to Allied fighting fronts.

On many of these Liberty Ship engines—over *nineteen hundred* to date, and on the piping and equipment of hundreds of these vessels, CAREY HEAT INSULATIONS are reducing heat waste and fuel consumption to a minimum, increasing power plant output, saving valuable cargo space, standing up under all extremes of vibration.

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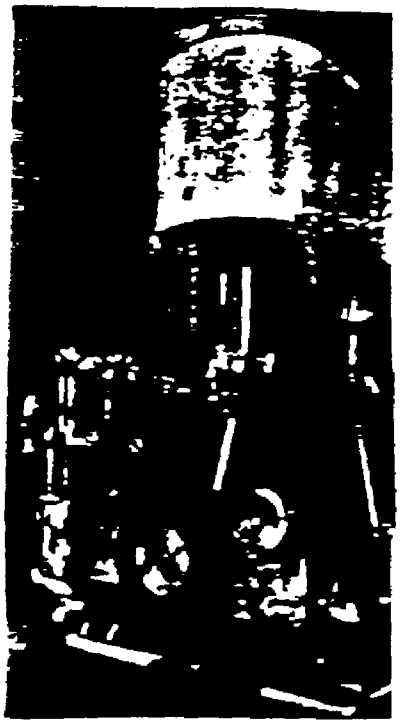

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IN CANADA THE PHILIP CAREY COMPANY

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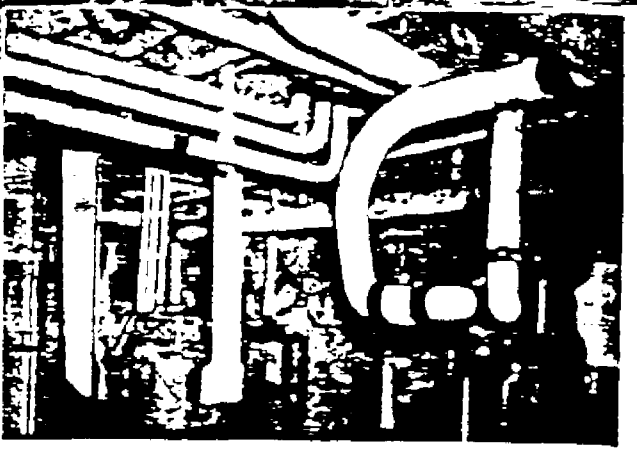

Saving precious fuel and steam

K&M "FEATHERWEIGHT" 85% *Magnesia*

"Photo Courtesy Armstrong Cork Company"

Every intricate bend of the steam piping to pumps and apparatus in the engine room of this cargo vessel is tailored uniformly with K&M "Featherweight" 85% Magnesia. This widely used pipe covering combines the high insulating properties of basic Carbonate of Magnesia with strong Asbestos Fibres, and is designed for pipes carrying temperatures up to 600° F. It is extremely light in weight and it delivers maximum efficiency.

In one shipyard alone, 250 cargo vessels of the Liberty and faster 16 knot Victory type (pictured above) have been insulated by the skilled coverers of the Armstrong Cork Company, distributors of K&M "Featherweight" 85% Magnesia.

K&M "Featherweight" 85% Magnesia is giving this same kind of dependable service—these same heat and fuel savings—in power plants and industrial process plants all over the country. In fact, from the time 85% Magnesia Insulation was first developed by K&M more than sixty-five years ago, the name "Featherweight" has been a by word for quality with plant operating men.



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When Ingalls Shipbuilding Corporation recently converted this fleet of C-3's, replacing gun mounts with cargo handling gear, they found the insulation intact and undamaged, ready to serve in peace instead of war. The original insulation of these ships was done by Badham, and we developed many on-the-spot techniques that meant greater safety and comfort for the crews. Insulating merchant ships will require other methods, some in use, others to be developed through constant research.

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Liberty Ship Program Completec

This is the eighth and concluding article of the series dealing with the production time of Liberty ships. Previous articles appeared in the following issues: October, 1942; June, 1943; April, May, June and September, 1944; and February, 1945.

The completion this month of the last of the various types of Liberty ships brings to a successful conclusion the world's greatest effort in the direction of mass production of duplicate seagoing vessels. This building program, sponsored by the Maritime Commission and beginning early in 1941 when the first keel was laid, produced 2710 ships of 19,467,441 gross tons and 28,764,361 deadweight tons, with triple-expansion reciprocating steam engine propelling machinery developing 6,775,000 indicated horsepower. This fleet of new ships is two and one-half times greater than the entire prewar merchant fleet under the United States flag which then totaled 11,617,200 deadweight tons; in fact, it is 25 percent larger than the prewar fleet of the British Empire which totaled 22,133,400 deadweight tons.

Of the total built, 2624 were practically cargo ships and in their construction it is [illegible] an excellent comparison of the [illegible] involved at each shipyard. This group of [illegible] completed in an average of [illegible] days each [illegible] to delivery. Liberty ships have [illegible] or converted to many special-purpose types [illegible] including colliers, boxed aircraft transports, [illegible] tank carriers with specially reinforced decks [illegible] heads, merchant seaman training schools [illegible] ships, troop transports, and several types of [illegible] naval auxiliaries, such as radar repair and [illegible] ships.

