CHAPTER V

THE SECOND WORLD WAR TO THE APPOINTMENT OF R. J. FRASER AS DOMINION HYDROGRAPHER

1940-1947

Twelve years had now elapsed since the Canadian Hydrographie Service was last reclassified, and this despite its amalgamation with the Map Service in 1936 and subsequent requests for another general reclassification, or unit survey as it was then called. This review had its commencement in the fall of 1938, and in May 1940 a reclassification of the Hydrographie and Map Service was approved. Since 1898, this was the fourth reclassification of the hydrographie service, and coincidentally its last. In the post-war years departmental heads were granted more authority in matters pertaining to staff and promotions - a procedure that has since proven to be more progressive than the pre-war method. Ironically, the same Order-in-Council that authorized this new classification also introduced the first wartime freeze on civil servants' salaries, and fixed the proportion of permanent staff as of 30 September 1939. As the war became more intense, regulations of the *War Measures Act* were enforced that imposed more stringent staff and financial controls on employees. One problem that became quite acute was manpower shortage, and to offset this, most civil servants in September 1943 were "frozen" in their positions for the duration. Had he an opportunity to improve his lot elsewhere, departmental approval was necessary, or resign. Senior employees above the $3,000 salary ceiling were in a most frustrating position. They were not eligible for the cost-of-living bonus, and since January 1942 their statutory increases were suspended. Most also did not receive the War Supplement and War Risk Bonuses, especially those not employed on war work. Their counterparts however, those in classifications below the $2,100 salary ceiling, had received a cost of living bonus (approximately $11.80 per month) since 1941, and those in the $2,100 to $3,000 range, a partial bonus since April 1943. Those financial restraints, coupled with longer working hours and suspension of certain peacetime privileges, did not add to civil service morale in the latter years of the war.

In April 1945, promotions and statutory increases were restored to civil servants above the $3,000 salary ceiling, and the following year (1946), the cost-of-living bonus of those below the $3,000 ceiling were consolidated with their basic salaries. With the amendment of the *Civil Service Act* in 1947 new salary ranges were authorized for various classifications of civil servants. Further to the proposed departmental re-organization of its scientific and technical personnel, in February 1947 the classification of Mr F.H. Peters, surveyor general and chief, Canadian Hydrographie Service, was abolished, and renamed chief, legal surveys and map service, and chief, hydrographie service. This was the first official action to separate the Hydrographie and Map Service (since 1936) into two separate services, each with its own chief. A second step was taken in October of this year with the

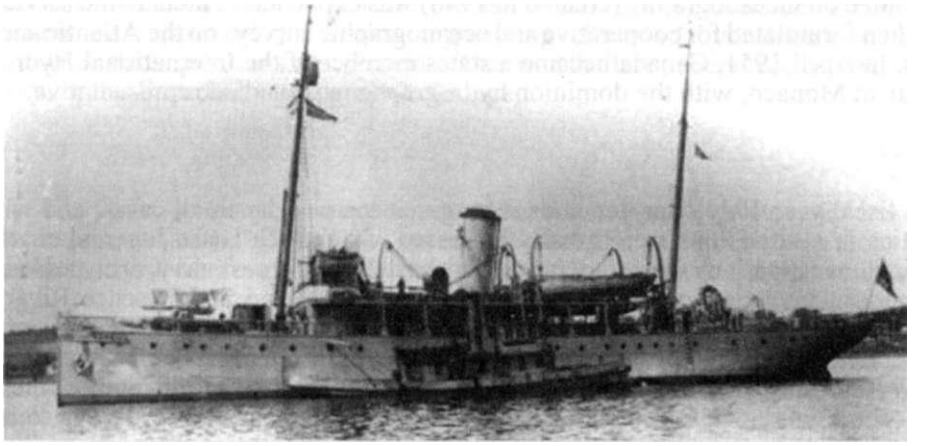
abolishing of the Surveys and Engineering Branch (since 1936), and its reconstitution as Mines, Forests and Scientific Services Branch. Under this new branch was the newly created Surveys and Mapping Bureau that included the "Hydrographie Service" (P.C. 37/4433). To head these new classifications, Mr Peters was named tentatively "chief of the former, and Mr R.J. Fraser, "chief hydrographer." At Mr Fraser's request, official consideration was given to proper nomenclature for the future. As of 1 January, Mr Peters was reclassified as chief, Surveys and Mapping Bureau, and Mr R.J. Fraser, dominion hydrographer, Canadian Hydrographie Service (P.C. 117/1666)

As a peacetime organization, the hydrographie service made a most significant contribution to the war effort, and when the war ended, two of its senior officers were honoured with membership in the Order of the British Empire (Messrs Peters and Parizeau). There were few civilian government services that surpassed the hydrographie service in supplying information for war purposes. First priorities were always given to the urgent requirements of the Department of National Defence Headquarters in Ottawa, and its district commands on the Atlantic and Pacific coasts, including Newfoundland. According to their importance, consideration was next given to requests from the National Harbours Boards, Department of Transport and the Department of Public Works. Other agencies greatly assisted were the British Admiralty, Ministry of War Department of the United Kingdom [sic], United States Hydrographie Office, and the United States Lake Survey. In the early part of the war, a special report on water-air temperatures along the north Atlantic shipping lanes was prepared for the *Department of* Agriculture, and in 1944 special current investigations were conducted in Georgian Bay and the upper Ottawa River on behalf of the National Research Council.

The wartime peak of hydrographie production and activities had been reached by 1944 when considerable thought was given to post-war planning of the service. To assist other departments, special surveys were undertaken on the sea coasts and inland waters, including Great Slave Lake and the Mackenzie River.

While the mother ships *Acadia* and *Carder* were with the Canadian navy, organized parties from these ships, working in small launches (equipped with echo-sounding machines) continued inshore survey work in the maritime provinces and Newfoundland. When not employed on urgent defence projects, attention was focussed on the recharting of former Admiralty surveys in these areas. Generally speaking, these defence projects comprised chart revisions of strategic harbours, plans and layouts of mine fields and degaussing apparatus, measured miles and current investigations. Other significant surveys by this service included charting the waters bordering the international air base sites in Newfoundland (Botwood Harbour), Labrador (Goose Bay) and Hudson Bay (Coral Harbour); the new naval base H M C S *Cornwallis* in Nova Scotia and for proposed causeway sites in the Strait of Canso (since built) and in Northumberland Strait (New Brunswick - Prince Edward Island). To assist with the *Cornwallis* survey, in 1942 a new survey launch, C H L *Anderson,* was built in Nova Scotia. Two years later (1944), another cabin cruiser was purchased and reconditioned for the Nova Scotia party - the C H L *Dawson.* This year surveying was resumed in Great Slave Lake with a 27-foot survey launch (later named *Tern),* and in 1947 she was used as an auxiliary with the new cabin cruiser, C H L *Rae.*

In British Columbia similar surveys for the defence forces and merchant marine were carried out from the Victoria office in the *Wm. J. Stewart,* and houseboat *Pender.* While charting Seymour Narrows in 1944, the *Stewart* grounded on Ripple Rock. She was refloated, and when reconditioned returned to Seymour Narrows the following year with *Pender* to chart the turbulent, rapid, tidal streams that surged through this passage. Here the *Pender* was to remain until 1949 in developing these investigations further.



HMCS ***Acadia*** in war service. A gun is mounted on her fo'c'sle, and she is wearing the white ensign at her stern. She was used extensively training RCNVR officers. Photo courtesy CHS

In the summer of 1945, the *Acadia* and *Cartier* were declared surplus to naval requirements. When inspected, the *Acadia* was declared suitable for reconditioning, but the *Cartier* had deteriorated so badly she had to be sold out of the government service. In 1946, the *Acadia* sailed from the newly established Pictou Depot to resume the post-war era of ship sounding on the Atlantic coast. In September 1947 the launch *Dawson,* while working in Halifax Harbour, was completely destroyed by fire, and had to be replaced by a second reconditioned launch the following year (also named *Dawson).* The *Anderson* was in commission intermittently until the mid-1960s, and in 1966 was sold out of the government service.

Despite wartime handicaps, the ever-prevalent manpower shortage, hydrographic chart production kept pace with its field activities. By 1943 chart distribution had trebled that of 1939, and the next year (1944), it reached an all-time high of some 106,000 miscellaneous publications including navigation, strategic and instructional charts. The service in the early years of the war assumed the responsibility as custodian of a complete set of facsimiles and special proofs of all Admiralty charts - many of which were reproduced to meet the exigencies of war. As a link in the chain of hydrographic services throughout the world, a constant flow of hydrographic information was maintained with hydrographic offices in London and Washington. When the Second World War ended, Canada emerged from it, "with a considerable advance in the total area of coastal waters charted, and as a result, the Hydrographic Service is in a position to present to post-war shipping set of navigation charts greatly improved over the pre-war issues." In 1947 civilian demands, especially from tourists, had greatly offset the decline of war requirements, and this year distribution reached its greatest peacetime peak, and the highest annual revenue in the history of the service.

The departmental reorganization in 1947 was another milestone in the history of the hydrographic service, and with the appointment of Mr R.J. Fraser as dominion hydrographer

the service embarked on a new era of marine surveying. This became more significant during his first year in office when in 1948 the membership of the Canadian Joint Committee on Oceanography (created in 1946) was expanded to include the service. Plans were then formulated for cooperative and océanographie surveys on the Atlantic and Pacific coasts. In April 1951, Canada became a states member of the International Hydrographie Bureau, at Monaco, with the dominion hydrographer a Canadian representative.

1940-41

In the fiscal year 1940, war demands were given top priority in all cases, and with it the activities in all divisions were greatly increased. On the sea coasts, special charting and technical investigations were undertaken for the defence forces (navy, army and air force), tidal-current investigations were conducted in the Gulf and St Lawrence River; water-surface elevations were recorded as usual along the [words missing] Great Lakes.

In the maritime provinces, many small harbours and ports had been charted by the British Admiralty, in some cases a hundred years previously. By 1939 many of these charts had become outdated, and there was now an urgent demand for resurveys to meet the immediate requirements of the merchant marine, the navy, local shipping, and industrial interests. With the mother ships on naval duty, full-time attention could now be given to these requests for the duration. At headquarters, many new charts and publications were received from the British Admiralty, the United States Hydrographie Office, the United States Lake Survey, and the International Hydrographie Bureau (established 1921). Before the fiscal year 1939 ended, the Victoria office had assumed responsibility for Canadian tidal publications on this coast, and in 1940 it took over permanently all tidal field work. Reorganized this year for more extensive operations, the service for obvious reasons was obliged to suspend its peacetime plans, and to concentrate all its capabilities in support of the war effort. Until 1942 field work was carried out with one major ship, one houseboat, two cabin cruisers (36-foot and 44-foot), and four shore-based parties using the 27-foot small half-cabin launches from the mother ships *Acadia* and *Carder*.

THE RECLASSIFIED HYDROGRAPHIC SERVICE AND THE ***WAR MEASURES ACT***

P.C. 44/1905

Since 1898 there had been three reclassifications of the hydrographie staff (1908, 1919 and 1928). When the service came under the newly formed Surveys and Engineering Branch in 1936, only three senior officers had their classifications up-graded. To correct this anomaly, a unit survey was initiated by the Civil Service Commission in 1938, and it probably would have been approved sooner had it not been for the outbreak of the Second World War and the subsequent enforcement of the *War Measures Act*. Its approval came with Order-in-Council P.C. 44/1905 dated 10 May, effective 1 April 1940. By this authority, most of the regular hydrographie staff had their positions reclassified.

Senior hydrographer Mr R.J. Fraser (since 1936) was renamed assistant chief, hydrographie service; Mr H.D. Parizeau, hydrographer grade IV (since 1928) became supervising hydrographer, Pacific coast (salary $4,020 to $4,500); Mr H.W. Jones, senior tidal and current surveyor, (prior to 1924) to chief, Tidal and Current Survey ($3,360 to $3,720); and Mr C.A. Price, assistant engineer (since 1928), renamed chief, Precise Water Levels ($3,360 to $3,720). Reference only was made to the salary of the "Chief, Drafting Division," Mr G.L. Crichton ($3,000 to $3,700). Hydrographers were as follows: Grade I, $1,800 to $2,160 (when permanent only); Grade II, $2,220 to $2,700; Grade III, $2,820 to

$3,240; and Grade IV, $3,360 to $3,900. The position of senior and tidal current surveyor, Pacific coast (vice Mr S.G. Hayden) was "to be transferred from Vancouver to Victoria when classification changed," and in the Precise Water Levels Division, a downward classification was approved for senior engineering clerks to hydrometric recorders, "effective when dates positions are vacated." This was the last general reclassification, or unit survey, in the Canadian Hydrographie Service.

P.C. 32/1905

Item 32 of this Order-in-Council normally would have held up the statutory increases and promotions approved with P.C. 44/1905, were it not that this unit survey was the result of studies made two years before the war began, "it would be inequitable to refuse these now for the sole reason that they were delayed by various agencies of the Government." However, no increases in compensations were authorized for certain categories of civil servants by this document - believed to be the first wartime salary freeze in the civil service. Another restriction imposed by this Order-in-Council fixed the permanent staff ratio in any unit, with the basis of such percentage being the total staff as of 30 September 1939. In the hydrographie service this ratio was 80 per cent, or as Mr Peters wrote, "a total of 79 permanent positions in the newly approved establishment."

DIVISION OF HYDROGRAPHY

Nova Scotia, Mainland

This party in 1940 comprised a nucleus of hydrographie and former ship's officers of the *Acadia,* with Mr J.U. Beauchemin, officer-in-charge, assisted by Messrs G.E. Lowe, J.A. Deveault, S.R. Titus, C H . Martin, C.R. Crocker (to early July) and G.A. Surette (from late August). Floating equipment consisted of the *Acadia* port and starboard launches (equipped with echo-sounders), the *Acadia* power dory and a few dories. For most of the field season, the party operated as two detached units from base headquarters in Mahone Bay, and when not engaged in charting this bay, was occupied with special surveys for the defence forces and merchant marine. Early in May, the survey of Mahone Bay was resumed by Messrs Titus and Crocker, and Messrs Beauchemin, Lowe, Deveault, and Martin proceeded to Port Hebert to survey this port as an aid to pit-prop and pulpwood carriers. To expedite this work, Messrs Titus and Crocker joined this party, and when survey work was well advanced, they left for Halifax. Early in July, Mr Crocker left the service to join the army, and when the war ended, he did not return. The survey of Port Hebert by this time was completed, and the party returned to Mahone Bay. By the third week in July, they were on the move again, this time to Shelburne Harbour for special surveys for the navy and air force. In mid-August, Messrs Beauchemin and Lowe had completed preliminary work, and at the end of the month Mr G.A. Surette of the Northumberland Strait survey joined the party, vice Mr Crocker. Early in September, the *Acadia* starboard launch began sounding this harbour, and when it was finished at the end of October, the boats returned to Mahone Bay for the winter. Work in Halifax Harbour ended in mid-October, but until early December Mr Beauchemin was engaged here "in checking over the buoys, completing the necessary triangulation in connection with the Range Finder Test Chart, and assisting Commander Griffith of the Dockyard in setting up magnetic range beacons." From the season's activities a standard chart for Shelburne Harbour and Approaches was published, plans from special surveys supplied the defence forces, and the Halifax Harbour chart checked for revisions.

Northumberland Strait

For reasons of expediency, it was decided to discontinue the Quebec Harbour survey and transfer it to Northumberland Strait, where it worked as a detached unit with hydrographers and petty officers from the *Carder.* Personnel of this composite party comprised Mr H.L. Leadman, officer-in-charge, Mr T.M. Tardif and Capt. D.M. Snelgrove, CHL *Henry Hudson,* and Messrs N.G. Gray, A.F. Wightman, G.A. Surette (to late August) and a new assistant H.R. MacKinnon. In addition to the *Hudson,* other floating equipment under Capt. Snelgrove's supervision comprised the *Carder* port and starboard launches, a 25-foot gig once used in Lake Winnipeg and one canvas covered boat was shipped from Quebec.

Under convoy of the *Henry Hudson,* the "fleet" left the home port of Charlottetown in the last week of May, and began the season's activities in Caribou Harbour, NS. Wood Islands, PEI, was then visited, and the survey extended to Pinette Shoals where it was tied in with the Hillsborough Bay chart. When this work ended, the new proposed ferry service between Nova Scotia and Prince Edward Island was charted, and while this survey was in progress Capt. Snelgrove left the service to join the Canadian navy. On his return to duty in 1946, he assumed command of the *Acadia.* To chart this exposed sector of the strait with small boats was no easy task, and in tribute to their efficiency, here is what Mr Leadman wrote about them. "Doing it from Caribou necessitated crossing the strait (about 11 miles) with the 27-foot launches and I expected them to be occasionally storm bound over there but they never were."

In the last two weeks of July, Messrs Tardif and MacKinnon sailed the *Hudson* to Gaspé Harbour where a sectional survey across its entrance was made for the Naval Service. Another was also conducted to the westward in Fox River, PQ. Late in July, the *Hudson* rejoined the Caribou party. A month later, summer headquarters were moved to Tatamagouche Harbour, NS, where the survey of Amet Sound began, including River John, Brule Harbour, Tatamagouche Harbour and Malagash. In September, Mr Leadman accompanied Mr Tardif in the *Hudson* to the east coast of Cape Breton, where his triangulation of 1939 was positioned with permanent bench marks from Belfry Gut to Michaud Point. En route to this area, the *Hudson* developed serious engine trouble on this exposed coast. While waiting repairs, Mr Leadman rejoined Mr Gray at Tatamagouche, leaving Mr Tardif to complete the "planting" with a hired car. The boats returned to Charlottetown at the end of October, and from the season's operations a standard chart for Caribou Harbour and approaches was published with large-scale insets of both ferry terminals.

Botwood, Newfoundland

In response to a special request from the Naval Service, Messrs Tardif and MacKinnon with coxswain S. Morrison were then sent by rail and boat to Botwood, where they surveyed several sectional areas in this vicinity, and checked the existing Admiralty chart for Peter Arm, for corrections and revisions. The information acquired was most helpful in improving communications in this area, and in assisting sea transport in the development of the present site of the international airport terminal at Gander. When he returned to Ottawa, Mr MacKinnon resigned from the service to join the RCAF.

Future Survey Launches

With thoughts to the future, and from his personal experience in the *Hudson* this season. Mr

Leadman wrote, "during the summer I noticed that there were a great many sunny days when the 27-foot launches were driven to shelter and the day was a total loss as far as sounding was considered. They could not stand up to the fresh water summer breeze. In replacing these launches as they wear out it would be highly advisable to use a much larger craft. I would suggest one about 40 to 45 feet long, under four feet draft, one of easy running and fairly light construction. In view of our Cape Breton experience and others, it should have two engines of about 40 HP each." One wonders if Mr Leadman's suggestions were not in mind when the launches *Anderson, Dawson* and *Rae* were later commissioned.

St Lawrence River

This survey was resumed by Mr M.A. MacKinnon, with assistants Messrs R.E. Hanson, A.L. Mack, P.N. Bowie-Evans and J.I. Thompson (to mid-June). To assist with the field work, the *Bayfield* Launch (in storage since 1935) was shipped from Charlottetown to Lake St Peter. About the middle of May, the *Boulton* sailed from Prescott for Trois Rivières (Three Rivers), where a 23-mile stretch of the river was resurveyed between Point Citrouille and the foot of Lake St Peter. Included was a detailed survey of Trois Rivières Harbour, where many changes were found since last surveyed by the Public Works ship channel survey of 1901-02. The *Boulton* returned to Prescott the last week of October, and from the season's activities the new chart, "Champlain to Foot of Lake St Peter," was published - the third of the new Quebec-Montreal chart series.

British Columbia

In the spring of 1940, Mr S.C. Hayden, senior tidal and current surveyor, Pacific coast, retired on pension and, in accordance with Order-in-Council P.C. 44/1905, his position was duly transferred to the Victoria office. This meant that all tidal and current work on this coast had now been officially transferred from the Vancouver office, and placed under the supervision of the supervising hydrographer, Mr H.D. Parizeau. Mr Hayden had been in charge of all Pacific coast tidal field work since 1913; and just prior to his retirement in 1924, Dr. W. Bell Dawson, superintendent of the Tidal and Current Survey Division, established a permanent tidal office at Vancouver, with Mr Hayden in charge.

