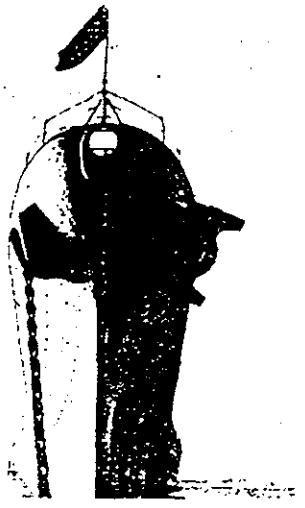
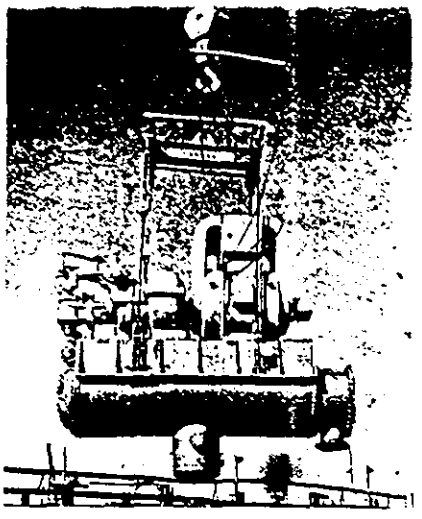


Most devastating instrument of destruction ever devised, battleship of the Iowa class rates upward of 200,000 shp. plus 10,000-kw electrical auxiliaries

American Armada Supplies Allied Armies



Twin-screw turbine-electric troopships need two of these 3500-hp packaged, condensing power units, 4800 rpm at 80 cycles. *Kaiser-Walsh photo by Norman Ray*

U. S. Navy now has more installed horsepower than all land plants within the country; land, sea and amphibious fighting power depends on supplies brought by cargo ships and tankers of merchant fleet and Navy fleet train

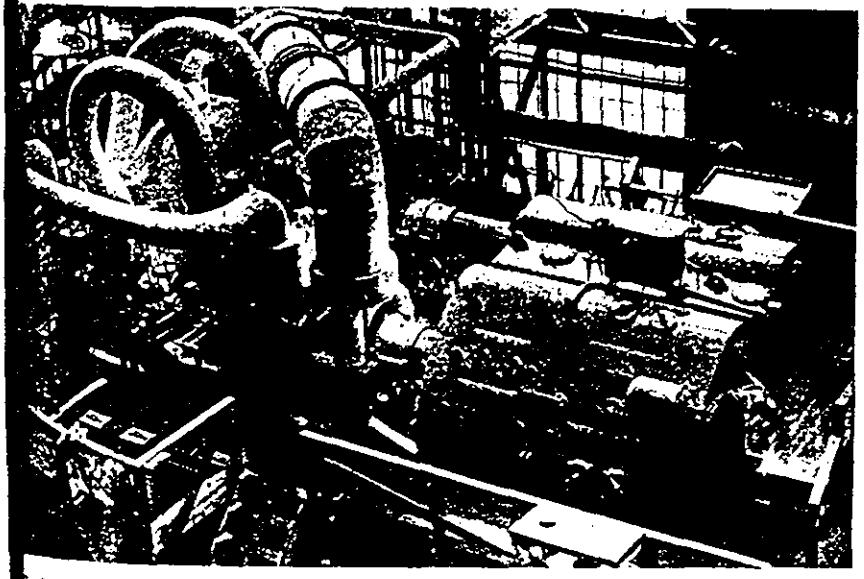
►GETTING THE land power-plant program to the home in 1942 seemed at the time to involve a considerable risk of electric-power shortage. Fortunately, baling wire, patches and general good luck have held, and the several million kilowatts of turbines and other power equipment that would have been bought as insurance against home trouble are now contributing directly to military successes in the Navy, its supply train and the globe-girdling merchant marine.

Wartime developments in ship propulsion can be expected to bring handsome dividends to stationary power operators in years to come. Specifically, steps toward mass production of turbines, boilers and diesel engines have accomplished a certain amount of standardization which will have a limited but definite effect on land plants. Furthermore, research in metals, design and manufacturing processes has advanced at an accelerated pace with results already visible that mean better land power equipment for less money.