The construction cost of the 2710 vessels [illegible] $5,400,000,000 and to this must be added [illegible]

TABLE 1.—NUMBER AND TONNAGE OF LIBERTY [illegible] CONSTRUCTED BY TYPE

Type	No.	Gross tons	Dead weight tons
Cargo—EC2-S-C1	2580	18,544,475	27,417,[illegible]
Collier—EC2-S-AW1	24	159,432	[illegible]
Tank Carrier—ZEC2-S-C2	8	57,408	79,1[illegible]
Aircraft Transport—ZEC2-S-C5	36	258,336	347,[illegible]
Tanker ZET1-S-C3	62	447,790	655,1[illegible]
Totals	2710	19,467,441	28,764,[illegible]

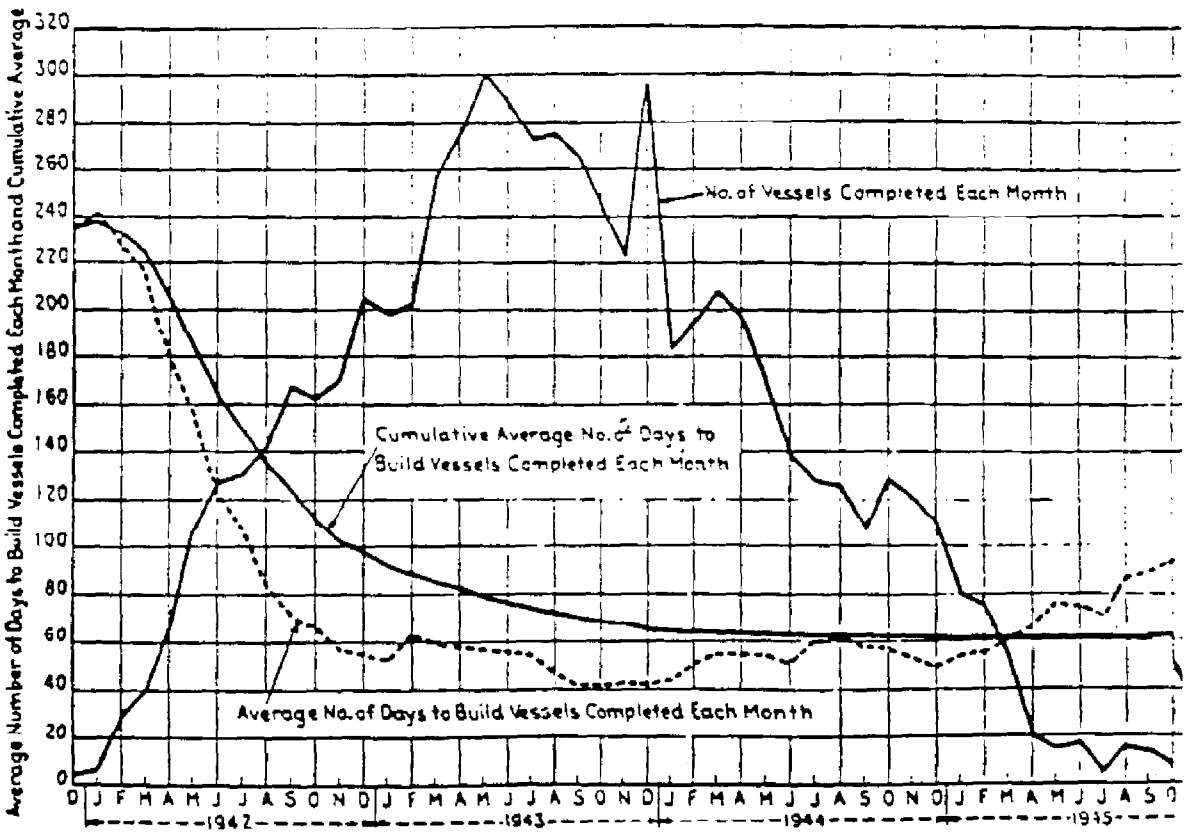


CHART SHOWING NUMBER OF LIBERTY CARGO SHIPS COMPLETED EACH MONTH, 1941-1945; AVERAGE NUMBER [illegible] TO BUILD VESSELS COMPLETED EACH MONTH, CUMULATIVE AVERAGE NUMBER OF DAYS TO BUILD VESSELS C[illegible]

Shipyard	No. of ways	Date first keel laid	Number completed						Average No. of days per vessel to build
			1941	1942	1943	1944	1945	Total	
Atlantic Coast				(c)	(c)				(a)
Bethlehem-Fairfield Shipyard, Baltimore, Md.	16	4-30-41	1	77	192	114	—	384	53.8
Jones Construction Co., Brunswick, Ga.	6	7- 6-42	—	—	21	53	11	85	79.7
New England Shipbuilding Corp., So. Portland, Me., West Yard	6	9-24-41	—	12	40	58	20	130	77.2
New England S. B. Corporation (d), So. Portland, Me., East Yard	7	9- 8-42	—	2	51	52	19	124	68.1
North Carolina Shipbuilding Co., Wilmington, N. C.	9	5-22-41	—	51	75	—	—	126	74.8
St. Johns River Shipbuilding Co., Jacksonville, Fla.	6	8-15-42	—	—	25	51	6	82	77.6
Southeastern Shipbuilding Company, Savannah, Ga.	6	5-22-42	—	—	20	44	8	88	85.6
					(e)				
Walter Kaiser Co., Providence, R. I.	6	6-27-42	—	—	6	5	—	11	208.7
Total	62		1	142	446	367	64	1020	68.1
Gulf Coast				(b)					
Alabama D. D. & S. B. Co., Mobile, Ala.	12	7-28-41	—	18	2	—	—	20	137.5
					(b)			(h)	
Delta Shipbuilding Company, New Orleans, La.	8	10- 1-41	—	28	85	90	9	132	82.8
Henry J. Kaiser Co., Panama City, Fla.	6	7- 9-42	—	—	21	53	28	102	83.6
Todd-Houston Shipbuilding Corp., Houston, Texas	9	7-18-41	—	32	71	83	19	205	68.4
Total	35		—	78	132	196	56	462	78.8
Pacific Coast					(b)			(g)	
California Shipbuilding Corp., Los Angeles, Cal.	14	5-24-41	—	109	166	31	—	306	60.7
				(e)					
Kaiser Company, Vancouver, Wash.	12	4-15-42	—	2	8	—	—	10	90.4
					(b)				
Permanente Corporation, San Francisco, Cal.	6	6-27-42	—	5	10	—	—	15	112.2
Portland Shipbuilding Corp., Portland, Ore.	11	5-19-41	1	113	197	11	—	322	44.9
Permanente Metals Corp., Yard No. 1 (d)	7	5-12-42	—	30	92	16	—	138	48.3
Permanente Metals Corp., Yard No. 2	12	9-17-41	—	63	187	101	—	351	41.1
Total	62		1	322	660	159	—	1142	49.6
Grand Total	159		2	542	1238	722	120	2624	61.9

