

FIG. 1.—H.M.C.S. "SNOWBERRY" FLOWER CLASS CORVETTE

## SHIPBUILDING IN CANADA DURING THE SECOND WORLD WAR

*The following information was contributed for the Journal by Naval Service Headquarters, Ottawa.*

On September 1st, 1939, when the German armies entered Poland, there were thirteen ships in commission in the Royal Canadian Navy. By the end of the European War there were more than nine hundred. Many of these were local craft performing miscellaneous harbour duties, but over 375 were armed for offensive action against the enemy. Some of the larger ones had been obtained from the United Kingdom and others were vessels converted from peace-time use, but by far the greater number were ships built in Canadian yards during the five and a half years of hostilities; and, in addition, these yards had turned out a few ships for the American and Russian navies, and some two hundred for the Admiralty.

The vessels built in the largest numbers were anti-submarine escorts and minesweepers. These were the types required for the defence of Canadian coastal waters and the safeguarding of North Atlantic convoy routes, the major responsibilities of the Canadian Navy throughout most of the war. They were, moreover, the most suitable kind for building in Canada where the plant and the highly skilled labour were not available on the scale needed for the economical production under war-time pressure of larger and more complex naval vessels.

Corvettes and steam *Bangors*, and later frigates and *Algerines*, were all built without difficulty in Canada. Their hulls, reciprocating machinery, and boilers, either cylindrical or water-tube, were of types generally familiar to Canadian industry. Wooden craft of both the M.L. and motor minesweeper classes were also constructed although the petrol engines for the former had to be obtained from the United States. Diesel engines, not only for the wooden sweepers but also for a small group of Diesel *Bangors*, were produced by Canadian manufacturers.

For vessels in the first programmes, most of the auxiliaries, special equipment and armament were obtained from the United Kingdom. The objective at that time was to get the ships finished and into service as quickly as possible, and it seemed preferable therefore to make use of known British facilities rather than take time to look for or develop others in Canada. However, the disasters in Europe in May and June, 1940, which altered the whole complexion

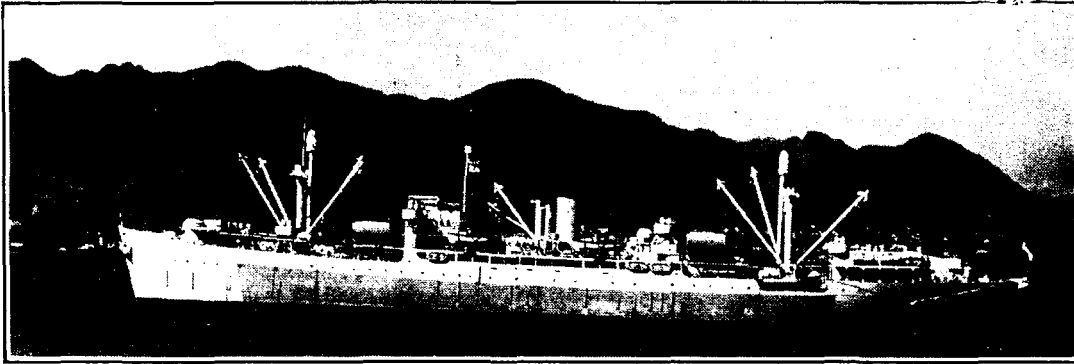


FIG. 2.—H.M.S. "BUCHAN NESS" CANADIAN-BUILT MAINTENANCE SHIP

of the war, led to a hurried attempt to make the Canadian shipbuilding industry more self-sufficient.

Actual or potential air raid damage in Britain and the loss of shipments in transit due to enemy action had already resulted in some consideration being given to such a change of policy, but it was not until June 5th, the day after the evacuation of Dunkirk had been completed, that a serious study began of methods by which the Canadian Navy could obtain all its requirements without drawing on either Britain or the Continent.

In June and July, meetings were held and plans were discussed for building and completely equipping from Canadian sources ships up to the size of destroyers. Each item needed for such building was examined and manufacturing possibilities were considered. High tensile steel, steam turbines and gearing, high-pressure water-tube boilers, all types of auxiliary machinery, guns and mountings, ammunition, fire-control instruments, asdics, wireless and electrical equipment, compasses, and torpedoes and mines were only some of the articles dealt with at that time. Two major decisions were subsequently reached, and were implemented in due course: one was to place an educational order for *Tribal* destroyers, the hulls to be constructed at Halifax, the turbine machinery at Toronto; the other was to create a government-owned company, Research Enterprises Limited, to develop and manufacture optical and scientific instruments.