Field and office assistants under Mr Parizeau in 1940 comprised Mr W.K. Willis, CGS *Stewart;* Mr R.B. Young, CGH *Pender,* Mr L.R. Davies, in charge of chart production and distribution; and Mr G.W. LaCroix, acting tidal and current surveyor, Pacific coast. In April Mr J.W. Dolphin resigned, but was kept on for office work until early August. Clerical assistant Mr G.P. Stoney was granted leave of absence to join the RCAF and to replace him temporarily, Miss D. Payne was appointed. To assist Mr Davies with chart work the first two student draftsmen were appointed, Messrs F.R. Smithers and D.R. MacKenzie, in February and March 1941 respectively. During the field season, Mr A.E. Stewardson, senior assistant of the *Stewart,* suffered a nervous breakdown, and after a few subsequent leave periods, retired on pension for reasons of health in July 1941.

Hydrographers with Mr Willis aboard the *Stewart* this season included Messrs Stewardson (part season), Ettershank, Johnson, Rutley, LaCroix (to the end of April when he assumed duties of tidal and current surveyor), and J.I. Thompson (St Lawrence River survey, end of June). From the last week of April to the end of September, the *Stewart* charted areas in the northern portion of the Strait of Georgia, Malaspina Strait, Jervis Inlet, Millbanke Sound to Hakai Passage, and Half Moon and Buccaneer Bays. When working in the Millbanke Sound area (June-September) eight tests were made with the radio acoustic

ranging apparatus (RAR), but for the want of certain parts, these tests were not conclusive. Assistance was also rendered to the geodetic survey party in charge of Mr Riddell. A launch and crew were loaned him to extend his triangulation network in the Queen Charlotte Sound area. The *Stewart* rejoined the *Pender* in Buccaneer Bay at the end of September, when this bay was sounded out. Both units then sailed for Victoria and tied up at the DOT Wharf on 30 September. The season now ended, Mr Thompson resigned from the service to join the Canadian Army.

Total complement of *Pender* was fourteen men, including Mr R.B. Young and assistant Mr T.S. Bremner. During the season the two launch parties were kept in operation. *Pender* was towed to Malaspina Strait in the last week of April, and until the end of September worked with the *Stewart* in Hunter Channel, Jervis Inlet, Cultus Inlet, Kilidlt Inlet and Nalau Passage. Some 1,050 miles were boat sounded, 17 shoals swept and 303 examined. At the end of the fiscal year Mr T.S. Bremner, who had been with the service since 1938, resigned.

Emergent war work included cable laying surveys in the Prince Rupert Harbour area by Messrs LaCroix and Dolphin, and across the entrance to Burrard Inlet, Vancouver Harbour, by Messrs Stewardson and Ettershank. Other strategic areas were visited for chart revision surveys, and with Mr Hayden's retirement, Mr LaCroix attended to all regular tidal work on this coast.

In his first annual report as supervising hydrographer, Mr Parizeau wrote, "chart distribution this year has been considerably heavier than ever before, mostly due to the requirement of the Army, Navy and Air Force, and there has been a 25 per cent increase in sales to the public and Merchant Marine, the total sales being 6,516 and 245 BC Pilots."

TIDAL AND CURRENT SURVEY

Highlights of this division in 1940 were the long-delayed reclassification of Mr H.W. Jones as chief (nominally in charge since 1924); the retirement of senior tidal and current surveyor, Pacific coast, Mr S.C. Hayden; and the official close and transfer of the Vancouver office to the district hydrographie office at Victoria. All possible assistance was rendered to facilitate this transition. However, when completed, the office work of reduction and the preparation of the Pacific coast tide table still remained with the division in Ottawa. Maintenance and construction of the principal tide stations, and current survey instructions, were invariably prepared in Ottawa. Tidal stations on both coasts were inspected this season. A tide recorder was installed at Port Alberni, BC, and on the north shore of the Gulf of St Lawrence, minor tidal-current investigations were conducted in the Perroquet Islands and Harrington Harbour, PQ. All Pacific coast field work was carried out by the acting tidal and current surveyor, Mr G.W. LaCroix, and on the North Shore by Messrs R.B. Lee and O.M. Meehan respectively. For comparative purposes, a seasonal tide gauge was installed in the open water of Port Churchill, Manitoba. Data from these records were compared with the permanent gauge on the government wharf, to determine the difference in elevation between mean tide level inside the harbour and mean sea level on the open coast. The level network of the Hudson Bay railway could then be adjusted for closer accuracy. During the year, considerable data was supplied the Departments of National Defence, Transport, Public Works, and the Geodetic Survey of Canada. In July, Mr M.S. Madden, who had been with the service since 1931, was transferred to the Department of National Defence for special war duty at Lindsay, Ontario, and when the war ended, he did not return. Early in 1941, he was temporarily replaced by Mr J.E.V. Goodwill.

PRECISE WATER LEVELS

"Existing water levels offset both loading capacity of ships and power developments ... factors of great importance in Canada's war effort." Under supervision of the reclassified chief, Precise Water Levels, Mr C.A. Price, over 600,000 water surface elevations were computed for the Great Lakes and St Lawrence navigation system. Some 25,000 sheets of bulletins, profiles, etc., were prepared and issued during the year, much of it for publication in engineering and marine journals.

CHART CONSTRUCTION

Owing to an increased demand for more and large-scale charts, a heavy work load was placed on this division during the transition from peacetime to wartime production. Special folios were supplied to the Naval Service in great quantity, and a number of Admiralty charts were reproduced on short notice. In all 127 charts, maps, prints and correction-patches were printed: charts in colour, 40; in black only, 43 and including 18 reprints of 14 Admiralty charts; process prints, 5; *Customs Act* Maps, 4; special direction-finding diagrams, 1 ; wall charts for naval intelligence service, 3 ; and patches for chart correction, 3.

Subsequent to the hydrographie reclassification this year, the copper-plate engraving unit, with the service since 1921, was officially transferred from the charting division to the map service. Mr W.C. Cunningham, the chief of this unit, retired on pension, and in the years that followed, this craft was allowed to die out. As the need for the remaining engravers in the map service increased, they were gradually transferred from the hydrographie service in the Confederation Building to the map service in the Labelle Building. Mr Walter J. Watts, one of the first engravers to join Mr Cunningham's unit in August 1911 when it was formed in the Printing Bureau, was also the last of the hydrographie copper-plate engravers to be transferred from the Confederation Building. He was also the last of this unit to retire from the map service in 1947.

In lieu of Mr Cunningham's classification, a new position, senior map draftsman, was created by Order-in-Council, P.C. 36/4274, 24 August 1940. It had already been filled by Mr W.O. Hodgins (in 1967 ± in chart of Chart Drafting). Also on Mr Crichton's staff were principal map draftsmen, Messrs J. Bell and E. Leslie (since May 1940); senior map draftsmen, Messrs R.S. Simpson (granted leave January 1941 to join RCN, but never returned), C. Weese, M. Isabelle (since 1940), and E.D. Baldock (vice Mr H. Melancon, but never worked with the hydrographie service); map draftsmen, Messrs Y. Pinard and H. Kelson (since 1940); and student draftsmen A . M . Dunn and L . C . MacDonald (transferred from Chart Distribution, November 1940).

CHART DISTRIBUTION

"Owing to the exigencies of war, the number of calls for navigation charts in the calendar year 1940 exceeded those of any other year in the history of the service." During the year 33,136 navigation charts, 1,056 pilots and sailing directions, and 38,727 tide tables were distributed. This was an increase of two-thirds above the 1939 distribution, and these charts were obtainable in 25 Canadian and 2 United States ports. As of 1 January 1941, there were 90,554 copies (including 6,566 at Victoria) in stock, and 503 official charts of the "Hydrographie Service of Canada." In June 1940, Mr A. Carbonneau, a clerical assistant since 1906, retired. Assisting the officer-in-charge, Mr P. Radikir, were clerks, Messrs L . C .

MacDonald (until November), K. Conroy, and L.M. Vechter, and office boy, R. Stewart.

1941-42

"In order to expedite emergency hydrographie work in the various strategic areas, it was necessary to organize the different charting units with special regard to flexibility of movement of personnel and equipment. Priority was to specific war surveys required by Canadian and British naval authorities and the RCAF. Where possible these special surveys were incorporated into the regular scheme of coastal charting. As a result, a number of important standard navigation charts were issued, or older editions were brought up to date."

DIVISION OF HYDROGRAPHY

Bay of Fundy

To assist wartime shipping, detailed harbour surveys in 1941 were resumed on the southwest coast of Nova Scotia, and at the head of the Bay of Fundy. This party was again in charge of Mr J.U. Beauchemin, assisted by Messrs G.E. Lowe, S.R. Titus, P. Radikir and C H. Martin. Due to illness, Mr J.A. Deveault did not join the party, and upon his return to duty the following year, he was transferred permanently from the hydrographie to the map service. This season, field work was conducted as two detached units, with all three *Acadia* launches in operation. One unit in charge of Mr J.U. Beauchemin, assisted by Mr C H. Martin and Mr P.A. Radikir (part of season), charted LaHave River, NS, from Conquerall Bank to Bridgewater. When completed early in August, the lower section of the river between Conquerall Bank and Mosher Island was taken in hand. The second unit, in charge of Mr G.E. Lowe, worked in the Bay of Fundy, and was assisted by Messrs Titus, Martin and Radikir (part time). Surveying began at Alma, NB, in mid-May, and ended the last week in July. From then until the last week in November, Apple River and Parrsboro Harbours were charted. Launches and equipment then left for Hantsport, in Minas Basin, where they were hauled by truck to East LaHave, NS, for winter storage. As a result of this party's operations, one coast and three harbour charts were compiled: "LaHave River, Riverport to Conquerall Bank," "Alma, NB, and approaches," "Apple River, NS, and approaches," and "Parrsboro, NS, and approaches." Considerable data had also been obtained for the chart "LaHave River, West Ironbound Island to Riverport."

Gulf of St Lawrence to Cape Breton

Field operations by this party were also quite widespread, extending from the Gaspé Peninsula on the west, to Cape Breton and Newfoundland on the east. Surveys in Bay Chaleur and Sydney, NS, were special urgent requests by the Ministry of War Transport of the United Kingdom, and those in Newfoundland the government icebreaker *N.B. McLean* was placed at the disposal of the service, and to better coordinate all field projects hydrographers were grouped as two units: Gulf Party and the Newfoundland Party [sic]. The former, in charge of Mr N.G. Gray, was assisted by Messrs T.M. Tardif *(Henry Hudson),* P.N. Bowie-Evans and Mr A.F. Wightman until early June, when he was replaced by Mr A.L. Mack of the St Lawrence River survey. Under Mr Leadman in Newfoundland were assistants Messrs R.E. Hanson and G.A Surette (both of the St Lawrence River survey), and Mr A.F. Wightman.

Gaspé Peninsula

From mid-May to mid-August, seven small harbours were surveyed on this coast, working out of base headquarters at Port Daniel, PQ, in Bay Chaleur. Field activities began with triangulation and other preparatory work in Grand River, Chandler, and Port Daniel Harbours, by Messrs Gray and Bowie-Evans, using a truck for transportation. By the end of May, Mr Tardif arrived from Charlottetown with the *Cartier 's* floating equipment of the previous season. This comprised the launch *Henry Hudson,* the *Cartier* starboard launch (with port launch MS 2 echo-sounder), a gig with outboard motor, a surf boat, and three dories. Since long runs were necessary this season, the trunk cabins in both launches were extended to enclose their forward cockpits. While taking gasoline at Port Daniel, on 14 June, the *Henry Hudson* caught fire, injuring three of the crew before sinking. Until repaired by the end of July, progress was slow and arduous. Unable to use the *Hudson* for surveys to the westward of Port Daniel, Messrs Tardif and Bowie-Evans were obliged to use a truck and hired boats to chart Cap Chat, Mechins, and Petite Vallée harbours. In the meantime, Messrs Gray and Mack completed other surveys in Barachois and Mai Bay harbours, in Bay Chaleur. When the *Hudson* was repaired, she worked closely with the other launches to complete unfinished sounding and survey details in the harbours charted, and before closing out work in this area, made a long run in Bay Chaleur from Percé to Campbellton to check the Gulf of St Lawrence Pilot. The Bay Chaleur survey was closed out in mid-August, when the party left Port Daniel for Cape Breton by truck, and the *Henry Hudson* [sailed]. En route, the *Hudson* visited Charlottetown to store unnecessary equipment and to repair the *Cartier* starboard launch.

Newfoundland

Early in June, the government icebreaker *N.B. McLean,* Capt. W.J. Balcom, master, having taken aboard hydrographers R.E. Hanson and G.A. Surette, sailed from Quebec for Bay Chaleur. At Port Daniel, Messrs Leadman and Wightman, with equipment, joined the ship's company. The *McLean* then proceeded to Mortier Bay on the south coast of Newfoundland, where until the end of July she was used as a ship base to rechart this harbour. Mortier Bay, lying in the western entrance to Placentia Bay, was last surveyed in 1876 by Commander W.F. Maxwell of the Royal Navy, and the Admiralty had tentatively selected this site for the planned historic meting of Prime Minister Winston Churchill and the President of the United States, Mr F.D. Roosevelt.

Surveying began on 7 June with the *Cartier* port launch and its new MS 10 echo-sounder, and in late July a rough sheet of this harbour was rushed to Ottawa for further action. In addition to a standard survey, spar buoys were positioned in the entrance to the harbour, and a set of range beacons established. Observations for latitude, longitude, azimuth and magnetic variation were made by Mr Nadill of the Dominion Observatory. When this provisional chart was compiled and forwarded to London, it was never used by the Admiralty for its intended purpose. In August 1941, it was printed as Chart 487, "Mortier Bay," with inset showing the wharves of Marystown - the first Canadian standard chart for Newfoundland.

For the mid-August meeting of HMS *Prince of Wales* and the USS *Augusta,* a less exposed and deeper site was chosen on the east coast of Placentia Bay. This site is believed to be Argentia Bay, and here the historic Atlantic Charter was signed (NATO, in 1949). A few months after this historic meeting the *Prince of Wales* was sunk in Japanese waters [by the Japanese in the South China Sea, north of Singapore].

Instructions were then received to make a strategic survey of St. John's Harbour for Canadian naval authorities. This survey was duly conducted from the *McLean* until the last week in August. Geodetic controls had already been established here that enabled the work to progress favourably, until mid-August, when the port launch went adrift outside the harbour from engine trouble. When one from the *McLean's* launches was installed, sounding was resumed until the work ended on the 28th. Mr Wightman, the port launch, and three of the crew then departed on the *McLean* for Charlottetown.

To complete Newfoundland projects, Messrs Leadman, Hanson and Surette travelled to Bell Island (Conception Bay), where a special investigation for a degaussing range was conducted for the naval command at St. John's Harbour. A local boat was hired for this purpose, and soundings were taken with lead line. When this work ended, the party left for North Sydney, NS, arriving there by train and boat in mid-September. Early in 1942 the second Canadian standard chart for Newfoundland was printed No. 488 St. John's Harbour.

Cape Breton

In the last week of August, the Port Daniel party began the survey of Little Bras d'Or to assist the bunker trade plying the Sydney route. Until mid-October the sector from High Cape Light in Spanish Bay to Chapel Point in St Andrew's Channel was surveyed. Due to recent groundings, certain areas in Sydney Harbour were also resounded for the Ministry of Transport of the United Kingdom. On 16 September both parties were again amalgamated under Mr Leadman. Until the last week of October Sydney Harbour was resurveyed, and a small investigation made in the entrance of Great Bras d'Or. The *Henry Hudson* and other boats were then assembled in Little Bras d'Or, and when loaded with the field equipment, departed for Charlottetown under Mr Tardifs charge, arriving there in early November. Following his return to Ottawa, Mr Leadman was granted leave of absence, and until 1944 was employed on special war work with the Ontario Hughes Owens Co. Ltd. in Ottawa. This year the *CARTIER* starboard launch was condemned and sold out of the government service. This 15-year old launch was built in 1927 by Mr Obed Hamm, Mahone Bay, NS, ($4,515 complete), and was one of the first to test an echo-sounder in 27-foot launches.

St Lawrence River

As part of the scheme of recharting the St Lawrence River from Quebec to Montreal, Mr M.A. MacKinnon was again placed in charge of this party, and until early in June was assisted by Messrs Hanson, Surette, Mack and Goodwill. With the departure of the first three assistants for Newfoundland and Bay Chaleur, Mr Goodwill alone remained as field assistant. The *Boulton* sailed from Prescott the middle of May and established summer quarters at Nicolet a few days later. In the last week of August, the launch moved to the St Francis River. Lake St Peter had not been surveyed since 1899, and when the field season ended in mid-October, "approximately two-thirds of the lake" had been charted.

British Columbia

As in 1940, the main charting activities on this coast in 1941 were carried out by the *Wm. J. Stewart* and houseboat *Pender.* Special surveys were also conducted by tidal and current surveyor, Mr G. W. LaCroix, who this year gave two-thirds of his time to hydrographie work alone. At the Victoria office, with Commander Knight still on war leave, the bulk of

the office work of chart production and distribution was handled by Mr L.R. Davies and his small staff. An indication of wartime activities on this coast was the many demands for hydrographie information. This year chart distribution was 16 per cent more than 1940 with little noticeable change in pilots and sailing directions; but in tide tables sales there was an increase of 50 per cent. Distribution in 1941 comprised 7,677 navigation charts, 267 BC pilots and 10,640 BC tide tables.

The *Stewart* was commissioned early in May, and left with *Pender* in tow for the northern portion of the Strait of Georgia. Here the houseboat was moored to assist the survey of Sutil Channel, including Malaspina Inlet. Hydrographers with Mr Willis this season were Messrs Young, Ettershank, Rutley and D.A. Rankin. Early in June, Mr Young took charge of *Pender,* now moved to Klik-tso-atlai (near Bella Coola). The *Stewart* then left for the Spider and Calvert Islands area until the last week in July, and up to the end of August was in the northern portion of Queen Charlotte Sound. Until the middle of September, work centred in the Queen Charlotte Islands and Prince Rupert Harbour (Seal Cove). The season ended in the Strait of Georgia on 18 October, and the following day both units returned to Victoria.

Strategic surveys by Mr LaCroix for the defence forces included cable [location] surveys, Victoria and Estevan Islands (Langley Passage), degaussing survey English Bay, Fraser River (Morey Channel), Vancouver (Jericho Beach), and Esquimalt Harbour. When *Pender* returned to Victoria in the fall, she was used for work in Langley Passage and Esquimalt Harbour. Hydrographers assigned to assist Mr LaCroix with these projects were Messrs Ettershank, Rutley and Rankin.

Following the Japanese attack on the American naval base at Pearl Harbour, December 1941, there was a general uneasiness in British Columbia. To meet any possible exigencies that might arise the *Wm. J. Stewart* was recommissioned on 2 January 1942, and kept in readiness.

TIDAL AND CURRENT SURVEY

In addition to the maintenance of tidal stations and the preparation of tide tables considerable information was compiled and supplied to the defence forces, the merchant marine, other government departments, the Admiralty, and US government departments. To replace Mr Madden for the duration, Mr Wm. J. Miller was temporarily transferred from the Precise Water Levels Division to this office.

At the request of the Montreal Harbour authorities, a current measurement survey was carried out in this harbour during the spring freshet stage of the river (late in May, 1941) by Messrs F.C.G. Smith and O. M. Meehan of the hydrographie service. It was a joint project with cooperation of the St Lawrence Ship Channel and Montreal Harbour Board engineering staff. A chart showing the current directions and velocities was printed from these results.

A special study of the water-air temperatures in the Gulf and River of St Lawrence was also made by Messrs Smith and Meehan. This entailed the tabulation of these values on monthly sheets and studied for possible isotherms in designated areas. These results with descriptive notes were compiled in monthly chartlet form, and the whole submitted to the Department of Agriculture for their immediate purposes.

These "egg route charts" as they were unofficially called were intended to save valuable cargo space in the holds of ships transporting eggs and other perishable foods from Canada to the United Kingdom. With the advent of powdered eggs and processed food products, the need for ships to travel on courses close to the perishable isotherm ended

further development, and publication of these special wartime chartlets was discontinued.