(a) Time to construct includes the day of keel laying.
(b) Part of contract cancelled to permit tanker construction.
(c) Facilities employed part of year on special naval craft ships.
(d) Yard previously built 30 similar ships for Great Britain.
(e) Part of contract suspended to permit construction of special Navy type vessels.
(g) Does not include 30 Liberty type tankers constructed.
(h) Does not include 32 Liberty type tankers constructed, and 24 Liberty Colliers.

TABLE 3.—LIBERTY EC-2 CARGO SHIPS COMPLETED EACH MONTH AND AVERAGE NUMBER OF DAYS TO BUILD

Month	Number of yards producing ship	Number built each month	Monthly average time to complete	Cumulative number of ships constructed	Cumulative average time to complete
[illegible]					
[illegible] ember, 1941	2	2	230.0	2	230.0
[illegible] ary, 1942	2	3	241.3	5	229.8
[illegible] ruary	5	12	227.8	17	222.1
[illegible] rch	5	16	217.7	33	225.6
[illegible] il	5	26	179.2	59	205.6
[illegible] y	8	43	155.4	102	184.7
[illegible] e	9	51	122.4	153	164.3
[illegible] y	10	52	108.4	205	150.4
[illegible] ust	11	57	82.9	262	136.0
[illegible] tember	10	67	70.1	329	122.8
[illegible] ober	11	65	66.0	394	113.6
[illegible] ember	11	68	56.0	462	102.0
[illegible] ember	12	82	55.0	544	97.9
[illegible] ary, 1943	13	79	52.6	623	92.3
[illegible] ruary	14	81	62.1	704	88.9
[illegible] rch	14	103	59.5	807	85.2
[illegible] il	15	110	58.1	917	81.9
[illegible] y	15	120	57.6	1037	79.1
[illegible] e	15	115	56.1	1152	76.8
[illegible] y	15	109	53.8	1261	74.4
[illegible] ust	14	110	46.8	1371	72.1
[illegible] tember	12	106	42.2	1477	70.0
[illegible] ber	12	98	42.6	1575	68.3
[illegible] ember	11	89	43.2	1664	66.9
[illegible] ember	12	118	42.0	1782	65.3
January, 1944	12	73	44.0	1855	64.5
February	13	78	50.7	1933	63.9
March	13	83	55.2	2016	63.5
April	13	79	55.1	2095	63.2
May	12	67	54.5	2162	63.0
June	10	55	51.4	2217	62.7
July	10	51	59.5	2268	62.6
August	9	50	61.6	2318	62.6
September	9	43	58.1	2361	62.5
October	9	51	56.9	2412	62.4
November	8	48	53.1	2460	62.2
December	8	44	48.8	2504	62.0
January, 1945	8	32	54.0	2536	61.9
February	8	30	55.4	2566	61.8
March	6	21	60.2	2587	61.8
April	3	8	66.2	2595	61.8
May	4	6	76.1	2601	61.8
June	2	7	73.8	2608	61.8
July	1	2	70.0	2610	61.9
August	2	6	86.0	2616	61.9
September	2	5	89.0	2621	
October	2	3	91.0	2624	61.9

Note: These figures do not include 62 Liberty ship tankers and 24 Liberty ship colliers.

[illegible] the shipyards in which the ships were constructed, which was more than $300,000,000. Over [illegible],000 tons of steel were used in their construction. [illegible] of the Liberty ships have been constructed at new emergency-built shipyards, a total of eighteen establishments participating in the program, with 159 [illegible] ways, although all of these ways were not utilized continuously for the building of Liberty ships, some being devoted to the construction of other types of vessels at various times. All of these emergency-created shipyards are owned by the Government and are now scheduled to be sold, dismantled or otherwise disposed of in the near future. Stretching along the Atlantic coast from Maine to Florida are eight of these yards with 62



TABLE 4.—COMPARATIVE TIMES FOR COMPLETING CERTAIN LIBERTY CARGO SHIPS AT EACH OF THE EMERGENCY BUILDING YARDS, AND OTHER DATA

