

## "WE'LL GET OUR OWN": CANADA AND THE OIL SHIPPING CRISIS OF 1942

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Tankers were the prime targets for German U-boats in North American and Caribbean waters in early 1942.<sup>1</sup> Canada was dependent upon oil brought from the south by these ships, but the United States Navy (USN), consumed by the Pacific crisis, refused to defend merchant shipping in the western Atlantic. Within weeks, the Royal Canadian Navy (RCN) responded by unilaterally establishing its own tanker convoys between the West Indies and Halifax. In this inter-Allied dispute, Canada acted decisively and with immediate effect. Suddenly, the relationship between Canadian naval strength and the protection of the economy—hazy in the past because of Canada's junior position in the alliance—became vividly apparent.

It would be difficult to overstate the importance of foreign oil to the Canadian economy. During 1940 domestic oil fields produced only 8.4 million of the fifty-one million barrels of crude oil refined in Canada. In addition to 42.6 million barrels of crude, Canada also imported 5.4 million barrels of blending stocks and processed fuels.<sup>2</sup> Almost half was shipped by ocean tankers from ports in the Caribbean and Gulf of Mexico. Pipelines and Great Lakes and Pacific ports handled most of the remainder.<sup>3</sup>

The geography of the Canadian market required that petroleum be drawn from a variety of sources. Supplies for British Columbia came by tanker from California and Peru. The Prairies relied on oil produced in Alberta and Montana. The Ontario refineries, located in Sarnia and Toronto, were supplied by pipeline and lake tanker from the American mid-west.<sup>4</sup> None of these sources was threatened. Instead, it was Québec and the Maritimes that bore the brunt of the oil shipping crisis. The five principal refineries serving these provinces (located at Montréal and Dartmouth, Nova Scotia) depended upon crude from Colombia, Venezuela, and Texas, carried by tankers that were a favourite prey of U-boats. As well, the coastal tankers that distributed the petroleum from Dartmouth to ports in the Maritimes and Newfoundland were at risk. Atlantic Canada, moreover, bore the added strain of providing fuel for Allied warships operating from Halifax and St. John's. The Imperial Oil refinery at Dartmouth supplied these bases and the Canadian Oil Controller was responsible for ensuring adequate supplies.<sup>5</sup>

Canada suffered from an acute shortage of oil tankers. At the outbreak of war the country had only nine ocean-going tankers of more than 3000 gross tons, all owned and operated by Imperial Oil. One, the SS *Canadolite*, was captured by the Germans in March 1941.<sup>6</sup> The other oil companies that served eastern Canada—Shell, McColl-Frontenac, and British American—chartered British and Norwegian-flag tankers to supply their Montréal refineries. During 1940 and 1941 the requisition of several of these vessels by Great Britain reduced the tonnage available to Canada. Shell lost all its ships and was forced to change the source for its Montréal refinery from Texas to Illinois.<sup>7</sup> By June 1941 the Canadian-controlled

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fleet could carry only seventy-five percent of domestic requirements. McColl-Frontenac and British American still had eight Norwegian tankers under charter but by the end of the year three were requisitioned by the United Kingdom.<sup>8</sup> To ease the strain, a pipeline was built between Montréal and Portland, Maine, during the summer and autumn of 1941, shortening the voyage from the Caribbean by 2000 miles.<sup>9</sup>

Since June 1940, the Department of Munitions and Supply had regulated oil supplies. C D. Howe, the Minister, at that time appointed George R. Cottrelle as Oil Controller. Cottrelle, a specialist in industrial reorganization, recognized that an oil shipping expert was required to solve the emerging tanker crisis, and in July 1941 appointed George H.G. Caulton to his staff.<sup>10</sup> The situation deteriorated later in the year with the entry of the United States and Japan into the war. Caulton had to shift one large tanker to the Pacific coast, deepening the Atlantic shortage.<sup>11</sup> Canada's ocean-going tanker fleet had been reduced to six Canadian and five Norwegian-flag vessels on the east coast, and two Canadian vessels on the west coast. The Allied Tanker Control Board estimated Canada's deficiency at 6.6 units.<sup>12</sup> Worse still, German U-boats were now free to raid the previously safe waters of the western hemisphere.