PRECISE WATER LEVELS

Forty-seven water gauges were in operation along the Great Lakes and St Lawrence River waterway, and were distributed into three sectional areas: Section 1(17) Port Arthur to Kingston and Grenville, Section II (13) Prescott to Ste. Anne de Bellevue and Section III (17) Pointe Claire to Neuville. This year Mr Price's staff was reduced by three of his technical assistants: Mr Wm. J. Miller (on loan to tidal survey) and in September A. W. Cole and W. E. Rainboth. Mr Rainboth was loaned to the engineering division of the branch for special land survey work in Newfoundland and Ottawa. Mr Cole (a certified dominion land surveyor prior to joining the Precise Water Levels in 1934) was successful in a promotional competition and returned to map service where he became secretary, Board of Examiners for Dominion Land Surveyors until his retirement in 1960. A total of 22,000 sheets of water level data were issued this year, and many requests were supplied for specific water level problems.

CHART CONSTRUCTION

To ensure their safety from possible enemy destruction, by 1941 the Canadian Hydrographie Service had become the custodian of many engraved Admiralty baryta charts of world wide coverage. As new editions were received, the older ones were destroyed, and from this repository many reproductions were made on very short notice. Special hydrographie charts were also designed and supplied to the naval intelligence service in Ottawa. In all, some 210 charts, maps, prints and correction patches were prepared, including 36 reprints of Admiralty charts. This production quota was *2Vi* times that of 1939, and 1*Vi* times the 1940 figure. In July, Mr P. Brunet was appointed a temporary map draftsman, and in December the first two women student draftsmen, Misses L. W. Sweet and M. Cassidy, were appointed as chart correctors. This year, student draftsmen A. Dunn and L. C. MacDonald left the service, the latter to join the RCAF.

CHART DISTRIBUTION

With Mr Radikir's return to field duty, he was replaced in May by Mr J.L. Foreman as officer-in-charge. Before this month ended, Mr A. Willis was appointed a clerical assistant, and together with clerk L. M. Vechter and a few office boys, (two of whom resigned in two months), handled routine matters in this section. This included the distribution of 47,699 navigation charts, 1,345 pilots and sailing directions and 39,623 tide tables. Junior assistance in this section had been quite a problem since the war began and, according to Mr Foreman, "it should be noted that although the office boy is assigned to the Chart Distribution Section, his services are largely used by other divisions of the Hydrographie Service." This was typical of "staff piracy" during the war years when "slaves" were eagerly sought after.

1942-43

As the tempo of the war progressed, manpower shortages and labour disputes in industry became problems of national concern, and were reflected in the government service. These and other staff controls had a bearing on hydrographie operations and output, and with all

divisions operating at capacity, more than 90 per cent of the year's activities were for the fighting services. With the exception of 1944, no annual hydrographie wartime expenditure exceeded that of 1939. In 1942, to expedite emergent requests in the maritime provinces, the first twin-screw cabin launch *Anderson* was built. To aid in the rapid development of airbase terminals in Labrador and Hudson Bay, strategic surveys were conducted from the Department of Transport icebreaker *N.B. McLean.* These were the first hydrographie surveys in the sub-Arctic waters since the Hudson Strait survey was closed out in 1935. In British Columbia, for the want of a crew to man the houseboat *Pender,* this unit was used sparingly.

DIVISION OF HYDROGRAPHY

While Mr Leadman was absent on war leave, Mr Beauchemin was placed in charge of hydrographie surveys in Newfoundland for the duration. To carry out the seasonal instructions, the Atlantic coast party was divided into two units: the Nova Scotia party in charge of Mr G.E. Lowe, with assistant Mr P. Radikir, and the Newfoundland party, in charge of Mr Beauchemin, with assistants Messrs S.R. Titus and C.H. Martin. By the middle of May, all three of the *Acadia's* launches were ready for field work.

Nova Scotia

The charting of the lower portion of the LaHave River, begun by Mr Beauchemin the previous year, was resumed by him and assistants in 1942 until the end of May. With his departure for Halifax, to prepare for work in Newfoundland, this unit was placed in charge of Mr G.E. Lowe. Until mid-July, survey work progressed satisfactorily with the aid of the *Acadia* starboard launch and power dory. The launches and equipment were then detailed to Shelburne Harbour for shoal examinations and other investigations. The party returned to LaHave River early in August, and until the end of October surveyed the sector from Pearl Island to Cape LaHave. The season now ended, launches, etc., were stored at East LaHave for the winter, and Messrs Lowe and Radikir returned to Ottawa. Following his return from Newfoundland, Mr Beauchemin visited East LaHave to arrange necessary repairs for the boats, and in his annual report remarked that the LaHave party launches, built in 1931, still had the same 35-50 HP engines, and the echo-sounders in the starboard and port launches (MS II) were still in good condition.

Newfoundland

With assistants Messrs Titus and Martin, and the echo-sounder equipped *Acadia* port launch, the party left Halifax early in June on one of the Furness Line ships, and arrived at St. John's Harbour a week later. For the season's activities, Brigus was selected as base headquarters, and from here special surveys were carried out for the defence forces and the Newfoundland Public Utilities. Until early November, Harbour Grace, Holyrood and Bay Bulls harbours were carefully recharted. [Wire] Sweeping surveys were conducted in Harbour Grace, made necessary in connection with marine railways and port facilities here. While Messrs Beauchemin and Titus were absent in Bay Bulls, Mr Martin was left at Harbour Grace to carry on. In the last half of November, a small strategic survey was made at Bell Island in December. The launch and equipment were then stored with the boom defence here, and Messrs Titus and Martin returned to Ottawa. Before returning to headquarters, Mr Beauchemin visited the commodore of the Halifax Dockyard to discuss proposed surveys in 1943. He then visited East LaHave to check equipment stored here, and

delayed by heavy snowfall did not return to Ottawa until 19 December.

Gulf of St Lawrence to Bay of Fundy

During Mr Leadman's absence on war leave, the general supervision of this party was under Mr N.G. Gray, with Capt. H. Anderson in charge of outfitting and the maintenance of the boats. Both units worked in Northumberland Strait until July, when Mr Gray was detailed for special work in the Bay of Fundy. For this latter assignment, a new 39-foot cabin cruiser was built as a replacement for the condemned *Carder* starboard launch. Other hydrographers with Mr Gray this season were Messrs Tardif, Wightman, Surette and Bowie-Evans.

Northumberland Strait

In the third week of May, the *Henry Hudson, Carder* port launch and other small units of the fleet sailed from Charlottetown for Tatamagouche, NS, where the first summer base was established. While here, the resurvey of Amet Sound was completed and the charts for Wallace and Malagash harbours checked for revisions. Early in July, the party moved to Pugwash, NS, to extend the coast charting eastwards. While here, Mr Gray received instructions to ship the *Carder* port launch to Quebec, and to undertake a special survey of Annapolis Basin, NS, in the Bay of Fundy. From then until the end of October, Messrs Tardif and Wightman worked as a detached unit, and when the season ended, the *Henry Hudson* returned to Charlottetown for the winter.

In his annual report, Mr Gray wrote:

> During the war, the greater percentage of our work has been done at the request of the Naval Service or shipping interests directly connected with the war effort, work of this nature, and rightly so, should receive priority over other work. However, I think that a proper scheme for a set of coastal charts of Northumberland Strait at 1 inch = 1 mile should be decided upon, and the limits for each chart set down on paper. Then at the beginning or end of a season, or whenever one of our boats may be available work on a certain sheet could be done. Also projections and information relative to this sheet could be prepared in the office, and I think more advantageous use of our time in the field would thereby be utilized.

Bay of Fundy

In late July, Messrs Gray, Surette and Bowie-Evans left Pugwash by truck, the former proceeding to Chester to take delivery of the new launch *Anderson* and the others to Annapolis Royal to commence the preliminary triangulation work. Named after Capt. F. Anderson (chief hydrographer, 1925-36), she was built at Chester, NS, by Reuben Heisler at an approximate cost of $4,000 ($1,800 hull alone), and was equipped with a modern MS 14 echo-sounder. Early in August, she was sailed from Chester to Digby, NS, by Mr Gray and a small crew. For the remainder of the season, *the Anderson* completed the preliminary work in this and the Annapolis Basin area, including the approaches to the new naval training base H M C S *CornwaUis.* When the launch laid up at Digby in mid-November, only the sounding of these waters remained to complete the chart. Mr Gray with the crew then left for Charlottetown by truck to pay off the *Hudson* crew and take inventory. Before the fiscal year ended, Mr Bowles-Evans who had been with the service since 1939, resigned.

St Lawrence River

The resurvey of Lake St Peter was completed this season by Mr MacKinnon, with assistance of hydrographers Messrs Hanson and Mack (part time) and Mr Goodwill. The *Boulton* sailed from Prescott in mid-May, and in consort with the *Bayfield* Launch completed the unfinished sector in the St Francis River area. Early in June, Mr Hanson left the party for Quebec to commence the season's activities in Labrador and Hudson Bay, and in July was joined by Mr Mack. In the last week of this month, the *Boulton* proceeded to Ile aux Coudres below Quebec to undertake a special survey for the Naval Service. She then returned to Lake St Peter, and when its resurvey ended in the third week of October, the party returned to Prescott.

Labrador and Hudson Bay

At the request of the Department of Transport, strategic surveys were conducted this season in Labrador by Mr R.E. Hanson, and in Hudson Bay with assistant Mr A.L. Mack. These projects entailed charting the waters at two airbases to aid aircraft and sea transport to these sites. For this purpose, the government icebreaker *N. B. McLean,* Capt. W.J. Balcom, master, was used by the hydrographie party as a ship base for the season. Early in June, the ship left Quebec for Lake Melville in Hamilton Inlet, arriving there a week later. With the assistance of seamen and the ship's launch, Mr Hanson completed much of the preliminary survey work for a chart of Terrington Basin - site of the international airport terminal, Goose Bay. Four uncharted shoals were also positioned, sailing directions noted, and general revisions made to Canadian Chart No. 420, "Lake Melville," (surveyed by *Acadia,* 1921). About the middle of July, the ship returned to Quebec to prepare for its annual patrol of the Hudson Bay Route. In the meantime, the *Cartier* port launch (equipped with a modern MS 10 echo-sounder) arrived from the Northumberland Strait survey; and assistant Mr A.L. Mack from the St Lawrence River survey.

Late in July, the *McLean* again sailed from Quebec, and on the 30th entered Hudson Strait. From then until 31 October while in this region, the hydrographie party made a detailed survey of a portion of Coral Harbour on the south coast of Southampton Island. At that time, this harbour had considerable strategic value, with an American airbase located here, and lying on the North Atlantic air route of the Ferry Command to the British Isles. A topographical reconnaissance was made by Mr Hanson in this area to facilitate the locating of the monument on air photos. On his return to Ottawa, Mr Hanson was supplied with plans of surveys in this area by USS *Bear,* and when combined with his own work, a preliminary chart of Coral Harbour was printed - the first existing chart (classified) for this harbour. While on patrol duty, several lines of soundings were run by the *N.B. McLean* in both Hudson Bay and Strait. A reconnaissance and additional soundings were also added to the Admiralty chart for Ashe Inlet, Hudson Strait. Observations for magnetic variation were taken as opportunity occurred.

The *McLean* returned to Goose Bay on 4 November, and until the 17th was unable to accomplish little survey work due to weather conditions and the lateness of the season. When the ship returned to Quebec on the 22nd, some 640 miles of ship and 110 miles of boat soundings had been recorded, and 15 shoals examined. Revisions and additions were also made to four existing Admiralty charts for Hamilton Inlet.

British Columbia

Mr Parizeau wrote, "we had a considerable amount of worry and trouble on board the *Wm. J. Stewart.* It was due mostly to circumstances beyond our control. In ordinary times, none of these would have amounted to a great deal, but the unrest amongst the labouring classes; the ambition of wages; the demand for extraordinary conditions; the order that we could not employ men over the age of eighteen ... inability to obtain proper cooks, have all added to our troubles."

At the Victoria office, Mr Parizeau was assisted by Mr Davies in charge of chart production and distribution, Mr G.W. LaCroix tidal and current surveyor and part time hydrographer, and Commander J.H. Knight for a short period in October. In September, Commander Knight was discharged from the navy on grounds of ill health. He returned to the hydrographie service until December when his illness became serious. The following year (1943), he was obliged to retire for reasons of health. He had joined the Service in Ottawa (1911), and in 1913 was transferred to the Victoria office. In 1942 two student draftsmen were added to Mr Davies small staff (Miss Hawkins and Mrs. Chettleburgh). Mr James Hall, appointed a temporary clerk, "had to be laid o f f since he was over 18 years of age (P.C. 4759, 27 June 1941).

For the want of a crew, the houseboat *Pender* could not be commissioned for a full season, and due to local labour troubles, the *Stewart* was unable to sail from Victoria with *Pender* in tow until late in July. This party, in charge of Mr W.K. Willis, was assisted by Messrs Young, Ettershank, Rutley, Rankin, W.O. Williams and J.M. Phillip. Activities began with a degaussing survey in Vancouver Harbour for the Naval Service. *Pender* was then moored in Beaver Harbour, where until the end of August this harbour, Hardy Bay, and Safety Cove (Calvert Island) were charted by the *Stewart.* Until the third week in November, other areas charted were located in Fitzhugh Sound, Addenbrooke Island, Namu Harbour, Deep Bay, Porpoise Harbour, Grenville Channel and the Fraser River from its entrance to above Stevenson. *Pender* was taken in tow in Deep Bay on 24 November and the following day both units tied up at the Marine Wharf at Victoria.

Esquimalt Harbour

Before laying up for the winter, *Pender* was anchored in this harbour by the *Stewart* for a resurvey by Mr LaCroix, assisted by Messrs Rutley, Rankin, Phillip and with the cooperation of naval personnel. Of particular note was this statement by Mr Parizeau on this strategic survey. "The value of sweeping operations was demonstrated during the Esquimalt work. With the assistance of Naval divers, a number of sunken piles were removed near wharves and floats. A group of large angle irons 12 feet long buried 6 feet in mud was also found and removed from the fairway. None of these obstructions could be located by sounding, either with hand lead or echo machine."

TIDAL AND CURRENT SURVEY

Other than the maintenance of the principal tidal stations and the preparation of tide tables, the only field work of note this season was the installation of a new tidal station at the head of the Saguenay River in Chicoutimi, PQ, and special level surveys in Vancouver Harbour for the degaussing apparatus. The Chicoutimi seasonal station was to service the requirements of the Department of Transport and the National Harbours Board. Due to the condition of the wharf at Father Point, PQ, the permanent station was temporarily closed in

the fall, and because of the war, the continuation of tidal stream investigations was "largely left in abeyance, but there remains much to be done in new areas and even in these that have already been given attention."

PRECISE WATER LEVELS

Forty-five water gauges were in operation along the Great Lakes and St Lawrence waterway (37 yearly, 8 part time), and from them 1,200 tri-monthly, half monthly and monthly reports of daily mean water levels were systematically furnished. Assisting Mr Price with field and office work were Messrs Matthewman, Turtle, Williams and Rainboth (promoted to senior engineering clerk, vice Mr A.W. Cole).

CHART CONSTRUCTION

A feature of this year's production was the large number of special and confidential charts prepared for the defence forces. The total output tallied 189 charts, maps, reprints and chart correction patches: coloured charts, 50, black only, including 17 reprints of Admiralty charts, 33; wall and special Defence charts, 71; Miscellaneous, 9; and chart correction patches, 9. In September, Miss D. Cuthbertson was appointed student draftsman, vice Miss L.W. Sweet, who resigned.

CHART DISTRIBUTION

This year was a heavy one for chart distribution. Mr Foreman noted, "greatly increased work was required of the Distribution staff, and the serious labour turn-over from unsatisfactory appointments from September on, has caused a very difficult year... the breaking strain has been reached and full cognizance thereof should be taken." Eight office boys and clerks came and went, with one remaining, Miss Y. Paquette, the first woman clerk to this section. Chart distribution increased 7 per cent above the previous year to 50,968 copies; pilots and sailing directions experienced a slight drop to 1,262 volumes, while tide tables showed an increase distribution of 1 Oper cent to 44,315 copies.

EXPENDITURE 1939-42

In 1942 the hydrographie expenditure was approximately $335,157, and indicated the rigid financial controls in effect during the first half of the war. This was about 18 per cent less than in 1939. In 1940, with two major ships not with the service, the annual expenditure was 23 per cent less than the 1939 figure. Wherever economies could result in financial savings, this policy was invariably adopted. To quote from the departmental report (1942), "as a matter of war economy the list of nautical charts published during the year has been deleted from this Report." And, to cap it all, this season Mr Parizeau began sending his reports and correspondence to Ottawa typewritten on both sides of the sheets.

1943-44

To assist field officers this season, a new class of temporary hydrographie assistant was approved, named "seaman technical." For the most part, these were promising young men with special aptitude for hydrographie work. Some of this new class were college students, later classified student assistants, and it was hoped they might be interested in making

hydrography a career following graduation. To offset the critical manpower shortage due to many wartime factors, and to ensure continuity of Government services for the duration, in September 1943 most regular civil servants were frozen in their positions until the end of the war. To better themselves, from then on Departmental approval was necessary, or resignation. Strategic surveys for the defence forces did not slacken this year on the Atlantic coast and inland waters, and on the Pacific coast joint operations were carried out by this service working in cooperation with the Naval Service and the US Coast Guard. Owing to the rapid expansion in wartime shipbuilding, and extended activities of naval and merchant fleets, chart production reached an all-time peak. A slight peacetime trend was noticeable this year at headquarters, and in certain field assignments, on behalf of the Departments of Public Works and Transport. One major ship, one houseboat, and five launch parties carried out hydrographie field operations.

DIVISION OF HYDROGRAPHY

The Atlantic coast survey again under the general supervision of the former officer-in-charge of *the Acadia,* Mr J.U. Beauchemin, for obvious reasons operated as two units; one on the southwest coast of Nova Scotia, the other in Newfoundland. The Nova Scotia unit was again in charge of Mr G.E. Lowe, assisted by Mr P.A. Radikir and Mr J.F. Moriarity, seaman technical. The other unit under Mr Beauchemin was assisted by Messrs S.R. Titus, C.H. Martin and A.L. Mack (until his departure in June to join the Hudson Bay party).

Prior to departure for Newfoundland, Mr Beauchemin began surveying areas in the outer portion of Halifax Harbour in the middle of April. A plan of the French Cable Wharf (winter quarters for hydrographie ships in the post war years) was prepared, and sounding taken between certain piers in the Ocean Terminals. In response to a special request form the commander-in-chief, Northwest Atlantic, Mr Martin was left here to make a small survey of Herring Cove in the western entrance to the harbour. Messrs Beauchemin and Mack then proceeded to Shelburne Harbour where, with a hired launch and local labour, special investigations were made to bring this chart up to date. Additional checks were made by Mr Titus in Halifax Harbour following his return from Newfoundland early in December.

Nova Scotia

Until the launches returned to Chester from Halifax, Messrs Lowe and Moriarity were fully occupied with triangulation surveys and other preliminary work prior to sounding. The season's project was the charting of the LaHave River from Pearl Island to Cape LaHave. In the third week of July, Mr Radikir, who had been with Mr Tardif in the Strait of Canso, joined the party. When the *Acadia* starboard launch and power dory returned from Halifax, the remainder of the season was devoted to the completion of this chart, and extending the survey from Pearl Island to Pollock Point. A few areas in Mahone Bay, including the approaches to Lunenburg, were also resurveyed. The season ended in mid-November, and the launches returned to Chester for the winter. Acting on instructions, Mr Lowe then journeyed to Shelburne Harbour to position the buoys and make revision checks, and in the last week of November returned to Ottawa.