Number of Days

Liberty cargo ships	Permanente			North	Bethlehem	New England West	New England	Jones	Jones		South-	Walsh-			Todd	Kaiser	
	Calif.[a]	No. 1[b]	No. 2	Oregon	Carolina	Fairfield	Yard	East Yard[b]	Brunswick	Panama	St. John's	eastern	Kaiser	Alabama	Delta[a]	Houston	Vancouver	Marinship
1st ship completed	376	98	160	254	221	265	280	99	332	218	259	268	242	297	243	314	97	127
10th ship completed	231	93	118	184	149	218	114	98	127	85	332	316	198	305	219	176	87	97
25th ship completed	133	63	61	86	78	106	69	68	64	65	53	69			65	89		
50th ship completed	93	53	41	56	52	61	48	48	50	51	45	64			61	65		
75th ship completed	73	44	34	43	37	50	36	36	36	36	43	58			74	60		
100th ship completed	61	36	33	37	33	40	30			61					79	54		
125th ship completed	49	28	26	37	34	44	..	103							58	52		
150th ship completed	46	20	25	30		35	..	..								50		
200th ship completed	36	..	29	28		35	..	..								44		
300th ship completed	49	..	31	26		43	..	..										
322nd ship completed	..	..	26	26		44	..	..										
351st ship completed	..	..	33	..		43	..	..	..									
384th ship completed	..	..	..	..		41	..	..	..									
Longest time to complete a ship	286	99	205	257	304	250	308	117	332	252	369	297	299	292	213	333	109	173
Shortest time to complete a ship	22	29	8	16	10	29	49	49	35	44	38	49	125	71	44	43	58	60
Number completed by each yard	304	134	331	322	126	384	112	133	85	102	82	88	11	20	112	208	10	55
Number of ways in each yard	14	7	13	11	9	16	6	7	6	6	6	6	6	12	8	9	12	6
Ships completed per way	21.8	19.1	29.2	29	14	24	18.6	19.0	14.1	17.0	13.6	14.6	1.8	1.6	16.5	23.1	0.8	2.4
Average time between each completion	2.6	4.6	2.4	2.2	4.5	2.4	9.3	7.9	8.1	9.1	8.3	8.4	17.1	13.0	8.1	4.9	6.8	19.1
Elapsed time between first and last completion	833	718	869	766	557	1036	1043	1058	693	937	666	742	1st lot—127 2nd lot—61	261	1069	1036	1st lot—117 2nd lot—58	287

[a] Does not include 30 Liberty tankers built at California Ship; 32 Liberty tankers and 24 colliers built at Delta Ship.
[b] Yards had previous experience in building 30 vessels of similar type for British Government.

TABLE 5.—GROUPING OF LIBERTY SHIPS COMPLETED BY NUMBER OF DAYS AT EACH OF THE EMERGENCY BUILDING YARDS AND OTHER DATA

Number of Ships Completed

Number of Days to Complete	Permanente			North	Bethlehem	New England West	New England	Jones	Jones		South-	Walsh-			Todd	Kaiser	
	Calif.[a]	No. 1[b]	No. 2	Oregon	Carolina	Fairfield	Yard	East Yard[b]	Brunswick	Panama	St. John's	eastern	Kaiser	Alabama	Delta[a]	Houston	Vancouver	Marinship
8	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
14	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
21	..	..	..	8	..	..	..	..	..	..	..	..	..	..	..	..	..	..
22	..	..	..	8	..	..	..	1	..	..	..	..	..	..	..	..	..	..
23	..	..	..	7	..	..	..	..	..	..	..	..	..	..	..	..	..	..
24	..	..	1	7	..	..	..	..	..	..	..	..	..	..	..	..	..	..
25	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
26	..	..	13	7	..	..	..	..	..	..	..	..	..	..	..	..	..	..
27	..	..	28	13	..	..	..	..	..	..	..	..	..	..	..	..	..	..
28	..	1	40	34	..	..	..	..	..	..	..	..	..	..	..	..	..	..
29	..	1	43	41	1	..	..	..	..	..	..	..	..	..	..	..	..	..
30	..	1	36	30	3	4	..	..	..	..	..	..	..	..	..	..	..	..
31	..	3	31	7	5	9	..	..	..	..	..	..	..	..	..	..	..	..
32	1	4	10	10	9	9	..	..	..	..	..	..	..	..	..	..	..	..
33	..	6	12	17	4	20	..	..	..	..	..	..	..	..	..	..	..	..
34	4	7	11	11	2	14	..	..	..	..	..	..	..	..	..	..	..	..
35	9	7	12	11	3	16	..	1	..	..	..	..	..	..	..	..	..	..
36	17	8	5	1	6	8	..	..	..	..	..	..	..	..	..	..	..	..
37	18	7	7	6	7	11	..	..	..	..	..	..	..	..	..	..	..	..
38	12	3	4	5	13	12	..	1	..	1	..	..	..	..	..	..	..	..
39	14	1	3	7	6	13	..	1	..	..	..	..	..	..	..	..	..	..
40	13	5	6	4	6	13	..	1	..	..	..	..	..	..	..	..	..	..
41	8	6	6	7	3	17	..	2	..	2	..	..	..	..	..	1	..	..
42	11	1	7	3	6	18	..	1	..	2	..	..	..	..	..	..	..	..
43	12	1	3	3	1	21	..	2	..	5	..	..	..	..	..	..	..	..
44	10	3	6	3	..	18	..	2	1	1	..	..	..	..	1	7	..	..
45	10	5	6	3	5	17	..	3	2	..	..	..	..	..	..	4	..	..
46	11	3	3	2	2	13	..	3	..	4	..	..	..	..	..	10	..	..
47	11	3	3	1	4	11	..	3	..	..	..	..	..	..	..	5	..	..
48	7	2	4	..	..	11	..	1	1	3	..	..	..	..	..	14	..	..
49	6	4	3	1	3	5	1	1	1	3	1	..	..	..	2	10	..	..
50	3	6	3	1	..	12	2	1	2	2	..	..	..	..	..	14	..	..
51 to 100	24	30	41	48	39	84	47	116	55	69	45	71	..	9	112	150	9	..
101 to 200	12	..	14	13	6	15	12	14	1	12	3	6	1	3	13	4	1	8
201 to 333	15	..	1	0	9	13	3	0	4	4	4	2	1	3	4	1	..	..