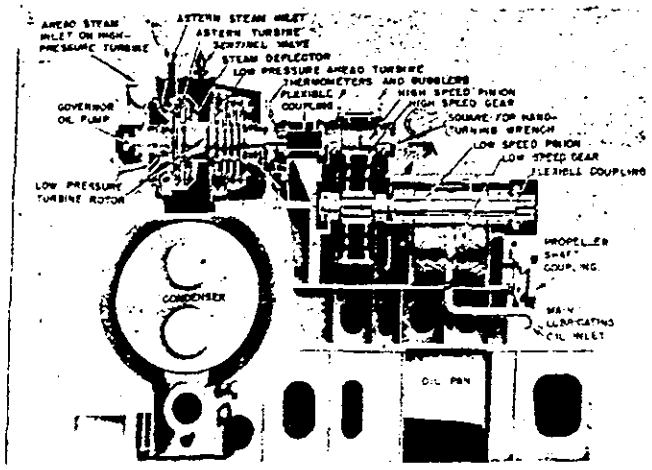
To review progress briefly, note that the Navy now has more horsepower afloat than all combined utility, government, municipal and industrial plants in the country. More than half the Navy power is accounted for by internal-combustion engines but larger ships are steam-turbine or turbine-electric drive except certain smaller aircraft carriers that are reciprocating steam driven.

Battleships of the Iowa class have high-pressure (even by stationary-plant standards) steam turbines aggregating more than 200,000 hp in four geared units and 10,000 kw of auxiliary power in eight turbine-generator sets. Cruisers and aircraft carriers account for a large number of only slightly smaller turbine sets. General Electric alone produced more than 7,800,000 hp in main propulsion turbines of all classes in 1944 and this was only 10% above the 1943 figure.

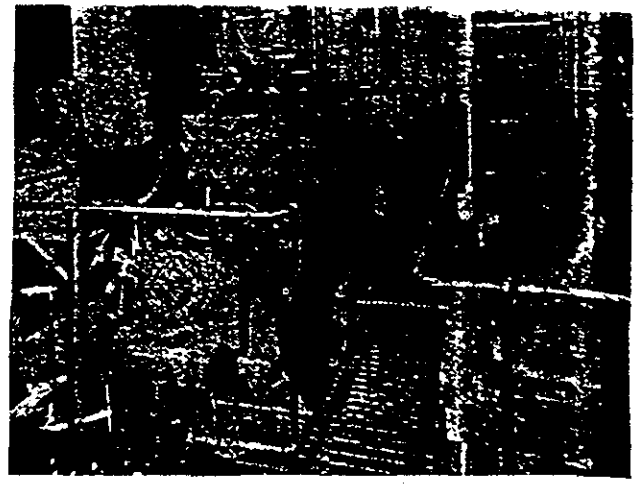
Details of Navy special-purpose craft such as the LST and LSM, as well as supply and troopships, are still restricted, but already some indications of newly developed equipment and arrangements have been released. For example, a 3500-hp packaged power plant by Westinghouse for turbine-electric troopships is complete with



Each of more than 15 Essex-class carriers has four of these Westinghouse cross-compound geared turbines with astern blading capable of high speeds in combat



Section of model of General Electric 6000-hp set for Victory ship; port-side view shows low-pressure and astern turbines, condenser, low-pressure side of gear trains and auxiliaries



Engine-room view of 8500-hp geared-turbine set, such as installed on some of the Victory ships. High-pressure turbine is at left, low-pressure is at right

auxiliaries when shipped from the factory, and General Electric reports higher interrupting capacity and shock-proofness for certain types of circuit breakers developed for Navy.

The merchant-ship program, at the end of 1944, included some 2500 Liberty ships, more than 400 "C" type vessels, about 500 oceangoing and coastal tankers, and approximately 100 Victory ships. These, together with a number of special-purpose craft aggregate 50 million tons, four times that of our prewar fleet and perhaps two thirds of all tonnage afloat in the world.

According to Vice-Admiral Emory Land, Chairman of Maritime Commission, this country will have all the elements needed to restore its eminence as a maritime nation after the war emergency has passed. He believes that we can find use for 15 to 20 million deadweight tons of the merchant fleet for peacetime trade including coastwise, lake and other domestic transportation. This fleet would include most of the turbine and diesel vessels leaving the Liberty ships to be disposed of or maintained as a reserve fleet.

Except for the Liberty ships, which were admittedly designed for war needs alone, practically all other vessels can hold their own in commercial cargo service. The Victory type, for example, does 16½ knots compared to the Liberty's 11 limit. Using 440-psi 740-F steam, the Victory 6000-hp (VC2-S-AP2) and 8500-hp (VC2-S-AP3) propulsion units are competitive in efficiency with other steam-driven vessels and afford a cruising range of 20,000 miles.

The 6000-hp unit represents a coordinated design of turbine manufacturers so that any turbine and any gear can be installed in the hull of any ship with only minor differences in bolting. Principal shipyard piping connections are at the same locations.

