INTRODUCTION

Following the Canada-American War (1812-1814) wooden-hulled, paddle-wheel steamers began appearing on the Great Lakes, and with them a gradual transition from sail to steam navigation. In the ensuing years as these lakes developed, so did the numbers, sizes and models of these early steamers. About 1838 some of them were propeller-driven, and by the early 1870s, to cope with the heavy lake traffic, larger, deeper-draft, iron-hulled carriers were in service on the upper lakes, including Georgian Bay - at that time the hub of Canadian Great Lakes shipping.

Unlike early sailing ships, these steamers were capable of closer inshore navigation. However, for the want of more detailed coast charts, many of them over the years became marine casualties, often with the loss of lives. By 1841, the United States government had become cognizant of this exigency, and authorized its Lakes Survey to begin the resurveying of its coastal waters, west from Buffalo, New York - at that time the gateway to the Atlantic Ocean via the Erie Canal. When this survey ended in 1882, some seventy-six general coast and harbour charts of American Waters had been compiled to the 3-fathom (18 feet) contour line, sufficient to accommodate ships drawing twelve feet of water. In addition to this, canals had been built at Sault Ste Marie: one in 1855, with 12 feet on its sills; the other (Weitzel[1]) in 1881, with 15 feet of water on its sills. Through these two gateways passed many Canadian colonists en route to the western prairie provinces. Others preferring to remain in Lake Superior found employment with the Canadian Pacific Railway, and the rapidly developing agriculture, mining, lumbering and fishing industries.

During these years sailing masters navigating Canadian waters from Georgian Bay to Lake Superior were still dependent on two outmoded editions of Bayfield's charts, published in the late 1820s and with few corrections added to them since. These charts, although surveyed in the early days of steam navigation by Lieutenant Bayfield, lacked many essential coastal details for safe inshore navigation. This was expressly so for the east and north coasts of Georgian Bay, the North Channel, and Lake Superior. Consequently, as the size and numbers of steamers increased, so did the annual toll of marine casualties. One particular instance was the loss of the ore-carrier SS *Cumberland* in Lake Superior during September 1877. Despite this and previous requests for better navigation charts for Canadian waters, no positive action was taken until the freight and passenger SS *Asia* foundered in

[1] General Godfrey Weitzel, US Army Engineer Corps. [Ed]

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Georgian Bay during a heavy gale on 14 September 1882 with only two survivors. This marine catastrophe, the greatest on the Great Lakes to this time, not only created a public agitation in the press but also increased political pressure on the Dominion government for new surveys. Following official investigations and enquiries, it was finally decided to heed these applications and by this decision the present Canadian Hydrographic Service had its commencement.

Unable to secure the services of a qualified hydrographic surveyor in Canada, the Minister of Marine and Fisheries (Honourable Mr A.W. McLelan) on 16 December 1882 wrote the Canadian High Commissioner in London, Sir A T . Gait, asking him to confer with the Lords Commissioners of the Admiralty in this regard. Subsequent to correspondence between Ottawa, the Canadian High Commissioner, the Admiralty and Colonial Offices in London, in February 1883 the Hydrographer of the Navy, Sir F. Evans, instructed Staff Commander W.F. Maxwell, RN, of the Newfoundland Survey, to proceed from Charlottetown to Ottawa and there confer with the Minister of Marine and Fisheries about the conduct of the survey to be undertaken in Lakes Superior and Huron. This duty Staff Commander Maxwell completed by 6 May and in this connection the first hydrographic expenditure was incurred and paid out of the $5,000 voted by Parliament for "Surveys of Lakes Superior and Huron ... W.F. Maxwell, ... Travelling expenses, inspection ... $77.81."[2] When his report and recommendations were forwarded to the Hydrographer, Staff Commander Maxwell then left his winter base at Charlottetown in HM Surveying Ship *Gulnare* for Newfoundland.

