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Allocating Property Rights Over Shoreline: Institutional Change in the Newfoundland Inshore Fishery

KENNETH NORRIE and RICK SZOSTAK

I. INTRODUCTION

THE NEWFOUNDLAND FISHERY played a pivotal role in the early exploration and development of North America, and provides a compelling case study of institutional change. As in the California gold rush (Umbeck 1977), private interests established a system of property rights in the absence of governmental authority. Yet the evolution of property rights in the Newfoundland inshore fishery was unique.

The scarce resource in the inshore fishery was not fish — though the ease of catching them varied from year to year — but shoreline. The Newfoundland coast is characterized by limited amounts of flat and sheltered shoreline. There was a significant benefit to getting such 'good' shoreline, and in the absence of an agreed allocation system, ship captains would have fought over desirable locations. The key institutional challenge for the fishery was to allocate scarce 'good' shoreline in a manner that was both efficient and sufficiently equitable. This paper, then, does not analyze the allocation of fish stocks themselves — an issue that would become of great importance from the twentieth century — but of the shoreline used for processing fish.

The paper seeks to provide economic rationales for three interrelated issues that are puzzling, at least from the perspective of economic history. In all three cases, these rationales provide both a theoretical underpinning for the course of institutional change in the Newfoundland fishery, and add new insights to scholarly understanding of institutional change more generally. First, was the "admiral system," devised by the earliest migratory fishers to allocate shore space and governmental power in terms of order of arrival in the harbour, an efficient institutional structure? It is argued here that the main cost of the admiral system involved rent dissipation, as ships left Europe much earlier than necessary, and the main benefit accrued through efficiency gains — ensuring that the best shoreline was the most utilized every year. Such a benefit does not arise in situations of continuous, as opposed to intermittent, resource exploitation.

An understanding of the rationale for the admiral system is essential to the analysis of later developments. In the eighteenth century, three distinct organizational forms coexisted in the Newfoundland inshore fishery: migratory fishing ships, resident fishers, and bye-boat keepers. These were distributed somewhat differently geographically, but the three types were generally present in the same harbours. While different institutional forms in the same industry are often observed historically, it is less common for such an outcome to continue for over a century. In any case, all such historical episodes raise the question of why the most efficient institutional form did not quickly drive out alternatives. Why did these three institutional forms coexist for so long in the Newfoundland inshore fishery, and why did the resident fishery rise to dominance at the end of the eighteenth century? The answer to this question hinges on the answer to a third: how were property rights over shoreline transferred from admirals to residents, or, in other words, how was the fishing admiral system replaced by private property?

It was once commonly held that proponents of the fishing admiral system were for centuries intensely hostile to the idea of private property rights. It is now acknowledged by historians that migratory fishers came to appreciate in the seventeenth century, if not earlier, that there were advantages to some full-time residence in Newfoundland (Bannister 2003: 8). There are few examples where a group of agents with a set of property rights over a resource acquiesced in a process that would see their rights superseded by the rights of others. Why did migratory fishers come to accept year-round residence, and how did this acceptance lead to private property? This paper argues for the importance of what will be termed an "intermediate institutional form." While a direct transition from the admiral system to private property could not have occurred without conflict between competing interests, this intermediate form — in which men left behind over the winter could claim fishing space — was found to be in the interests of migratory fishers, yet paved the way for private property rights. While historians have appreciated that this change in institutions occurred, this paper will argue that this transformation was critical for the development of private property.

Analyses of complex institutional changes, such as the decline of feudalism, have often noted the existence of intermediate institutional forms, at least implicitly. Yet their role is rarely explicitly spelled out. Just as in the child's game where one word is transformed into another by changing one letter at a time, intermediate institutions allow transformations to occur over time. They have two important characteristics. Those in a position to drive institutional change see the intermediate form as advantageous; yet once in place the intermediate form encourages further changes which the original actors would not have perceived as beneficial. Intermediate institutional forms rely, then, on imperfect foresight.[1]

The existence of such intermediate institutions provides a further argument in favour of the path dependence of institutional change. The ability of any society to move toward more efficient institutional forms will depend on the availability and recognition of intermediate forms that allow the transformation to take place in small steps. Small differences in starting point may have a major impact on whether particular intermediate forms are viewed favourably.

While the intermediate form paves the way for further institutional change, it in turn may reflect either inherent conflicts within the original institutional form, and/or pressures emanating from elsewhere in the economy. It will be seen that a traditional Newfoundland historiography supports the first interpretation, but more recent research points to the second.

The intermediate institutional form sets the stage for the rise of both a resident and a bye-boat fishery alongside the migratory fishery. Why did they coexist for over a century? This paper argues that there was a symbiotic relationship between the bye-boat and migratory fisheries. The former relied on the latter for transport, and in turn solved two critical problems for the migratory fishery: fishing ship captains had difficulty monitoring the work effort of fishers in multiple fishing boats, and that of men left behind to perform various tasks during the winter. The size of the resident fishery was, of course, constrained by the size of the Newfoundland population. The resident fishery also proved able to solve the monitoring (agency) problems faced by the migratory fishery. As the resident population grew, it was able to outperform both bye-boat keepers and migratory fishing boats.

The paper proceeds as follows. The next section provides a brief history of the Newfoundland inshore fishery through to the early nineteenth century. Section III examines the efficiency of the fishing admiral system. Section IV surveys the course of institutional change from admiral system to private property, and discusses why migratory fishers opted for the intermediate institutional form. Section V shows that the advantages of the intermediate institution were in turn driven by changes in the costs and benefits of wintering in Newfoundland. Section VI discusses how the intermediate institution set the stage for the bye-boat fishery, the bye-boat fishery's symbiotic relationship with the migratory fishery, and its eventual eclipse by the resident fishery. Section VII reviews the rise of the residential fishery and the resident population. Section VIII provides a brief reprise of the response of the migratory fishery to the rise in resident population. The final section offers concluding remarks.

II. A Very Brief History of the Newfoundland Fishery

Cabot's news of a sea "swarming with fish" in 1497 quickly attracted the attention of European governments and fishers. Soon, ships from France, the Basque country of France and Spain, and (to a much lesser extent) Britain were visiting on a regular basis. This was the first phase of the island's history, as host to an international fishery. The fish off Newfoundland can be caught in the spring and early summer on the Grand Banks or later in the summer as they move into the waters along Newfoundland's coast. The off-shore or bank fishery emerged in the mid-sixteenth century (Turgeon 1987: 138). The fish were preserved using the green (salt)-cure preservation method; little or no contact with land was required, though bait, water, and wood might occasionally be procured on shore.

The other possibility was to fish for cod in its summer habitat along the coast. This, the inshore fishery, was pursued soon after Cabot's news reached Europe, and is the focus of this paper. This activity began in March through May of each year when supplies and crews left Europe (earlier if they stopped for salt on the way in France or Spain). Once landed, the crew would set up stations on shore, and the fishing ship would be unrigged and moored for the season. Crews would then go out early each morning in small fishing boats, returning to shore in the evening. A dry-cure method came to dominate the inshore fishery. After being unloaded on wooden stages, the fish were gutted, headed, and split. Then they were lightly salted, and stacked in piles for up to ten days. In a few areas the fish would then be laid out directly on a gravel beach to dry in the sun. More often, however, the fish were dried on wooden platforms known as flakes. The crews fished as weather permitted through to September, when the fishing ships would be brought out of their summer moorings and readied for the return voyage to Europe, laden with the summer's catch (Handcock 1989, Matthews 1988).

The international fishery has received less attention than the later fishery, despite its institutional uniqueness. Fishing ships from France, Spain, Britain, and (to a lesser extent) Portugal participated, operating under the fishing admiral system, for most of a century. While this fishery was not always peaceful (see Quinn 1979), fishing captains generally accepted the rules of the game, at least in peacetime. The British were a minor presence in the international fishery until the mid-sixteenth century when they began to assert themselves (Kowaleski 2000).[2] The French would remain the largest fishing fleet in Newfoundland as a whole through the seventeenth century, and caught roughly twice as many fish as the British in 1700 (Pope 2004: 20). Still, by early in the seventeenth century the English had exclusive control of the Avalon Peninsula shoreline from Bonavista to Trepassey. West Country merchants were the dominant presence in the English migratory fishery.