...ding yards, the Bethlehem-Fairfield Shipyard with ... ways. On the Pacific coast, located in California, ...shington and Oregon, are six Liberty building yards ...h 62 ways. Along the Gulf coast, in Alabama, Florida, ...as and Louisiana, are four more of these yards with ... building berths. Many of these yards have con-...acted other types of vessels since completing their ...ntracts for Liberty ships.

The first of the Liberty ships were finished late in ...ember 1941, shortly after the attack upon Pearl Har-...by the Japanese, when the Bethlehem-Fairfield Ship-...d and the Oregon Shipbuilding Corporation each ...pleted one vessel. In the following year the tempo ... increased rapidly and 542 were finished. The peak ... for the production of Liberty cargo ships, as will ...oted from Table 2, was in 1943 when the entire eigh-...n Liberty building yards were producing this type ...essel and 1238 ships were completed, or almost four ...s every day. In 1944, production of Liberty ships ...an to taper off, due to the diversion of some of the ...ds to the building of Victory ships, but 722 Libertys ...e completed, or two every day. In 1945, to the end ...his building program, 120 Liberty ships were finished ...the eight yards still producing this type of vessel.

...Pacific coast shipyards built 1142 Liberty cargo ships ...s 30 Liberty tankers, while Atlantic coast yards com-...ted 1020, and the Gulf yards 462 Liberty cargo ships, ... Liberty tankers, and 24 Liberty colliers. Not only ...re more Liberty ships constructed by Pacific coast ...yards than in the other regional districts, but the ...ific coast yards completed their part of the program ...t, in 1944, while the other two districts were still ...lding up to the end of the schedule in 1945. Pacific ...st Liberty shipbuilders as a group achieved the best ...rage production time per vessel, turning out their ...ns of the cargo ship type in the remarkably low ...rage time of 49.6 days each. Atlantic coast yards had ... next best average production time of 68.1 days per ...sel, while 78.8 days per ship was the average time ...sumed by the Gulf plants.

...To the J. A. Jones Construction Company shipyard ... Brunswick, Ga., and the Todd-Houston Shipbuilding ...rporation at Galveston goes the rather dubious honor ...producing the two ships consuming the greatest con-...uction time, requiring 332 and 333 days, respectively. ...wever, there were some extenuating circumstances. ...e Permanente Metals Corporation No. 2 yard at ...hmond, Cal., built a Liberty ship in eight days, the ...rtest time of any, closely followed by the Oregon ...ipbuilding Corporation, which produced a vessel in ...rteen days. The greatest number of Liberty ships was ...lt by the Bethlehem-Fairfield Shipyard, which turned ...t 384 in an average of 53.8 days each before being ...rted to the construction of Victory ships. The first ... ships constructed at each of the eighteen yards ...olved more than 1,000,000 man-hours time but in ...e cases this was later cut to as low as 300,000 man-...rs for succeeding ships.

...Probably the most revealing of the tables is Table 5, ...n which will be noted the remarkable production ...e achieved by the Oregon Shipbuilding Corporation. ...total of 150 ships were built at the Portland yard in ...rty days or less and of these 23 were constructed in ... days or less. The No. 2 yard of the Permanente ...tals Corporation built 157 ships in thirty days or ...s. Only three other yards were able to build vessels ...thirty days or less and they finished eight vessels in ...s time, this including two at the No. 1 yard of ...manente Metals Corporation, one by the North Carolina Shipbuilding Company, and five by Bethlehem-Fairfield Shipyard.

During the war about 150 Liberty ships were sunk as a result of enemy action while others have been ordinary marine casualties. Several hundred of the vessels have been registered under the flags of a number of foreign nations under Lend-Lease terms with ownership remaining vested in the United States Government.

Coast Guard Authority to Waive Compliance with Vessel Inspection Laws

The authority of the Coast Guard to waive compliance with the navigation and vessel inspection laws and regulations of the United States will expire December 31, 1945, unless the Second War Powers Act is extended by authority of Congress.

Waivers were issued during the war for a dual purpose: first, to insure that full utilization of vessels engaged in the war effort would not be impeded by the requirements of laws which were designed to regulate the peacetime operations of the merchant marine, and, second, to bring this about without the outright repeal of peacetime requirements so that they could still be made applicable in situations in which they did not operate to the detriment of the war effort.

The Secretary of the Navy granted a general waiver of all the navigation and vessel inspection laws administered by the Coast Guard conditioned upon findings by the Commandant of the Coast Guard that an application of the waiver would be necessary in the conduct of the war or attributable to conditions created by the war.