Newfoundland

Early in July Messrs Beauchemin, Titus and Martin left Halifax for Newfoundland, arriving at Botwood (Bay of Exploits) on the 7th. At the request of the Naval Service, a cable survey was made about eight miles north of here between Thwart Island and Kite Cove. When

finished on the 26th of the month, a plan was then given to the officer-in-charge of the cable ship. Cables could now be laid between these areas and Wiseman Head. For this survey, the *Acadia* port launch was shipped from Bay Bulls, and a boat was rented at Lawrencetown. In addition to close sounding, coastlining and triangulation, five special areas were very closely examined to establish sonobuoys and HDH systems. By 27 July the launch was returned to Bay Bulls to complete unfinished work here, and in Witless Bay. Field work ended with a revision survey of St. John's Harbour early in December. With the launch and gear again stored for the winter at Bay Bulls, the party returned to Nova Scotia for a few minor investigations before continuing to Ottawa. Halifax Harbour was checked for a new chart, and Mr Beauchemin had discussions with the naval authorities at the Dockyard on the 1944 season's hydrographie requirements. Concerning the *Acadia* port launch at Bay Bulls, he wrote about its MS 2 echo-sounder, "purchased some ten years ago, being first used in Hudson Strait, then transferred to our launch in 1937 ... not suitable for special war work requirements ... showing signs of wear and tear ... will endeavour to carry on with it this summer ... if not called upon to perform too extensive survey work it may last this season."(The *Acadia* port launch was the former Hudson Strait launch CHL *Discovery.* It had been salvaged by the *Acadia* in Charlottetown Harbour in 1936, and designated her port launch in 1937.)

Bay of Fundy

This detached unit of this party was in charge of Mr N.G. Gray, assisted by Mr G.A. Surette and Mr A.W. Baxter, seaman technical. The party left Charlottetown for Digby by truck early in May, and when the motor launch *Anderson* was commissioned, base quarters were established at Annapolis Royal early in June. From then until the end of the month this sector of the river was sounded. Acting on instructions, the launch then proceeded to Saint John Harbour, NB, where a "loop defence" survey was undertaken outside the harbour for the Naval Service. Four sheets of this area were required and when prepared, were forwarded direct to command headquarters at Halifax. By the end of September the survey of Annapolis Basin was resumed from Digby and concluded the middle of October. The *Anderson* then cleared for Charlottetown arriving there on 18 October. Until the season ended in early November, a reconnaissance and triangulation survey was commenced from Victoria, PEI, for a coast chart of the area between the Hillsboro Bay and Port Borden chart. The launch then returned to Charlottetown for the winter.

In the last week of March 1944, Messrs Gray and Surette returned to Saint John Harbour where sweeping surveys were made in the Reversing Falls area. These operations were conducted with the aid of a naval tug and a 20-foot sweep, mostly in the locality where a corvette reported touching bottom. A set of range beacons was established from the results obtained, and corrections made in the new chart of this harbour.

Strait of Canso

About the middle of May, Mr Tardif arrived at Mulgrave, NS, from Charlottetown, and here assistants Messrs A.F. Wightman and P. Radikir joined the *Hudson.* Due to engine trouble, a naval truck and craft were used for more pressing work. The first project was a special survey in this area for the Naval Service, followed by a special plan of the waterfront features for the Department of Public Works. Late in July, Mr Radikir left to join Mr Lowe in Mahone Bay, and Mr Wightman was sent to Northumberland Strait to seek a suitable work base in that area. Cape Tormentine was decided to be most suitable, and at the end of

July the *Hudson* began the coastal survey from Tryon Shoals to Cape Egmont. Due to more engine failure, it was impossible to use the launch for sounding purposes before September, "when the weather is adverse for that purpose." The season ended in the last week in October and the *Hudson* returned to Charlottetown for winter storage. Early the following year (1944) Mr A.F. Wightman, who had been with the service since 1930, resigned.

St Lawrence River

Considerable time was taken up this season with special surveys for the Naval Service that included a measured mile layout at St. Irenée, PQ, below Quebec, the establishment of twelve anchorage areas in Quebec Harbour, and the sounding of two strategic areas off Sorel Harbour (site of Marine Industries, Ltd). Prior to the field season, and at the request of the Department of Transport, Mr MacKinnon positioned Jackass Shoal and a gas buoy in the Upper St Lawrence River in CGS *Grenville* (ice casualty, Lake St Louis, 18 December 1968). With assistant Mr J.E.V. Goodwill, the *Boulton* left Prescott on 24 May for Quebec, and when this work ended returned to base headquarters at Sorel, PQ. Until the last week of October, with the aid of the *Bayfield* Launch and *Boulton,* the previous season's survey was extended to the westward, and current measurements observed in certain sectors of the river. Field work was now concluded for the proposed chart of Lake St Peter, that was later published. Before laying up at Prescott on 28 October, a special survey was made for the Naval Service at Sorel, and chart revisions made for Brockville Harbour. This was to be Mr MacKinnon's last full field season. The following year he was re-assigned to headquarters to take charge of the Sailing Directions Section, vice Mr R.W. Bent, who retired.

Labrador and Hudson Bay

In mid-June the icebreaker CGS *N.B. McLean,* Capt. W.J. Balcom, again sailed from Quebec for Lake Melville, Labrador. Here hydrographers Messrs R.E. Hanson and A.L. Mack began the unfinished work of sounding out Terrington Basin with the *Cartier* port launch. Beset with echo-sounder troubles, it was necessary for Capt. Potts of Hughes-Owens to fly there from Ottawa. He was unable to get the MS 10 echo-sounder in working order, so the launch was refitted with a new MS 14 model. While the ship was at anchor, sounding work proceeded intermittently. As Mr Hanson noted, it was "a very busy place during the navigation season ... the terminus for ships carrying supplies to the Goose Bay airport." However, the party did manage to establish two sets of beacon ranges in the approaches to the basin. No previous chart existed for this part of Lake Melville, since the days of the 1921 survey, and it was not carried beyond the entrance to Terrington Basin. The *McLean* departed Goose Bay for Hudson Strait and entered this northern passage on 25 July.

To assist ships resupplying the radio station at Cape Hopes Advance, a sketch reconnaissance of the south coast of Hudson Strait was made from here to Hearn Island, and sounded out. Of special interest were the three trips by the *Mclean* to the head of Ungava Bay (9 August, 13 Sepember and 17 October)to place a buoy about twenty miles from the entrance to the Koksoak River. These [trips provided] the first recorded depths to any extent in Ungava Bay by this service. Other areas in the Strait visited were Lake Harbour, Ashe Inlet, Wakeham Bay and Nottingham Island. While anchored in Acadia Cove in late October, two reported harbours were examined by Mr Hanson, lying two and five miles, respectively, east of the radio station, both of which appeared "to be suitable for medium sized ships" (charted by Mr D.A.H. Charles, MV *Algerine,* 1951). Commenting on Resolution Island, Mr Hanson wrote, "Resolution Island is shown on Chart 405 as one large

island but actually it consists of one or more large central islands bordered by several hundred smaller ones, forming a number of large and smaller harbours throughout this area." This statement was confirmed for the most part by USAAF air photographs taken during reconnaissance patrols over this area in the early years of the war. At that time, American planes were based near Fort Chimo, Ungava Bay; Coral Harbour, Hudson Bay; and at the head of Frobisher Bay.

In Hudson Bay additional soundings and shoal examinations were made at Coral Harbour to complete this chart; assistance was rendered to the SS *Bensas* [?] aground on Coats Island; lines of track soundings were recorded in both the bay and strait; the chart of Port Churchill was checked for revisions; and the Hudson Bay pilot updated. In all harbours visited during this patrol, magnetic observations were taken with other hydrographie information. Weather observations were sent to the Meteorological Service, and water temperatures (three times a day) were noted. From hydrographie surveys by USS *Bear* and Mr Hanson in 1942 and 1943, a classified preliminary edition of Canadian Chart 5410 (1946), was printed in February 1944 (resurveyed by Mr J.E.V. Goodwill, MV *Terra Nova,* 1950).

Hudson Strait was cleared on 23 October and three days later the *McLean* anchored in Goose Bay. Here until the departure for Quebec on the 31 st, unfinished sounding and other details were concluded, sufficient to publish in May 1944 Canadian Chart 4722 (1946), "Terrington Basin." When the *McLean* docked at the King's Wharf on 6 November, it brought to a temporary close further hydrographie charting in Labrador and Hudson Strait until 1950. In December 1943 Mr Mack resigned from the service to join the RCAF, and in September 1945 was re-appointed.

British Columbia

"We had less trouble with men, due to the fact that the Navy was able to give us the number of men that was required to carry on ..." (Parizeau). What was a gain one way was soon to be lost in another. The *Stewart* lost six weeks' work when obliged to enter drydock for hull damage, and at the end of the field season a survey launch equipped with a modern echo-sounder was lost while being towed across Queen Charlotte Sound during a southeast storm. Of special concern were the joint surveys with officers of the Naval Service and the US Coast Guard.

Field work began in April with tidal investigations in Vancouver Harbour for the Naval Service, and in the Saanich Inlet area of Vancouver Island for the RCAF. Other tidal work by Mr LaCroix was the building of a tidal station at Canoe Pass, Seymour Narrows, for the Department of Public Works, a most necessary preliminary "in connection with the removal of Ripple Rock" (blasted successfully on 5 April 1958). In the last week of May, the houseboat *Pender* was towed to the Prince Rupert Harbour area by a naval vessel, and anchored in Porpoise Bay. Here a hydrographie and tidal survey was undertaken by Mr LaCroix, assisted by Messrs Ettershank and Williams. From then until early July, when the *Stewart* attached *Pender,* the sector from Porpoise Bay to Digby Island was surveyed, and a large-scale chart made for Morse Basin. In early October, this survey was resumed by Messrs LaCroix and Philip from the *Pender,* working in close cooperation with officers of the Canadian navy and the US Coast Guard Cutter *Mansanita.* When work ended, the *Pender* was towed back to Victoria by a naval vessel, arriving there early in November. Other special field assignments by Mr LaCroix included measured mile layouts in Parry Bay and Spanish Bank, and investigating a reported shoal at Port Alberni.

Early in June the *Stewart,* in charge of Mr W.K. Willis with assistants Messrs

Young, Rutley and Philip, arrived in Vancouver Harbour to test the degaussing apparatus off Stanley Park. Shoals were then located in Barkley, Clayoquot and Kyuquot Sounds and in Rivers Inlet. On 14 June the survey of the inlets in Loredo Channel began, and was progressing well until 5 July, when the ship sustained slight hull damage obliging her to enter drydock for repairs. Until her return on 17 August, a shore party was established on Savary Island, and Mr Young continued inshore field work in Loredo and Campania Sounds from the *Pender*. Early in October *Pender* was taken to Prince Rupert Harbour to complete previous work in this area, and on the 26th the *Stewart* left the working area in Principe Channel for the northern portion of the Strait of Georgia. Triangulation and sounding surveys were carried out in this area until the 20th, when the ship returned to Vancouver Harbour for chart revisions and further tests on the degaussing range. "De-permed" on the 24th, the following day a reported shoal was examined in Houston Passage, and on the 25th she tied up at the Marine wharf in Victoria. As a result of the season's activities a number of confidential plans were supplied the Naval Service, but chart and sailing directions distribution had fallen off by seventeen per cent respectively, from the pervious year.

TIDAL AND CURRENT SURVEY

"With the fiscal year 1943-44, the Tidal and Current Division begins its second half century of service. The tidal work commenced on an organized basis as a branch of the Marine Department, under Dr. W. Bell Dawson, in 1893. Some preliminary investigation had been carried out previously, however, by Dr. Carpmael of the Meteorological Service ..." (Mr Jones). Field work on the Atlantic coast this season included the rebuilding of the tidal station at Father Point. To establish a more accurate low water gradient at the head of the Saguenay River, a joint tidal investigation was conducted in the last week of May with engineers of the Ship Channel Branch - responsible for the dredging this river. For this purpose, the ship channel steamer *Ernest La Pointe* was berthed at Chicoutimi, and served as a ship base. The hydrographie party comprised Messrs Jones and Meehan, and Mr H. Land of the Ship Channel Branch. Simultaneous tide heights were taken at points along the river for a four day period, and tied in with a series of new benchmarks established by instrumental levelling. From these data, a low water datum, or gradient, was obtained and connected with the Geodetic Survey network.

A low water datum and tide levels were obtained for the purpose of planning the removal of Ripple Rock, and tables of predicted rates of the tidal streams through Seymour Narrows [in BC] were obtained from the Tidal Institute, Liverpool. Data was supplied the Department of Transport handbook for the St Lawrence ship channel. In a general memorandum on "field work for the future," Mr Jones suggested the re-establishment of several former principal stations on the Atlantic coast, and a new one on the Labrador Coast for more accurate predictions in that area. In most areas of former current investigations, further studies were proposed, and as to the future work on the Pacific coast he remarked, "One might say that the work to be done in this branch of tidal activities on the BC coast is limited only by the extent to which we are prepared to undertake it."

PRECISE WATER LEVELS

This division "maintains close contact with related services in the United States and as a result, valuable water level data for the information and improvement of waterborne transportation are exchanged on a cooperative basis." From forty-eight water gauges, over 600,000 water surface elevations were tabulated, and some 20,126 sheets of bulletins,

profiles, etc., issued.

CHART CONSTRUCTION

War output of this division was well maintained during the year, and despite a shortage of trained cartographers, "satisfactory progress was made in chart standardization." During the year 239 charts and other navigational publications were printed: coloured charts, 60; black only, including Admiralty reprints, 24; wall and special defence charts, 90; miscellaneous, 38; index maps, 2; and correction patches, 5. This production was three times that of 1939, and the highest in the history of the service to date and including the remaining years of the Second World War. In April, Miss E. M. Martin was appointed student draftsman bringing the total to three women in this classification at headquarters.

Future Chart Plans

By the end of the fiscal year 1943, the hydrographie service began looking ahead to the post-war years. Already field staffs had given this matter some thought, and before another field season rolled around, Mr H.L. Leadman had begun a review of ship and launch requirements. As to chart production, "a vast amount of modern charting on both coastal and inland waters requires to be done, and to this end, plans for undertaking the work are being formulated under the broad scheme of Post War Planning. It is confidentially expected that, in the period following the termination of hostilities the hydrographie service will be adequately equipped to expand its spheres of operations and thereby enable to participate more extensively in the development of lake, river, and ocean transportation. Such plans for the future are concerned solely with a class of major charting projects considered prudent and sound economically, and which would act as a valuable stimulus to employment through the expansion of Canadian mercantile activity, the development of her coastal industries, and the encouragement of a profitable waterborne tourist trade."[1]

CHART DISTRIBUTION

Despite the slight fall-off of distribution on the Pacific coast, the general overall picture showed an increase of 65 per cent over the previous year, 366 per cent increase over 1939, and 800 per cent over the past decade. While demands for charts for the defence forces were heavier than ever, the abnormal increase this year was partly due to a large number of instructional charts being supplied to the Navy League training schools. These latter editions were cancelled stock and were issued free of charge. Distribution in 1943 included 83,936 navigation charts; 1,126 pilots and sailing directions, and 43,918 tide tables. Junior help continued to plague this section with two regular clerks (one female) and at least three other clerks and office boys resigning, or being relieved of duties.

1944-45

Nine parties were assigned to the field this season, from the Atlantic to the Pacific Ocean and the District of MacKenzie, N W T. "For economy purposes the work of each survey was made to tie in to, and contribute to, the established long-term scheme of coast charting."

[1] *Report M&R, 1943.*

With Mr Leadman's return to the service from the Ontario Hughes Owens Company, his knowledge and experience of ships, launches, and equipment could be put to planning the post-war fleet, and bringing it up to date with modern hydrographie and océanographie equipment. With an increased tempo of war activities in Europe and the South Pacific, chart distribution reached an all-time high - some 100,000 publications. With the request of the United States Hydrographie Office the service collaborated in the compilation of a new Arctic pilot, most of which covered Canadian territory. With the *Stewart,* a casualty of Ripple Rock, the only unit of the pre-war fleet in service (other than launches) was the houseboat *Pender.* In accordance with post-war plans, charting along the rapidly developing Great Slave Lake - Mackenzie River waterway, suspended in 1933, was resumed.

DIVISION OF HYDROGRAPHY

Bay of Fundy

With an eye to the future, this party in 1944 was divided into two field of operations, with Mr G.E. Lowe in charge of the Nova Scotia - Bay of Fundy areas, and Mr J.U. Beauchemin, the Newfoundland - Cape Breton area.

Nova Scotia

On 16 May Mr H.L. Leadman arrived in Chester, NS, from Charlottetown to inspect the recently acquired launch *Dawson,* and to install in her a new MS 10 Admiralty Pattern echo-sounder. The former launch *Escapade,* the *Dawson* was renamed after Dr. W. Bell Dawson, superintendent of the Tidal and Current Survey (1893-1924), and was intended for long runs during the field season. She was purchased for $1,500 and when reconverted for survey work by Reuben Heisler at Chester, made her first trial run to Lockeport to examine a shoal off Bull Rock. In the meantime, Messrs Lowe, Radikir and Seaman Technical J.G. Moriarity had begun the season's operations with the *Acadia* starboard launch and power dory in Mahone Bay. Before departure Mr Leadman also inspected the old MS 2 echo-sounder in the starboard launch. Early in July instructions were received to make a survey of the west side of Saint John Harbour, NB. Messrs Lowe and Moriarity then left in the *Dawson,* leaving Mr Radikir with a recently hired seaman, Mr P.L. Corkum and others to carry on with the starboard launch. This special assignment was finished by 28 July and four days later, the *Dawson* was back in Mahone Bay. Until the end of October, both launches were in operation, and when work ended they were stored for the winter at Chester. Unfinished work in the Pearl Island to Cape LaHave sector was completed, and a new chart issued for Mahone Bay. Early in January 1945, Mr Lowe returned to St Margaret's Bay to lay out a measured mile for the Naval Service.

Newfoundland

With no regular assistants this season, Mr Beauchemin completed his operational instructions with the assistance of the launch coxswain Mr H. Pelerine, the gasoline engineer Mr G. Richard, and three or four seamen hired locally as the work warranted. At the request of the flag officer at St. John's, a minor investigation was made in Port aux Basques Harbour with the aid of a hired launch, local labour, and survey instruments on loan from the Newfoundland Railway. Here, a large-scale plan of the Newfoundland Railway wharf was made, and Southeast Shoal closely examined. In his annual report, Mr Beauchemin

noted, "a corrected copy of the Admiralty chart of Port aux Basques, showed the urgency to make a thorough survey of the locality at the first opportunity." From 28 June to 23 July, the chart of Bay Bulls was rechecked, and additional work undertaken for the Naval Service. Other harbours visited for chart checking purposes were Holyrood Bay, Harbour Grace, Carbonnear, St. John's Harbour, and Bell Island (Conception Bay), where markers were erected over survey hubs for use in laying anti-submarine nets. The wartime survey in Newfoundland was brought to a temporary close in mid-August with the field staff, port launch and equipment, embarking for North Sydney on one of the coal steamers of the Newfoundland Railway.

Gulf of St Lawrence to Cape Breton

Early in 1944 the officer-in-charge of this party, Mr H.L. Leadman, returned to the service from war leave, and was temporarily detailed to headquarters. Here he assumed charge of maintenance and updating the remaining units of the fleet on the Atlantic coast and inland waters, and planning for the return of the former ships *Acadia* and *Carder* from the Naval Service. These duties included new ship and launch construction as wartime regulations permitted. When not so preoccupied, he gave considerable time to writing of a preliminary edition of the Mackenzie river pilot (published 1946). Early in May, he began the inspection of floating equipment and. when in Chester, NS, he supervised the installation of a new echo-sounder in the reconverted launch *Dawson.* No changes were made in charting operations in Northumberland Strait, with the *Anderson* and *Henry Hudson* again working in this area as two separate parties.

Northumberland Strait

Under Mr Leadman's supervision, the *Henry Hudson* was outfitted and left Charlottetown the end of May for Wallace, NS, to extend the charting on the south coast of the Strait. Until the arrival in July of temporary hydrographer Mr T.F. Holmes, Mr Tardif was assisted by Mr C. Cranston, seaman technical. Early in July, base headquarters were moved to Cape Tormentine, NB. Following a season beset with engine trouble, the *Hudson* returned to Charlottetown in the last week in October, and in his report on the season's activities Mr Tardif stated, "in order to make the *Hudson's* engine last the whole season, it was run only at about half speed and even that, towards the end of July, the engine got disabled for a period of twelve days." Results obtained this season were later incorporated in the two coast charts for this portion of the Strait: "Pictou Island to Tryon Shoals," and "Tryon Shoals to Cape Egmont." In addition, minor investigations were made in Pugwash and Caribou Harbours.