Gradually, two other types of fishing arrangements emerged alongside the West Country fishing ships in the Avalon Peninsula. One was a resident fishery, consisting, as the name implies, of individuals who resided year-round in Newfoundland. They fished from shore in small boats, dried their catch onshore, and sold their finished product to the trading (sack) ships. The third group, known as bye-boat keepers, was a cross between the other two branches. Bye-boat keepers did not own ocean-going vessels; instead, they purchased passage to Newfoundland for themselves and their crews on the fishing ships. Once on the island, they operated much as the residents did, with the difference that they typically planned to return to England at the end of a season or two. They were styled bye-boat keepers because of the common practice of leaving fishing boats to "bide" in winter in Newfoundland. On the eve of the American Revolution, there were 500 bye-boat keepers employing 6,000 men (Mercer 2003: 212).

The relative contributions of these three groups to total output varied over the two centuries. In 1710 (notably during a period of war) bye-boat keepers contributed about 10 percent of total output, fishing ships some 35 percent, and residents the remainder (Handcock 1989: 76). The non-resident portion rose to nearly 80 percent of the catch in the 1730s, split evenly between bye-boat keepers and fishing ships, and was still above 50 percent in 1790.

This second period in Newfoundland's history came to an end after 1790, with the collapse of the migratory activities during the wars with France which lasted until 1815. Bye-boat keepers disappeared completely as the nineteenth century began, and fishing ships as well soon after (Handcock 1989: 76). By 1815, residents were responsible for virtually all cod production in Newfoundland, and the third phase of Newfoundland's history, that of a resident-based fishery, began.

III. The Admiral System

The admiral system takes its name from the fact that the captain of the first ship into a harbour in the spring would not only be able to choose the best shoreline, but would serve as "admiral" of the harbour for the season, settling any disputes. The captains of the second and third ships into harbour received the next best pieces of shoreline and assisted the admiral in exercising these powers (see Bannister 2003). The admiral system was utilized by the international fishery and maintained by the British for well over a century after they had come to control the fishery on the Avalon Peninsula.

In studying the emergence of an institution other than private property, it is natural — at least to the modern economist — to begin by comparing the cost, in terms of reduced investment, against any benefit that might have existed in terms of decreased transaction costs. Since fishing ships could not be confident of gaining access to the same shoreline every season, crews did not build permanent structures, but annually rebuilt cabins, stages, and flakes. It will be seen below, however, that permanent facilities may not have been feasible unless someone wintered in Newfoundland to guard these. If so, then the negative effect of the admiral system on investment was negligible, since little investment would have occurred in any case (and we shall see that the eventual practice of wintering in Newfoundland triggered the move to private property).

The size of the inshore fishing fleet was constrained by the limited supply of flat shoreline suitable for drying fish (see Pope 2003a) . There was no governmental authority to allocate space, and the cost of negotiating a complex institutional arrangement, such as allocating particular spaces by country or captain in perpetuity, would have been prohibitive. The fishers came from several countries and could hardly gather to negotiate.[3] To negotiate in Newfoundland would require *all* fishing ships to spend much longer than the fishing season there. The admiral system had the advantage of simplicity. One simple rule could allocate shoreline without any need for annual renegotiation. Changing fortunes could be dealt with readily; those that did not show up would be ignored in the allocation.

Transaction costs fell significantly, but did not disappear, as English ships came to dominate the Avalon inshore fishery. Merchants and captains could not simply declare property rights to exist, however. They would have had to find a way to allocate the fishing rooms among themselves, a task which became more difficult when multiple ship captains could claim long usage of particular pieces of shoreline. They would then have to find a way of enforcing possession. The costs involved would have been very high in the international fishery, as noted already, but both sets should have diminished as the industry became dominated by West Country English interests. The group was relatively small, homogeneous, and potentially subject to British law. Still, one should not exaggerate the ease of contact among different towns across four different counties, nor underestimate the differences of opinion on many issues that characterized the West Country migratory fishery.

If migratory fishers could establish property rights, they could then overcome the most serious cost of the fishing admiral system: the "rent dissipation"[4] caused by ships leaving port earlier than necessary in order to obtain good shoreline. In the early seventeenth century the "official" date for departure to Newfoundland was 1 April. "As the century wore on, ships tended to leave earlier for Newfoundland, probably as a result of competition for shore space" (Pope 2004: 21). By 1670 the "official" departure date was 1 March and ships often left in February (earlier if stopping for salt on the way). James Yonge in 1671 complained that some ships left so early that they risked freezing their sailors to death, only to arrive in Newfoundland months before the fish (Mercer 2003: 215). Private property would simultaneously, however, eliminate one of the key advantages of the admiral system: as long as the vast majority of fishers traveled to Newfoundland seasonally, only the admiral system could ensure that the best shoreline was used each year. If a migratory fishing captain "owned" a good piece of shoreline, and failed to visit Newfoundland one year (whether due to illness, shipwreck, or other opportunities), the valuable resource (shoreline) might be wasted (or there would be conflict among others over the resource). This benefit of the admiral system is unique to systems of seasonal resource exploitation in which there is considerable risk that a given agent will not return the following year. The fact that the admiral system was maintained for decades after the British came to dominate the Avalon fishery suggests that either negotiation costs remained prohibitive[5] or — more likely — that the size of this benefit was large.

If so, then the admiral system would be retained until there was some shift in the relative benefits and costs of using it. Only once there was a resident population large enough to guarantee continued use of the best shoreline would the benefits of private property outweigh the costs. Given the limited economic opportunities outside the fishery in the seventeenth and eighteenth centuries, this large resident population could not emerge unless residents were able to participate in the fishery. This in turn would depend on the merchants who backed the migratory fishery seeing some advantage in year-round residency.

IV. The Evolution of Property Rights in the Inshore Fishery

As noted above, early histories of Newfoundland assumed that the antipathy of the migratory fishery to private property rights, expressed vociferously through the sixteenth century, had continued unabated into the eighteenth. Pope (2004: 204) suggests, though, that migratory fishers in the seventeenth century were hostile to local government rather than settlement itself — though they likely did not want very much settlement. And Bannister (2003) has detailed how fishing admirals upheld the claims of residents in the (at least mid- and later) eighteenth century. How and why did migratory fishing captains become supportive of private property rights?

Did residents gradually usurp property rights against the wishes of the migratory fishery? It is hard to imagine such a process occurring without intense conflict. King William's Act of 1699 forbade residents from claiming any land used by the migratory fishery (though the Act recognized some property claims already in existence). Yet there is no evidence of migratory fishery interests (or the government) attempting to apply this law against residents. Nor did they object to the Act's recognition that land not being used by the migratory fishery could become private property. Likewise, when in the 1730s the British government began to appoint magistrates, the West Country merchants and admirals protested only incursions these might make into the admirals' rights to adjudicate disputes among migratory fishers (though Bannister [2003] surveys court records and finds that magistrates dealt almost exclusively with criminal cases while admirals dealt almost exclusively with property). This, arguably, is because the migratory fishery had already by that time made a small but very far-reaching change to the admiral system, the result being the intermediate institutional form referred to in the introduction. The admiral system allocated shore space by the order in which *ships* arrived in the harbour. This rule was changed sometime in the seventeenth century (Matthews 1988: 21) so that shore space could be protected from year to year if a man was left behind over winter. In other words, the key to property rights was no longer the presence of *ships* but of *men.* Though the phrase was not used at the time, possession no longer followed a "first-ship" rule but rather a "first-man" rule.

Lueck (1995) has shown how groups with access to a "first-possession" resource often act to limit entry, and enforce various customs in the face of overexploitation of resources. While the overexploitation of Newfoundland resources is only one possible cause of the adoption of the first-man rule, Lueck's argument should hold for any problem that threatens the profits to be extracted from the resource in question. The seasonal aspect of the industry might have worked against developing a code of conduct that included sanctions, though the fishers' common culture and background would have facilitated its development. But their dispersion among numerous small ports (and a tendency to disagree on a wide range of issues, as both Matthews [1988] and Handcock [1989] emphasized) would have made the option of restricting entry untenable. They could not directly solve the annual problem of rent dissipation by agreeing not to fight over scarce resources; thus the "group" would focus on other "customs."

If a large number of migratory fishing ship captains and merchants came to see an advantage in over-wintering and the first-man rule, the rest would face a choice between accepting institutional change or entering a costly period of conflict.[6] The greater the proportion of the migratory fishery that came to favour wintering, the smoother would be the path to institutional change. The point to emphasize is that the choice is internal to the migratory fishery: it was not pressure from the small population of seventeenth-century residents but from within the migratory fishery itself which led to change.