The 3500-rpm high-pressure turbine has five stages while the 4000-rpm low-pressure rotor mounts five ahead stages and two astern disks with a double-row impulse on the first disk. Condenser is suspended from the low-pressure casing exhaust flange with suitable bracing to prevent side sway. Double-reduction gear turns propeller shaft at 100 rpm.

Last but not least in interest to stationary power operators is the history of four 30,000-kw floating power plants originally intended as emergency backup for American power systems. Two of these have been converted for 50-cycle operation and have been in use by the Army in the European theater for some weeks. A third is now undergoing necessary modifications for similar use.

The fourth of these power barges, actually the first completed, served in Vicksburg, Miss., to help alleviate a tight local power situation, then was tied in with Gulf Power Co system at Pensacola, Fla., where it has served for the past year. It will soon proceed to Jacksonville, Fla., to help carry the municipal system load pending installation of new boiler equipment.

For foreign service, where 50 cycles is standard frequency, a 50-to-60-cycle frequency changer is added to drive auxiliaries while the main unit is slowed down to 50 cycles. In addition, turbine blading in the last stage is rearranged for the slower speed.

The hulls require minor strengthening for the ocean crossing as well as the addition of a bow, rudders, steering engine, light gun mounts, refrigeration, an additional evaporator, pilot house, compartments for more crew and a sick bay.

For operation in this country, these plants cost about $100 per kw and require 20-to-25 men for 3-shift operation. Modifications for overseas duty represent an additional cost and a crew of 65 men is required including military personnel. Two have been towed overseas at about nine knots and proved seaworthy.

Combined activity in improved ship propulsion machinery and such war-born developments as these floating power units can be expected to be of enduring benefit to stationary power operators in postwar years.

HEAVY SNOWFALL MAY MEAN FLOODS

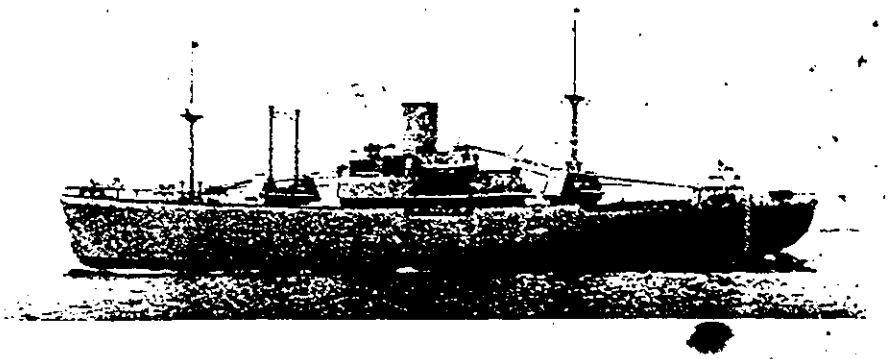
This winter's abnormal snows forecast potential flood trouble in many sections of the country. Power engineers in these areas undoubtedly are aware of the situation and are taking steps to avoid flood damage wherever possible and, where it can't be avoided, are planning how to restore full service as quickly as possible after flood waters recede.

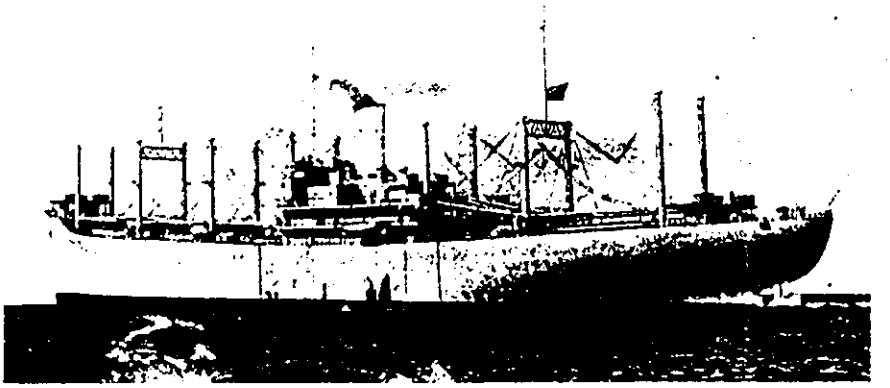
If you need information on reconditioning flooded power equipment, just drop a line to POWER. We will be glad to send you our own data sheets on drying-out procedures and to refer you to other sources.

