

## The International Whaling Commission 1949–1959 : An Exercise in Uncertainty Becoming Certainty

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Under the International Whaling Commission's (IWC) stewardship during the 1950s, hunting was mainly focused on three species — the blue, fin and humpback — and each of these species, despite warnings from the commission's Scientific Committee, were hunted to the point of near extinction in the Antarctic, where the majority of whaling operations occurred. In retrospect, it is tempting simply to lay the blame for the excessive hunting of the period at the feet of the five governments that effectively controlled Antarctic hunting — Great Britain, Norway, The Netherlands, Japan, and the Soviet Union — by explaining their actions only in terms of a single-minded pursuit of profits which gave short shrift to conservation initiatives. But while such thinking no doubt was prevalent in the IWC at the time, and contributed greatly to the depletion of some Antarctic stocks, this account of why excessive hunting continued throughout the 1950s provides only a partial explanation of the situation, since it ignores the question of how perceptions of scientific uncertainty affected management policies during this period.

In the course of explaining the controversy and disagreement which surrounded the IWC's setting of catch quotas and their implementation, this paper will, therefore, focus upon the treatment and interpretation of scientific uncertainty by the commission's members and scientists. The reasons why the IWC's members continued to approve quotas that were in excess of what the Scientific Committee believed to be sustainable — the strong post-war demand for fats, the financial pressures caused by intense competition and declining stocks, and the compelling need of the various industries to recoup exaggerated investment in infrastructure — will be outlined, but only briefly, since the economic forces that drove whaling during this period have already been examined in detail elsewhere. For the purposes of this study, explanations of why governments and whaling industry representatives argued in favour of what many believed, or at the very least suspected, to be unsustainable policies are of course important. But of particular importance is the question of how this situation was played out and rationalised in the IWC by the parties involved. The pressing economic imperatives for the industry at the time provide the motivation for the varying degrees of unwillingness within the commission to accept scientific advice aimed at conservation, but they tell us little about how the relegation of scientific advice to near irrelevance in the IWC, an organisation which had declared its policies “shall be based on scientific findings”, actually occurred.

To borrow the parlance of a police investigation, the motive appears to be clear

(financial pressures) and the victim easily identifiable (conservation of whale stocks). It is, however, the contention of this study that the weapon involved was none other than the invocation of scientific uncertainty: the weapon of choice for governments and organisations seeking to discredit scientific advice advocating policies that do not match their existing political and economic priorities as defined by what I have termed criterion I (the utility provided by a given activity) and criterion II (an activity's compatibility with the already established needs of a society, government, group or individual). The example chosen here to illustrate how scientific uncertainty can be employed in order to pursue a desired policy outcome is the fin whale debate, which occurred in the IWC during the mid to late 1950s and also shares some important similarities with many of the problems the commission struggles with today.

### Whaling before the IWC

As many observers and critics have noted, conservation issues were never taken seriously by the international whaling community prior to the Second World War — in spite of several earlier whaling conventions being initiated along with some steps taken (primarily by the UK and Norway) to curb the excessive hunting which had characterised pelagic whaling for most of its history.<sup>3)</sup> In the modern era, heavy capitalisation of the various whaling industries in the years following the First World War led to intensive hunting, which resulted in the whale oil market being over-supplied by the early 1930s, a subsequent drop in market prices and the severe depletion of species such as the blue, humpback and right whales. The attempts by the industry to reduce the number of animals taken at this time were at best only partially effective, since they were based more on economic concerns than any genuine awareness of the pressing conservation issues that later would have such a profound effect upon whaling<sup>4)</sup> — the scenario, in effect, for the events of the late 1940s and 1950s.

In retrospect, it is perhaps ironic that the international situation accompanying the end of the Second World War heralded both an excellent opportunity to reform the whaling industry and the beginning of a period noted primarily for some of whaling's worst excesses. Indeed, with much of the world's whaling fleets destroyed during the war, the financial imperatives for larger hunts — created by previous over-capitalisation of the industry — had largely disappeared along with the many sunken or converted whale catchers and factory ships,<sup>5)</sup> thereby providing the chance for a fresh start in terms of balancing the economic needs of the whalers with the biological and reproductive capabilities of the whales. Furthermore, the war years had provided a short respite for the stocks and allowed for some recovery in numbers, although it is now generally agreed that the period of reduced hunting during the war was too short to have had any significant effect.<sup>6)</sup> In the post-war years, however, it soon became obvious that the goals of conserving stocks and using scientific advice to determine quotas, as set out in the 1946 International Convention for the Regulation of Whaling (ICRW), were being ignored for the most part by the IWC's members. The

same short term economic priorities which had so far driven the capital-intensive era of modern whaling quickly re-emerged after the Second World War — signaling an ominous and unmistakable return to business as usual for the whaling industry.