It will be seen below that the advantages of wintering hinged on the degree of deforestation, which undoubtedly differed across harbours at any point in time. It is thus likely that the new rule was introduced in some harbours before others. Pope (2004: 146-7) shows how ships from different ports favoured different harbours, though these preferences shifted gradually over time. The fact that any one harbour was visited only by ships from a handful of West Country ports would further reduce the costs of negotiating a change in the rules.

Once migratory fishing captains accepted that a man wintering in Newfoundland had a claim on property, they inevitably opened the door to the resident fishery. If a man spending one winter could save a place, a man living continually in Newfoundland could also do so. At the time the change was made, the resident population was very small (1,500 in 1650).[7] As it grew, residents gradually laid claim to the entire shoreline. Once they did so the intermediate institution disappeared, for it had served its purpose: the point here is that the intermediate institution paved the way for resident ownership of the shoreline. If migratory fishers came to appreciate the role played by the growing resident population, they would acquiesce in the establishment of private property rights even before residents had come to occupy the entire shoreline: this would not detract from the importance of the intermediate institution.

Private property encompasses a diversity of rights: notably to use the property, to the income from the property, to bequeath the property to others, to lease the property to others, and to sell the property to others. The argument here is that the intermediate institution established *de facto* private property rights long before *de jure* property rights were established in law. It is clear that those wintering in Newfoundland could claim use of a piece of shoreline for the next fishing season (and thus perpetual use if they wintered continually), and had the right to any income they gained from such use. As permanent residents came to occupy shoreline, the right to bequeath followed naturally, for at least adult children who had lived on a piece of land could claim it upon parental demise. The fact that those left behind to winter were often acting (at least in part) as agents of fishing ships shows that some right to "lease" land to others was inherent in the intermediate institution. Given the importance attached to using the best shoreline each year, and the fact that some ships would not return as planned, it should hardly be surprising that those left behind would be able to lease land to ships other than those for which they were agents. It is only with respect to sale of land that the intermediate institution would provide a severe limitation: one could not transfer perpetual rights to a stranger, though one could conceivably pass the rights listed above to someone after a brief period of cohabitation. Possessors would have to wait for the legalization of private property before fully exercising the right to sell (and bequeath to non-cohabitants).

Fishing admirals adjudicated property disputes throughout the eighteenth century. Bannister (2003: 53) reports a case from 1752 in which an admiralty court upheld a lease to a fishing room when a deceased landlord's daughter wished to void it: this case indicates support from the migratory fishery for both rights of inheritance and leasing. More generally, Bannister (2003) and Johnson (1998) concur that the English common law principle that possession provided a presumption of ownership was applied in Newfoundland. Indeed, English common law was applied to the degree possible; this meant, though, that "local custom" was regularly cited in legal decisions. Johnson (1998) is confident that the right to inherit at least was recognized by mid-century. Bannister (2003: 123-4) concludes that all of the rights enumerated above were recognized by the late eighteenth century, with the single caveat that fishing rooms had to be employed in the fishery. He also notes that three-quarters of property rights recognized in 1792 were established by occupancy, with the remainder reflecting government grants or the property recognized by King William's Act of 1699.

Why, if those wintering were serving the interests of migratory fishing masters, did the rights to property not reside with migratory fishing interests (and thus prevent the rise of resident landowners)? The key point here is that those wintering must have operated as independent agents rather than employees: the migratory fishery might first have experimented with employees but found advantages to independence. Notably, an independent agent would be better able to ensure that the scarce fishing room was still employed if a particular captain or ship failed to return: he would not face the transaction costs inherent in acting as an agent for an employer who was not doing what he had been expected to do. But this was not the only advantage of independence. It will be important to show below, when bye-boat keepers are discussed, that fishing ship captains would have faced enormous difficulties in monitoring the performance of employees left behind for the winter. A man protecting a fishing room and supplies on his own account, with a promise to give a particular ship first claim next year, would be more diligent than an employee. Bye-boat keepers were admirably suited to the role of agent, though residents could also serve in this role.

The concept of path dependence was discussed in the introduction: in a path-dependent process, the final outcome is dependent on the path taken. It might be objected that one should not speak of path dependence if the end result was inevitable. That is, if it is accepted that private property is the most efficient institutional structure, then this would most likely have been the result even in the absence of the intermediate institution. Note first that Libecap (1986), Alston (1996), and others have shown that institutional change need not lead to the most efficient institutional form, especially if this is not in the perceived interest of those in positions of power. In the case of Newfoundland, it must also be recognized that (*de facto* or *de jure*) private property was only the most efficient institutional form if people lived year-round in Newfoundland; otherwise it would be wasteful, as good shoreline went unused (recall that winterers could lease land to others if 'their' ship failed to arrive). Since the intermediate institution allowed and encouraged the year-round residence that in turn made private property beneficial, it is reasonable to speak of path dependence.

Alternative explanations of this smooth institutional transition can be briefly disposed of. The first is that private property rights had long/always existed through custom. This might have been the case, for example, if captains visited the same harbours and occupied the same fishing rooms year after year, even before the practice of wintering began. Then the intermediate institutional form would not have been observed, nor would it have been necessary. Migratory fishers would have been able to move smoothly to private property rights if they had very nearly had these in practice. Yet this clearly was not the case. Fishing ship records (e.g., Yonge 1663) show captains arriving in Newfoundland and touring three or four harbours to find the best remaining fishing room. In a world of incessant competition for shoreline, direct institutional transition proved impossible.

Another possibility is that the costs of enforcing property rights would have been prohibitively expensive in the seventeenth century, but fell as the British government established a presence. Since fishermen relied on the British judicial system to resolve disputes involving murder and theft in the early inshore fishery (before magistrates were established), English courts might conceivably have been used to police property rights violations. But the precise surveying of boundaries in Newfoundland would have been problematic, travel between West Country towns could be difficult, and Bannister (2003: 31-3) maintains that it was always difficult to try criminal cases in Britain. One further problem with this explanation is that there was an obvious way to introduce property rights: through colonization companies. The West Country merchants could have bought into existing schemes, or they could have founded their own. The fact that they refused to do so, preferring the admiral system instead, suggests that there must have been some real or perceived benefit to racing.

A third explanation might run as follows. The ship fishery featured the separation of ownership and control. Ship owners and provisioners remained in England while captains and crews laboured in Newfoundland. The separation meant that fishing ships operated on a share system: typically one-third each to owner, provisioner, and captain/crew. This was the only way to align the interests of the three groups, since it was impossible for those in England to monitor the efforts of those in Newfoundland. Capital owners and provisioners could insure against risk by purchasing shares in many different fishing ships, and the evidence suggests that they indeed did so. Captain and crew could not insure against risk, however. Their income each year was totally dependent on the success of the fishing season. Thus they needed to be free to search for the best fishing rooms and the best fish stocks each season. Private property rights would have deprived them of this option. Merchants in England therefore had to respect these wishes, or they would not have found captains and crews for their vessels. In the eighteenth century, as wages came to replace shares in British shipping generally, the income of fishers no longer depended on how many fish they caught. They would thus cease to demand the right to race for the best harbour and shoreline. As above, this explanation suffers from being at odds with the facts. While aggregate fish stocks fluctuated due to climate, they tended not to change sharply from one year to the next, and were generally the same over a wide area; moreover, fishers searched for the best room and would not have ready access to information about fish stocks across distant harbours (Pope 2004: 34-5). Within harbours, too, the best fishing rooms did not change from year to year.