For the want of a gasoline engineer, the *Anderson,* with Messrs Gray, Surette and Seaman Technical A. M. Baxter, was not able to clear Charlottetown until early June. Base of operations was established at Victoria Harbour, PEI, and from here the charting of the north coast of the Strait was conducted between Hillsborough Bay and Port Borden. In the middle of July, the *Anderson* proceeded to the east coast of New Brunswick where surveys and investigations were made in Miramichi Bay, Caraquet Harbour, Richibucto and Buctouche Rivers. On 28 July, a three-mile section of the strait was closely sounded between Cape Bald, NB, and Cape Egmont, PEI, "with a view to study the depth here for a proposed tunnel or causeway linking Prince Edward Island with the mainland." By the end of August, *Anderson* had resumed regular work from Victoria Harbour, including a minor investigation at Port Borden to check previous soundings taken there. The season ended in

the last week in October, and a month later Gasoline Engineer R. Morrison was paid off.

Early in December, Messrs Gray and Surette returned to Saint John Harbour to check soundings around the grounded freighter SS *Beaverhill.* These soundings had already been taken by engineers of the harbour commission. Other than a few check depths, the time here was given to current measurements at slack water, and the selection of a range leading through the passage past the sunken ship.

St Lawrence River

With Mr MacKinnon now reassigned to headquarters, this party was placed in charge of Mr S.R. Titus with Mr Goodwill, assistant. The *Boulton* left Prescott with Mr MacKinnon aboard as pilot, and arrived at Sorel the end of May. From then until the third week of October, the sector of the river from Ste Anne de Sorel to Lavaltrie was charted, current measurements were observed over the sounded areas at depths of six, eighteen and thirty feet. Considerable time was also given to triangulation work, including the occupation of the geodetic station on St Hilaire Mountain. This was necessary to tie in the western end of the hydrographie network on the river. The *Boulton, Bayfield* launch, gig, and dory then left Sorel for Prescott. Acting on instructions, and as a result of an earthquake in the Cornwall area the previous fall (1943), some sounding checks were made in the main channel three miles east of here. The least depth found was twenty-two feet in contrast to thirty feet shown on this chart. Due to adverse weather conditions against the river current, a closer examination of this spot was not completed. Before the end of October the *Boulton* was laid up at Prescott for the winter.

Inland Waters

A the request of the National Research Council, two confidential hydrographie and tidal investigations were conducted this season by Mr C.H. Martin under the supervision of Mr R.J. Fraser. The first was from June to mid-July in a restricted area of Parry Sound in Georgian Bay, and the other until the last week of September, in a second restricted area of the upper Ottawa River, now the site of the Deep River Atomic Energy Plant. Reports and plans from these surveys were later forwarded to the NRC for their information.

Great Slave Lake

Hydrographie surveying on this lake had its commencement in 1922, and two years, later special investigations were undertaken in the delta of the Mackenzie River bordering the Beaufort Sea. For reasons of economy, hydrographie work along the waterway was discontinued in 193 3. In the ensuing years, due chiefly to the development of the mining and fishing industries, frequent requests were received for new surveys in this region, especially the eastern portion of this lake from Slave Delta to Yellowknife Bay, site of the present capital of the Northwest Territories. This latter locality was high on the priority list of post-war hydrographie planning. His work in Labrador and Hudson Bay now ended, Mr R.E. Hanson was detailed to chart Yellowknife Bay and its approaches, and also, on behalf of the Public Works Department, to investigate the previously surveyed localities of Buffalo River and île du Mort.

Early in June the *Cartier* port launch (with echo-sounder) reached waterways from Quebec with two dories, and when a crew was hired, the party left for Great Slave Lake. By mid-July, Buffalo River and île du Mort harbours were resurveyed, and a few days later the

party reached Yellowknife from Resolution settlement. Here, Assistant Mr W.O. Williams of the Pacific coast survey joined the party, and by the third week of September, this bay was charted. The boats were then stored for the winter, and the hydrographers left for Edmonton by plane. During the winter months, a new chart for Yellowknife Bay was prepared and the revisions made to the plans of harbours visited. In reference to the navigation of the Mackenzie River waterway, Mr Hanson reported, "an unusual feature of the Slave River, Great Slave Lake, Mackenzie River water route is the shallow draft required in all craft navigating this waterway. This is necessary on account of the shallowness of the rivers and of many harbours on the lake. The largest boat using the waterway, the S S *Distributor,* draws only two and one half feet."

British Columbia

The Victoria office experienced many changes with its clerical and drafting personnel this season, most being resignations by women employees. While tide-table distribution differed by little from 1943, that of charts almost doubled - from 8,556 sheets to 15,875 in 1944 - an indication of the war tempo in the Pacific Ocean. Mr Parizeau noted, "This will conclude my 25th annual report as Officer in Charge of the Pacific Coast."

Working out of the district office, Mr LaCroix was fully occupied with the maintenance and inspection of the principal reference tidal stations on this coast, establishing Sand Head Datum in Ettershank Cove, level lines on Yorke Island, and the establishment of a measured mile marker at Spanish Bank for the Defence Forces, current measurements (pole float method) in Fraser River for Department of Public Works, sweeping surveys in Esquimalt Harbour for the Naval Service, and a detailed survey of hydrographie property at Victoria.

In 1944 hydrographers aboard the *Stewart* comprised Mr W.K. Willis, officer-in-charge, and assistants Messrs Young, Ettershank, Rutley, Rankin, Philip and Williams (part season). Sailing master was Capt. J.J. Moore; and chief engineer, Mr J. Ascroft. The ship sailed from Victoria on 4 May and after taking coal at Union Bay, made a sounding and sweeping survey in Nanoose. Following a special survey for the navy in Howe Sound, she sailed for Vancouver Harbour to test the degaussing range off Stanley Park. The following localities were then visited for whitewashing survey marks and identification of low water features: Jervis Inlet to Savary Inlet, Seymour Narrows (15 to 20 May), and Cape Lazo to Cape Mudge. Sounding was continued intermittently in this area until 8 June, when the *Stewart* left for Union Bay to take on coal bunkers.

While proceeding north in Seymour Narrows on 11 June, about 2 p.m. the ship struck Ripple Rock and twenty minutes later was safely beached a short distance from here, in Plumper Bay. She was salvaged by the Pacific Salvage Company and reconditioned in Vancouver at Yarrow Shipyards. "To provide for the repair and renovation of hydrographie steamer *Wm. J. Stewart...* $364,000"* and on 9 March 1945, Mr Parizeau advised Ottawa, "repairs almost completed. We expect to have the final trial by the middle of next week." The ship suffered major ship damage, but no fatal casualties resulted from this accident.

For the remainder of the season, the houseboat *Pender* was pressed into service, and placed in charge of Mr R.B. Young. By mid-July sounding and topographic surveys in the Strait of Georgia were continued from Jervis Inlet to Cape Mudge. Jervis Inlet was surveyed from Agamemnon Channel to its head, including Hotham Sound and Princess Louise Inlet.

[2] *Auditor General Report, 1944.*

The season ended with the return of *Pender* to Victoria in mid-October.

Salvaging the *Wm. J. Stewart.*
Photo courtesy Mr Fred Smithers, Victoria BC

SAILING DIRECTIONS

In April 1944 Mr R.W. Bent, who had been in charge of this editorial section since 1936, retired and was succeeded by Mr M.A. MacKinnon of the St Lawrence River survey. To this year, thirteen pilots and sailing directions had been written by Canadian hydrographers, and from time to time they had been updated with supplements. In addition, the section supplied nautical information for Canadian Notices to Mariners, checked lists of place names for charts, and acted "as a ready reference service for supplying navigational information of all kinds through correspondence and personal contact."

TIDAL AND CURRENT SURVEY

This year, tide tables for St Augustin Bar in the St Lawrence River (above Quebec) were prepared for the Department of Transport, and tables for the times of arrival at Moncton, NB, of the Petitcodiac River tidal bore were determined. Large quantities of tide tables were acquired by the Department of Fisheries for distribution to fishermen, and predictions for Canadian ports for 1946 were supplied to the government of the USSR.

PRECISE WATER LEVELS

On 18 June 1944, the Lake Huron water gauges recorded outstanding seiches, with a range of 3.95 inches in 54 minutes at Goderich, Ontario. This was the sharpest and largest fluctuation in this locality in over thirty years. Mr Price noted, "major seiches occur more frequently in Lake Superior than in the other Great Lakes, and are considered to be the largest of any in the world." A review of the old water levels for the Great Lakes was completed, with some dating back to the year 1819. Progress was also made with historical data for the "adjusted 1897 low water datum" adopted for charts of the St Lawrence River

between Montreal and Quebec. In connection with a proposed charting of the Mackenzie River, a study was given to the establishment of a suitable standard datum for this northern waterway. With the assistance of Messrs Matthewson, Turtle, Williams, Rainboth and Miss Reed, Mr Price maintained 47 water gauges this season, from which 20,843 sheets of data were issued.

CHART PRODUCTION

Due to more stabilized war operations in the Atlantic Ocean, there was less demand for new wall and special plotting sheets for the defence forces. To keep abreast of advances in marine cartography, coloured charts were printed in special tints visible under red light conditions used at night in ships' chart rooms. Production was less than in 1943 with 154 publications: coloured charts, 74; black only, including 9 Admiralty reprints, 23; wall and special defence charts, 37; miscellaneous, 6; index maps; 7; correction patches, 6; and one supplement for the chart catalogue.

CHART DISTRIBUTION

In 1944 chart distribution reached a wartime peak, and the highest in the history of the service to this time - 106,042 sheets. In addition, 1,040 pilots and sailing directions and 45,088 tide tables were issued. Since many Canadian charts were reproduced in quantity by hydrographie offices of other allied nations, the total world circulation greatly exceeded these figures.

1945-46

Outstanding highlights in the fiscal year 1945 were the cessation of hostilities in Europe (VE Day, 7 May), and in the South Pacific (VJ Day, 14 August). Of special concern to civil servants was the relaxation of government staff and financial control from wartime to peacetime standards. This transition, though gradual, brought under immediate review hydrographie problems concerning future charting projects, the modernization of the small run-down fleet of ships and launches, and the recruitment of technical and cartographic personnel to execute these post-war plans. In connection with post-war requirements of other government agencies, numerous consultations were held with officials of the Departments of Public Works, Transport and National Defence. An encouraging sign this year was the resumption of normal contact with a number of European and South American marine services, particularly the International Hydrographie Bureau.

This was the last year for rigid wartime hydrographie appropriations ($397,214), just 3 per cent less than that of 1939, but coincidentally the largest since 1940. Despite this mini-budget, eight parties were detailed to various hydrographie field assignments, all of which were carried out in one major ship *(Stewart),* one houseboat *(Pender),* a diesel vessel on loan from the Naval Service (renamed *Parry,* 1947); four cabin launches *(Boulton, Henry Hudson, Anderson* and *Dawson),* and two 27-foot half-cabin survey launches, equipped with echo-sounders *(Acadia* port launch, *Carder* port launch). During the summer, the former survey ships *Acadia* and *Carder* were examined for reconditioning. The *Acadia* was found suitable, but the *Carder* had deteriorated too much. Pending the *Carder's* disposal, she remained in custody of the navy, and plans were accordingly made to replace her in the Gulf of St Lawrence with a smaller wooden vessel of the minesweeper class (also named *Carder,* 1948). Plans were also finalized to improve the smaller units of the fleet with replacements

for the older 26-27-foot survey launches, and a new class of 31-foot models. To handle the heavy load in Chart Construction the drafting staff was augmented with a few student draftsmen as they became available.

AMENDMENT OF WARTIME STAFF CONTROLS, 1945-47

In April 1945 Treasury Board regulations were amended (P.C. 26/2969, effective 1 January 1945), and returned to civil servants earning more than $3,000 their first statutory increase since January 1942. It also opened the door for a return of staff promotions. In February 1946, Treasury Board further authorized the continuance of payments of War Duties Supplements and, in August 1946 (P.C. 1/3687), consolidated the cost of living bonus to employees earning less than $3,000 per annum, with their basic salaries. Further amendments in 1947 provided new salary ranges for numerous classifications, including new grades as a result of departmental re-organizations.

DIVISION OF HYDROGRAPHY

Nova Scotia

With the assistance of a naval launch and personnel, a small survey was made in Halifax Harbour by Mr Lowe early in May. By this time, base quarters were established at Hubbards, NS, where the survey of St. Margaret's Bay began. Assistants this season were Mr Radikir and Seaman Technical J.G. Moriarity. For longer cruises the *Dawson* was used, while inshore work the *Acadia* starboard and power dory performed satisfactorily. In September, Mr Radikir was urgently recalled to Ottawa, and was replaced by Mr A.L. Mack (returned from the RCAF). Early in October, the *Dawson* was back in Halifax for revision checks and sounding, and until Mr Lowe's return, Mr Mack was occupied with coastlining in the Bay and bottom sampling. The season ended in the last week of October, and during the winter a chart of this coast was started from East Ironbound Island to Betty Island, including St Margaret's Bay. Some 70 miles were coastlined by air photographs, and about 782 miles soundings recorded by the boats. In his report Mr Lowe remarked "the chart should be of special interest to yachtsmen and sportsmen."

Cape Breton

Charting in Great Bras d'Or was resumed in 1945 by Mr Beauchemin, with the assistance of Seaman Technical R.W. Rutledge and Coxswain H. Pelerine. Gasoline engineer of the *Acadia* port launch was Mr G. Richards. From early June to mid-December, surveying in Great Bras d'Or was conducted from Seal Island to Kemp Head and Black Point. It was then extended into St Andrews Channel to Chapel Point - to connect with the Little Bras d'Or chart. Base of operations was Point Bevis. Other examinations were made at North Sydney, and when the season ended, the launch and equipment were stored here for the winter.

Gulf of St Lawrence

Preparatory to field operations, Mr Leadman inspected and supervised the outfitting of the launches on the Atlantic coast. New sounding tanks were installed in the *Bayfield* Launch, and a new gasoline engine was placed in the *Hudson.* In June and August the former ships *Acadia* and *Carder* were declared surplus to requirements by the navy. "Dry-offs" were held of *the Acadia* at Pictou and the *Carder* at Liverpool. Following close inspections, the former

was declared suitable for reconditioning but the latter had deteriorated too much for economical repair. In January 1946, Mr Leadman visited Midland and Sarnia to inspect three 126-foot wooden minesweepers, and recommended that one at Midland be remodelled as a replacement for the first *Carder.* Drawings and specifications were also prepared for a new 47-foot cabin launch for Great Slave Lake *(Rae,* 1947) and submitted "for the guidance of the Naval Construction Branch in their final design." Other drawings were prepared for two new 31-foot survey launches for the *Acadia (Eider, Scoter),* and requisitions, crew lists, etc., for this ship were also submitted. Until he was capable of assuming full charge of this party in 1946, surveying in this region during 1945 was again carried out by two separate parties.

Northumberland Strait

A century of time had almost elapsed since the British Admiralty last surveyed Northumberland Strait (1839-57). In 1909 the first Canadian survey was made in Tatamagouche Harbour, NS, and until 1935 several other local areas had been recharted. That year, a start was made in Charlottetown Harbour, PEI, to undertake a systematic recharting of the entire strait, and when the war ended most inshore work of the critical sectors had been resurveyed on a much larger scale than the older Admiralty charts.

Early in June the *Anderson,* with hydrographers N.G. Gray, G.A. Surette, and Seaman Technical T.B. McLellan, established a base at Summerside, PEI,, and from here charted the unfinished areas of the strait from Cape Egmont to Cape Tormentine, NB, When this work ended in the last week of August, the party occupied the previous season's base at Victoria Harbour to extend this survey. In addition, current measurements were observed at Cape Tormentine and Port Borden on behalf of the Department of Transport, "for the new car ferry... expected to be completed.. on this run during the latter part of 1946." When the season ended in mid-October, the *Anderson* returned to winter quarters at Charlottetown for the last time (Pictou Depot, 1946).

Strait of Canso

In June, the *Henry Hudson,* in charge of Mr T.M. Tardif and assistants Seamen Technical T.C. Cranton and T.E. Coffin, was based at Port Hawkesbury, NS. From here, several sections of the Strait of Canso were sounded and plans made for the Department of Public Works (preliminary causeway studies). Early in July the *Hudson* returned to Northumberland Strait, occupying her former base at Woods Island, PEI, From here, a triangulation network was established across the strait and sounding lines ran from shore to shore - from High Bank on Prince Edward Island to Bell River and across to Toney River on the Nova Scotia coast. Caribou Channel was also sounded and a plan of it sent to Ottawa. Early in October, the *Hudson* returned to the Strait of Canso, where more sectional lines of soundings were taken and a triangulation net was completed from Port Hastings to Ship Point. With the departure of the assistants to college, Mr Radikir joined the party early in October, and remained with Mr Tardif until the *Hudson's* return to Charlottetown for the winter early in November. This was also the last winter for the *Henry Hudson* at Charlottetown (Pictou, 1946).

St Lawrence River

Early this spring the *Bayfield* launch was equipped with sounding tanks to permit the use of

the *Boulton's* echo-sounding machine, and which "proved valuable for shore to shore sounding with respect to speed and accuracy." This party, in charge of Mr S.R. Titus, was assisted by hydrographer J.E.V. Goodwill and Seaman Technical T.A. Todd. The boats cleared Prescott for Contrecoeur in the last week of May, and on passage positioned buoy-laying ranges east of Cornwall. From early June to early October the river was charted from the head of Lake St Peter to Lavaltrie, and current measurements taken over the sounded areas at depths of 18 and 30 feet. Homebound, a sunken tug was located in the vicinity of Beaver Point near Cornwall. Early in November the *Boulton* laid up at Prescott for the winter and a few days later, CGS *Grenville* unloaded the *Bayfield* launch and gig here.

Great Slave Lake to Mackenzie River

"It is the intention of the Hydrographie Service to issue charts of the Slave River through Great Slave Lake and down the MacKenzie River area."[3] With Yellowknife Bay now charted, attention was given in 1945 to critical sections of the Mackenzie River - requested by the Department of Public Works, and the Bureau of Northwest Territories and Yukon Affairs. The first assignment was the Green Island Rapids sector from Rabbitskin River to Fort Simpson. The purpose of this work was to locate existing channels, and to chart areas where dredging should be done. Mr Hanson said, "this is considered one of the most difficult portions of the river to navigate since the current is swift, the water is shallow, and the channels change their position due to boulders transported by the ice during the spring break-up. The Green Island Rapids occupy the middle of the area where several barges have been wrecked in recent years." Hydrographers assigned to carry out this survey were Messrs R.E. Hanson (officer-in-charge), C.H. Martin, and Seaman Technical G.M. Kernahan.

While a new engine was being installed in the *Cartier* port launch at Yellowknife, Mr Martin in mid-June flew with half the crew to Fort Simpson to commence the season's field work. Here a water gauge was placed, and a triangulation network commenced with the aid of a hired boat. Later, five additional gauges were levelled in near Green Island Rapids. Staff readings from the gauges were submitted to the Precise Water Levels Division for study. Ice did not leave Great Slave Lake this year until late in June (ten days later than average), and as a consequence the boats and survey equipment did not reach Fort Simpson until early in July. From then until 10 September the river was charted, and current measurement surveys made with pole-floats over the surveyed areas. The boats returned to Yellowknife on 14 September. Of 132 days in the field, 72 were working days. Some 65 miles were coastlined, and about 515 miles of boat soundings recorded. From the season's activities large-scale prints of the Green Island Rapids section were supplied the Bureau of the Northwest Territories and Yukon Branch, and the chart from Rabbitskin River to Fort Simpson published.

British Columbia

To complete field work on this coast, in 1945 four units were employed: the recommissioned *Wm. J. Stewart;* the houseboat *Pender;* and on loan from the Naval Service, the 84-foot diesel-engined *Talapus* (renamed *Parry,* 1947) and a Fairmile. At the end of December 1945 Mr H.D. Parizeau, the supervising hydrographer on this coast since 1920, retired, and in January 1946 he was succeeded by Mr W.K. Willis (transferred to Victoria

[3] *Report M&R, 1945.*

office, May 1917). A month later, in February 1946 a subject dear to the heart of Mr Parizeau over the years was forwarded to Ottawa for publication, *The Gazetteer of British Columbia Coast Names.*

Principal assistants at the Victoria office prior to Mr Parizeau's retirement were as follows: Mr L.R. Davies, in charge of the chart distribution office (drafting and revisions); Mr G.W. LaCroix, tidal and current surveyor; Mr G.W. [or G.S. or G.P. ?] Stoney, clerical and administration; and Mr J.G. Ryan, storekeeper (appointed October 1945).