Throughout most of its history, the whaling industry has continued its habit of sequentially depleting various stocks: the practice of hunting the most desirable species until sufficient numbers could no longer be found before then moving on to the next most desirable species, and so on. This methodology began with the slow swimming right whales, which were heavily hunted in the North Atlantic until depletion of these stocks near the end of the 1700s led the whaling fleets to stocks in the southern hemisphere and North Pacific. These stocks too had collapsed by the mid-1800s and sperm whaling was also coming to an end about this time.<sup>8)</sup>

Thus, by about the 1860s it seemed as though the world's whaling industries were rapidly drawing to a close everywhere. The subsequent revival was due solely to the fact that species which previously could not be taken were made available by the development of new methods.<sup>9)</sup>

The introduction of the harpoon gun and exploding harpoon, invented by the Norwegian whaler Svend Foyn in the 1860s, and its use aboard steam ships was a revolution that revived whaling<sup>10)</sup> by allowing hunting of the faster swimming and previously uncatchable rorqual species such as the blue, fin and sei. With rowboats and hand harpoons, whalers had been limited to the slower humpback, gray, and right whales. The arrival of steam driven ships armed with harpoon guns, however, meant that no species was beyond the reach of the whaling fleets and thus the blue, fin and sei whales in the Northern Hemisphere, thanks to Norwegian technology, were now the industry's main targets. The era of modern whaling began off Finnmark, a Norwegian county, in the 1860s and progressively spread around the world until the discovery of large numbers of blue and fin whales (and also hitherto untouched stocks of right whales) in the Antarctic. After 1904, the year of the first southern expeditions, the Antarctic became the main focus of the world's whaling fleets and its stocks, in particular the blue and fin, would suffer accordingly over the next sixty years until they too, like the right whales before them, became too scarce to be commercially viable.<sup>11)</sup> The final act of this sequence of depletion was played out in the 1970s with Japanese and Soviet hunts of the minke, the smallest baleen whale. But by this time, the political environment of the IWC had changed sufficiently — in response to an obviously failing whaling industry — to spare this species the same levels of over-hunting experienced earlier by its larger rorqual brethren.

Thus, improved technology, leading to the opening of the Antarctic to whaling, and also the near annihilation of the world's right whale stocks by the early 1930s<sup>12)</sup> ensured that the two largest rorquals, the blue and fin, would become and remain the whales of preference for most of the modern whaling period. As a result, much of the IWC's early scientific deliberations and attempts at regulation involved these two species and in particular the Antarctic

stocks, since this was where the vast majority of whaling occurred.

### Old Habits Die Hard: The Whaling Olympic

The short explanation of why the IWC almost allowed several species of whale, and itself, to be consigned to oblivion within the first twenty years of its existence is a relatively simple one: irresponsible management based on greed. The price of whale oil in the post-war years almost tripled, increasing from £40 per ton in 1945 to £110 by 1948, and maintained an unprecedented average high of £100 between the years 1946-52.<sup>13)</sup> The rapid post-war increase in price was caused by the world fats shortage that had occurred due to war-related disruptions, a widespread failure of grain and other crops in 1947, increasing populations and also a shortage of US currency in Western Europe which made the purchase of fats difficult in a market which most often traded in US dollars.<sup>14)</sup> The net result of the increased demand for whale oil and its ensuing higher prices was a highly competitive scramble by whaling companies for as large a share as possible of the 16 000 Blue Whale Units (BWU)<sup>15)</sup> that had been set as the Antarctic quota at the 1944 and 1946 whaling conferences and was later reconfirmed at the IWC's inaugural 1949 meeting.<sup>16)</sup>