The extent to which waivers assisted in expediting the movements of vessels during the war can be appreciated when it is realized that the only vessels that are exempt from inspection are those ships owned outright by the United States and used for public purpose, except those owned or operated by the Maritime Commission.

Among the more important general waivers were those issued on the following: annual inspections; construction, conversion and equipment, including waivers on auxiliary boilers, cast iron valves, control valve for smothering systems, electric cable for telephone, escape hatches and crash panels, flanges, lighting distribution panels, hours of work on tugs and WSA vessels; lifeboats, life floats, life preservers, and life rafts; lights and signals on vessels; load lines; employment of aliens; and various other matters involving merchant vessel operation.

In addition to these general waivers made by the Commandant, specific waivers were made by District Coast Guard Officers and Coast Guard merchant marine details overseas covering individual cases where the delay in sailing of a vessel was regarded as a hindrance to the war effort.

The Coast Guard, while advocating a return to prewar requirements at the earliest opportunity, is well aware of the situation that can develop if the authority to grant waivers is not renewed. The Service, therefore, favors the issuance of waivers in cases of necessity to keep the maximum number of vessels running with the minimum amount of inconvenience to the operators.

It is believed the industry is cognizant of the advantages derived from the issuance of the waivers during the war. It is for the general interest of the ship operators, therefore, that information concerning the possible expiration of waivers on December 31, 1945, is made known.

boilers. [illegible] combustion chambers of the boilers where it is vaporized to a gas which chemically attacks the deposits on the gas sides of the boiler tubes. By chemically removing such deposits and keeping the tubes clean and bright, the decks are kept free from soot. The thermal efficiency of the boiler is also improved, reducing fuel costs, and stack fires are eliminated.

Insulation Saves Fuel

The importance of insulating all steam and refrigeration lines aboard ships for greater economy of operation has long been recognized. But now the fuel shortage re-



emphasizes the conservation of fuel supplies.

Carey 85 percent magnesia and Carey asbestos cement supplied by The Philip Carey Manufacturing Company, Lockland, Cincinnati, O., have long been standard materials for insulating these lines on ships. In fact, Carey insulations such as Carey High-temp No. 19 and 85 percent magnesia, in combination, can be used for equipment and lines where temperatures range as high as 1900 degrees F and are delivering excellent service on vessels all over the world.

Adding the Third Dimension to Air Conditioning

As soon as the shipping situation eases and vessels under the American flag begin to carry passengers as in the good old days, the passengers will travel in much greater comfort. One of the prime reasons for this comfort will be improvements and developments since the war in the theory and practice of air conditioning for ships. One of the basic functions of air conditioning systems, whether on land or sea, has been that the systems were designed for the circulation of air and either the cooling or heating of outside air taken into closed spaces. Air conditioning systems, however, did not provide for a most essential function—that of odor control. No matter how fast you circulate the air, the system recirculates all the odors of the space it services plus the odors of the mechanism.

On ship board the galley odors, bilge water odors and odors from the machinery and cargo penetrate to the passengers' cabins. To overcome this a new product which has proven highly successful in the [illegible] during the war is now being adapted to ships at sea. This is called Marine Airkem Chlorophyll Air Freshener and is composed of a complex group of substances from plants and activated chlorophyll. These aromatic substances of Marine Airkem when volatilized instantly bring objectionable odors under control. The activated chlorophyll restores to the air its freshness and gives it that pleasurable outdoors effect.

Marine Airkem was developed in the laboratory and perfected over many years of research. After extensive tests by the Research Department of Northwest University and D. W. D. Turner, Professor of Chemical Engineering at Columbia University, Airkem was put on the market. It has been used successfully on board naval hospital ships, submarines and Coast Guard vessels.

The units which evaporate Airkem into the air stream are easily engineered into existing air conditioning units whether large overall systems or small self-contained units are used. Another application is through evaporation from a 15½-ounce bottle supplied with a special wick. These bottles will take care of small spaces such as cabins on ships. A few minutes after a bottle has been opened all odors are controlled and the Marine Airkem gives a fresh air effect to the space.

All inquiries concerning this product should be addressed to the William W. Smith Company, 274 Madison Avenue, New York 16, N. Y., which is national distributor of Marine Airkem.

Inclined-Port Rotating Pump Valve

The Sims valve, manufactured by the Sims Pump Valve Company, Inc., New York, is a practical, scientifically designed valve, adaptable to reciprocating pumps in all kinds and conditions of service. The Sims valves are guaranteed to overcome such troubles as valve slam or knock, seat-imprinting of disks, slip, valve stem and



spring breakage, and the steam waste they cause. They greatly reduce and usually entirely eliminate check valve slam and fluctuation in pressure so important in oil service pumps.

The complete Sims valve consists of five parts—the seat, disk, rotator, spring and stem. Instead of the usual straight ports the Sims valve seat has inclined ports, formed by ribs with rectilinear warped surfaces.

[illegible] protected [illegible] or the usual Navy [illegible] which [illegible] in the pump landings. The [illegible] must conform to [illegible] found in reciprocating pumps.

Triple-Action Wat[illegible] Nozzles

New [illegible] Navy [illegible] W-N-1905 nozzles, manufactured by Rockwood Sprinkler Company, Worcester, Mass., are available for service [illegible] and 2½-inch fire hose lines. They originally designed by Rockwood for the Damage and Fire Control of the Bureau of Ships and [illegible] as standard for use on most [illegible] Thousands of the nozzles are now on vessels of the Navy, Coast Guard, Maritime Commission and Army Transport Corps, as well as in industrial [illegible].