On 28 July, Admiralty surveyor Staff Commander John George Boulton, RN, was advised of his appointment by the Canadian High Commissioner's Office, and on 2 August he sailed from England for Canada - on loan from the Admiralty to undertake these surveys, and to instruct his assistants on the Canadian surveying ship *Bayfield* in the standard practice and techniques of Admiralty surveying. Here are Staff Commander Boulton's own account of some of the major events that led to the commencement of the Georgian Bay survey: "Owing to the number of vessels lost every autumn in Georgian Bay, culminating with the loss of the *Asia* with some one hundred and fifty lives, coupled with the prospect of a rapidly increase trade from the south-east parts of Georgian Bay to the westward in connection with the railway systems, it was decided by the Dominion government to have the waters of Georgian Bay and the North Channel of Lake Huron, as far as Sault Ste Marie surveyed, and a request was made to the British government for a suitable officer to undertake the work. I had the honour of being selected by the Admiralty for this survey and arrived at Ottawa on the 13th and Georgian Bay two days later."[3]

In its formative years, under the command of Staff Commander Boulton, the Hydrographic service was known as the Georgian Bay Survey, and during this period its activities were reported by Commander Boulton directly to the Minister of Marine and

[2] [Department of Marine and Fisheries! M & F Report, 1883.

[3] M & F Report, 1889.

Fisheries. By an Act of Parliament in April 1892, all technical work in the Marine and Fisheries Department was placed under the chief engineer, Mr Wm P. Anderson, who reported the activities of this branch directly to the deputy minister, Mr Wm Smith. Included in this work were tidal observations on the coasts and hydrographic surveys.

His work in Canada now ended, in April 1893 Staff Commander Boulton relinquished the command of the Georgian Bay Survey to his first assistant since 1894, Mr Wm J. Stewart, and returned to the Admiralty Office in London. From then until 1904, all hydrographic work in the Department of Marine and Fisheries, including his own special surveys, were under the direct supervision of Mr Wm Anderson.

When the survey of Georgian Bay and the North Channel ended in 1894, the Dominion government decided to complete the recharting of the remaining Canadian waters in the Great Lakes. From then until 1904, this surveying was more familiarly known as the Great Lakes Survey.

In March 1904, hydrographic units in the Departments of Public Works and of Railways and Canals were transferred to the Department of Marine and Fisheries, and then amalgamated with its Great Lakes Survey to become the Hydrographic Survey of Canada, or the Canadian Hydrographic Survey. This was the nucleus of the present Canadian Hydrographic Service, and the present regional hydrographic offices in the Marine Sciences Branch. In June 1904, the British Admiralty, by circular letter, requested all the self-governing colonies to assume responsibility for their own coast surveys. To head the recently established hydrographic survey,[4] and in compliance with the Admiralty's request, early in August 1904 Mr Wm J. Stewart, in charge of the Georgian Bay and Great Lakes Surveys since 1893, was appointed Canada's first Chief Hydrographic Surveyor, or as he preferred to be called, Chief Hydrographer. The actual growth, development and expansion of the Hydrographic Survey to its present proportions date from the year 1904 onwards.

In 1912 the Hydrographic Survey assumed responsibility for all automatic water-gauges of the Public Works on the Great Lakes and the St Lawrence river, and this unit became known as the Automatic Gauges Section. In 1924 the Tidal and Current Survey Division in the Department of Marine and Fisheries was duly transferred to the Hydrographic Survey. Following a reorganization in Marine and Fisheries in the fiscal year 1927-28, the Canadian Hydrographic Survey was renamed the Canadian Hydrographic Service; and its Automatic Gauges Section, the Precise Water Levels Division. At that time no change was made to the title of the Tidal and Current Survey Division. This was not to come until 1956 when both these divisions were amalgamated and renamed Tides, Currents and Water Levels.