V. The Costs and Benefits of Wintering

Why would migratory fishers change the institutional structure to recognize the claims of those who wintered in Newfoundland? If they were not reacting to external pressure, they must have come to see wintering as advantageous. This section will show that several forces combined to lower the costs and increase the benefits of wintering in the late seventeenth century. The analysis will be carried through to the eighteenth century, for it also informs our discussion of the rise of the resident fishery.

a) *The Cost of Supplies*

An important characteristic of Newfoundland geography is that the soil is acidic and the growing season short. Nevertheless, Newfoundland historiography has likely been too critical of the island's agricultural potential. Grains and a variety of vegetables are and were grown, and cows, pigs, and sheep were raised. Vegetables were essential to prevent scurvy (a fact well understood at the time), and livestock provided an invaluable source of fat. Grain tended to be imported for the most part, but vegetables which could easily spoil in a cross-ocean voyage were grown widely. Pope (2003a) suggests that the key constraint on early agriculture was not the soil or climate but the fact that wages were higher in the fishery than could be afforded in agriculture (Pope does not speculate on why agriculture prospered alongside fisheries farther south than Newfoundland). In any case, early settlers largely relied on outside supplies of food. Island folk were also dependent on imports of clothing, cooking gear, and other necessities.[8]

In the early days of the Newfoundland fishery supplies came almost exclusively from England. Presumably, then, Newfoundland residents would have to pay the cost of supplies in England plus the cost of transporting these supplies to Newfoundland. Given that migratory fishing ships needed to carry both men and fish back, but only men out, the cost of carrying enough supplies to support some residents over the winter need not have been high. In the seventeenth century, at least, fishing ships travelled largely in ballast outward (carrying only the salt and food needed by their crews), and could thus easily supply residents (Pope 2004: 77) Unfortunately, the few extant lists of prices from early Newfoundland colonies provide their cost in England rather than Newfoundland.

Moreover, fishing ships were not the only ships visiting Newfoundland. Since the fishermen themselves took up most of the room on the fishing ships the "sack" ships (named thus because they had originally carried wine) entered the trade. From 1584 at least they sailed to Newfoundland in late summer to collect fish and thence directly to markets in southern Europe to sell the fish, thus saving on the cost of transshipment in England (Cell 1969). And what did the sack ships carry on the way out? Janzen (1998) describes the voyage of one sack ship in 1726: it carried "biscuit" and a range of trade goods (which it had trouble selling due to bad timing and lack of familiarity with the trade). Janzen notes that sack ships had originally worked on consignment (or travelled in ballast), but began to carry trade goods speculatively as the Newfoundland market grew in size. While sack ship owners needed to turn a profit, this was primarily earned by taking fish to Europe. Sack ships were twice the size of fishing ships, and faced a choice between travelling outward in ballast or with trade goods: they would thus carry the latter at a charge barely sufficient to cover costs associated with procurement, loading, and unloading.

Whatever the case in the early days, the cost of provisioning Newfoundland fell as alternative sources of supply were tapped. In the late seventeenth century, fishing ships began to call regularly in southern Ireland (Mannion 2003), which was near the main sailing route to Newfoundland (the main alternative being southward past the Azores). There were also some Irish sack ships and (more rarely) fishing ships (Mannion 2003). Wages and food prices were generally lower in Ireland, and the Irish undercut English suppliers by up to 40 percent in the 1680s (Head 1976: 108).

Provisions could be obtained even less expensively on the European or North American continents (Matthews 1988: 46). The Navigation Acts were largely successful in excluding European ships from Newfoundland, though Dutch sack ships were important in the late seventeenth century. New England traders came to provide a link between Newfoundland and one of the least expensive sources of food in the world during the century before the American Revolution. Head (1976) provides data on the sources of various supplies in St. John's harbour in 1742. England supplied 452,000 pounds of bread, Ireland 22,000, and America 422,000. In terms of flour, though, America dominated England 121,000 pounds to 8,000. Ireland dominated pork supplies, providing 1,181 pounds to England's 227 and America's 91. Ireland also dominated beef supply with 970 hogsheads to England's 128. Assuming that Newfoundlanders bought from the low cost source, these figures indicate that either Ireland or North America was a cheaper source of all the major categories of food. Since fish was carried from Newfoundland to both Europe and the Caribbean (via New England),[9] provisions could be supplied to Newfoundland from all directions with limited transport costs. Indeed, Pope (2004: 148) argues that Newfoundland had become an entrepôt for trade between North America and Europe in the late seventeenth century, due to the low cost of moving goods to (but not necessarily away from) Newfoundland. According to Matthews (1988), Newfoundland was almost completely dependent on American supplies — of not only flour but beef as well — by the time of the American Revolution. He notes that 170 New England ships visited Newfoundland in 1774.

Detailed information on prices in Newfoundland during the seventeenth and eighteenth centuries is unavailable. Head (1976: 219) provides flour prices for 1764, 1771, and 1802-4 in St. John's. Comparing these to the costs of provisioning the navy in London (Beveridge 1939: 575), the price was lower in Newfoundland in 1764, higher in 1771, and covered the same range 1802-4. Given that both Ireland and North America had lower prices than England, and that ships going to Newfoundland to buy fish would likely carry provisions for a minimal transport charge, it would seem that the cost of provisioning Newfoundland should never have been extreme, and that the cost of living relative to England must have improved in the early eighteenth century as alternative supply sources became available.

The American Revolution provided a sharp but short jolt to this trend. The American colonies cut off trade to Newfoundland, and there is evidence that prices exploded there causing great hardship. After the Revolution, Britain attempted to exclude American ships from imperial trade. As a result, British North America came to supply food to Newfoundland and traded to the West Indies as well. The trading population in Newfoundland also blossomed. Innis (1940: 290) speaks of monopoly power among Newfoundland traders being broken shortly after the Revolution, and prices falling yet again.

The migratory fishery was vertically integrated, whereas the resident fishery relied on the provision of shipping services by others. Vertical integration is observed when market opportunities are limited, and thus agents must worry about being held hostage by either suppliers or buyers. In the extreme case, if there is only one firm providing supplies or purchasing output, those dealing with that firm will find their bargaining position seriously constrained. Resident fishers needed to worry about whether fishing boats would take advantage of their market power in the prices charged for supplies. Newfoundland history well into the nineteenth century is filled with stories of a handful of merchants — at first British, later local — controlling the trade of individual harbours. Recent scholarship, albeit focused on the nineteenth century, suggests that these complaints may be exaggerated, though not without foundation (see, for example, Ommer 1990). In any case, economic theory suggests that the exercise of market power would depend both on the number of ships visiting a harbour and the source of those ships. In the earliest days, when a handful of boats from a handful of West Country ports were the only visitors to any harbour, potential residents would have had much to fear. The increase in fishing activity over the seventeenth and eighteenth centuries would have made collusion increasingly difficult. Sack ships should have provided an alternative. Visits by New England traders, and later those from British North America, would also have severely limited the danger of collusion.

b) *The Potential for Winter Income in Newfoundland*

The earliest settlers must have earned some income over the winter, since their supplies were at least marginally more expensive than at home (with any net income they might earn at home tipping the balance further). There was some scope for berry picking in the fall, and some limited scope for hunting and trapping, though this seems to have disappeared in the Avalon by the late seventeenth century (Pope 2004: 339-40). The next to stay over the winter naturally turned to the fishery itself for recompense. In the seventeenth century, "Most proponents of settlement admitted that the costs of overwintering at least matched the transit costs of the ships fishing, unless the inhabitants could be kept fishing most of the year" (Pope 2004: 70). Early settlers could fish until November (and again in the spring near Placentia

[Pope 2003a]). The fish were much less abundant then, though, and thus this seems to have provided only a minor source of income.[10] A more lucrative employment was to service the needs of the summer fishery. Griffith Williams, in 1765, had no doubt of the original purpose of wintering: "they [migratory fishers] found it necessary for numbers to remain in the island during the winter, in order to build boats for the service of the ensuing season, as also to get materials out of the woods, for their fishing rooms etc." Closer to the period in question, Sir William Poole in 1678-9 asserted that residents were of great use for sawing boards, building boats, and making oars over the winter (Innis 1940: 101). Pope (2004: 342) calculates that the fishery needed some 200 new boats each year by 1670, and also wood for stages and flakes; the best time for lumbering was the late winter when black flies were dormant and wood could be skidded on snow. Pope (2003a) suggests that fishing boats lasted only five to eight years and that those wintering could earn 20 percent of their annual income by building boats.

Since space was at a premium on the fishing ships, especially on the voyage back to England, it was disadvantageous to carry fishing boats back and forth. Residents therefore also protected property left behind. Arguing for the legalization of settlement in 1677, an agent of the residents emphasized the great value of a mere 150 families protecting migratory fishers' stores (Matthews 1988: 101). Innis (1940: 101) also speaks of people left behind to guard boats. There were laws against stealing boats, but they were often stolen nevertheless, as were salt and wood from stages. Settlers were often blamed for theft, but Sir John Berry in 1675 argued that the biggest problem was migratory fishers destroying their own stages. Head (1976: 17) also speaks of migratory fishers dismantling stages because of the low probability of returning to the same room. Pope (2004: 22-3) suggests that fishing structures were often dismantled and used for firewood on the trip home.