Field activities this season were in conformity with the planned post-war program of charting the inside passage route along this coast, from Victoria and Vancouver in the south, to the northern ports bordering the Alaskan border. One major activity was the detailed current survey investigation, from May to October, in Seymour Narrows - the most critical area of the inside passage, and the locality of many ship casualties over the years. In addition to the *Stewart* and *Pender,* two naval vessels assisted with the charting of the strong currents in this passage.

Hydrographers aboard the *Stewart* in 1945 were Mr W.K. Willis, officer-in-charge, and Messrs Young, Ettershank, Rutley, Philip and Williams. Late in May Mr Rutley returned to the Victoria office, and in June Mr W.O. Williams resigned. Before the month ended both these officers were replaced by Messrs S.O. Wigen and J.C. Kent. Sailing master was Capt. G. Billard; and chief engineer, Mr J. Ascroft. About the middle of May, *Stewart,* with *Pender* in tow, sailed from Victoria, and on the 17th *Pender* was moored on the east coast of Canoe Pass to accommodate the tidal observer at Seymour Narrows." Assistance was rendered to the tidal party (under Mr LaCroix's supervision) with the erection of three tide gauges, and in planting bench marks in this area between Race Point and Plumper Bay. From these bench marks, cross-ranges could be positioned and used for rating the strong, turbulent tidal streams racing past Ripple Rock. And by the end of May, the *Stewart* had swept a reported shoal in Plumper Bay - the locale of her salvage the year previously. Other areas visited this season by the *Stewart* were Vancouver Harbour for chart revisions, and investigations in the following inlets along the inside passage: Jervis Inlet, Fitzhugh Sound, Fisher Channel, and Grenville Channel in northern waters. Early in October when surveying ended in Goletas Channel, *Pender* was moored securely on the east coast of Canoe Pass, and two days later (13 October), the *Stewart* tied up at Victoria for the winter. When Mr Willis came ashore, it was his last field season, a career that began on the Great Lakes in the old "training ship" *Bayfield* in 1913, and from general hearsay, he would have preferred to remain in the field.

In addition to inspection and maintenance of the reference tidal stations, Mr LaCroix this season erected six other seasonal gauges on this coast: one at Port Hardy for the District Airways engineer, another for the Department of National Defence on Digby Island and four in connection with tidal-current investigations in Seymour Narrows. These latter were located in Menzies Bay, Discovery Passage, and Canoe Pass (2). During these investigations, the houseboat *Pender* was used by tidal observers as living quarters. Others who assisted Mr LaCroix with this tidal survey were Mr Ettershank of the *Stewart* and Mr F.R. Smithers of the chart distribution office. With the aid of the naval reserve patrol vessel *Talapus,* and a fast Fairmile, current velocities were taken from June to September in the ship channel between Maude Island and Ripple Rock. These were observed at mid-flood and mid-ebb streams, and were determined by ranging the Fairmile in a steady position in the stream. The current was then rated with the engine speed necessary to maintain this position. A series of observations indicated the current to be 13 knots, more than what could be registered on the standard Curley current meter at that time. In his report Mr LaCroix noted, "velocity in the Narrows may now be calculated from the head and this way may prove of

value for current table purposes."

This was the last active season for the 15-year old houseboat *Pender*. Until about 1948 she was used intermittently for hydrographie work, but chiefly as living quarters for the tide gauge attendants working in the Seymour Narrows area. She was sold out of the government service in 1950, and was destroyed by fire in Tahsis Inlet in 1955.

TIDAL AND CURRENT SURVEY

This division continued to serve the needs of navigation and marine interests in Canadian and Newfoundland waters. "The scope of scientific work undertaken embraces the obtaining of data in regard to tides and tidal streams, predictions of tides and tidal currents and also the determination of mean sea level and low water datum planes for charts and engineering purposes." Of particular importance this season was the charting of tidal streams through Seymour Narrows. The annual tide tables issued by this service are sold through the Department of Public Printing and Stationery. Postmasters, custom officers in seaports towns, maritime newspapers, libraries and tourist bureaus were supplied free with single copies.

PRECISE WATER LEVELS

In 1945 there were forty-seven water gauges in operation on the Great Lakes, the St Lawrence and Ottawa Rivers, and from them over 14,070 sheets of bulletins, profiles and special data were issued. This year a "Memoranda re Bench Marks, Low Water Datums, etc., covering the St Lawrence River from Montreal to Quebec" was completed by this division and published. There were also numerous inquiries during the year concerning the unusual, but not unprecedented, annual cycle of water-levels in Lake Ontario, especially in the vicinity of Toronto and Hamilton. For the purpose of determining a preliminary low-water datum on the Mackenzie River, arrangements were made with the government and commercial interests to establish staff gauges at various points on the river. From records already received, a preliminary study indicates that "a low water datum coordinated for the whole river will require the running of a line of precise levels and the establishment of Geodetic benchmarks throughout the waterway."

CHART CONSTRUCTION

For six years hydrographie operations were concentrated on specific war requirements, and when this war ended Canada had acquired "a considerable advance in the total area of coastal waters charted" and was in a more favourable position to present to post-war shipping "sets of navigation charts greatly improved over the pre-war issues." However, the rapid changeover from wartime to peacetime requirements was reflected in a slight decline in production for 1945 - from 154 publications in 1944 to 88 this year. These latter comprised coloured charts, 47; black only, including 1 Admiralty reprint, 15; wall and special defence charts, 13; index maps, 6; chart correction patches, 4; miscellaneous, 2; and one catalogue of nautical charts. The cessation of hostilities now enabled the post-war staff to prepare "new charts from data on hand, and [make] extensive cartographic revisions to other existing charts which had become almost obsolete." The shortage of trained draftsmen to undertake this work was still acute, but with the relaxing of wartime staff controls, improvement of this situation was expected to be quite noticeable in 1946. To prepare for future eventualities, "commencing 1 January 1946, the numbering of Canadian

Hydrographie Service navigational charts was changed to a modern geographic district numbering system."

CHART DISTRIBUTION

Like chart production, in 1945, there was also a slight fall off from the all-time high of 106,054 publications in 1944 to some 101,633. In addition 977 pilots and sailing directions, and 59,203 tide tables were distributed. Of these totals, the District Office at Victoria sold and distributed (free list) 14,986 charts, 114 BC pilots, and about 10,000 tide tables. Revenue from all sales amounted to $19,670.28. For the records, there were in stock as of 31 December 1945, the following charts: Ottawa, 104,957, and Victoria 10,940.

1946-47

The fiscal year 1946 was the actual commencement from wartime to peacetime standards. This was made possible with a moderate increase in the hydrographie appropriation. Commencing this year, expenditures were not charged to one Vote as in former years, but to two Votes: Hydrographie Surveys, and Supplies and Equipment. For the records, this was the highest normal expenditure in the service's history - $646,313.

Provision could now be made for the acquisition of two former naval vessels (later named *Parry* and *Carder),* a new launch for Great Slave Lake *(Rae);* one 31 -foot launch for the Atlantic coast *(Eider);* three 27-foot launches for the Pacific coast *(Goose, Eagle* and *Duck);* and the recommissioning of the *Acadia.* These launches could also be equipped with new MS 14 echo-sounders, and further purchases [were] made for modern surveying, navigational and cartographic equipment. In support of an active recruitment, several technical positions in the service were reclassified as technical officers, technicians, assistant technicians and student assistants. The last-named grade replaced in some instances the former classification seaman technical, and were mostly undergraduates. It was hoped that some of them after a brief period of training, would make hydrography their profession following graduation.

Having reached the statutory age of retirement (65 years) the chiefs of the Tidal and Current Survey, and Chart Construction, retired, in June [July?] and September, respectively. In accordance with plans for a departmental reorganization, by Order-in-Council P.C. 111/444 dated 6 February 1947, and effective 1 October 1946, the title of Mr F.H. Peters, surveyor general and chief, Hydrographie and Map Service, was abolished and renamed chief, Legal Surveys and Map Service, and chief, Hydrographie Service. This was the first official action to divide the Hydrographie and Map Service into two separate services, each with its own chief.

To streamline the heavy workload in Chart Construction this year the cartographic work was rearranged as Chart Compilation and Chart Drafting. To speed up production, the staff was increased by additional student draftsmen.

Prior to the Second World War there began an increasing demand for what were then called yachtsmen's charts. For obvious reasons, consideration could not be given to these peacetime requests until the war ended. The opportunity presented itself when field work for the St Lawrence River party [ended] in October, and by early November the launch *Boulton* had made a return reconnaissance of the Rideau River waterway from Kingston to Ottawa. This was the last official task by the 21-year old *Boulton;* following her return to Prescott and a close examination, she was condemned. Before navigation opened on the Rideau River in 1947 two map-charts of this historic inland waterway were issued by the

service - the actual commencement of the present era of tourist charts, or what might be called small boat charts.

DIVISION OF HYDROGRAPHY

Nova Scotia

Prior to the commencement of field work, the worn-out *Acadia* starboard launch was shipped from Chester to the Pictou Depot. Operations this season included the completion of the St Margaret's Bay chart, and a triangulation survey of Halifax Harbour for new charts. This party, working with the launch *Dawson* and the power pory, was in charge of Mr G.E. Lowe, assisted by Mr D.A.H. Charles, technician, and Mr J.G. Moriarity, student assistant. Base headquarters for most of the season were at Indian Harbour, NS, and by the end of May, surveying in St Margaret's Bay had begun. Due to engine repairs, the *Dawson* could not join the party until mid-June. When this project was concluded in early October, the boats and equipment moved to Halifax for triangulation and revision surveys. By mid-November the field season ended, and the equipment was returned to Chester for the winter. In his report, Mr Lowe included a most interesting remark concerning the St Margaret's Bay survey. "A shoal with a least depth of 16 feet, and which is not shown on existing charts, was found at a distance of 1*V** cables to the northward of Black Rock, on the southwest side of the channel leading to West Dover." (It was on Black Rock that the CSS *Baffin* grounded on 4 July 1957.)

Cape Breton

Early in June, Mr Beauchemin with Mr Goodwill and Student Assistant D. Moore arrived at Baddeck from North Sydney in the *Acadia* port launch. From here, charting operations were resumed in the southwestern portion of Great Bras d'Or and in St Patrick's Channel to Whycocomagh. Depths in the eastern channel of Great Bras d'Or were checked from Little Narrows to Mclvor Point (Leadman, 1937). Due to a faulty echo-sounding tank, the sounding in St Patrick's Channel was delayed almost to mid-July. To expedite the field work, the launch *Anderson* and survey truck of the Northumberland Strait party (Mr Gray) were acquired from Charlottetown. Charting then progressed more rapidly, and when the season ended on 10 December, launches and gear were stored for the winter at Pinaud Shipyard, Baddeck. Commenting on the launch *Anderson* Mr Beauchemin wrote, "this launch proved very hard on gas consumption (8 gallons per hour, or 8 gallons for every 10 miles at the regular 2,000 RPM), and I had in mind to recommend two additional gas tanks of 100 gallons each." This was Mr Beauchemin's last field season, and by the end of the calendar year 1947, he had left the hydrographie service.

Northumberland Strait

This was the first year since 1941 that Mr Leadman was able to assume his former responsibility as officer-in-charge of this party, but for various reasons beyond his control, he was only able to report on part-time field activities. After six years of wartime service, extensive repairs were necessary by the navy to recondition *the Acadia* for survey work, and only on 16 July after a series of trials was she handed back to the service. However, for the want of officers and key men for the crew, she was delayed another week before resuming survey work, under Mr Leadman. Sailing master was Capt. D.M. Snelgrove; and chief engineer, Mr J.C. Lavoie. Hydrographie assistants comprised Mr N.G. Gray, G.A. Surette,

Mr T.M. Tardif (from 17 September), and Student Assistants J.K.C. Fraser and J.P. Wright (to 19 September)

While awaiting the *Acadia's* refit, Messrs Gray, Surette, Fraser and Wright working in the launch *Anderson* completed triangulation surveys on the south coast of the strait. This work was preliminary to ship sounding that was soon to follow, and was completed for the sectors Cape John to Caribou Harbour and Logan Point to Merigomish Harbour. With the aid of the survey truck, a survey of this latter harbour was made from Pictou. After some unforeseen repairs, the *Anderson* was available to the Bras d'Or party on 20 July.

It was intended that the *Acadia* would resume charting work on the west coast of Newfoundland where she left off in 1939, but this was now impossible with the season so far advanced and with no arrangements made for coal bunkering. The first project undertaken was offshore ship sounding in Northumberland Strait from Woods Islands, PEI, to Cape Tormentine, NB, In August, the ship cleared for the Magdalen Islands where a large-scale survey was made of Grand Entry Harbour. Early in September she visited the Strait of Belle Isle where the RDF Station was calibrated. Due to inclement weather and the want of bunker fuel, little time was given to ship sounding and station building. By mid-September *the Acadia* had returned to Northumberland Strait, and a few days later Mr Tardif joined the ship's company. When the season ended on 13 November, the ship returned to the Hydrographie Depot at Pictou for the winter. Prior to her arrival, in October the first 31-foot survey launch had been delivered here from Shelburne - the *Eider.* Ship sounding this season completed the unfinished offshore work by Messrs Gray and Tardif during the war years, and from all results two coast charts were later issued: No. 4405, "Pictou Island to Tryon Shoals," and No. 4406, "Tryon Shoals to Cape Egmont." Indicative of the post-war labour situation are the following remarks by Mr Leadman: "due to the inadequate wage scale, the crew was in part unsatisfactory throughout the season, and its turnover was very large." Rumour has it that when asked why so many firemen were leaving, Mr Leadman is said to have replied, "I don't know. I guess the Lord made them that way."

Strait of Canso

By the end of May the *Henry Hudson,* in charge of Mr Tardif, had made a small investigation at Caribou Harbour, and then continued on to Port Hawkesbury for a few weeks' work sounding certain sections across the Strait of Canso. Early in June Student Assistant Mr Bruce McLellan joined the party, and when this project ended, the *Hudson* returned to Northumberland Strait for a few days' sounding in the River John area. She then crossed the strait to base headquarters at Georgetown, PEI, where until 17 September, the charting of this coast was continued in the vicinity of Broughton Island. With Mr McLellan's return to college, Mr Tardif was left unassisted, and the party was disbanded. He then joined the *Acadia* for the remainder of the season "under the orders of Mr Leadman."

St Lawrence River

Seasonal instructions for this party in 1946 included the unfinished field work for chart No. 1338, "Head of Lake St Peter to Lavaltrie," sounding the Richilieu River from its mouth to the Marine Industries Shipyard, and charting the river westwards from Lavaltrie to Longue Pointe. On 28 May the *Boulton* with "gig, dory and Vercheres punt" in tow, left Prescott with hydrographers S.R. Titus and A.L. Mack, and Student Assistant A.C. Hewitson. Headquarters were established at Contrecoeur, and by the end of June the sounding of the

Richilieu River was completed. Activities were then resumed on the river proper, and when the *Bayfield* launch was delivered here late in August, the *Boulton's* sounding machine was transferred to it. Work in this area ended in the last week in October. Upon arrival at Prescott, instructions were received to proceed to Ottawa via Kingston and the Rideau Canal, for the purpose of locating of buoys, checking boat courses, and sounding the main channel of the river. The *Boulton,* with Messrs Titus and Mack then left Prescott on 28 October and arrived at Dow's Lake, Ottawa, four days later. The return cruise began on 7 November and near Prescott, a sunken object was examined. By mid-November the boats had returned to Prescott, and when the *Boulton* tied up it was her last season with the service - a charting record that began on the Atlantic coast of Nova Scotia and New Brunswick in 1926. When officially examined, she was "condemned due to the decayed condition of her wooden frames and planking." In Ottawa, with the aid of aerial photographs, much time was given to the preparation of two map-charts for the 126-mile inland waterway. Before navigation opened on the Rideau River the following year (1947), these two sheets were printed by the service, and "met with considerable demand and were the means of attracting much increased travel on this unique waterway" - the first of the present tourist, or small boat charts.

Great Slave Lake and Mackenzie River

In 1946, the Great Slave Lake party comprised hydrographers Messrs Hanson and Martin, and Student Assistants G. Kerhanan and K.R. Ebborn, and were again assigned to the Mackenzie River. At the request of the Department of Public Works, the Northern Transportation Company, and Eldorado Mines, another critical section of this river was charted, from Fort Providence to Beaver Lake, including the Providence Rapids sector. Mr Hanson observed, "a remarkable feature of the Providence Rapids section is the steep gradient here which averages two and one quarter feet per mile for twelve miles, and in the vicinity of the airport, from three to five miles above Fort Providence, the gradient is five feet per mile for a distance of two miles. This causes a swift current, the maximum measured being eleven miles per hour in the deep channel just above the airport. This steep gradient and fast water is unusual in a navigable stream."

Advantage was taken of the early opening of the Mackenzie River, and in early June Mr Martin with four of the men flew from Yellowknife to Fort Providence to begin a triangulation survey with a hired boat. He was joined here by Mr Hanson and the boats in the third week of June. From this base, this 15-mile stretch of the river was surveyed, sounded, and its strong currents measured, until early in September, when the party returned to Great Slave Lake for further investigations. To determine the gradient of the river at the rapids, and for further survey references, staff gauges were installed at Fort Providence, at the airport, and two in the Providence Rapids area. A check line of levels (based on mean sea level) was run from the 6th Meridian at the east end of Mills Lake to Beaver Lake - distance of 30 miles. Current velocities were measured by the float-pole method, and during the season, Mr Hanson (a certified dominion land surveyor) made a legal survey of the airport at Fort Providence for the Northwest Territories.

In Great Slave Lake, soundings were taken in the approaches of Hay River, with a view to the construction of a Public Works wharf and dredging. In search of refuge anchorages between the Mackenzie River and Yellowknife, two harbours were discovered and reconnoitred. The boats then proceeded to Yellowknife for wintering, and by 23 September the party had departed for Edmonton. As a result of the season's work one new chart for the MacKenzie River was published, another corrected with revisions, and

Canadian chart No. 6371, "Plans and Harbours, Great Slave Lake" was revised based on Public Works information 1945-46 and hydrographie surveys in 1944 and 1946.

In 1933 when the hydrographie service suspended its charting surveys in this region, there was little incentive and general interest to continue this important work. By the end of the Second World War, conditions had altered considerably, and the need for new surveys was well-expressed in this factual statement by Mr Hanson. "Water transportation in the Great Slave - Mackenzie River region has been on the increase for the past few years. This increase will be augmented by the opening of the new Grimshaw-Hay River Road, by the construction of the Snare River power project, and the opening and development of new mines in the Yellowknife area. The transportation of oil from Norman Wells to Yellowknife has already caused a heavier traffic on the Mackenzie River, and commercial fishermen on Great Slave Lake has increased freight on the Slave and Athabaskan Rivers. To meet the demand for better port facilities and deeper channels a new dredge is under construction by the Department of Public Works for use on the Mackenzie River and Great Slave Lake in 1947. This service has already spent several years in this region but a great deal of charting remains to be done." Mindful of this development a contract was approved this year for the construction of a new cabin launch to be delivered in 1947.

British Columbia

In his first year as supervising hydrographer, and until he had sufficient floating equipment and more technical staff, Mr Willis decided to adhere to his predecessor's scheme of charting essential localities along the inside passage route bordering the mainland. So that the *Stewart* might be freed to concentrate on offshore charting, from the sea coast to the continental shelf, plans were completed to remodel the 84-foot naval reserve patrol oat *Talapus,* (used for current survey work in 1945), for inshore work in 1947. This season three new 27-foot survey launches were added to the small boat fleet on this coast: the *Goose, Eagle* and *Duck.*

On his return from military leave, Mr G.P. Stoney resumed his clerical duties at the distribution office. Despite the resignations of three of his small drafting staff, Mr Davies managed to complete six fair sheets; attend to 157,974 hand corrections of existing charts, and also notices to mariners. Distribution comprised 15,850 charts; 750 BC pilots; and 19,000 tide tables.