Indeed, post-war whaling, which began in the 1945-46 Antarctic season, was largely a free-for-all involving anyone who was able to put together the ships and crews required for an expedition. As we shall shortly see, the number of participants was limited by the political circumstances of the time, but such impediments were not enough to prevent the wholesale slaughter that later would come to characterise this period. During the Antarctic season, the various fleets were required to radio in their catch (which could not be independently verified) to the Bureau of International Whaling Statistics in Sandefjord, Norway each week. When the whalers came close to filling the quota, the bureau then would announce the closing date for the season. The effect of this system was to create what whalers dubbed "the Whaling Olympic": a situation where the fleets killed as many whales as possible in the shortest possible time. In order to catch as big a share as possible, companies would invest in bigger and faster catcher vessels. But increasing investment in bigger and faster catcher boats by all the competitors soon led to a situation where the goal of catching more whales than anyone else was reduced to the hope of only maintaining one's share of the quota, in spite of the voluminous levels of capital the industry was fast absorbing. According to Small:

The Antarctic quota put every floating factory in a race against time with all other expeditions.... Financial success could be had only by killing as many as possible as quickly as possible before the order to stop whaling came out from Sandefjord. Factory ships and catchers alike worked twenty-four hours a day, seven days a week, weather and whales permitting, until the season was over. Pelagic whaling in the Antarctic was so exhausting and hectic that the whalingmen

aptly dubbed it "The Whaling Olympic."...

When a whaling company acquired better catcher boats it automatically acquired an advantage over its competitors. The competitors in turn had to acquire better catchers in order to overcome the disadvantage. Better catchers lead to fewer whales and fewer whales lead to a need for better catchers....

Better catchers did not bring increased production or revenue; they brought only the hope that each company would catch its proportionate share of a decreasing number of whales.<sup>17)</sup>

Thus, the pressures of competition led to a vicious circle of more and more capital being required to catch a steadily dwindling number of whales faster than anyone else. During the boom period, it was possible for profit margins to be maintained but when the prices began to drop after the 1951-52 season, profitability became increasingly elusive in the face of increasing capital investment. The major problem facing companies then was to make enough to recoup the heavy investment that participation in the whaling olympic already had required, which in turn led to increasing reluctance among IWC members to reduce the quota. This situation was precisely what the Norwegian and British governments had hoped to avoid by preventing other countries from rejoining pelagic whaling in the Antarctic. However, while their plans to create a monopoly over Antarctic whaling did effectively limit the number of nations involved, they were unable to exclude everyone.

The defeat of Germany and Japan had left Great Britain and Norway — the two countries that had been instrumental in initiating some earlier attempts at international management and conservation of whale stocks in the 1930s and the only two countries from which whaling companies were able to continue pelagic hunting throughout the war<sup>18)</sup> — as the dominant pelagic whaling nations in the aftermath of the war. Japan and Germany, who together with Great Britain and Norway had represented the major whaling nations in the 1930s, were prevented from returning to any significant role in whaling during the initial post-war years by the occupying Allied powers. But while Germany never managed a return to whaling, Japanese whalers were able to recommence Antarctic whaling as early as 1946 under US control and found themselves free to continue whaling independently after the signing of the 1951 peace treaty in San Francisco and its subsequent ratification in 1952.<sup>19)</sup>

Norway and Great Britain, however, were unable to continue their pre-war lead in the shaping of international regulation entirely on their own terms after 1945, since the outcome of the war had given the US government an influential international role and, therefore, also a strong voice in determining the future shape of international whaling regulation in spite of its own relatively small interests in the industry. Thus, the task of determining how post-war whaling would be regulated was left largely in the hands of these three governments.<sup>20)</sup> At the 1944 conference in London, and again at a second conference the following year, the creation of a standing commission was discussed. Both of these conferences<sup>21)</sup> were held primarily to amend the earlier initiatives of the 1937 and 1938 London agreements and create a regulatory regime for post-war Antarctic whaling. The most significant meeting of this

time, however, was the 1946 Washington Conference, which the United States had announced it would sponsor and host at the 1944 London conference, as it was this meeting which produced the International Convention for the Regulation of Whaling and its administering organisation, the International Whaling Commission.<sup>22)</sup>

But while Great Britain, Norway and the US were largely responsible for the IWC's creation and the duties it would perform, it is important to note that the governments of the Soviet Union and, in particular, the Netherlands were also developing a strong interest in pelagic whaling and, subsequently, its regulation. The Netherlands wasted little time in establishing its industry as a force to be reckoned with in Antarctic whaling by quickly putting together a whaling operation in 1946 with government support to meet the acute fats shortage being experienced at home. Indeed, the Netherlands' entry into the whaling club would later prove to be a turning point, as the influence exerted by the Dutch government on the international regulation of whaling over the next 15 years significantly contributed to the IWC's failure to conserve stocks.