More recent research by historians and archaeologists suggests that the Beothuk Indians often burned flakes and stages in order to obtain the iron from the hundreds or thousands of nails embedded in such structures (Pastore 1992, Pope 1993). The Beothuk had traded with the earliest fishers but soon found it both safer and more profitable to obtain desirable trade goods by scavenging. Pastore (1992) hypothesizes that the migratory fishery thus discouraged the trade which occurred elsewhere between natives and Europeans, while encouraging European antipathy toward the Beothuk; these factors combined to lead to the nineteenth-century extinction of the Beothuk as residency pushed them to the resource-poor interior. Pastore conjectures, though, that there may never have been much more than a thousand Beothuk in all of Newfoundland, and most of these far from the Avalon Peninsula. Marshall (1996: 61) notes that the Beothuk migrated away from areas frequented by Europeans, and suggests that the Beothuk had entirely retreated from the Avalon by at least the early eighteenth century. Great care should thus be taken in attributing any major role to the Beothuk in the evolution of the fishery. It *may* nevertheless be the case that the presence of the Beothuk militated against permanent structures in the early days of the fishery.

Why would the benefits associated with building and guarding boats and stages have increased over time? There is far greater evidence that deforestation on the Avalon Peninsula would have increased the cost of building wooden structures during the fishing season. Planters were accused in 1684 of using stages for fuel because of the distance of good firewood (Innis 1940: 102). There has been a long tradition of accusing the migratory fishers of deforesting the shoreline of the Avalon Peninsula (e.g., Innis), though the extent of deforestation was likely exaggerated. As might be expected with a common property resource, migratory fishers had been wasteful in their cutting practices. Matthews (1988: 21) says that the Avalon was deforested by 1700, and speaks of the advantages of being able to obtain wood from residents. Rowe (1980) argues that fire was an even bigger problem than cutting; even the thin topsoil would be burnt off so that reforesting would take centuries. Before deforestation, "The visiting fishing ships proved unwilling to buy lumber and boats from the settlers since lumber was available in profusion in every harbour in the Avalon peninsula" (Matthews 1988: 63). As readily accessible wood was destroyed by the fishery, the advantage of leaving men behind to fetch and/or guard wood increased.

Were the problems of theft and deforestation themselves due to the admiral system? In other words, would they have been less serious if private property were established before wintering? Mendelsohn (1994) has shown that imperfect property rights on a frontier can encourage deforestation. Yet we would wonder if, given the geographic concentration of both merchants and fishermen in the West Country, they could not have established some guidelines for conservation of resources on which they all depended. Lueck (1995) has argued both that overexploitation of resources is more likely when rights are held over a flow of resources rather than a stock — as was the case here — and that homogenous groups of claimants should enforce some customs that reduce this overexploitation. The admiral system (as opposed to not wintering) *may* bear little of the blame. Nevertheless, once some fishing captains encouraged wintering, competition among fishers for resources compelled others to respond (Pope 1993).

To recapitulate: a traditional Newfoundland historiography (e.g., Innis) blamed deforestation on the admiral system, and would thus attribute the intermediate institution to the inherent contradictions of that system. Lacking confidence that they would return to a particular spot, fishers were wasteful in their use of scarce wood resources. A newer historiography suggests that communal pressure *might have* acted to limit such behaviour.

We discussed above how the first-man rule might have become common in the fishery. "A migratory master who could depend on a resident to protect his boats, reserve his fishing rooms, and preserve his stages and materials would have a competitive advantage ... Once one fishing master in an area had a winter caretaker, such caretakers became necessary for his competitors, because fishermen whose equipment was unprotected were thus at the mercy of those whose boats and rooms were secure" (Pope 2004: 72). Pope thus provides further insight into how the institution would have begun and once begun would quickly become standard.

While guarding boats and stages required winter residence on the shoreline, lumbering (and the limited possibilities for hunting and trapping) could be best pursued inland. From about 1700 some Newfoundlanders pursued "transhumance," the seasonal movement of residence. This practice is rarely observed among non-pastoral peoples, and was unknown in the West Country or Ireland and virtually unknown elsewhere in North America. Those who moved for the winter were both closer to firewood and more distant from the winds of the coast. They could gather wood and transport this to the coast as winter came to an end. This practice would continue into the twentieth century, though churches, schools, livestock (which are difficult to manage in a forest), and other economic opportunities caused the practice to decline from the mid-nineteenth century (Smith 1995). For present purposes, the key point is that this innovation both lowered the costs and increased the output of some who wintered in Newfoundland from about 1700.

Much later, some non-fishery occupations also emerged. Sealing, fur, and salmon all increased in importance as settlement expanded.[11] While the small-scale opportunistic seal hunting of the early eighteenth century provided some encouragement to settlement in northeastern Newfoundland (Sanger 1977), a large-scale seal fishery where fishers went out to the ice rather than waiting on shore began only in 1794. Matthews (1988: 147) notes that this was only possible with a large resident population. By 1830 at least, a month of sealing could contribute one third of a fisher's annual income (Little 1990: 9; Ryan 1994). And since ships headed to the ice from at least as far south as St. John's (Head 1976: 225), fishers located far from the seals could participate.

Newfoundland's acidic soil supported a beaver population perhaps half as dense as on the nearby mainland; the earliest European visitors nevertheless traded occasionally with the Beothuk for beaver and other furs (Pastore 1992). As the natives turned to scavenging, Europeans trapped animals themselves. There are reports of trapping from the seventeenth century, and thus those wintering could have earned some income in this way. Pope (2003a) suggests that income from furring may have exceed 2,000 pounds per year in the late seventeenth century. Still, furring is best seen as a subsistence activity, adding only a little to the annual income of those who wintered (Smith 1995).

c) *The Cost of Transit to Europe and Winter Income in Europe*

Sir John Berry in 1675 complained that fishing ships encouraged men to stay behind to save the 30-40 shilling cost of transporting them (Innis 1940: 100). Pope (2004: 238) also speaks of masters paying 30-40 shillings for this reason to men who agreed to stay.[12] While the opportunity cost of carrying the fisher home was the fish he displaced, the opportunity cost of carrying him to Newfoundland the next year was the next best fisher. According to Boulton (1996) day wages for labourers in London rose from less than one shilling in 1597 and approached two shillings at the very end of the seventeenth century. He concurs with Woodward (1994) that London wages were likely double those in rural England. Fishing ships returned to England in late September or October if they went straight back, November or December if they took fish to the Mediterranean first (Pope 2004: 29), and generally left in February or March (January if stopping for salt on the way). Fishers thus averaged about four months of winter residence. Working full time they could hope to make perhaps twice the cost of a round-trip voyage to Newfoundland. There was, however, serious underemployment of labour during the winter in the West Country. Nevertheless, in the absence of any form of winter income in Newfoundland, migratory fishing captains inevitably faced difficulty in encouraging fishers to stay.

How did the ratio of income in the West Country to opportunity cost of transporting fish evolve over (especially the second half of) the eighteenth century? British real wages rose sluggishly at best in the second half of the eighteenth century, and may well have fallen for those at the bottom of the income distribution (Mokyr 1993: 122-3). Schofield (1994) reports a 25 percent increase in real wages in the first half of the eighteenth century, but feels this was matched by a decrease in the second half. Ryan (1986) records only a slight increase in average tonnage during the eighteenth century, and neither he nor any other historian speaks of significant technical change. Fishers still displaced just as much fish as before. However, the European fish market exploded after 1750 (Matthews 1988: 113). Output multiplied and prices rose. Fishing ship captains thus could offer their fishers a much more enticing payment to stay in Newfoundland.

VI. The Rise of the Bye-Boat Keepers

Why do three distinct institutional forms coexist through the eighteenth century? The intermediate institution had previously set the stage for the emergence of both bye-boat keeping and a resident fishery. Since neither residents nor bye-boat keepers had ships,[13] they would have been excluded from access to shoreline under the original admiral system. Once these new organizational forms emerged alongside the migratory fishery, however, one might anticipate that the most efficient form would quickly supplant the competition. It is perhaps only natural in treating "competing" institutional forms to focus on how they compete for fish and markets. When lengthy coexistence is observed, though, one should also ask whether and how these organizational forms may cooperate. In the case of bye-boat keepers, this paper will argue that they had a symbiotic relationship with the migratory fishery.