PRINCIPAL SHIP TYPES

of World's Greatest Merchant Fleet

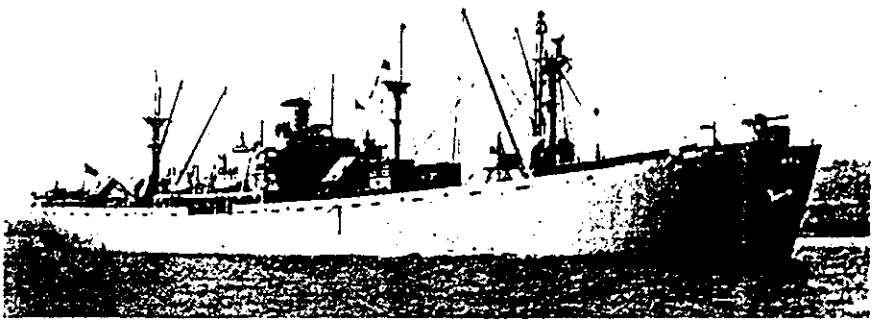
These basic designs of U. S. Maritime Commission were planned in detail before we entered 'shooting' war. Original program has been modified to suit varying needs



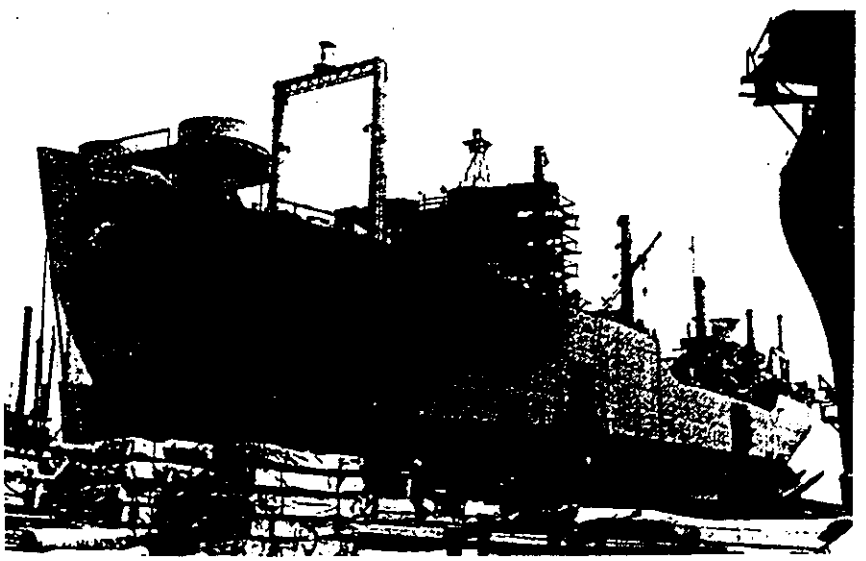


C1-A *(top)* Smallest of three original ship designs for general cargo purposes. 412-ft length, 60-ft beam, 7116 tons dead weight. Propulsion: 4000 shaft hp by steam turbine or diesel

C3 *(second from top)*—Biggest and fastest of original trio, these ships will have a permanent place in America's merchant marine, 492-ft length, 70-ft beam, 12,929 tons dead weight. Propulsion: 8500 shp by steam turbine



Photos U. S. Maritime Commission photos



EC2 *(above)*—Work horse of World War II, well-known Liberty ship developed from original C2 designs for mass production; 442-ft length, 57-ft beam, 10,800 tons dead weight. Propulsion: 2500 shp by reciprocating steam engine

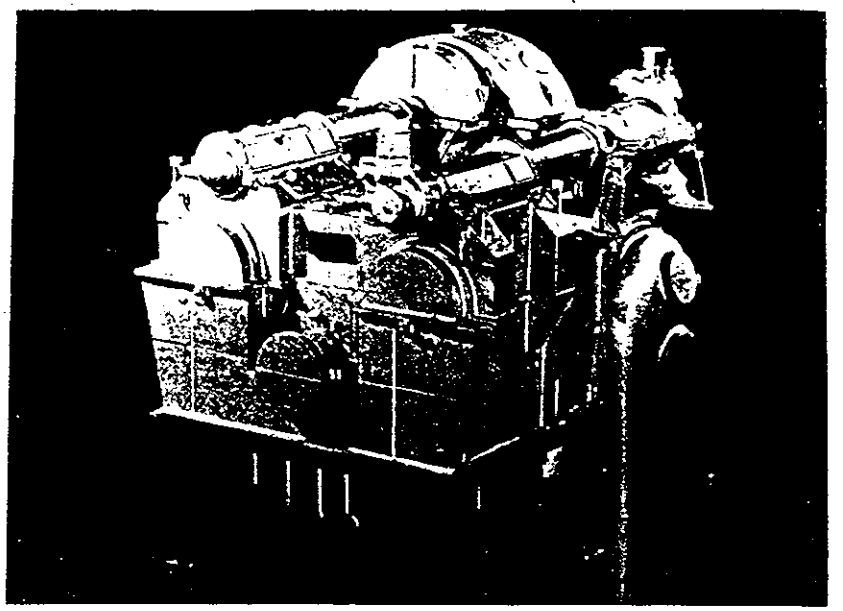
C4 *(left)*—Machinery installation at stern features newest vessel of cargo fleet. 523-ft length, 72-ft beam, 14,600 tons dead weight, and 15,000 miles cruising radius. Propulsion: 9000 shp by steam turbine