Norway and Great Britain's governments were both very keen to limit the number of whaling fleets going after the 16 000 BWU quota set at the Washington Conference, since there was already a strong suspicion among some scientists and industry managers that stocks had not recovered to any significant extent during the war — as indicated by the poor catches of the 1945-46 season — in addition to a somewhat prophetic belief that increasing competition would rapidly reduce stocks and bring about the industry's demise.<sup>23)</sup> Another, and perhaps even more compelling reason, was the Norwegian and British assumption that new competitors also would make whaling unprofitable in the long run since the boom in whale oil prices was certain to be short-lived. Thus, the Norwegian and British governments strongly opposed German and Japanese fleets returning to whaling, and also the Netherlands' bid to develop its own industry. In December 1945, less than a month after the Netherlands' admission to the 1945 London Conference, the Norwegian government even went so far as to impose the Norwegian Crew Law, which effectively banned Norwegians crews from working under any foreign flag other than Great Britain's — although the Soviet Union was allowed crews for the 1946-47 season. The law, in combination with the Antarctic quota, proved effective in dissuading most new comers but not the irrepressible Dutch.<sup>24)</sup> Many Norwegian whalers resented the crew law, due to the limits it imposed upon their employment opportunities, and this resentment on the part of the Norwegian whalers allowed the Netherlands' state-subsidised company to get around the law simply by inviting Norwegian crews to join its expeditions in Cape Town, much to the irritation of the Norwegian government.<sup>25)</sup>

But Norway and Britain's attempts at limiting the number of participants in Antarctic whaling were successful for the most part, considering that prior to the Second World War as many as ten countries engaged in some pelagic (as opposed to coastal) whaling while in the post-war period this number was mostly limited to five: Great Britain, Norway, the Netherlands, Japan and the Soviet Union.<sup>26)</sup> Given the post-war period's dearth of fats and skyrocketing prices for oil, the idea of going whaling was a popular one in many countries and enthusiasm for whaling was itself at an all time high. The hurriedly made plans of

most governments for Antarctic hunting, however, were never realised :

In 1945-50 it looked as if the whole world wanted to go whaling — Americans, Argentineans, Australians, Brazilians, Canadians, Chileans, Danes, Dutch, Finns, Germans, Italians, Japanese, Russians, Swedes, all had whaling plans, and practically everyone was thinking in terms of pelagic catching in the Antarctic. There was also talk of operating from shore stations in a number of places. On this occasion expansion ran into three obstacles that had not been encountered before : the Norwegian crew law, the I. W. C.'s 16,000 units, and the fact that the losers of the Second World War depended on the good grace of the victors.<sup>27)</sup>

Thus, by trying to create a monopoly over pelagic whaling, Norway and Britain probably prevented things from becoming as bad as they could have been. But they were unable to limit the number of Antarctic whaling fleets to a number where the “whale olympic” mode of hunting and the crippling amount of capital that it absorbed could be avoided. One result of the post-war return to Antarctic whaling and whale oil boom was the beginning of the end of Norwegian and British involvement in pelagic hunting, since their privately run industries — unlike the state-sponsored Dutch and Soviet whalers — found it increasingly difficult to remain profitable in the face of increasing competition and dwindling stocks.<sup>28)</sup> Another and more significant legacy of the period, however, was the creation of some major criteria I and II obstacles to regulation based on the majority of scientific opinion : a situation which would soon bring several whale stocks and the whaling industry to the brink of total collapse.