The first blow of the German U-boat offensive—Operation Drumbeat—fell on 12 January 1942, when *U-123* torpedoed the freighter *Cyclops* south of Nova Scotia. Over the next nine days, *U-123* and her consorts destroyed twenty-six ships. By mid-February, they had sunk sixty-three vessels off the Canadian and American coasts.<sup>13</sup> The U-boats pushed into the Caribbean in mid-February and tanker losses mounted. *U-156* shelled the oil refinery at Aruba and torpedoed three tankers in San Nicolas harbour on 16 February. Over the next twelve days, enemy submarines destroyed twenty-six merchant ships and twenty-three tankers in the Atlantic. The slaughter continued in March, when submarines sank thirty tankers and fifty-five merchant ships, most in the western Atlantic.<sup>14</sup>

Canadian tankers did not escape the carnage. On 4 February, *U-109* torpedoed and sank SS *Montrolite*, an Imperial Oil tanker en route from Venezuela to Halifax. Seven days later, northwest of Bermuda, *U-564* destroyed SS *Victolite*, bound for Venezuela. None of *Victolite's* crew survived and only twenty of *Montrolite's* complement of forty-eight were rescued. At over 11,000 gross tons, they were two of the largest Canadian-flag tankers. On 5 May, SS *Calgarolite*, sailing for Cartagena, was torpedoed by *U-125* south of Cuba. While there were no casualties, three of Canada's four largest tankers had been destroyed within the space of a few months.<sup>15</sup> Only eight were left under charter to the Oil Controller on the Atlantic coast: three Canadian and five Norwegian.<sup>16</sup> These losses had an immediate impact on oil reserves; by late March stocks of naval fuel at St. John's had fallen to under 3000 tons, only three days' supply.<sup>17</sup>

The British Prime Minister, Sir Winston Churchill, expressed his concern to American authorities about "the immense sinkings of tankers" in the western hemisphere as early as March 1942. Churchill urged the US Navy to "organise immediate convoys in the West Indies-Bermuda area."<sup>18</sup> The Americans lost seventy-three tankers in the first six months of 1942, most off their own coasts or in the Caribbean. But the British also suffered severely, losing sixty-eight tankers during the same period. In total, the United Nations lost 222 tankers of 2.7 million deadweight tons in the Atlantic to Axis submarines during 1942 and Allied shipyards failed to replace these losses. In addition, the United States and Britain were forced to transfer eighty-nine tankers to the Pacific and Indian Oceans in early 1942.<sup>19</sup>

By April the situation was desperate. The British had lost twenty-one tankers in March, mostly along the US coast. The cabinet considered suspending sailings in American waters, but instead decided to re-route British tankers from Caribbean ports due east to Freetown in west Africa to avoid the perilous eastern seaboard.<sup>20</sup> The slaughter continued: thirty-two merchantmen, including sixteen oil tankers, were torpedoed along the American coast in the first two

weeks of April.<sup>21</sup> Admiral Dönitz boasted that "our submarines are operating close inshore along the coast... so that bathers and sometimes entire coastal cities are witnesses to that drama of war, whose visual climaxes are constituted by the red glorioles of blazing tankers."<sup>22</sup> Shell officials requested permission to install aircraft on their ships for protection. When the USN refused, Shell offered to no avail to operate shore-based aircraft along their tanker routes.<sup>23</sup>

The United States Navy stubbornly refused to introduce convoys along the eastern seaboard, maintaining that sufficient escorts were unavailable. In contrast, after Drumbeat began the RCN "decided that coastal convoys were needed in Canadian waters" and scraped the bottom of the barrel to find escorts.<sup>24</sup> However modest were many of these craft, the coastal tankers usually sailed with some protection. The results of the efforts to run a comprehensive coastal convoy system were dramatic. Shipping losses in Canadian waters dwindled from thirty-seven in January and February to eleven in March and April.<sup>25</sup> The RCN Trade Division observed smugly that the US "coast proved the most satisfactory hunting ground throughout March and April while the Canadian coast enjoyed comparative peace."<sup>26</sup>

The losses in April alarmed even American authorities. Vice-Admiral Adolphus Andrews, Commander of the Eastern Sea Frontier, petitioned the Commander-in-Chief of the US Fleet, Admiral Ernest King, for destroyers, arguing "that the sinkings of ships, tankers especially, on this coast is a serious matter resulting...in dire consequences to our war effort." If escorts could not be provided, Andrews recommended "the stoppage of tanker sailings until adequate escort vessels are made available."<sup>27</sup> Admiral King listened and on 16 April ordered that "commercial oil tankers for Gulf and Caribbean and U.S. Atlantic ports shall be held in port pending further orders."<sup>28</sup>