This nozzle provides excellent cooling action on fires in ordinary combustibles as well as fires in flammable liquids, materials and gases.

Automatic Recirculatin[illegible]

The Hammel-Dahl Company, Providence, R. I., has brought out an automatic recirculating valve designed to prevent damage to centrifugal boiler feed pumps caused by water flashing to steam when the boiler feedwater regulating valves are closed. This is accomplished automatically by-passing a minimum of gallons per minute of water from the pump discharge line to the D. C. heater through a recirculating line. The units maintain a definite minimum flow of water through the boiler feed pump for all operating conditions.

The valves are fabricated for installation in the existing piping and located adjacent to the discharge connections of the pumps. Two types of valves have been developed, one having direct connection and the other having offset connections to permit installation where interferences are encountered.

A recirculating flow rate indicator assembly is mounted at a level where it may readily be observed by the operator and provides an instantaneous reading of gallons per minute of the volume of water being by-passed through the recirculating valve back to the D. C. heater.

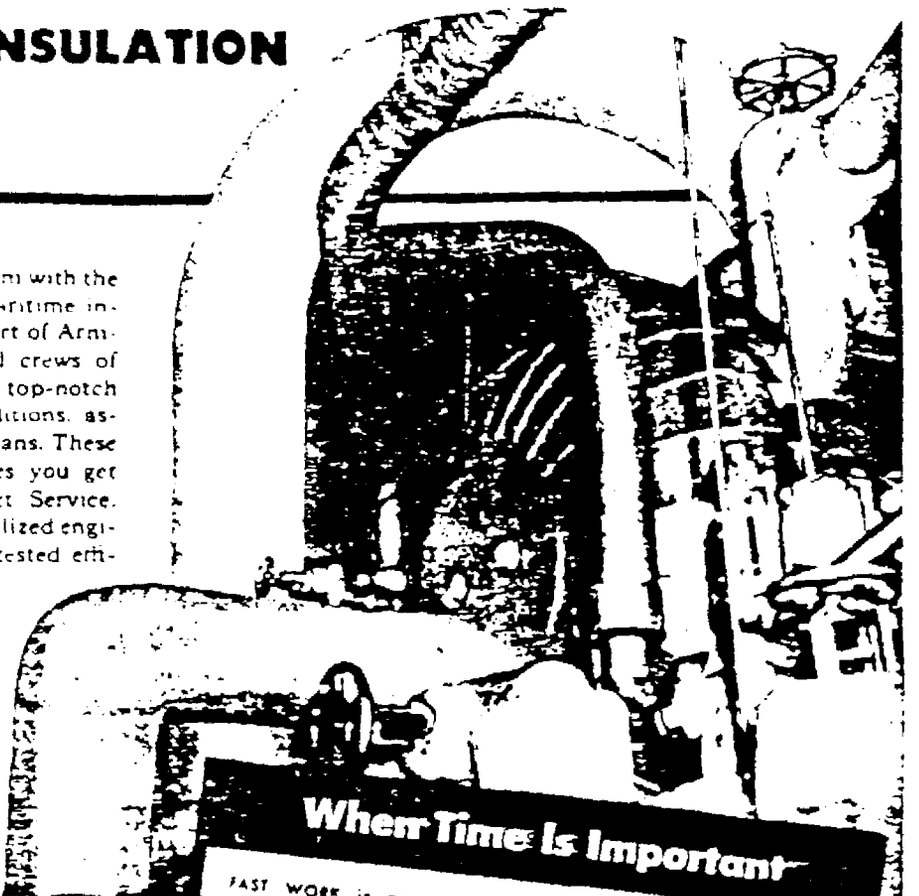
Process to Preserve Idl[illegible] Initiated by Navy

The 10,000-ton cruiser [illegible] into temporary drydock at the Philadelphia Navy Yard on October 23, to be protected against deterioration by the dehumidification method.

Captain M. Gordon Donald, [illegible] tion officer of the Navy Bureau [illegible] said the newly-developed process will make it possible for the Navy to preserve hundreds of fighting ships for 20 years or longer.

The *Brooklyn* is serving as a [illegible] the "dehumidification and [illegible] program.

Your special requirements easily met by ARMSTRONG'S CONTRACT SERVICE FOR HEAT INSULATION



FLEXIBLE PLANNING, to conform with the practical necessities of each maritime insulation job, is an important part of Armstrong's Contract Service. And crews of experienced workmen, who do top-notch work even under difficult conditions, assure the success of Armstrong plans. These are only two of the advantages you get by using Armstrong's Contract Service. You also get Armstrong's specialized engineering skill and materials of tested efficiency. Furthermore, Armstrong takes full responsibility for every detail of the work. For complete details, write today to Armstrong Cork Company, Industrial Insulation Dept., 5201 Concord St., Lancaster, Penna.

Where Time Is Important

FAST WORK is necessary, in many cases, in insulating high-temperature equipment.

At the Navy's Precommissioning Center, Newport, R. I., virtually every type of equipment found on naval vessels was installed for instruction purposes. Speed was the order of the day, and Armstrong's Contract Service, working closely with the mechanical contractor, insulated the piping as soon as it was hung. As fast as lines were approved, insulation was installed on welds, unions, and flanges. The ability of Armstrong's Contract Service to cooperate with other contractors was a big factor in getting the job done on time.

Above, main steam lines are shown covered with combination high-temperature and 85% Magnesia insulation, finished with asbestos cloth jacket sewed over asbestos paper.