(Continued on page 98)

MERCHANT FLEET

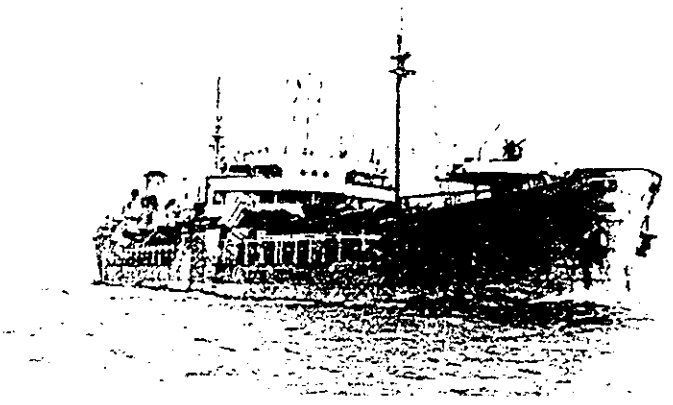
(*Continued from page 95*)

These are good ships, good enough to hold their own in peacetime trade after emergency wartime demands have been met. This time let's keep our merchant marine

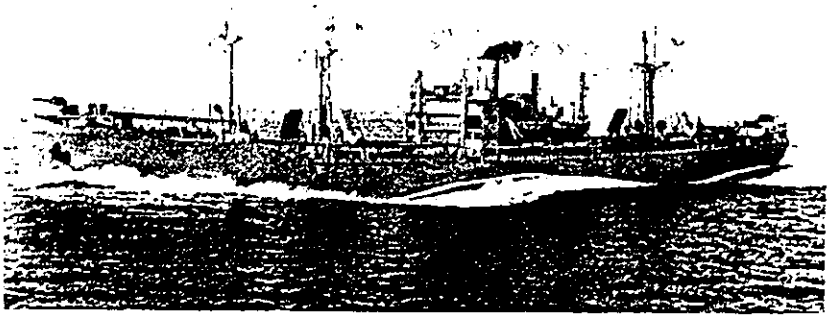


General U. S. Maritime Commission Photos

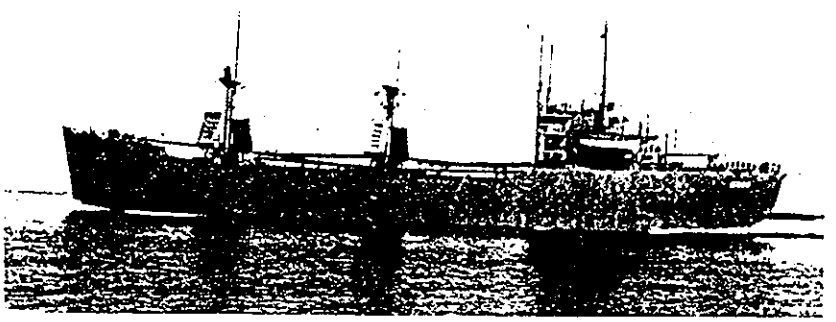
Model *(above)* of steam-turbine gear set for Victory ship comprising high- and low-pressure turbines, gear housing, condenser, turning gear and all ordinary auxiliaries. Units of all manufacturer-fit all Victory hulls



T2 Tanker had to be turbine-electric drive because gear shops couldn't make enough for all, but that has been no handicap; 523-ft length, 68-ft beam, 30-ft draft, 16,765 tons dead weight. Ship 6000 by turbine-electric drive



VC2—Victory type takes over where Liberty leaves off, production-line built but faster. Length 455 ft, beam 62 ft, 10,850 tons dead weight. Some have 6000-shp standardized geared-turbine drive, others 8500 shp units



C1-M-AV1 Small cargo ship of recent design. Length 339 ft, beam 50 ft, 5000 dead-weight tons. Propulsion: diesel 1700 shp. Experimental gas turbine has been ordered for a single ship of this type