The Canadian Oil Controller felt "obliged to follow suit" and prohibited his tankers from sailing.<sup>29</sup> Five Canadian tankers scurried to safety in ports from New York to Key West. This self-imposed blockade forced eastern Canada and the United States to subsist on oil reserves but at the same time spared enormous losses. Submarine strength in American waters peaked in the final weeks of April with sixteen to eighteen boats operating between Cape Sable and Key West. Dönitz ruefully observed that "at the end of April the heavy sinkings off the east coast of America suddenly ceased."<sup>30</sup> British tankers resumed sailing on 23 April but were still routed to Freetown.<sup>31</sup> Canadian and American tankers, however, remained in port.

Despite the introduction of gasoline rationing in Canada on 1 April, closure of the coastal routes created an "extremely serious oil situation" at ports in Atlantic Canada.<sup>32</sup> Stocks of fuel at Halifax and St. John's dwindled to a meagre 45,000 tons by the end of April—only fifteen days' supply. The shortage threatened naval operations, including transatlantic convoys.<sup>33</sup> Vice-Admiral Percy Nelles, Chief of the Naval Staff of the RCN, took unilateral action to stave off impending disaster. Although American authorities had prohibited tanker sailings, Nelles, as one of his staff officers later recalled, said "to hell with that, we'll get our own" oil. On 28 April he ordered two destroyers to proceed immediately to American and Caribbean ports to escort Canadian and Norwegian tankers to Halifax. America's inability or unwillingness to defend its coastal waters compelled Nelles to establish Canadian convoys to the West Indies.<sup>34</sup>

Despite the lifting of the ban on tanker sailings by American authorities on 29 April, Canadian shortages remained acute. The Chiefs of Staff Committee warned the defence ministers that the naval fuel situation was critical.<sup>35</sup> On 1 May, Cottrelle "refused to allow the few remaining tankers under charter to him to move without naval escort" because of the heavy losses and lack of escorts in the Caribbean.<sup>36</sup> Ultimate authority for Canadian tankers rested not with Naval Service Headquarters but with the Oil Controller. The initial stimulus for the convoys had arisen from the requirements of Allied warships at St. John's and Halifax, but the

impetus for Cottrelle's edict was declining reserves at the Montréal and Dartmouth refineries. Thus, both domestic and naval requirements ensured the continuation of the convoys.

The initial convoys had been established informally, but the Oil Controller's ultimatum compelled the RCN to provide escorts for a regular schedule. Naval Service Headquarters decided to transfer four corvettes from the mid-ocean groups to the Halifax force to "continue escorting tankers from Halifax to Trinidad and other ports in Venezuela."<sup>37</sup> Captain Eric Brand, Director of the RCN Trade Division, explained to the Naval Attaché in Washington that Cottrelle's decision forced the RCN "to make serious inroads into our escort forces."<sup>38</sup> The British and Americans did not block this move but the Admiralty was surprised by Canada's independent action and hoped to include some of its oilers in the new convoys.<sup>39</sup>

Canadian actions should not have been too surprising to the British, who shared the concern about the lack of convoys in the Caribbean. In fact, the Admiralty had attempted to start convoys there in late April. The First Sea Lord suggested this to American officials during his visit to Washington on 26 April, but Admiral King refused to provide escorts. King did, however, agree on 5 May to reduce the number of mid-ocean groups from twelve to eleven to free one British group to run a "tanker shuttle" between Trinidad and Aruba under British control.<sup>40</sup> The refineries of Aruba-Curaçao and Trinidad handled most of the oil produced at fields in Colombia and Venezuela. Thus, these islands were natural ports for any British convoy.<sup>41</sup> British tankers would still sail unescorted between Trinidad and Freetown.

Details of the regular Canadian oil convoys were ironed out in May. The route would pass close to Bermuda to provide some air cover. The northern terminus would be Halifax with local escort provided to the Portland pipeline. There was a fundamental problem, however, because the refineries at Montréal and Dartmouth relied on crude from Colombia, Texas, and Venezuela, three widely-separated sources. Commander P.B. German, Assistant Director of Naval Intelligence, advised Caulton that "loading ports may have to be altered" because the shortage of escorts limited the RCN to only one convoy route.<sup>42</sup> German and Caulton settled on Trinidad—close to Venezuela—as the southern convoy terminus.