Bye-boat keepers shared characteristics with both migratory and resident fishers.[14] On the one hand, they could at times be indistinguishable from residents, bye-boat keepers being those who wintered for one or more years, and the earliest residents often planning on returning to England after making their fortune (Matthews 1988; Handcock 1989: 26). On the other hand, the bye-boat keepers performed two tasks otherwise performed by employees of the migratory fishery. They operated fishing boats populated by migratory fishers, and they guarded and gathered supplies over the winter. They were not employees, though, but rather contractors for particular tasks that could not be trusted to an employee.

Bye-boat keepers could obviously not displace the migratory fishery, for they depended on the migratory fishing ships to transport both themselves and the fishers they employed between England or Ireland and Newfoundland. But why would the migratory fishing captains sacrifice precious space for their own fishers in order to transport bye-boat keepers and men who would only compete with them for fish? To be sure, no one fishing ship captain could exclude bye-boat keepers if other captains found it advantageous to transport them. At the urging of merchants and fishing ship captains, the Western Charter when reissued in 1661 contained a prohibition of bye-boat keepers; but James Yonge writing in 1671 noted that many merchants and fishing ship captains benefited too much from the practice to enforce this law. Yonge also appreciated that a law prohibiting the carrying of passengers would cripple the resident fishery; this may have been the law's real intent (see Mercer 2003: 210-5). And any one captain could (and often did) drop bye-boat keepers in a harbour different from their destination, and thus eliminate any possibility of direct competition. But why would any captain find this practice advantageous? More precisely, why would a fishing captain find it advantageous to carry a bye-boat keeper and the bye-boat keeper's fishers given the obvious opportunity cost: this would be one less of the ship's own fishermen that could be carried? The answer is that bye-boat keepers solved two critical agency problems for the migratory fishery. First, imagine the difficulties inherent in leaving one man behind over winter to guard one's boats and stages and fetch additional wood. While one could observe the number of boats guarded and built on arrival the next summer, these results must have depended on the vagaries of climate as well as the activities of thieves. The man wintering could all too easily engage in sloth or theft, and argue that some savage winter storm had destroyed the fruits of his efforts. If instead of an employee the fishing ship left a bye-boat keeper who guarded and carried wood on behalf of both himself and the fishing ship, it would be easy to monitor whether his efforts on the ship's behalf were comparable to his efforts on his own behalf.

Second, fishing ship captains must have always struggled to oversee a number of fishing boats. This problem was exacerbated as the Newfoundland fishery followed English merchant shipping more generally by shifting from paying sailors/fishers a share of the profits to paying them a wage (as workers agitated for thus shifting the risk onto merchants) in the first half of the eighteenth century.[15] As wages came to replace shares in the Newfoundland fishery, individual fishers must have become even harder to motivate. Nor could skippers be relied on to encourage maximum effort as these too became wage-earners. The independent bye-boat keeper, however, had a powerful incentive to encourage and monitor effort from those he employed in the fishery. Notably in this respect, bye-boat keepers always worked on their own fishing boats, and overwhelmingly managed only one, two, or three boats (Mercer 2003: 212-3). From the point of view of the merchants, they had the further advantage of absorbing much of the risk.

Bye-boat keepers were often said to have a further advantage of being able to attract better employees. Migratory fishing captains often complained that workers preferred to work for bye-boat keepers (Matthews 1988: 69). This might simply reflect the fact that bye-boat keepers were more productive for the reasons above, and could thus pay more. "The practice [bye-boat keeping] came to exert pressure on the migratory fishery by attracting more skilled workers and forcing up wages as bye-boat efforts were apparently more productive and returns to bye-boat servants were greater" (Antler 1982: 25).[16] Innis (1940: 152) concurs that bye-boat keepers were more productive. This was the view of James Yonge in 1671: he felt that bye-boat keepers used shares to a greater extent than the fishing ships (Mercer 2003: 213). The data on catch per boat and catch per man compiled by Ryan (1986) suggest that bye-boat keepers were *less* productive; unfortunately the data for the migratory fishery includes the bankers who caught large numbers of lower quality fish. As for wages, it is likely that the higher wages paid by bye-boat keepers merely compensated for the fact that they did not also pay the fishers passage to and from Newfoundland (Pope 2004: 178-80). The bye-boat keepers also (or alternatively) benefited from closer personal ties with the fishers (Innis 1940: 106). They could hire men they knew from their own village, while fishing ship captains inevitably hired large numbers of strangers. Moreover, just as small companies today can instil greater loyalty than large, the bye-boat keeper with a handful of boats at most must have appeared a less distant boss.

A further piece of the puzzle comes from considering the concept of vertical integration. When fishing ships controlled every stage of the fishery — supplying salt, catching fish, selling fish — it would have been virtually impossible for bye-boat keepers to operate. If residents needed to worry about the exercise of monopsony power by fishing boats, the concern of bye-boat keepers should have been even greater. They, after all, had to be confident of their ability to gain return passage for themselves and their fishers. They could often contract in advance, perhaps, though we have seen that fishing ship captains were accused of breaking such agreements with their own fishers. And a bye-boat keeper planning on wintering for a couple of years would likely be unable to contract in advance for the return voyage. The increase in the number of ships visiting harbours over the eighteenth century must have encouraged bye-boat keepers' confidence that they could obtain a fair return passage. Indeed, Pope (2004: 42-3) attributes the rise of bye-boat keepers *entirely* to the existence of sack ships and the fact that there was room on fishing boats going to Newfoundland; he thus discounts the fact that fishing captains must have seen some advantage to carrying bye-boat keepers in preference to more of their own fishers.

The advantages of the bye-boat keeper would all dissipate over the eighteenth century as the residential fishery expanded. Residents could always guard shoreline and supplies at least as well as bye-boat keepers. Once Newfoundland had a cheap but just as productive labour supply, the bye-boat keeper's ties to English fishers would no longer provide an edge. One caveat should be mentioned in this regard: while the challenge in the early days of residency was for Irish immigrants to master the skills of the fishery, the greater challenge later may have been matching the ability of the migratory fishery to hire unskilled labour at very low wages. The small-scale resident fishery would have the informational advantage with the residential labour force, and could supply an equally inviting work environment. Historians have missed this logical explanation of the decline of the bye-boat fishery. Handcock (1989: 83-4) blames a collapse in fish prices after the onset of the French Revolution, but does not discuss why this would have hurt one organizational form more than others. The residents, of course, were less able to change occupation in bad times. And cross-ocean travel was naturally disrupted by the quarter century of war after 1793. Matthews (1988: 134) blames the rise in wages and price of provisions during the war. But by this time the Newfoundland labour force was already dominant, and increased provisioning cost would hurt all types of fishery. As with the migratory fishery itself, the war accelerated the collapse of the bye-boat fishery, but since it had been in severe decline before the war we need to look further for a complete understanding of its disappearance.

VII. The Resident Fishery

The resident fishery could and did at times cooperate with the migratory fishery by reserving shore space for migratory fishers. The resident fishers could thus compete with bye-boat keepers in solving the agency problems of migratory ship captains. Residents would at first have a disadvantage in supervising fishers,[17] but this would dissipate as the resident population increased. Migratory fishing captains could thus see advantages of a resident population. A small population of residents might have continued to rent the shoreline to migratory fishers; it was only because further increases in population allowed residents to prosecute the fishery at lower cost than the migratory fishery that the resident fishery displaced the migratory fishery. Once the fishers were located permanently in Newfoundland, and the fishing boats built there, and the fish were taken to market by sack ships, the fishing boat captains lost their previous role in the fishery. Through the eighteenth century, population growth caused residents to replace migratory fishers, first in Conception Bay, then elsewhere (Cadigan 1995: 20-4). Instead fishing ships came to focus on carrying supplies to the resident fishery. This need not have been a misfortune for them: if residents could catch fish with lower costs than migrant fishers, while absorbing much of the risk, merchants may have been able to earn higher profits by supplying the resident fishery than by prosecuting the migratory fishery. The point to emphasize is that the first step in the chain of causation which led to a resident fishery — the first-man rule — was taken long before the benefits of an entirely residential fishery could have been obvious to migratory fishers.