### The IWC as an International Body

As noted earlier, the IWC was established at the 1946 Washington Conference as the administering body for the International Convention for the Regulation of Whaling. The commission's brief was to apply the rules and objectives set out in the convention to the whaling activities of its member states.<sup>29)</sup> By 1949, the year of the IWC's first meeting in London, a total of twelve governments had ratified the convention and become full members of the commission. The main objectives of the convention, as set out in its preamble, are “to provide for the proper conservation of whale stocks and thus make possible the orderly development of the whaling industry”.<sup>30)</sup> These goals were determined in light of the convention's general recognition of the whaling industry's past excesses and also the global need for fats in the post-war era :

Considering that the history of whaling has seen over-fishing of one area after another and of one species of whale after another to such a degree that it is essential to protect all species of whale from further over-fishing ;

Recognizing that the whale stocks are susceptible of natural increases if whaling

is properly regulated and that increases in the size of whale stocks will permit increases in the number of whales which may be captured without endangering these natural resources ;

Recognizing that it is in the common interest to achieve the optimum level of whale stocks as rapidly as possible without causing widespread nutritional distress ;

Recognizing that in the course of achieving these objectives, whaling operations should be confined to those species best able to sustain exploitation in order to give an interval for recovery to certain species of whales now depleted in numbers...<sup>31)</sup>

The ICRW, upon which the IWC's existence and legitimacy as an international regulatory body is based, is made up of two distinct parts : the convention itself, which sets out the objectives, basic rules and general codes of conduct for its members, and the schedule, which provides detailed information on exactly how whaling operations should be conducted in relation to the broader framework provided by the convention. Unlike the convention, the schedule is flexible since it must allow for changes in commission policy in relation to the setting of quotas, the opening and closing of sanctuaries and hunting seasons and the protection of species and stocks deemed to be endangered. However, the schedule cannot be altered without the consent of a three-quarters majority of the members present and voting at a meeting of the commission.<sup>32)</sup>

Thus, the main purpose of the IWC's annual meetings is to review the existing schedule and make changes where necessary in accordance with the wishes of the three-quarters majority of voting members (each contracting government is represented by a commissioner who is entitled to one vote), so long as these changes are deemed to reflect the objectives of the convention and follow the provisions that the various articles it contains set out. An often-criticised characteristic of the ICRW, however, is the often-vague nature of its provisions and also the "escape clause" that it provides for members not wanting to adhere to schedule amendments that have achieved the required majority vote. Perhaps the most controversial of the ICRW's articles is Article V, which states in Paragraph Two that :

These amendments of the schedule (a) shall be such as are necessary to carry out the objectives and purpose of this Convention and to provide for the conservation, development and optimum utilisation of the whale resources ; (b) shall be based on scientific findings ; ...<sup>33)</sup>

Paragraph Three of Article V goes on to say :

Each of such amendments shall become effective with respect to the Contracting Governments ninety days following notification of the amendment by the Commission to each of the Contracting Governments except that (a) if any government presents to the Commission objection to any amendment prior to the expiration of this ninety-day period, the amendment shall not become effective with respect to any



of the Governments for an additional ninety-days; (b) thereupon, any other Contracting Government may present objection to the amendment at any time prior to the expiration of the additional ninety-day period, ... and (c) thereafter, the amendment shall become effective with respect to all Contracting Governments which have not presented objection but shall not become effective with respect to any government which has so objected until such date as the objection is withdrawn.<sup>34)</sup>

The contradictions and ambiguities evident in the convention requirements cited here — the restating of the convention's conservation and optimum utilisation objectives and the requirement they be pursued on the basis of scientific findings *in addition to* the provision for governments not to be necessarily bound by commission policy — provided the basis for much of the IWC's inability to conserve whale stocks during the commission's first two decades. These aspects of the ICRW also are relevant to many of the problems it continues to experience today, particularly in terms of how the IWC membership has interpreted scientific advice and chosen to deal with it. The ICRW's simplistic requirement for schedule amendments to be "based on scientific findings" ignores both the inevitability of differing scientific findings being presented and the even more fundamental issue of what kind of scientific advice should be given priority when conflicts arise (i. e. how should the commission choose between science attempting to demonstrate that hunting is justified and science claiming that conservation is required). No unequivocal statement as to how these issues should be dealt with is provided by the convention since its objectives also are less than clear thanks to its use of phrases such as "optimal utilisation" and "the orderly development of the whaling industry" that clearly can be understood to mean a large number of different things.