Canada thus lost access to oil supplies from Texas and Colombia. Caulton considered Colombian crude "absolutely essential" because Cartagena produced vital supplies of lubricating oil and aviation grade crude, the latter of which was urgently required by the British Commonwealth Air Training Plan.<sup>43</sup> He arranged instead to have the Montréal refineries supplied with aviation crude from Puerto la Cruz, Venezuela. However, Canadian refineries had to do without some kinds of lubricating oil, which were unavailable in Venezuela.<sup>44</sup> As a result of these decisions, exports of crude from Colombia to Canada fell from 12.6 million barrels in 1941 to 1.5 million in 1942 while imports from Venezuela tripled from 3.2 million barrels in 1940 to 9.4 million in 1942.<sup>45</sup>

Because of the disappearance of shipping off the east coast with the closure of the US ports in mid-April, Dönitz had shifted the main thrust of his U-boats into the Gulf of Mexico and the Caribbean.<sup>46</sup> Three-quarters of the oil tankers leaving Texas and Louisiana ports over a two-week period were sunk. Although Gulf ports were closed from 6 to 12 May, forty-one ships were still destroyed in the Gulf during May.<sup>47</sup> Even Admiral King expressed alarm "that the vital Gulf of Mexico link in our common oil chain is now under serious threat and there are no escorts for this route." Enemy U-boats also destroyed thirty-eight merchant vessels in the Caribbean and fifteen ships in the seas around Bermuda.<sup>48</sup>

The oil shortage in Atlantic Canada was critical pending the arrival of the first convoy from the Caribbean. The oil supply had dwindled to dangerously low levels by mid-May.<sup>49</sup> Only one tanker, SS *Scottish Heather*, had reached St. John's since the end of April; she arrived on 14 May carrying 9445 tons of naval fuel. The coastal tankers were held in port while SS

*Teakwood*, which normally served as an oil storage tank at St. John's, sailed to Halifax for fuel.<sup>50</sup> Despite the six U-boats that lurked in the waters between Bermuda and Nova Scotia, the first convoy, comprising two tankers and a destroyer, arrived safely at Halifax on 17 May. The second, including three tankers and a destroyer, escaped attack and arrived eleven days later.<sup>51</sup>

In May the United States took steps to ease the tanker crisis faced by her allies. The War Shipping Administration transferred twelve American and Panamanian-flag tankers of 170,000 deadweight tons to Canada, increasing the number of ocean tankers under charter to the Oil Controller to twenty.<sup>52</sup> On 25 May, however, *U-593* torpedoed and sunk SS *Persephone* off New Jersey, before she could enter Canadian service.<sup>53</sup> The War Shipping Administration also assigned forty-five tankers of 684,000 deadweight tons to the United Kingdom, a transfer that was possible because of a dramatic increase in oil shipments by rail and pipeline within the US during 1942.<sup>54</sup> Despite these adjustments, the Allied tanker shortage remained acute.

The Canadian oil convoys continued through the summer of 1942 until the USN finally established a comprehensive coastal convoy system in August. Four, and later six, RCN corvettes provided escort for the Canadian oil convoys. In July the terminus was switched from Trinidad to Aruba to allow British tankers to make better use of this route. The sinking of *U-94* by HMCS *Oakville* on 27 August marked the climax of the Caribbean campaign for the RCN. As U-boat losses climbed in the Caribbean, Dönitz shifted the battle back to the north Atlantic and the threat to Canada's oil supplies subsided.<sup>55</sup>

By any measure the Canadian oil convoys enjoyed great success. Some 2.5 million barrels of petroleum were shipped to the refineries in Dartmouth and Montréal for domestic consumption, while another 1.5 million barrels arrived in Canada for trans-shipment to Britain. The RCN escorted fourteen convoys, including seventy-six tankers, between Halifax and the West Indies without the loss of a single vessel, despite the heavy concentration of U-boats in these waters. Between May and August 1942, when U-boats mercilessly ravaged the waters of the western Atlantic, the Canadian oil convoys escaped attack. Given the high number of independent ships sunk in these waters, it is clear that without the convoys several Canadian tankers would have been lost.