At left is the 250 KW Turbo Generator, covered with 2" of plastic insulation and finished with hard surface asbestos. Also shown is the atmospheric relief valve, insulated with removable asbestos blankets and finished with asbestos cloth.

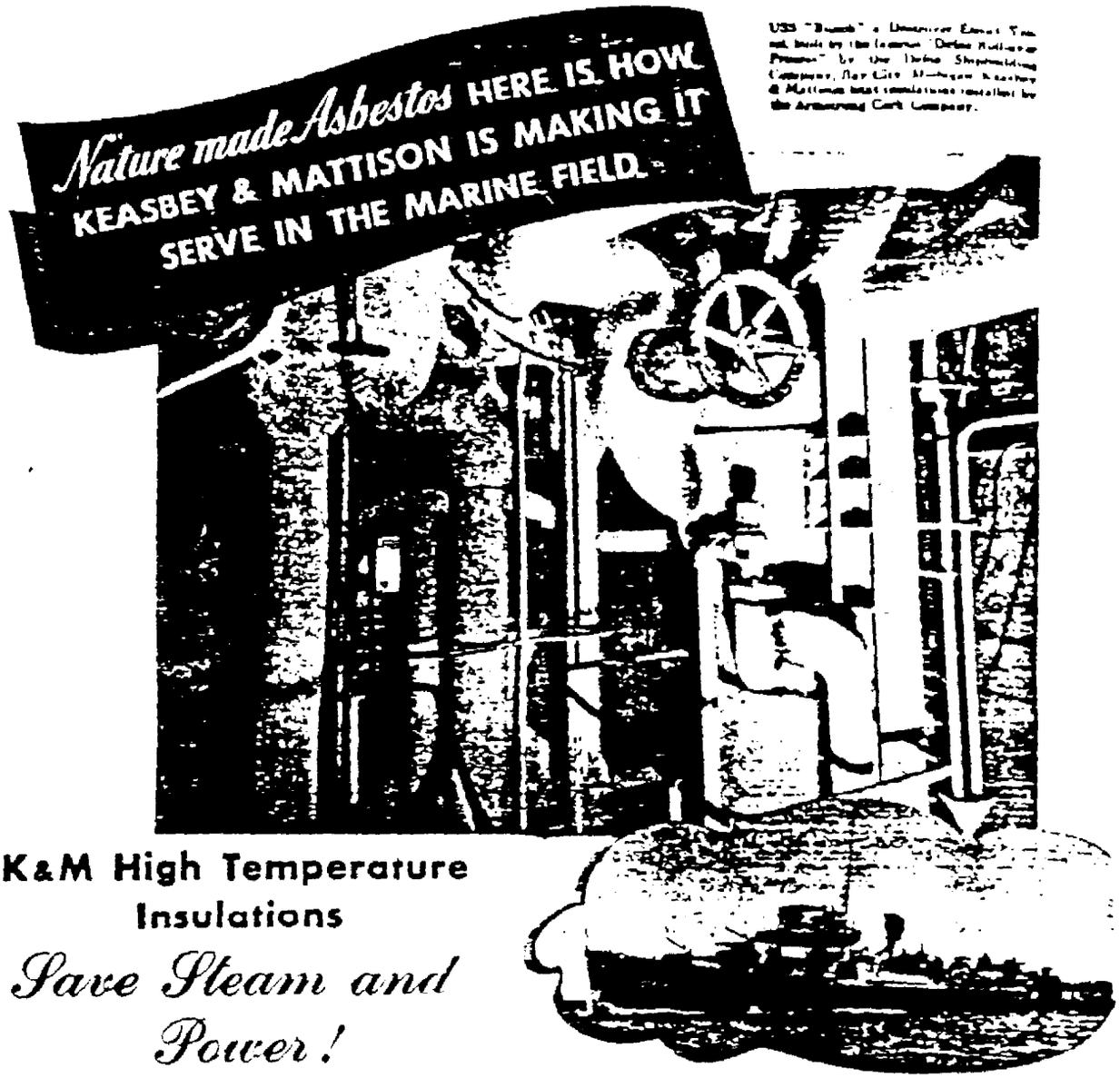


ARMSTRONG'S INDUSTRIAL INSULATION

Complete Contract Service For All Temperatures

From 300° Below Zero To 2000° Fahrenheit

USS "Busch" a Destroyer Escort Vessel, built by the famous "Defoe Rolling Process" by the Defoe Shipbuilding Company, Bay City, Michigan. Keasbey & Mattison heat insulations installed by the Armstrong Cork Company.


Nature made Asbestos HERE IS HOW KEASBEY & MATTISON IS MAKING IT SERVE IN THE MARINE FIELD.

K&M High Temperature Insulations

Save Steam and Power!

Keasbey & Mattison Asbestos products have seen extensive service in the Marine Field during the war. The above example is typical. The intricate network of steam lines, which are an essential part of the DE'S power plant, are completely insulated with K&M "Featherweight" 85% Magnesia and K&M Hy-Temp Covering.

K&M "Featherweight" 85% Magnesia Insulation is designed for temperatures up to 600°F. — Hy-Temp for temperatures to 1900°F. The proven quality and dependability that these K&M Insulations have shown at sea has also been apparent in every industrial use to which they have been put. In hundreds of plants throughout the country, these insulations are daily saving tremendous quantities of heat, fuel and power.

ARMY E NAVY
K&M
best in asbestos

KEASBEY & MATTISON

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