The problems of interpretation caused by the ICRW's vagaries have been further compounded by the IWC being unable to enforce its policies in the absence of unanimous agreement, since the ninety-day objection provision allows members not to comply with schedule amendments when they believe such changes are not in their interests. Furthermore, the unclear wording of the schedule allows dissenting members to justify such non-compliance by arguing alternative interpretations of the convention. Thus, as the arguments and examples of this study later will show, it has been possible since the IWC's inception for various governments to pursue entirely different goals in relation to other IWC members while at the same time claiming to be acting in accordance with the ICRW.

Many have criticised the ICRW's vague wording and, in particular, the ninety-day objection provision which severely limited the IWC's ability to enforce its decisions.<sup>35)</sup> Moreover, with the advantage of hindsight, it is clear that the IWC's failure to adequately conserve stocks during the post-war period was, at the very least, exacerbated by these problems. But according to Andresen, "The goals of the ICRW — although both vague and maybe inconsistent — were an attempt to compromise between the different interests represented in the IWC. Generally it was not the goals of the ICRW which were wrong, but the way they were implemented."<sup>36)</sup> And as others have noted, vaguely worded conventions and treaties are not uncommon and are often essential to the formation of international regimes, as are the

inclusion of so-called “escape clauses.”<sup>37)</sup> Gambell, for example, goes one step further to say that “This escape clause [the ninety-day objection rule] was designed to allow governments not to be bound by regulations which they consider to be detrimental to their own best national interests ... but it is doubtful if the Convention itself could have been approved without such an arrangement.”<sup>38)</sup>

In other words, while the convention’s lack of clarity and inclusion of an escape clause has contributed to the IWC’s lack of effectiveness in terms of conservation (and continues to do so today), it is highly unlikely that a more binding version would have been ratified by the governments which have had the most impact on the whaling industry’s development. Therefore, the real problem confronting the convention’s implementation of conservation initiatives has not been its wording and contents so much as the unwillingness of its members to compromise and refrain from interpreting the ICRW’s provisions and intentions only in ways which further their respective ambitions.

This [the depletion of whale stocks] is not the fault of the Commission as such, but is because a number of members have refused to recognise facts and have argued that they should be allowed to catch as long as there is anything to be caught.<sup>39)</sup>

This statement by Tonnessen and Johnsen accurately summarises the single-mindedness that characterised the attitude of many IWC members toward quota reductions in the post-war period. But it ignores the important link between the refusal of members “to recognise facts” and also their ability to argue in favour of continued catching. The uncertainty that has been (and remains) so prevalent in cetacean science means that “the facts” never have been beyond dispute so long as someone had something to gain from disputing them, even when such facts could be empirically supported by sudden drops in the number of whales caught in spite of the greatly increased capabilities of the whaling fleets or increasing numbers of younger whales being taken. The important question, then, is why opponents of lower quotas were able to argue so successfully against “the facts” presented by scientists in the IWC in support of reduced catches. The answer to this lies with the unavoidable uncertainty that accompanies scientific advice, due to the problematic nature of identifying and interpreting “the facts” in the first instance (i. e. in the process of formulating a given theory), and then, in the second instance, the various political motivations which ultimately determine the acceptance or rejection, and therefore the veracity, of scientific evidence within the policy-making process.

Put simply, “the facts”, as presented by a body of research, and their application in policy-making, can be whatever people and policy makers want them to be (i. e. reliable or highly questionable) in relation to the course of action they believe to be the most advantageous, or providing the most “utility”. This is especially so in a regime like the IWC where priorities are unclear and the influence of one set of interests usually is heavily favoured by the majority (i. e. the pro-industry bias of the IWC membership during the

1950s). Science, therefore, played an important role in the IWC membership's various policy machinations not simply because of its perceived ability to describe reality but because of the uncertainty inherent to science, particularly marine science, which frequently allows various forms of reality to be argued for.