A full survey of the determinants of Newfoundland population growth would require another paper. One key part of the puzzle was explored above: the cost of wintering fell and the benefit of wintering rose through the eighteenth century. It thus became increasingly advantageous to locate fishers in Newfoundland year-round. There were, though, several other factors that would encourage migration. Five such factors can briefly be listed:[18]

a) *A new source of immigration*. As noted above, fishing ships stopped in Ireland for inexpensive provisions and labour.[19] Mannion (2003) describes how these ships soon began to take workers as well. Matthews (1988: 53) speaks of a surge of Irish migrants after 1711. The southern Irish labour force was not as skilled in the fishery as the West Country fishers, but could be profitably employed in certain unskilled tasks (as had agricultural labourers from the West Country before them). Facing a lower opportunity cost at home, the Irish proved more likely to migrate than the English (especially during the famines of the 1720s and 1739 [Rowe 1980: 212-3]). They were also, crucially, more likely to bring their wives.[20] This reflected both the lower opportunity cost at home, and the fact that the Irish successfully transplanted the potato to Newfoundland: women thus had productive employment outside the fishery. The second generation grew up in the fishery, and matched the English in fishing skill.

b) *The cost of leaving*. As with Canada more generally, the question must be asked of why migrants did not carry on to the mainland. Some did: 1,300 in 1717 alone. Indeed, American traders were required to post bonds with the government as it attempted to limit on-migration. Though ships travelling to Newfoundland aspired to leave laden with fish, they could and did carry workers, perhaps as indentured servants. Newfoundland may well have been a cheaper source of labour for the United States than Europe. Nevertheless, Matthews (1988) suggests that the Newfoundland population barely declined in bad times, as residents could not afford transit off the island.[21] Much research needs to be performed on outmigration; it is possible, though, that this opportunity decreased after the American Revolution, and thus encouraged population increase.

c) *Involuntary migration*. Not all who settled in Newfoundland did so by choice. Fishing ship captains were often accused of leaving fishers in Newfoundland, rather than taking them home as promised. Or, if the fishers earned too little (as those paid on shares could easily do if the fishing was bad) or spent too much (perhaps on gambling or alcohol, though Pope [2004] doubts claims by previous historians that fishers were regularly exploited in this manner) to pay their way back, they were left behind (Handcock 1989: 27; Rowe 1980: 213-4). With no ability to get off the island, and starvation far from unheard of, the reservation wage of these unfortunates would be low. Matthews (1988) suggests that some of the earliest Irish fishers were abandoned due to low productivity.

d) *Non-pecuniary advantages*. Residence in Newfoundland had one huge advantage: it provided the protection of distance from British naval press gangs. There was increased migration to Newfoundland in times of war (perhaps in part as fishing ships too were pressed into naval service, stranding some fishers).[22] Britain was at war for half of the two centuries before 1815. Newfoundland may also have appealed to those in trouble with the law at home.[23] Pope (2004: 55) suggests that residence in Newfoundland may have been attractive to those who could not aspire to own property in England, even if the move did not make strict economic sense. There were certainly non-pecuniary disadvantages. The lack of a governmental presence forced communities to protect themselves, though it appears that as population grew settlers were better able to provide mutual protection. In this respect, the appointment of magistrates to handle criminal cases in the eighteenth century (see Bannister 2003) should have encouraged settlement. And while we now know that there was only one significant French military attack after 1713, residents of the island could hardly have assumed this result.

e) *Historical events*. The victory of the British over the French in 1763 must have encouraged settlement by giving English fishers access to more shoreline. Likewise, the American Revolution caused New England merchants to be squeezed out of the Newfoundland trade, albeit temporarily, and encouraged the rise of a Newfoundland-based merchant class. The rise in the price of fish during the Napoleonic Wars encouraged further migration. Notably, these later migrants were encouraged to stay permanently by the opening of the winter seal harvest (see Ryan 1994).

VIII. The Eclipse of the Migratory Fishery

How did the migratory fishery respond to the rise of the resident population? Residents were able to use the first-man rule to claim the best shoreline. Yet we have seen that conflict was avoided. There were rare instances in which migratory fishers leased shoreline from residents, but opportunities for this sort of transaction disappeared as the resident population grew. Migratory fishing merchants and captains responded in two main ways. They moved geographically to areas of limited settlement, and thus paved the way through the late eighteenth and early nineteenth century for resident expansion along Newfoundland's south and north coasts. While thus moving to less bountiful fishing grounds should have lowered the profitability of the migratory fishery, the second response likely increased profits. Some merchants came to supply resident fishers with agricultural and (especially) industrial goods from England. The period between the American Revolution and the repeal of the Navigation Acts in 1828 is of special importance here, for during this time the English government struggled to keep American ships away. Matthews (1988: 142) speaks of merchants building large establishments on the island before the Napoleonic Wars. Innis (1940: 290-1) cites the late eighteenth-century observer Reeves, who speaks of the twin "facts" that residents provided the cheapest way to fish, and that there had been a surge in provisions from the United Kingdom after the American Revolution; Reeves felt that it was only natural that merchants would essay to supply these residents. Note that if the resident fishery had lower costs than the migratory fishery, but residents were dependent on English merchants for provisions, merchants (assuming no change in the degree of competitiveness among them) would be able to make more money servicing the residents than prosecuting the fishery.

The English merchants were able to further enhance their profits by a change in ship type. The "migratory fishing ship" had always been a misnomer: the actual fishing was done from small boats. The ship itself served only as transport, and was generally moored over the summer. Merchants no longer temporally tied to the inshore fishery switched to ships that could pursue the bank fishery ("bankers") during the summer. Matthews (1988: 109) dates this innovation to the first half of the eighteenth century.[24] Between 1769 and 1776 bankers comprised 55 percent of the migratory fishing ships; as our analysis would predict these were heavily concentrated in the Avalon Peninsula while the traditional ships tended to be farther afield (Ryan 1986; Head 1976: 155). As noted above, green (salt)-cured bank fish were a lower quality output than dry-cured inshore fish. The bankers generally practised an intermediate technique where lightly (compared to Spanish and Portuguese bank fisheries) salted fish were dried on shore every few weeks, but the result was still inferior to that of the inshore fishery. The bankers thus made the bulk of their income in transporting supplies, with the bank fishery adding marginally to this income (Matthews 1988: 131).

IX. Concluding Remarks

The adherence of migratory fishers for centuries to the admiral system reflected primarily the fact that the admiral system ensured that superior fishing rooms would not be wasted due to illness of a particular captain, accident at sea, or diversion of a particular ship elsewhere. Thus, an institution likely to strike economists at first glance as inefficient can be seen as an efficient response to peculiar circumstances. As the costs of wintering fell and the benefits rose, the migratory fishery introduced an institutional innovation whereby those wintering could claim shoreline for the next season. This innovation has been recognized by previous historians, but its importance in encouraging further institutional change has not been fully appreciated. This intermediate institutional form provided *de facto* private property rights. It thus enabled and encouraged the entry of both bye-boat keepers and residents into the fishery. Why do the three forms coexist for so long? The size of the resident fishery was obviously constrained by the size of the Newfoundland population, since it relied on local fishers. As population expanded in some harbours, the migratory fishers and bye-boat keepers moved elsewhere, and some merchants turned to provisioning the merchants. Bye-boat keepers could not replace the migratory ship fishery, or vice versa, because these had a symbiotic relationship; bye-boat keepers depended on migratory fishers for transport, and migratory fishers valued bye-boat keepers for solving agency problems. While they both would prosper for well over a century, as the Newfoundland population grew the advantage tipped decisively toward residents. Residents took over from bye-boat keepers the solution to fishing ship agency problems, and then outperformed fishing ships themselves. Rapid rates of both natural increase and immigration characterize the last decades of the eighteenth century (driven in part by forces similar to those that had previously encouraged wintering). Economists tend to view economic activity in a competitive framework; the key to understanding the inshore fishery in the eighteenth century is to appreciate how different institutional forms cooperated.

It was suggested in the introduction that answers to each of the three main questions addressed in the paper would add new insights to scholarly understanding of institutional change in general. With respect to resources used intermittently, scholars are guided to appreciate the benefit of ensuring that the best resources are utilized first. When faced with an institutional change that appears to go against the stated wishes of those with political power, scholars are guided to look for intermediate institutions by which the powerful may set in motion an unforeseen chain of institutional change. And when confronted by the coexistence of "competing" institutional forms, scholars are guided to look for symbiotic relationships among these (as well as constraints on the growth of particular forms). More generally, this paper has provided yet another example of path dependence in institutional change.