Although an economic historian has noted that "during the U-boat attacks of 1942" oil shipments to the United States "from the Caribbean had dropped away almost to nothing," the RCN's effective action ensured that crude continued to reach the parched refineries of eastern Canada.<sup>56</sup> The oil convoys, together with the swift organization of convoys in Canadian home waters, were substantial achievements for the RCN in a year that otherwise witnessed almost continual crises for the overcommitted Canadian escort forces.

## NOTES

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1. *Befehlshaber der U-boote* (BdU) War Diary, 15 April 1942, National Defence Headquarters, Directorate of History (DHist), 79/446, Vol. 5.

2. John de N. Kennedy, *A History of the Department of Munitions and Supply* (2 vols., Ottawa, 1950), II, 155-157.

3. Memorandum to G.R. Cottrelle, "Re: Price Increases," 31 October 1941, National Archives of

Canada (NAC), RG 20, Vol. 409, C-12. Gulf and Caribbean ports shipped twenty million barrels of crude in 1941, while Great Lakes ports shipped twelve million, pipelines carried nine million, and Pacific ports shipped five million barrels.

4. "Report of the Interdepartmental Coordinating Committee on Petroleum" ("Report"), 9 February 1942, DHist, 193.009 (D4); Kennedy, *History, U*, 161.

5. G.N. Tucker, *The Naval Service of Canada* (2 vols., Ottawa, 1952), II, 137, 527; "Report."

6. Tucker, *Naval Service*, II, 361, 542; Margaret Hogan, *Esso Mariners: A History of Imperial Oil's Fleet Operations* (Toronto, 1980), appendix.
7. Memorandum to G.R Cottrelle, "Re: Price Increases." Shell acquired two lake tankers to supply its Montreal refinery.
8. G.R Cottrelle to L.D. Wilgress, Deputy Minister of Trade and Commerce, 6 June 1941, NAC, RG 20, Vol. 252, file 32821; D.J. Payton-Smith, *Oil: A Study of Wartime Policy and Administration* (London, 1971), 201-210.
9. Kennedy, *History*, II, 161-162.
10. Robert Bothwell and William Kilbourn, *CD. Howe: A Biography* (Toronto, 1979), 135.
11. Cottrelle to Wilgress, 6 June 1941; G.H.G. Caulton to F.W. Bergen, Executive Secretary of the Tanker Control Board, 19 December 1941, NAC, RG 20, Vol. 252, file 32821.
12. Kennedy, *History*, II, 161-162. A unit was a theoretical tanker with a carrying capacity of 100,000 barrels.
13. Michael Hadley, *U-Boats Against Canada* (Kingston, 1985), 57-61, 73.
14. BdU War Diary, 16-19 February 1942; Jurgen Rôhwer, *Axis Submarine Successes, 1939-1945* (Annapolis, 1983), 75-88.
15. Rôhwer, *Axis Submarine Successes*, 77-78, 94; Hogan, *Esso Mariners*, 42-44.
16. Kennedy, *History*, II, 162.
17. Flag Officer Newfoundland, Report of Proceedings, March 1942, DHist, NSS 1000-5-20.
18. Prime Minister to Harry Hopkins, 12 March 1942, Public Record Office, Kew (PRO), ADM 205/13.
19. Payton-Smith, *Oil*, 283-284; Memorandum, "Oil Flow to East Coast Tightening," 16 January 1942, NAC, RG 20, Vol. 409, C10. Allied shipyards produced 13 million deadweight tons of tankers during 1942.
20. Payton-Smith, *Oil*, 286; "Control of Shipping in West Atlantic During U-boat Campaign, January to June 1942," PRO, ADM 205/21, 4.
21. Rôhwer, *Axis Submarine Successes*, 88-90.
22. Samuel E Morison, *The Battle of the Atlantic-September 1939 to May 1943* (Boston, 1947), 157.
23. Eastern Sea Frontier, War Diary, April 1942, Chapter VII, "Merchantmen and Tankers," 349, DHist, 85/588.
24. Captain E.S. Brand papers, *Annual Report of the Director of the Trade Division* (1942), DHist, 81/145,1, 7.
25. Hadley, *U-Boats Against Canada*, 80.
26. Brand papers, *Annual Report of the Director of the Trade Division* (1942), I, 6.
27. CESF to Secretary of the Navy, 10 April 1942, "Subject: Submarine Activities on the Atlantic Coast," Eastern Sea Frontier, War Diary, April 1942, 356.
28. Eastern Sea Frontier, War Diary, April 1942, Chapter VII, "Merchantmen and Tankers," 349. For indictments of Admiral King, see Michael Gannon, *Operation Drumbeat* (New York, 1990), 384-415; and Eliot Cohen and John Gooch, *Military Misfortunes* (New York, 1990), 59-94. The latter devotes a chapter to the failure of the US Navy to learn from British anti-submarine experience.
29. Kennedy, *History*, II, 162.
30. Karl Dônitz, *Memoirs: Ten Years and Twenty Days* (London, 1959), 219-220.
31. "Control of Shipping in West Atlantic During U-boat Campaign, January to June, 1942," PRO, ADM 205/21, 5-9.
32. NSHQ to FONF, 1909Z/28 April 1942, NAC, RG 24, D13, Vol. 11969, NW223.
33. Chiefs of Staff Committee to the Ministers, 30 April 1942, DHist, 193.009 (D6). Halifax and St. John's consumed 3000 tons of naval fuel per day.
34. NSHQ to Admiralty and CinCAWI, 1908Z/28 April 1942; NSHQ to FONF, 1909Z/28 April 1942, both signals in NAC, RG 24, D13, Vol. 11969, NW223; Interview with Vice-Admiral H.G. DeWolf, RCN, 10 December 1987, 27-28, DHist, BIOGD. Nelles quoted by DeWolf.
35. Chiefs of Staff Committee to the Ministers, 30 April 1942, DHist, 193.009 (D6).
36. NSHQ to Admiralty and Cominch, 1658Z/1 May 1942, PRO, MT 59/1998.