Following the promotion of Mr Willis, in 1946 Mr R.B. Young replaced him as officer-in-charge of the *Stewart,* and had with him for the full season hydrographers D.A. Rankin, S.O. Wigen, J.C. Kent, and R.A. Upward, and for part-season Messrs Rutley, Ettershank, J.A. Brown, and former student draftsman D.R. MacKenzie. The *Stewart* left Victoria at the end of April, and after coaling at Union Bay, serviced the houseboat *Pender* in Seymour Narrows. Charting began in Goletas Channel early in May, and until the ship returned to Victoria on 28 October, the following localities were visited and areas charted: Gordon Channel, North Passage, Comox Bar, Drew Harbour, Baynes Sound (South Entrance), and Malibu Rapids in Jervis Inlet. Sweeping surveys were made in the James Island area and Patricia Bay, and revisions completed in Esquimalt Harbour. Over 2,700 miles were sounded by the new boats, and 852 miles by the ship. Some 1,250 shoals were also examined and 4 swept. Of 186 days in the field, 131 were working days.

SAILING DIRECTIONS, HEADQUARTERS

Under Mr MacKinnon's supervision, three coast charts and two supplements were prepared

and issued this year. This included a preliminary edition of the Mackenzie River Pilot, written mostly by Mr H.L. Leadman from the results of Canadian government surveys supplemented by the latest information available. Mr MacKinnon recorded, "Notice to Mariners are prepared as necessary and forwarded for publication. All place names for charts are referred to this section for submission to the Geographic Board. Special nautical information is procured and prepared for issue to the shipping interests. Numerous requests for similar and more detailed information received from the hydrographie department of the British Admiralty and from the hydrographie office of the United States are attended to."

TIDAL AND CURRENT SURVEY

The work of this division was somewhat disrupted in 1946 with the loss of two of its staff by retirement. In June Mr Wm.J. Miller, on loan from the Precise Water Levels Division since 1941, was the first to retire, followed in July by the chief of this division, Mr H.W. Jones. Mr Jones had joined the Tidal and Current Survey in 1904 as a technical officer, and in 1919 was classified as senior, tidal and current surveyor, Atlantic coast. When Dr. Bell Dawson retired in 1924, Mr Jones became nominal head of this division until 1940, when he was classified its chief - a service record of some 42 years. Early in 1947 he was succeeded as chief by his former assistant, and co-worker since 1912, Mr R.B. Lee. Inspections of Atlantic coast tidal stations were carried out by Mr Meehan, and included the building of a new station at Halifax and checking the gauge installed at the biological station of Grand Rivière, PQ, on the Gaspé coast. Minor current measurement investigations were also made in the east end of Montreal Harbour for the National Harbours Board. To assist with office routine this year, three student assistants were engaged: Messrs B.D. Seed, D.J. Fitzgerald and A.D. Perry. In addition to the preparation of standard tide tables for both coasts, calculations were made for the tidal bore of the Petitcodiac River, N B, and mean sea levels were supplied for tidal stations in the Gulf of St Lawrence for the Atlantic herring investigation. A paper was also prepared on the relation of land levels to mean sea levels for Atlantic tidal stations, and forwarded to the professor of Geophysics, University of Toronto. This office maintained five different publications on current investigations over the years, from the Bay of Fundy to the Gulf and River of St Lawrence; and four others not so concerned with navigation.

PRECISE WATER LEVELS

As of 1 July 1946, the former classifications of senior engineering clerks and assistant engineer were changed to technician, grades III and IV. No change was made to the grade hydrometric recorder, and to fill one of these staff vacancies, Mr D. Shearn was appointed. There were 49 gauging stations in operation in 1946 that gave over 600,000 water surface elevations, and supplied 10,500 sheets of miscellaneous data. Sheets of water-level information were supplied to the Canadian Press and Quebec Hydro Electric Power as evidence in a suit pending with the Beauharnois Power Company. Another interesting study was made for the hydraulic engineer in charge of the Ontario Hydro Power Commission's development on the north shore of Lake Superior at Aguasabo River. Finally, studies were continued from all water data to determine for charting purposes a low water datum for the Mackenzie River waterway.

CHART CONSTRUCTION AND REPRODUCTION

This division prepared the charts from original hydrographie data as submitted by the field officers, and when compiled and checked, they were printed on the presses operated by the map service. The cessation of hostilities and the normal resumption to shipping found the stocks of charts very low with many out of print. This became more noticeable when the Departments of Public Works and Transport, and the National Harbours Board became concerned with their post-war planning projects. A shortage of trained cartographers, and in September, the retirement of the chief of this division, Mr G.L. Crichton, created a heavy workload on the remaining staff. Mr Crichton had joined the former Hydrographie Survey of Canada as a draftsman in 1909 and, until 1915 was on loan to the International Waterways Commission at Buffalo, N.Y., as the Canadian chief draftsman. On his return to Ottawa that year, he was placed in charge of the drafting office, and this position he held until his retirement. He was succeeded by his principal assistant, Mr J. Bell, who carried on as acting chief until April 1947, when he was confirmed in this position.

To cope with the heavy backlog of chart requirements and new reproductions, the staff of this office was tentatively rearranged into two definite units, each working in close co-operation with the other: chart compilation, with Principal Map Draftsman E. Leslie in charge, and chart drafting in charge of Senior Map Draftsman W.O. Hodgins. To compensate the need for experienced map draftsmen, it was decided to train student draftsmen and promote them to this grade as they progressed. Student draftsmen appointed in 1946 were Messrs R.B. Mathie, E. Cowell, N. Veitch and F.H. Foley. Later, Mr Bell reported this arrangement to be satisfactory in handling the many chart corrections; "at times as many as three to six students and draftsmen had to be taken from their regular duties to assist this work in order to cope with the situation." In all, some 138,000 hand corrections were made to existing charts, and 28,800 charts corrected. New charts in colours numbered 75; in black only (no reference to Admiralty reprints), 10; index maps for catalogues and pilots, 6: and one nautical catalogue was prepared and printed. Despite this smaller output, to conclude, "it was sufficient to meet all demands."

CHART DISTRIBUTION

Although chart distribution in 1946 was less than the late war years, it still remained substantially higher than in 1939. There had been fewer requests for special strategic and instructional charts, but the demand for standard charts for commercial purposes was most rapid. Another interesting sidelight "was the insistent call for charts of Georgian Bay and other protected waters, for recreational purposes." This year, distribution was 50 per cent below 1945 - from 101,633 to 50,120. About 55,200 charts less were supplied to the defence forces. Other publications distributed consisted of 2,674 pilots and sailing directions, 59,260 tide tables and 10,000 water level bulletins, graphs, profiles, etc.

1947-48

The fiscal year 1947 marked significant milestone in the history of the Canadian Hydrographie Service, and it brought to a close a brief era of Canadian charting as the amalgamated Hydrographie and Map Service. Since the end of the Second World War, considerable progress had been effected in the reorganizing of all departmental scientific and technical personnel into proper administrative classes. When the fiscal year 1946 ended, the former classification "surveyor general and chief, hydrographie service," had been

abolished, and Mr R.J. Fraser was acting chief, hydrographie service. With the reconstitution of the Mines, Forests and Scientific Service Branch in October 1947, the Hydrographie and Map Services became two separate services each with its tentative head. Until official appointments were authorized to head the five separate divisions under the newly created Surveys and Mapping Bureau, Mr Fraser was tentatively named "chief hydrographer," and Mr Peters "chief' of the new Bureau. Following reconsideration of proper hydrographie nomenclature for the future, effective 1 January 1948, Mr F.H. Peters was officially named chief, Surveys and Mapping Bureau, and R.J. Fraser, dominion hydrographer, Canadian Hydrographie Service.

Eight parties were assigned to the field in 1947 and carried out charting operations from the Atlantic and Pacific oceans to Great Bear River in northwestern Canada. For these operations there were employed two major ships *{Acadia, Wm. J. Stewart),* one minor ship *(Parry),* four cabin cruisers *(Anderson, Dawson, Henry Hudson* and *Rae),* and the 22-year old 27-foot *Bayfield* Launch (renamed *Tern,* 1948). The 17-year old houseboat *Pender* was still moored in the Seymour Narrows area in British Columbia as living quarters for tidal observers, and by the end of the fiscal year considerable progress had been made at Midland, Ontario, in the conversion of a naval minesweeper to a minor survey ship (named *Cartier,* 1948). At the Pictou Depot, NS, delivery was taken of two new additions to the rapidly expanding small-boat fleet: the 31-foot launch *Scoter,* equipped with an MS 14 echo sounder, and the 25-foot *Beaver,* without a sounder.

Although large-scale charts were published this year for the Richilieu River, Saguenay River, and Lake of the Woods, of more significance was the introduction to the small boat owner of what might be termed tourist charts for inland waterways (Rideau River). Signs had not been lost of the many requests since the pre-war years for similar sheets covering the Trent Valley system, connecting the Great Lakes with the St Lawrence River via Georgian Bay. As for Georgian Bay it was stated, "inside the labyrinth of islands and rocks which fringe the shore of Georgian Bay exists a network of intricate, but uncharted channels. These and many other localities are potential cruising grounds of great attraction to yachtsmen but full development of a prosperous tourist trade awaits the production of suitable nautical charts."

The first small boat charts in book format were not published until 1962. Two years later, in 1964, the first of these editions was issued for Georgian Bay - Canadian chart No. 2203, "Parry Sound to Byng Inlet."

At headquarters in 1947, Mr F.R. MacMillan was still in charge of hydrographie records and accounts, and in June and August, two assistants were appointed to his section - Mr J.S. Pritchard (vice retired clerk, Mr W. Barling) and typist Mrs. M.P. Chenier, respectively. Since 1946, Miss E. Hardy had replaced Miss C. Condon as stenographer to Mr Fraser, and until transferred to the director's office, Miss R. Gould carried on as stenographer to both Messrs Peters and Fraser and other staff officers at times. Stenographer Miss M. Cumbers was assigned to the Tidal and Current Survey, and Miss F. Reed to Precise Water Levels.

In 1947 there was still a shortage of qualified hydrographers and cartographers, both of which had its effect on field and office production. To a small degree, this handicap was partially offset with the addition of student assistants and student draftsmen to the staff. Here in brief are the highlights of this season's activities, and with it ends this 64-year story of the Canadian Hydrographie Service.

DIVISION OF HYDROGRAPHY

Nova Scotia

This party, was again in charge of Mr G.E. Lowe, assisted by Messrs Charles and Moriarity and student assistant Mr G.C. McCausland. Early in June the *Dawson* and *Acadia* power dory left Chester, NS, for Yarmouth Harbour, where a standard survey was completed in detail for the Public Works Department. Early in August the boats then sailed for Halifax Harbour, and on passage a reported shoal off Lockeport was examined. Sounding off Thrum Cap in the entrance to the harbour began early in September, and this was progressing well when on the 15th the *Dawson* was completely destroyed by fire, without casualties. With no echo-sounder to continue the outside work, until the end of October the party was occupied in a triangulation survey of Bedford Basin, planting permanent bench marks [horizontal control point brass tablets], and lead line sounding with the power dory at the Oceans Terminals. At the end of the season Messrs Moriarity and McCausland accompanied Messrs Lowe and Charles to Ottawa, where during the winter months they were employed with this party as technical assistants.

Gulf of St Lawrence and Cape Breton

Under the general supervision of Mr H.L. Leadman since 1929, (except war years 1942-43), hydrographers in this region were actively engaged in completing surveys in Cape Breton and in Northumberland Strait. The party for the first time worked as three separate units. Until his reassignment to the Bras d'Or Lake Survey, Mr Gray assisted the *Acadia* party with preparatory surveys in Northumberland Strait, and when work in Cape Breton ended he returned with his party to the Strait for the remainder of the season.

Cape Breton

In mid-June, Messrs Gray and Goodwill arrived at Baddeck to complete the survey in Great Bras d'Or, begun by Mr Beauchemin a few years previously. In the last week of the month, Mr P. Radikir joined the party from Ottawa, where he was occupied in bringing the rough sheet of this party up to date. To complete this chart, there still remained to be surveyed areas in the western portion of the Great Bras d'Or area, including St. Patrick Channel and Barra Strait. Although the launch *Anderson* and *Acadia* port launch (CHL *Discovery,* 1933-36) were in the water at Pinaud Shipyard, little time could be given at the shipyard to service *the Anderson* until the third week in July. In the meantime, preliminary work of triangulation and inshore sounding was carried out with the survey truck and port launch. Early in September surveying ended and later Canadian chart No.4387, "Great Bras d'Or (Western Portion) and St Patrick Channel," was issued. Mr Gray said, "the St Patrick Channel route is used by large ships carrying gypsum from Little Narrows and as far as Whycocomagh for ships in the lumber trade; a small freight and passenger boat the *Lakingford* [?] maintains a regular service between Sydney and various ports throughout the Bras d'Or Lakes." Work in Cape Breton now ended; the boats sailed for Murray Harbour, PEI. With their departure, charting in the Bras d'Or Lakes was brought to a temporary close - a task that technically had begun in this area by Capt. F. Anderson, Messrs Bachand and Beauchemin in the last years of the First World War, and resumed by Mr Leadman in the *Carder* a few years prior to the Second World War.

Northumberland Strait

During the last week of May, a check survey was made in the entrance to the Richibucto River, NB, by hydrographers Messrs T.M. Tardif and T.B. McLellan. The purpose of this minor investigation was to position sunken obstructions on which ships reported having grounded. In mid-June base headquarters were re-occupied at Georgetown, and the regular work of recharting the east coast of Prince Edward Island was extended from Broughton River to Cardigan Bay. Broughton River was last surveyed by the Admiralty a hundred years previously, and since 1946 by this party. "It was found that no great change had taken place in the river bottom, except at the entrance where a bar had formed across the channel with a limiting depth of 6 feet," (dredged in 1916 to 10 feet). Surveys in Cardigan Bay area included St Mary Bay, Georgetown Harbour, and the Cardigan, Brudenell and Montague Rivers - all of which were tied in with the Murray Harbour survey, in charge of Mr Gray. Coastline for this chart was deduced from aerial photography and the season's work, 643 miles of soundings were recorded, and 24 shoals examined. Early in November the *Henry Hudson* returned to the Pictou Depot for the winter. This was to be Mr Tardifs last field season. His career dated back to the year of the first installation of an echo-sounding machine *(Acadia,* 1929). By the end of May 1948, he had resigned from the service.

Early in September Messrs Gray, Radikir and Goodwill established a base at Murray Harbour, PEL From there until the end of October, this harbour was recharted by the *Anderson* and *Acadia* port launch, and the east coast of the island surveyed to connect up with Mr Tardifs survey to the north. For special reasons, it was necessary to chart this area on a large scale, and when the season ended the boats returned to Pictou for the winter. Concerning Murray Harbour, Mr Gray remarked, "this harbour is an active port; local farming produce and stock are shipped out and coal and package freight imported; a sizable fishing fleet of small boats operate from this harbour."

In addition to the officer-in-charge, Mr H.L. Leadman, the *Acadia* party included Messrs N.G. Gray (until 14 June), G.A. Surette, and R.J. Noonan; student assistants Messrs F.A. Delory, H.R. Lumsden and G.H. Miles, and Seaman Technical J.K.C. Fraser. Sailing master was Capt. D.M. Snelgrove *(Bayfield,* 1929-31), and chief engineer, Mr J.S. Cann *(Acadia,* 1923-39). Until the ship was commissioned early in July, field assistants carried out preparatory surveys along the Nova Scotian coast between Merigomish and Caribou Harbours. With Mr Gray's departure for Cape Breton, Mr Leadman was left with only one experienced hydrographer (Mr Surette), and one experienced seaman technical (Mr Fraser). To add to his problems during this period of adjustment, Mr Fraser and the student assistants left early to return to college.

The principal operation of the *Acadia* in 1947 was the charting of the Nova Scotian coast bordering the Strait, from Cape George to Pictou, with insets for the approaches to Pictou and Merigomish Harbours. Early in August, the *Acadia* proceeded to the western portion of the strait for a large-scale survey of Summerside Harbour, PEL The purpose of this work was to determine the maximum drafts that could be carried into this harbour. For the remainder of the season other local areas visited were Cribbean Head, Bal lantynes Cove, Arisaig and Bailley Brook. When surveying ended early in November, the ship tied up for the winter at the new hydrographie depot at Pictou. The chart for this season's operation, said Mr Leadman, "will make available to shipping entering Northumberland Strait from the eastward, a large-scale series of charts, extending westward of Summerside, PEL"

This season brought to a close the recharting of Northumberland Strait - first recommended by Mr Leadman as a major wartime project in 1939. In 1948 the *Acadia* returned to the Gulf of St Lawrence to resume the present post-war era of charting, in St

Paul Island, and Newfoundland.

St Lawrence River

By the end of May, the *BayfieldLaunch* and gig had left Prescott with hydrographers Messrs Titus, Mack and Seaman Technical A.G. Hewitson, and had established a summer base at Varennes below Montreal. The water level this season was exceptionally high, "well above the small wharves along the St Lawrence River." Surveying this year was centred in the sector of the river from St. Michel to Pointe aux Trembles, but actual sounding could not begin until a new Bludworth deep recorder was installed in the launch in mid-July. Current measurements were also made as in previous seasons by the pole-vane method. Early in October, the party was detailed to Valleyfield at the head of Lake St Louis to chart and bar-sweep the channels in this locality. About the middle of October, this work was temporarily interrupted for a few days to undertake an urgent current measurement investigation in the vicinity of Pine Tree Point near Morrisburg. This survey, in connection with the ill-fated disaster of the SS *Milverton,* was carried out by Messrs Titus and L.P. Murdock of this party, and Mr O.M. Meehan of the Tidal and Current Division in Ottawa. When field work ended at Valleyfield early in November, arrangements were made by Mr Titus to have the boats delivered here by the CGS *Grenville,* and Mr Murdock, (crewman, since 1944), accompanied the hydrographers to Ottawa where he was employed for the winter as a technical assistant.

Great Slave Lake, Great Bear River

This party in 1947 comprised ten men, including the officer-in-charge Mr R.E. Hanson, hydrographer Mr C H . Martin, and two student assistants, Messrs G.M. Kernahan and D.I. Hogan. Centre of activities was a 32-mile sector of the west coast of Great Slave Lake, a survey requested by the Department of Public Works and local shipping interests. For work on the open coast of Great Slave Lake, a new 45-foot, twin screw motor launch, was built by the Midland Boat Works (Midland, Ontario), at a contract price of $14,830, and delivered at Waterways in the last of May. She was named the *Rae* after Dr. John Rae, the famous Arctic explorer, who in the early part of the last century mapped large areas of the District of Mackenzie during his travels. The *Rae* was fitted with a modern echo-sounder at Midland, and in addition to charting, was a valuable asset to the party in transporting men and supplies to the surveying grounds.

Early in June, while Mr Martin and the remainder of the crew were taking the *Rae* from Waterways to Fort Smith, Mr Hanson with two men completed a small investigation in the Great Bear River at the entrance to Great Bear Lake. This request by the Northern Transportation Company was to determine the existence of a 6-foot channel in the river from Great Bear Lake to its wharf located about a mile downstream. Transportation, boats and accommodation were supplied to Mr Hanson by the company. When this work ended, he returned to Fort Smith to join Mr Martin and the *Rae.* Investigations in the entrance to Great Bear River revealed the existence of a few heaps of boulders blocking the entrance, and these were scheduled for dredging in 1948 by the Public Works Department.

On 27 June the party arrived at Yellowknife, and early in July at the surveying grounds. From then until the third week in September, the west coast of the lake was charted between Slave Point and Moraine Point, including three harbours of refuge of which little was previously known. Due to shortness of the season in the North, both the *Rae* and *Carder* launch were used for charting - the inshore work under Mr Martin in the port launch, and

the offshore area by Mr Hanson in the *Rae.* From the season's operations, 1,178 miles were sounded by the boats, and 18 shoals carefully examined. Corrections were also supplied for anew edition of Canadian chart No. 6370, "Slave River to Mackenzie River," and when the new chart was published, shipping "which formerly waited at the entrance of the Mackenzie River for favourable weather before crossing the lake may now proceed with the assurance that good harbours exist near their route. This particularly applies to tugs and barges bringing oil from Norman Wells to Yellowknife." By 21 September the boats returned to Yellowknife for winter storage, and the party disbanded.