Since its inception in 1883, the Hydrographic service has passed through four periods of national and international stress that did much to retard its early growth and development. These periods were the years of the South African War (1899-1902), when Canada sent its

[4] Meehan invariably used capital letters for "Hydrographic Survey." To be consistent with current editorial practices, namely that only proper names are capitalised, this abbreviated or familiar usage has been amened to lower case letters.

first troops overseas; the First World War (1914-18); the economic depression of the 1930s; and the Second World War (1939-45). Over the years, the service has served in eight different departments of the government, two of which were in the same one on different occasions (Marine and Fisheries). It has also had to date eight heads or chiefs to supervise its various field and office functions. To serve the public better prior to 1961, two district offices were established on the sea-coasts: the first at Victoria, BC, on the Pacific coast in 1907, and the second at Halifax, NS, on the Atlantic coast in 1959. A few months prior to the opening of the Bedford Institute of Oceanography in October 1962, the Halifax office was moved to this Institute in Dartmouth where it is now permanently located. On 1 April 1962, the Hydrographic service became a division of the newly created Marine Sciences Branch in the Department of Mines and Resources, under the direction of Dr W. M. Cameron. When Mines and Technical Surveys became the present Department of Energy, Mines and Resources in October 1966, the Hydrographic service had reached its ninth milestone in its history of government service.

As already stated, the first Canadian hydrographic survey was for the inland waters of the Great Lakes in 1883. The first salt-water survey on the sea-coasts was in Burrard Inlet, BC, in 1891. Since then other regions of Canadian waters to undergo their first charting by Canadian hydrographers have been as follows: Lake Winnipeg, Manitoba, 1901; the St Lawrence River above Quebec, 1904; the St Lawrence River below Quebec, 1905; the maritime provinces of Nova Scotia and New Brunswick, 1908; Hudson Bay and Strait including adjacent islands of the District of Franklin, NWT, 1910; Prince Edward Island, 1910, 1920; James Bay including adjacent islands of the District of Keewatin, NWT, 1912; coast of Labrador, 1921; Great Slave Lake, District of MacKenzie, NWT, 1928; MacKenzie River delta 1930, 1933; Newfoundland 1939; Yukon River, Yukon Territory, NWT, 1950; Parry Channel and Jones Sound, NWT, (eastern Arctic), 1951; the Beaufort Sea and Prince of Wales Strait (Western Arctic), 1954; the Arctic Ocean, Queen Elizabeth Islands, NWT, 1959.

The first Canadian publication from Canadian resurveys was Chapter One of the *Georgian Bay and North Channel Pilot* written by Commander Boulton, and issued to the public by the Department of Marine and Fisheries before navigation opened on the Great Lakes in 1885. The first chart from Canadian resurveys was for the entrance of Georgian Bay, and published by the Admiralty in the spring of 1886. In 1892, the first Canadian volume of *Sailing Directions* was written for Georgian Bay and the North Channel, and placed in the hands of chart agents. Eleven years later, in February 1902, the first Canadian chart from Canadian surveys was printed by the Department of Marine and Fisheries for the southern portion of Lake Winnipeg, from Red River to Berens River. Since then, the Hydrographic service has published from Canadian surveys approximately one thousand standard navigation charts, fourteen volumes of sailing directions and pilots, together with miscellany of water-level bulletins, tidal and current tables and reports, etc. - all primary aids to navigation, and scientific research for Canadian waters.

These are a few of the many significant highlights in the history of the Canadian

Hydrographic Service that made it an interesting nautical story, and did much to assist Canada's becoming the fifth largest trading nation of the world in 1966. To tell this story in a more detailed form to the end of the Second World War, it has been documented chronologically under five major periods in its charting history: Chapter I,"The Georgian Bay and Great Lakes Survey, 1883-1903"; Chapter II, "The Hydrographic Survey of Canada, from its formation to the First World War, 1904-1914"; Chapter III, "The Hydrographic Survey of Canada, from the First World War to the commencement of the Canadian Hydrographic Service, 1915-1927"; Chapter V, "1928 to the commencement of the Second World War, 1939," and Chapter V, "The Second World War to the appointment of R.J. Fraser as Dominion Hydrographer, 1940-1947."

The story begins with a brief biographical sketch of Staff Commander J.G. Boulton, RN, and continues with his arrival in Collingwood, Ontario, on 15 August 1883, to commence the first Canadian charting survey.

John George Boulton
photo courtesy CHS