37. NSHQ to Admiralty and Cominch, 1658/1 May 1942, PRO, MT 59/1998.
38. Captain E.S. Brand to Commodore V.G. Brodeur, 8 May 1942, NAC, RG 24, D13, Vol. 11969, NW223.
39. Memorandum from Director General to W. Humphreys, 6 May 1942, PRO, MT 59/1998.
40. "Control of Shipping in the West Atlantic During U-boat Campaign, January to June 1942," PRO, A D M 205/21, 5-6.
41. Payton-Smith, *Oil*, 258.
42. P.B. German to George Caulton, 19 May 1942, NAC, RG 24, Vol. 6789, NSS 8280-800/9.
43. George Caulton to Commander P.B. German, 23 May 1942, NAC, RG 24, Vol. 6789, NSS 8280-800/9.
44. George Caulton to Commander P.B. German, 19 May 1942, NAC, RG 24, D10, Vol. 11014, COAC 5-2-2A, vol. 1.
45. George Caulton to P.B. German, 28 May 1942, NAC, RG 24, Vol.6789, NSS 8280-800/9; Kennedy, *History*, II, 156,162-164.
46. Dönitz, *Memoirs*, 220-221.
47. Robert Goralski and Russell Freeburg. *Oil and War* (New York, 1987), 112; OPNAV to CinCAWI, 6 May 1942, PRO, MT 59/1998; Admiralty to CinCAWI and NSHQ, 1811B/12 May 1942; Admiralty to BAD, 1328/15 May 1942, PRO, A D M 199/2083.
48. Cominch to First Sea Lord, 21 May 1942, NAC, RG 24, D13, Vol. 11969, NW223; Morison, *Battle of the Atlantic*, 410414.
49. Chiefs of Staff Committee to the Ministers, 30 April 1942, DHist, 193.009 (D6).
50. Tucker, *Naval Service*, II, 194-195; and Flag Officer Newfoundland, Report of Proceedings, May 1942, DHist, NSS 1000-5-20.
51. BdU War Diary, 16-27 May 1942, DHist, 79/446, Vol. 5; HMS *Caldwell*, DHist, Ships Cards; HMS *Bumham*, Report of Proceedings, 29 May 1942, NAC, RG 24, Vol. 6789, NSS 8280-800/9.
52. George Caulton to NSHQ, 22 May 1942, NAC, RG 24, D1, Vol. 6789, NSS 8280-800/9.
53. Röhwer, *Axis Submarine Successes*, 99.
54. Payton-Smith, *Oil*, 298-303. Tanker shipments to the northeastern US declined from 1.4 million barrels per day in 1941 to 391,000 barrels in 1942.
55. Dönitz, *Memoirs*, 251-252.
56. Payton-Smith, *Oil*, 379.