For Mr Price's study and analysis, a staff gauge was maintained by the service at Fort Providence. Other interesting notes from Mr Hanson's report were as follows: "for the first time in four years the visibility was not impaired by smoke ... the opening of navigation was extremely late ... the latest in thirty years according to the natives ... a small amount of ice in the lake as late as July 1." This year the lake level had reached its highest point in several years, about *PA* feet above low water datum of 1945. The barges could now be loaded to capacity, thus moving more freight per trip. Finally, to handle the higher number of aids to navigation on this lake, as a result of the 1947 survey, a new Department of Transport buoy-boat was put in operation. This was a far cry from the year 1934 when the auxiliary hydrographie schooner *Pilot No. 1* was transferred to the Fort Smith agency of the Northwest Territories for these and other relevant duties in this District.

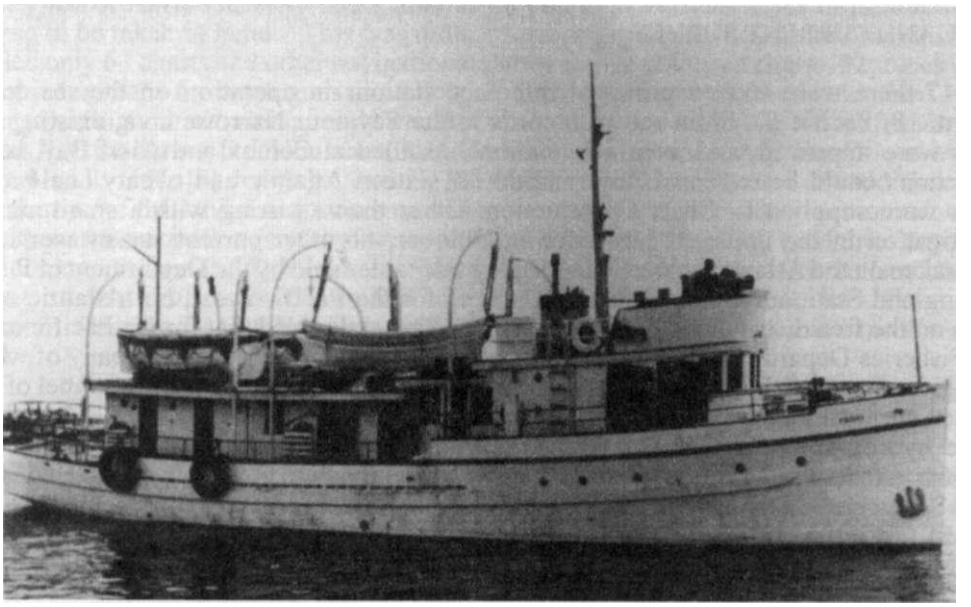
British Columbia

For the first time since 1923, houseboat *Pender* excepted, two hydrographie ships were employed in charting operations on the Pacific coast: the *Wm. J. Stewart* (since 1933), and this year, the reconditioned patrol vessel *Talapus* - on permanent loan from the Canadian navy, at Esquimalt. This 84-foot diesel-engined vessel was named the *Parry* after Admiral Sir John F. Parry, K C B , former commander, HM Surveying Ship *Egeria* on this coast prior to 1910. Admiral Parry was also the hydrographer of the Navy during the years of the First World War, and president of the International Hydrographie Bureau in its formative years of the early 1920s. Canadian hydrographers who served under him during the First World War were Messrs Fraser, Smith, MacKinnon, Foreman, Willis, Prittie, Parker and Morrisey.

Principal assistants, at the Belmont Building in Victoria, to the supervising hydrographer, Mr W.K. Willis, were the officer-in-charge of the chart distribution office, Mr L.R. Davies (transferred from Ottawa 1907), and tidal and current urveyor, Mr G.W. LaCroix. Mr G.P. Stoney was clerical assistant, and Mr J. Ryan in charge of stores and equipment. Characteristic of the times, there were several resignations and new appointments amongst junior personnel - field and office. Despite these handicaps, 160,000 hand corrections were made to existing charts, five fair sheets were compiled, and five others almost ready for mailing to Ottawa. In addition, 15,283 charts, 594 BC pilots and sailing directions and 19,683 tide tables were distributed. Assisting Mr Davies with this production quota were Mr F.R. Smithers (fair sheets), Mr P.E. Smart (notices to mariners), Mr G.E. Hawkins (place names, etc.), and student draftsmen (chart correctors, chiefly) Mrs. Van Haaff and Misses Soulsby and Ngai - six full-time personnel, exclusive of Mr Willis.

Hydrographers aboard the *Wm. J. Stewart* in 1947 comprised Mr R.B. Young, officer-in charge; full-time hydrographers Messrs R.H. Ettershank, S.O. Wigen, and R.A. Upward; part-time hydrographers Messrs J.R. Rutley, J.C. Kent, J.G. Spencer and H.L. Hammersley; student assistant Mr G. B. Milligan; and seaman technical Mr D.R. MacKenzie. During the fiscal year Messrs Kent, Spencer and Upward left the service. Sailing master was Capt. G. Billard; and chief engineer, Mr N. McKenzie. The ship was

commissioned in the last week of April and decommissioned 28 October. During this period, charting surveys were completed in the Queen Charlotte and Smith Sound areas, Otter Pass and Banks Island, Hemfray and Sutil Channels, and revision surveys in sixteen localities including Esquimalt, Vancouver and New Westminster Harbours. From the season's work, 1,050 miles of ship and 2,818 miles of boat sounding were recorded, 322 miles of coast surveyed, and 1,433 shoals examined.



CGS ***Parry***
Photo courtesy CHS

The *Parry* was commissioned expressly for surveying along the inside passage with Mr J.A. Brown her first officer-in-charge and captain - the first hydrographer in the service qualified to wear "two caps" at sea, since the days of the former chief hydrographer, Capt. F. Anderson (1893-1936). Hydrographie assistants were Messrs D.A. Rankin and H.G. Clark, and chief engineer, Mr C.A. Freeman. Areas resurveyed by the *Parry* this season were located in Finlayson, Tolmie and Mathieson Channels; Meyers, Jackson and Oscar Passages, and Alexander andNowish Inlets. Some 600 miles of ship and boat sounding were logged, 194 miles of coastline surveyed, and 96 shoals examined. Before the fiscal year ended, Mr D.A. Rankin, who had been with the service since 1941, resigned.

In addition to inspection and maintenance of the principal tidal stations, Mr LaCroix visited Seymour Narrows to repair the seasonal station there, and to take an inventory of the houseboat *Pender* (sold out of the government service 1950). Until 1949, the *Pender* was moored in this area as a living quarters for tidal observers. In June 1947, current investigations begun the previous year in First and Second Narrows, Vancouver, were extended. Hydrographie work by Mr LaCroix this season included checking fair sheets at the Victoria office, checking the measured mile beacons at Spanish Bank, and examining Vancouver Harbour for chart revisions.

SAILING DIRECTIONS

This section at headquarters, in charge of Mr M. A. MacKinnon, prepared for publication two new editions of the pilots for the St Lawrence River above Quebec, two for the Great Lakes - Ontario, Erie, Huron, and Georgian Bay, notices to mariners, and lists of place names for the Geographic Board.

TIDAL AND CURRENT SURVEY

In 1947 there were sixteen principal reference stations in operation on the sea coasts (Atlantic 8, Pacific 8). From recent records in the Seymour Narrows area, existing tide tables were improved, and from new stations installed at Comox and Alert Bay, better predictions could be expected. Information for sixteen Atlantic and twenty-one Pacific charts were supplied to Chart Construction. Other than assisting with a small current investigation in the upper St Lawrence in October, no other current survey work was undertaken on the Atlantic coast. Of the 30,565 tide tables sold by the Department of Public Printing and Stationery, almost two-thirds were for the Pacific coast, but Atlantic coast tables on the free distribution list for official use almost doubled that for the Pacific coast. The Fisheries Department purchased and distributed about 14,000 copies, many of which were given free to fishermen at the time fishing licences were purchased. Personnel of this division during the year were Mr R. B. Lee, chief, tidal and current survey; Mr O. M. Meehan of the hydrographie service (to February 1948); assistant technician, Mr B.D. Seed; temporary student assistants, Messrs A. D. Parry (to September 1947), G. McCausland of the Nova Scotia survey (to March 1948), and Miss N. Tucker (November-December 1947). Miss M. L. Cumbers (Mrs. Soutar) had been with this division since 1929 as the regular stenographer, and at times assisted with checking tidal records and proofreading of tide tables.

PRECISE WATER LEVELS

This division in 1947 maintained forty-eight water gauges on the Great Lakes, St Lawrence River and lower Ottawa River, and they were attended by forty-six part-time river observers. Readings from six staff gauges along the Mackenzie River waterway from Yellowknife to Aklavik were analyzed, and in this regard Mr Price stated "that the setting of all the gauges along the MacKenzie Waterway, should be checked each year by direct levelling to the local reference bench-mark, so that an accurate year to year relation will be maintained, otherwise inaccurate and questionable relations will develop and lead to erroneous deductions." From 525 continuous recordings at the field stations, some 650,000 water surface elevations were reduced, and collated into twelve monthly, five annual, six general and five hydrographie bulletins. Close cooperation was maintained and extensive data supplied to engineering, construction and marine interests of both federal and provincial government services, as well as to many private enterprises. Personnel of this division during the year were Mr C. A. Price, chief, Precise Water Levels; technicians Messrs A. S. Matthewson, H.P. Williams, A. C. Turtle, W.E. Rainboth; hydrometric recorder Mr D. Shearn; and stenographer (since 1934) MissF. Reed.

CHART CONSTRUCTION AND REPRODUCTION

Although this division had the responsibility for the production of navigation charts, the

general supervision such as specifications and final checking was still one of the major responsibilities of the superintendent of charts, since 1936, Mr F.C.G. Smith. Another major responsibility of this division was keeping all chart stocks at hand in Ottawa corrected to date. For the want of an increased number of experienced cartographers severe limitations were imposed on chart production, and at the end of the fiscal year, the backlog of charts awaiting attention "was never greater." The recently appointed chief, Mr J. Bell, said, "the priority list of April 1st, 1948 had a total of 48 charts in various states of production or waiting to be taken in hand." This was quite a serious problem when production this year totalled only 63 charts and other navigational publications: coloured charts, 52; black only, 9; and index maps for catalogues and pilots, 2. To handle some of this production, and to undergo cartographic training, eight student assistants were added to the staff this year: Messrs R.F. Petticrew, D.J. Houlahan, R.C. Hamilton, J. Hanrahan, A.E. Banks, and Misses M. Caldwell, H.H. [?] Jennings, and H. Pazkowski. Including these new additions, the organization of this division now comprised approximately twenty-three personnel: chief, J. Bell; chart compilation (and draftsman) Mr E. Leslie; chart drafting (and draftsman) Mr O. Hodgins; draftsmen (5) Messrs C. Weese, M. Isabelle, Y. Pinard, H. Kelson, and P. Brunet; student draftsmen Messrs R.B. Mathie, E. Cowell, N. Veitch, F.H. Foley, and Misses M. Cassidy, D. Cuthbertson, and E. Martin - a total student draftsmen enrollment of fifteen.

CHART DISTRIBUTION

The fiscal year 1947 marked the greatest peacetime distribution to date, and also established an all-time record of revenues from chart sales, "largely due to the Tourist demands." As of 31 December 1947, charts in stock at Ottawa numbered 112,326, and at Victoria, 23,958. Ottawa distribution was 59,043 (19,850 in 1939) and pilots, 1,518. There were also 11,535 sheets of water-level data issued. Revenue from sale of all publications in 1947 was $24,376, ($8,250.58 in 1939, and $23,016.24 in 1943, when 106,042 publications were issued). Personnel of this section in 1939 [1948?] comprised officer-in-charge, Mr J.L. Foreman (since 1941); clerks, Messrs A. Willis, K.D. Brading (from September 1947), H.H. Betts vice Miss Y.C. Paquette (November 1947); and messenger Mr L.H. Murphy, vice G.E. Burns, who died in September 1947. To conclude, "A list of nautical charts published during the year may be obtained on application to the Chief Hydrographer, Canadian Hydrographie Service, No. 8 Temporary Building, Ottawa, Ontario, Canada."[4]

DEPARTMENTAL REORGANIZATION AND THE CANADIAN HYDROGRAPHIC SERVICE, 1947-48

As of 1 November 1947, (P.C. 37/4433, assented to 30 October 1947), the former Surveys and Engineering Branch was officially abolished, and reconstituted as Mines, Forests and Scientific Services, with Mr W.B. Timm its first director. Mr J.M. Wardle, director of Surveys and Engineering since 1936, was renamed director of Special Projects under the deputy minister.

The new Branch now comprised eight bureaus, one of which was the newly created Geographical Bureau (established 5 June 1947), and another the Surveys and Mapping Bureau that comprised the following divisions: Topographical Survey, Hydrographie Survey, Geodetic Survey, Legal Surveys, Map Compilation and Reproduction. F.H. Peters

[4] *Report M&R, 1947.*

was tentatively named "chief of this bureau, and R.J. Fraser "chief hydrographer." In a memorandum to the director, Mr W.B. Timm, dated 10 November 1947, Mr Fraser brought to his attention the question of appropriate terminology for the Canadian Hydrographie Service. He compared the title of this service and its head, with other countries, and stated, "in the Naval Service, National Defence, a position was set up during the war and called 'Hydrographer, Naval Service.' He therefore suggested "that it would not be inappropriate to introduce the title 'Dominion Hydrographer.' He also suggested "that the term 'Service' should be retained, as being more comprehensive to this case than that of 'Surveys,' and as likely to cause the least measure of adjustment of the hydrographie responsibilities at this time." This memorandum Mr Fraser signed as assistant chief, Hydrographie Service.

In a letter to Admiral J. Nares of the International Hydrographie Bureau dated 11 February 1948, Mr Peters wrote "there has been a reorganization in the Department, and my position is now that of Chief of the Surveys and Mapping Bureau, and Mr R.J. Fraser is now Chief Hydrographer of the Canadian Hydrographie Service."

To bring together staff units whose work was closely allied, early in 1948 the hydrographie service moved from the Confederation Building (since 1936) to No. 8 Temporary Building, Carling Ave. Here it was united with its field staff from the Labelle Building, and other units of surveying and mapping, including the chief, Mr Peters. Only in 1961, when the present Surveys and Mapping Building could be occupied, was it possible to house all divisions of the Surveys and Mapping Branch (renamed 1950) under one roof.

To finalize this reorganization P.C. 117/1666 was assented to on 17 April 1947. Effective as of 1 January 1948, Mr Peters' official classification of chief, Legal Surveys and Mapping Service, and chief, Hydrographie Service was abolished, and reestablished as chief, Surveys and Mapping Bureau; and that of Mr Fraser, assistant chief, Hydrographie Service, was also abolished and reestablished as Dominion Hydrographer, Canadian Hydrographie Service.

RECAPITULATION, FISCAL YEARS, 1940-47

In the fiscal year 1947, Mr F.H. Peters was still chief hydrographer, and Mr R.J. Fraser his assistant chief (since 1940). The former had yet to be officially appointed as chief, Surveys and Mapping Bureau; and the latter, dominion hydrographer. In anticipation of these appointments, in January 1948 both field and headquarters staff of the Atlantic coast and Inland Waters Division were relocated from the Labelle and Confederation Buildings respectively to No. 8 Temporary Building, Carling Avenue. This was the first time since 1936 that field and office staff were again united under the same roof. In British Columbia, the Victoria office had moved to the Belmont Building, but still on Government Street. Since the war ended, hydrographie stores and equipment at Charlottetown, PEI, were transferred to the new depot at Pictou, NS, and in British Columbia, a full-time storekeeper was now permanently employed.

Since 1946 Mr W.K. Willis had been supervising hydrographer, Pacific coast. In 1947, at headquarters, Mr F.C.G. Smith was superintendent of charts, Mr M.A. MacKinnon in charge of sailing directions and pilots, and Mr J.L. Foreman in charge of chart distribution. Chief, chart construction was Mr J. Bell; chief, Tidal and Current Survey Division, Mr R.B. Lee; and chief, Precise Water Levels Division, Mr C.A. Price. Including the chief hydrographer and the assistant chief, the hydrographie staff in 1947 was approximately 16 per cent higher than in 1939 - with most new appointments dating since the end of the war. The establishment now included the following classifications: administration, 3 (Ottawa 2, Victoria 1); clerical and stenographic, 14 (Ottawa 11, Victoria 3); hydrographers, 29 (Ottawa 18, Victoria 11); tidal and current survey, 4 (Ottawa 3,

Victoria 1); chart construction and revision, 29 (Ottawa 23, Victoria 6); and precise water levels, 6 - in Ottawa, an approximate total of 85 personnel. Ships' officers numbered 12 (Atlantic coast 4, Pacific coast 8); tide gauge observers, 16 (Atlantic coast 8, Pacific coast 8); and river observers, inland waters, 46 - an overall total enrollment of 159 personnel (Atlantic coast and headquarters 121, and Victoria 38).

When the Second World War ended, the hydrographie fleet had been reduced to two major ships *(Acadia, Wm. J. Stewart).* This was three fewer units than in 1914, two fewer than in 1931, and one less than in 1939. On the Atlantic coast, two of *Carder's* launches and one of the *Acadia's* were "beached" during the war, and in British Columbia, the days of the aging houseboat *Pender* were numbered. Since 1940 the service had also endured a few casualties in the fleet. In 1941, the cabin launch *Henry Hudson* caught fire in Bay Chaleur; in 1944, the only major ship in service during the war, *Wm. J. Stewart,* sustained serious hull damage from Ripple Rock, and in Halifax Harbour in 1947, the reconverted launch *Dawson* became a total loss from fire. When the war ended the cabin launches *Hudson, Boulton* and *Anderson,* and the 1925 open *Bayfield* launch were still in commission. Also in service were the port launches of the *Acadia* and *Carder;* the former in Bras d'Or Lakes, Cape Breton; and the latter in Great Slave Lake, NWT. All these launches were equipped with automatic echo-sounding machines. In 1946 the 21-year old *Boulton* ended her days with a reconnaissance survey of the Rideau River waterway from Kingston to Ottawa, and the following year she was replaced by the old *Bayfield* Launch. With the return of Mr H.L. Leadman from war leave, plans were formulated in 1944 to modernize the old fleet of hydrographie ships and launches with new units. In 1946, three 27-foot open launches were built in British Columbia and equipped with modern echo-sounders, and this year the first of a new class of 31-foot cabin launches was delivered to the Pictou depot. The next year (1947), the CGS *Parry* was added to the Pacific coast fleet, and a new 47-foot cabin launch CHL *Rae* was commissioned in Great Slave Lake.

Commencing 1 January 1946, Canadian charts were renumbered on a more modern geographic system and as of 1 April 1948, the Canadian catalogue listed 367 general, coast and harbour editions, and 11 special *Customs Act* maps - a total of 378 sheets. Including in this total were 51 [?] for Newfoundland, 3 for Labrador, and 103 for British Columbia. This was 211 more sheets than when the Hydrographie Service began in 1923, and 63 more than in 1939. Price per chart in 1947 was 50 cents per copy, unless otherwise stated. To 1928, six volumes of Canadian sailing directions had been published; to 1939, thirteen, and to 1947, fourteen. Cost per copy ranged from $0.50 to $1.25. In 1947 there were distributed 19 tidal publications: current reports 5, tide tables 14. Cost per copy ranged from $0.10 to $ 1.00. Of the 8 water level bulletins and hydrographs, some were listed as 25 cents per copy.

As the result of a "hold-the-line" policy and stringent staff and financial controls, the average annual hydrographie expenditure during the war years was approximately $354,000. This was about 18 per cent less than the annual average prior to the Second World War, and about half of the two post-war years, 1946-47. To provide for post-war planning and expansion, in 1946 the hydrographie appropriation was grouped under two expenditures: hydrographie surveys, and supplies and equipment. In 1947 this appropriation was the highest in the history of the service ($724,444), and in the year of the branch reorganization and appointment of Mr Fraser as dominion hydrographer (1948), the figure for the first time exceeded the million-dollar mark ($1,148,584).