Meanwhile the Admiralty and the British Government had likewise become aware of the need for having alternative and supplementary sources of supplies on the North American continent and at this time, therefore, the British supply missions, which had already been set up in Ottawa and New York, were re-organised and their scope was enlarged. Arrangements were also made to send out British technicians on the scale needed to interpret specifications and inspect output. As part of this general plan the British Admiralty Technical Mission arrived in Ottawa in July, 1940, to work with the Department of Munitions and Supply in the procurement of items required by the Royal Navy.

The character of Canadian shipbuilding was gradually altered as a result of these steps taken by the British and Canadian Governments in the summer of 1940, and during the following year an enormous industrial expansion took place. Shipyards were enlarged, factories and foundries were built or extended and began to produce the multifarious articles required for the construction and fitting out of ships; labour was sought and trained. In course of time thousands of firms throughout the country, ranging from the largest engineering and shipbuilding plants to small one-man shops, became engaged on various types of naval production, and by the end of the war nearly all parts of

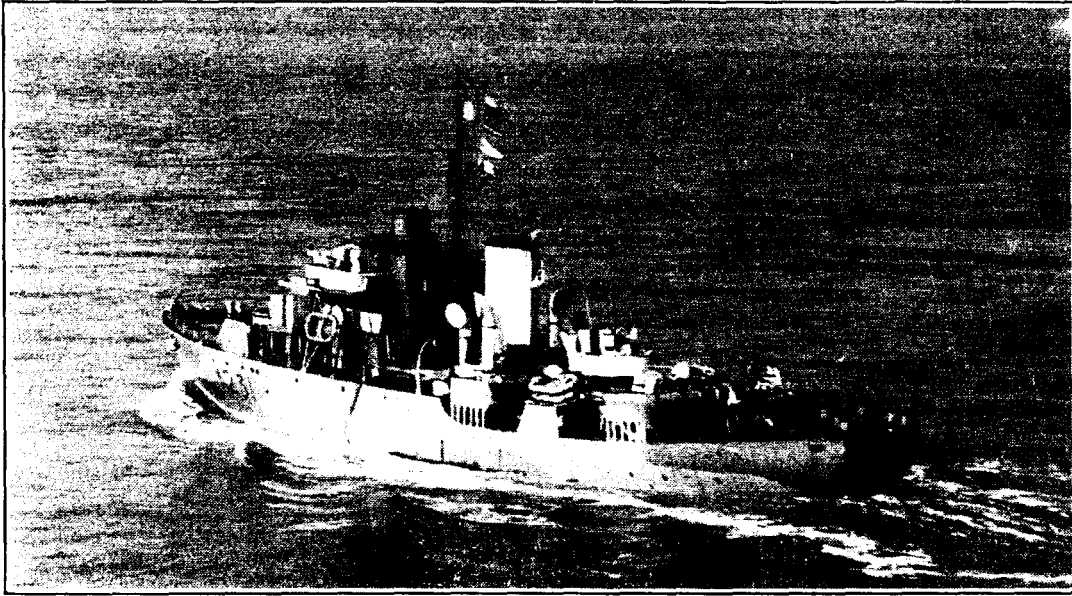


FIG. 3.—H.M.C.S. "CALGARY" CANADIAN-BUILT CORVETTE

Canadian ships and items of their equipment were made in Canada : and both ships and their equipment were being supplied to the Admiralty as well. In all of this, the work of the British Admiralty Technical Mission in conjunction with the Canadian Naval Service and the Department of Munitions and Supply, was of the utmost value.

The fact that Canada is closely linked, not only with Britain but with the United States as well, was of great importance with regard to shipbuilding. Canadian industry generally conformed to the standards and practices of her immediate neighbour. The Canadian Navy, on the other hand, has always been modelled on that of the Mother Country and most pre-war Canadian ships had actually been built in Britain. When the war broke out it was almost inevitable that Canada should turn to the Admiralty for assistance in the matter of plans and specifications, particularly in view of the neutrality of the United States : but the experience and tools of Canadian firms made it very difficult, and in some cases altogether impracticable, to use these specifications without numerous changes.