Notes

[1]Given that the institutional transformations discussed take place over a period of decades, an argument might be constructed instead in terms of time preference: agents may be willing to bequeath to their grandchildren a less favourable institutional setting. Still, the important point is that they are willing to countenance only a moderate change in institutional form at any point in time.

[2]Pope (2003: 130) suggests that England may have eclipsed France for the simple reason that it was closer to Newfoundland (he also notes that the English learned Arabic navigation techniques previously mastered by the French and Portuguese [132]). His argument is

that by being closer they could inevitably win a race to Newfoundland. There are at least two problems with this explanation: all Europeans would be constrained by the difficulties of crossing the Atlantic in winter, and the French could have chosen to no longer recognize the admiral system (though with the costs noted below). Nevertheless, it could be that the English faced lower costs due to proximity.

[3]To be sure, different countries came to focus on different broad regions. Not only did these regions evolve over time but the challenge remained of allocating shoreline within such regions.

[4]A reasonable prediction from the literature on rent dissipation would be enough racing to entirely dissipate the rents to be gained from possessing the best shoreline. Lueck (1995) notes that rent dissipation depends on the homogeneity of claimants: if these are heterogeneous the agent who *clearly* wants the resource most may claim it unopposed. A strong assumption of homogeneity is necessary to generate complete rent dissipation. The Newfoundland fishery, dominated as it was by West Country fishers, provided a homogenous pool of claimants. These were, though, economically heterogeneous, as some fishing ships were ten times the size of contemporary competitors.

[5]Zerbe and Anderson (2001) suggest that a "first come, first served" rule was adopted in the California gold fields because it was perceived as fair, and because it allowed each "player" to know how others would react in a repeated game. Nevertheless, while the costs of negotiation were not trivial, they were one-time costs: if a system of private property could be achieved, no further negotiations (other than between individual buyer and seller) would be required.

[6]One might imagine that some fishing ship captains were appreciated for their administrative skills; this would have weakened objections to their reserving shore space for the next year and thus being the admiral of the harbour. This would be especially likely if other captains disliked the duties associated with admiralty. The fact that ships raced shows by revealed preference that at least some captains found the costs of admiralty less than the benefits. Bannister (2003, 2003a) shows that admirals did not work very hard in the eighteenth century, and suspects that this was true in earlier periods as well. This line of argument thus seems unlikely.

[7]It is not entirely clear why this number was that large for only a couple of hundred people had likely remained from failed colonization efforts early in that century (Pope 2004: 65). Given the non-existence of alternatives they must all have served (or scavenged from) the fishery.

[8]"Furring" will be discussed later and it will be seen that those who hunted fur during the winter were able to feed themselves on the local game. One cannot speak of a fur trade both because the Beothuk did not trade with Europeans and because there was not enough fur-bearing fauna to support anyone: the trapping of furs was thus always a subsidiary activity. The best furring grounds in Newfoundland were far from the Avalon.

[9]Notably the fish carried to the Caribbean to feed slaves were inferior to those carried to Europe. The profit margin may nevertheless have still been similar.

[10]There are no detailed climatic records for Newfoundland. If, as is likely, Newfoundland experienced the same warming trend following the Little Ice Age of the seventeenth century that is observed elsewhere, this would have served to lower the costs and increase the benefits of wintering.

[11]After the American Revolution, with access to trading ships from the United States cut off, Newfoundland residents built ships during the winter (Matthews 1988: 120). Head (1976: 46-7) disparages the quality of Newfoundland wood, saying that wood along the shore was only 20-30 feet tall and 5 inches in diameter, but inland 70 feet and 14 inches. The quality and location precluded timber exports at the time, but apparently did not prohibit shipbuilding.

[12]The cost of passage to New England was only half that to England. While the government tried to outlaw on-migration, hundreds did so every year in the century before the American Revolution (Pope 2004: 241-3).

[13]Occasionally, several bye-boat keepers would combine to freight an entire ship. But the norm was to take passage on fishing ships (Mercer 2003: 211).

[14]Of course, the boundaries between these three organizational types could be fuzzy. A migratory fisher who decided to winter might resemble a bye-boat keeper, while a bye-boat keeper intending to return to England might easily become a permanent resident. In turn, many residents did eventually return to England or Ireland.

[15]Cell (1969: 17) says wages were always paid on the sack ships, and that fishing ships also paid wages for part of the trip if they took fish straight to the Continent. She says it became more common through the seventeenth century for wages to be paid for straight fishing boats. Fishing ship owners complained in 1680 that they could not find people willing to work for shares (Matthews 1988: 69). Pope (2004: 163-89) argues that the transition from shares to wages is obscured by the fact that the word "wage" was often used loosely at the time, but agrees that the use of wages accelerated in the late seventeenth and early eighteenth centuries; he is skeptical though that the fishers asked for wages because working for wages was seen as degrading at the time. It is harder to see why masters would have preferred wages given the costs of monitoring.

[16]Both Rowe (1980: 107) and Innis (1940: 155) suggest that bye-boat keepers paid wages rather than shares. If so, we must wonder how they managed to bear the risk of the fishery. Their income depended on fluctuations in catch and price, but their outlays for transit and wages were fixed. Perhaps the prosperity of the fishery for much of the eighteenth century saved them.

[17]Planters did occasionally hire Europeans in the early days. The cost of hiring at a distance could be mitigated by the maintenance of family ties in England or Ireland. Such ties were naturally attenuated the longer a planter family remained in Newfoundland (though we should note that new planters arrived and others left through time). Though planters needed ties of credit with Europe, these ties need not generate connections with potential fishers. English planters would have been at a particular disadvantage with respect to hiring Irish labour.

[18]Myers (2002) suggests a further argument: that the resident fishery expanded when yields increased, and that catch rates, after collapsing between 1714 and 1727, rose from 1740 for a decade. Myers uses "inhabitants" as his measure of fishers, assuming that residence reflects greater confidence in the fishery. He thus ignores the complementary nature of the three types of fishery. Also, he asserts that fluctuations in catch rates reflect overfishing. This seems unlikely: climatic changes provide an alternative explanation.

[19]The estimates available suggest that the 40 percent differential in Irish versus English wages which Mokyr (1983) found for 1841 applied earlier. Cullen, Smout, and Gibson (1988) find that Dublin wages held at 11 pence per day from 1700 to 1770, while

Phelps-Brown and Hopkins (1955) found English wages between 14 and 16 pence per day over that period. We would expect that Waterford wages were, if anything, lower than those in the capital Dublin.

[20]There was a later stream of female servants, many of whom married and stayed. Many married English settlers; modern Newfoundland has many Irish Catholic families with English surnames as a result. Women were more likely than men to stay in Newfoundland (reflecting no doubt the unequal gender balance; women had many potential mates to choose from). And married men were much more likely than single men to stay (Handcock 1989: 153, 278-9). In the early nineteenth century (and likely earlier), women married on average six years earlier in Newfoundland than England, ensuring a high ratio of children to women.

[21]Recent scholarship focused on the nineteenth century takes a benign view of credit relationships in the fishery, noting that credit was an essential element in the fishery (Ommer 1990, Macdonald 1990). Still, if debtors were legally barred from emigrating in the eighteenth century as well, population growth would be encouraged.

[22]James Yonge in 1671 noted that settlement increased during seventeenth century wars, though he stressed wartime impediments to the migratory fishery; he later speaks of the "untimely interference of press gangs" (see Mercer 2003: 210, 214). Matthews (1988: 21, 28) suggests that press gangs (and pirates) provided one of the greatest incentives to settlement.

[23]Handcock (1989) estimates that somewhat less than 10 percent of the labour force in the migratory fishery were orphans apprenticed by parish authorities. These may have found Newfoundland especially enticing. Note, though, that Irish attempts to transport felons to Newfoundland were disallowed because transportation was only allowed to official colonies (Bannister 2003: 174-6).

[24]Head (1976: 72) suggests that the English learned of the technology from the French around 1714. Innis (1940: 149-50) feels the bank fishery began due to the poor inshore fishery experienced between 1717 and 1720. Its persistence at least was clearly not dependent on poor inshore fishing.

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