Influential as well in determining the nature of Canadian shipbuilding were certain geographic factors, and in some cases these imposed handicaps that required considerable ingenuity to overcome. Great distances added to the difficulty of co-ordinating and standardising shipbuilding programmes. Halifax and Esquimalt are over 3,500 miles apart and ships were built not only at and near these ports on the Atlantic and Pacific coasts but also at places up to 1,700 miles inland from Halifax, on the Saint Lawrence River and the Great Lakes. Manufacturing for naval use was carried on throughout the whole country. A few of the more striking examples of what happened as a result may be worth mentioning. Some of the ships built at Toronto were taken to Saint John, New Brunswick, eight hundred miles away for fitting out ; the destroyer turbines manufactured at Toronto were installed in hulls constructed at Halifax over one thousand miles distant ; reciprocating engines from a Montreal plant were shipped 980 miles to Port Arthur and almost three thousand miles to Vancouver for installation in *Bangors* built at those places.

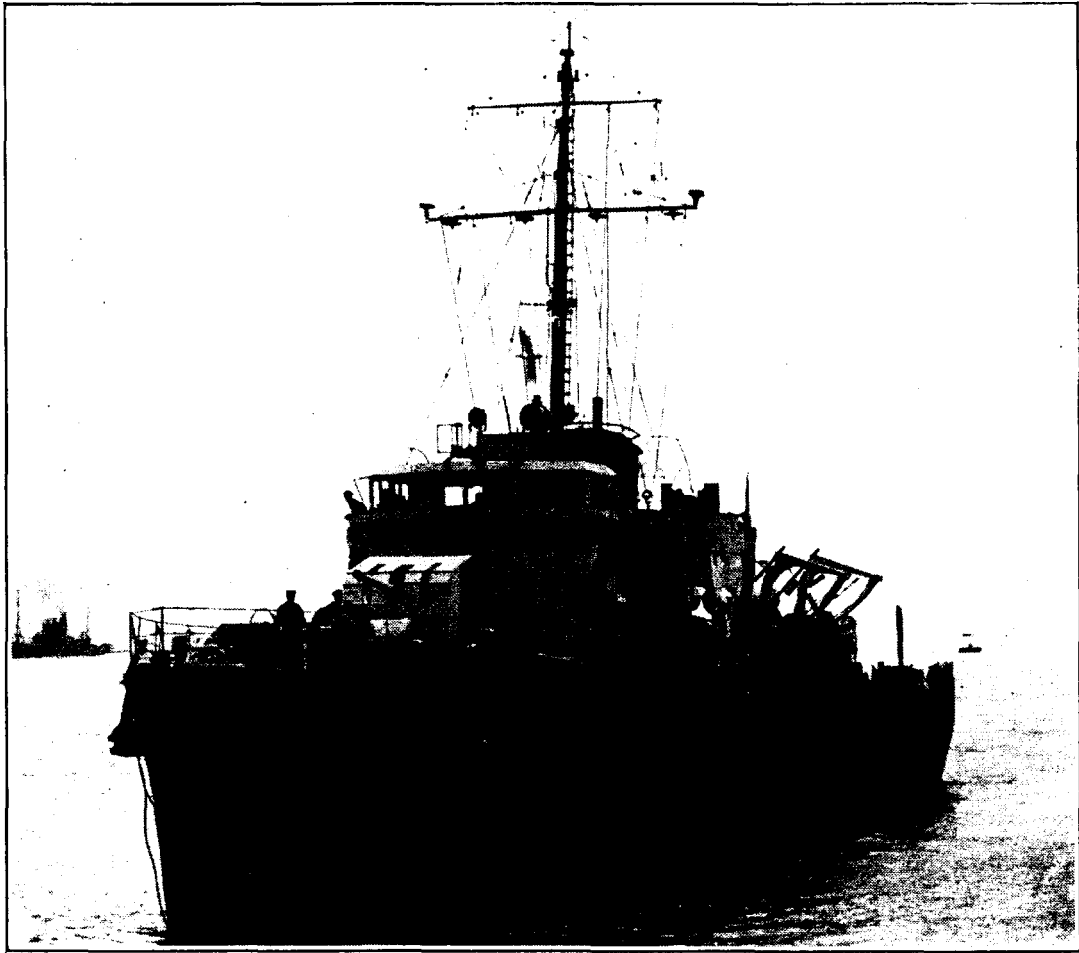


FIG. 4.—H.M.S. "SHIPPIGAN" CANADIAN-BUILT MINESWEEPER

Climate was no handicap at places on the coast, but the Great Lakes and Saint Lawrence are closed by ice for about five months of the year. This region is the industrial centre of Canada and the great bulk of naval ship-building during the war was done there. Few yards had covered slips and during the winter snow and low temperatures slowed building considerably. Moreover, ships not out of the river by the time of the freeze-up could not be brought out until spring : and ships leaving Port Arthur in the fall had some 1,700 miles to steam before reaching Halifax which remains ice-free throughout the winter. Sometimes ships nearly completed were caught by ice on their way down this long route to the sea and had their operational career postponed many months. A great rush to avoid this occurred each year, and frequently unfinished ships were steamed, or sometimes even towed, to the seaboard to be completed in yards there and brought into service without delay.

One special difficulty arose as a result of the fact that certain canals in the Saint Lawrence River, near where it flows out from the Great Lakes, have locks only 270 feet long. Frigates with an extreme length of 301 feet 6 inches could pass through the Great Lakes and the rivers and canals linking them to one another and, had it not been for this brief section with the small locks, could have steamed on another one thousand miles down the Saint Lawrence to the sea. As it was they could not be got out of the Lakes ; consequently yards there that had been used for building corvettes and *Bangors* which were sufficiently short to pass through locks, could not be used when it was desired to change to frigates. This meant added pressure on shipbuilders outside the

Lakes after 1941 when the first frigate programme was launched. It meant too that Lake Yards had to continue being used to build revised corvettes and *Algerines* long after the superior frigate design had become available.

The problem of obtaining drawings from the United Kingdom was of major importance in connection with Canadian shipbuilding. In the early stages of the war, many of the shipyards and manufacturers of naval equipment in Canada were inexperienced and lacked skilled workmen and drawing office staff. They were not accustomed, as were yards in the United Kingdom, to receiving outline plans and specifications and producing their own working drawings. Much more detailed information was required before they could begin work, and since the United Kingdom firm building the prototype prepared detailed drawings only as work progressed, it was impossible for a complete set to arrive in Canada until after the completion of the first ship in Britain. Despatch of the drawings to Canada also took time. In 1939 and 1940 all had to come by sea. Some still did so in 1941 when the frigate drawings were sent out, but others were coming much more rapidly by bomber mail. Later, in the case of the transport ferries, the problem was satisfactorily solved by having a Canadian naval architect work in England for some time, while the design was being prepared, to organise carefully the flow of drawings in such a way that work could proceed almost simultaneously in both countries.

Emphasis on some of the peculiar problems faced by Canadian shipbuilders during the war should not be allowed to obscure the picture of their total accomplishment. They built hundreds of small harbour craft and tugs, and Canadian industry supplied large quantities of miscellaneous equipment and armament not only for Canada's own Navy but for other allied forces as well. An extensive programme of cargo shipbuilding was also undertaken. Finally, the following table indicates what was achieved in the field of purely naval construction :—

#### NAVAL VESSELS BUILT IN CANADA DURING SECOND WORLD WAR

Type	For RCN	For RN	For USN <sup>(1)</sup>	For USSR
Destroyers ( <i>Tribal</i> class) ... ..	4	—	—	—
Frigates ( <i>River</i> class) ... ..	60	8	2	—
Corvettes ... ..	97	17 <sup>(2)</sup>	8	—
<i>Algerines</i> ... ..	12	50	—	—
<i>Bangors</i> (steam) ... ..	38	12 <sup>(3)</sup>	—	—
<i>Bangors</i> (Diesel) ... ..	10	—	—	—
<i>Western Isles</i> Trawlers ... ..	—	16 <sup>(4)</sup>	—	—
M.T.B.'s (70 ft. Scott-Paine) ... ..	12 <sup>(5)</sup>	—	—	—
M.L.'s (Type " B " Fairmile) ... ..	80	—	8	—
126 ft. Motor Minesweepers ... ..	9	21	—	7
105 ft. Motor Minesweepers ... ..	10	32	—	—
Transport Ferries ... ..	—	26	—	—
Maintenance Ships ... ..	—	16	—	—
Base Supply Ships ... ..	2	—	—	—

<sup>(1)</sup> Built by British Admiralty Technical Mission and transferred to United States Navy.

<sup>(2)</sup> Ten lent to Royal Canadian Navy.

<sup>(3)</sup> Six lent to Royal Canadian Navy.

<sup>(4)</sup> Eight lent to Royal Canadian Navy.

<sup>(5)</sup> Contract transferred to Royal Navy.