### Scientific Advice in the IWC

Although it is now one the IWC's three permanent committees — the Scientific Committee (SC), the Technical Committee (TC) and the Finance and Administrative Committee (FAC) — the SC was originally formed as part of a Scientific and Technical Committee and relied on scientists working in ad-hoc sub-committees for recommendations it would then discuss and present to the commission.<sup>40)</sup> The SC and TC did not become separate committees until 1951,<sup>41)</sup> allowing the attention of the SC to become more focused on the reports it received from its sub-committees rather than being distracted by other issues such as the whaling regulations of member countries, catching methods and infractions which became solely the brief of the TC.<sup>42)</sup>

The SC's structure has remained basically unchanged since the creation of a standing Scientific Sub-Committee in 1955 (of which there are now several), although its role was "considerably expanded" by the adoption of new procedure rules for the SC in 1981.<sup>43)</sup> Notwithstanding the various changes to meeting schedules and rules of procedure which have occurred over the years, the functioning of the SC has remained basically the same. The plenary sessions of the IWC at each annual meeting have directed the Scientific Committee to pursue particular research issues and problems, which it then delegates to the various Scientific Sub-Committees approved by the commission. The reports from these sub-committees are then given to the SC for deliberation and inclusion in part in the SC report to the commission which is included in the annual report for the following year. The SC's recommendations are first considered by the TC which acts, in addition to its other duties, as a form of preliminary plenary session since most member governments maintain representatives at the TC meetings, before finally being discussed and voted upon at the plenary session for that year's annual meeting.

Scientific research in the IWC, in spite of the important role given to it by the ICRW, mostly remained on the fringes of the commission's policy making until the late 1950s when the threat of whaling's imminent collapse was sufficiently convincing for enough of the pelagic whaling nations to prompt at least a partial change in the commission's perception of uncertainty and the role of scientific advice. The relatively minor role afforded to scientific advice in practice was mostly due to the IWC's strong pro-industry bias and the weakness of cetacean science at the time which prevented it from countering the industry's dominance. But the ineffectiveness of scientific advice during this period can also be linked to how the scientists were organised within the commission and the limits imposed upon them by the commission.

The IWC scientific community was small and somewhat isolated during the 1950s and while many of its members were competent in cetacean biology, few had any expertise in the important fields of statistical analysis and population dynamics. As Schweder has noted, the post-war period saw significant progress in statistical methodologies and fisheries science, culminating in Holt and Beverton's landmark work *On the Dynamics of Exploited Fish Populations* in 1957, and these fields have since provided the basis for the development of cetacean management science.<sup>44)</sup> The IWC's Scientific Committee, however, was seriously restricted in its ability to take advantage of such expert advice by budgetary pressures which, in addition to thwarting attempts to include members of the broader scientific community in its deliberations,<sup>45)</sup> forced its own members to meet "somewhat irregularly"<sup>46)</sup> during the 1950s and also delayed publication of the Scientific Committee's reports to the commission until 1955.

Since becoming a separate committee, the SC's deliberations ostensibly have been focused on only the biological issues pertaining to management as described by Article IV of the convention but several instances during the 1950s demonstrated that the SC's advice on biological issues was often tempered by non-biological factors. At the IWC's sixth meeting in 1954, a proposal for quotas based on species rather than the BWU in the Scientific Subcommittee was supported on the grounds "it would be a great advantage". But the committee agreed not to put the proposal forward after a Norwegian member pointed out that "there would be great practical difficulties in operating such separate quotas."<sup>48)</sup> In 1955, alarmed by the rapid decline in blue and fin stocks, the SC believed that, in addition to separate quotas, a drastic cut in the quota from 15 500 to 11 000 BWU was needed. But as in the previous year, the scientists realised the commission would not accept such a sudden reduction due to the hardship it would cause the whaling companies. Instead, they recommended reducing the quota incrementally, starting with 14 500;<sup>49)</sup> but even this watered-down proposal was rejected by the commission. These developments eventually resulted in the SC chairman, Dr. N. A. Macintosh, being strongly criticised by the New Zealand commissioner at the following year's meeting:

From one meeting to another, [the NZ commissioner] asserted, one gained a stronger and stronger impression that the [Scientific] Committee took into consideration factors that were anything but purely scientific... He put a direct question to Macintosh: What was the scientific reason for proposing such a small reduction now and a larger one later? Mackintosh was openly forced to admit that the Committee had allowed itself to be influenced by factors that were irrelevant to it. On the other hand, the Committee had felt that it should take into consideration what was feasible, and not what it considered should be done on the basis of a biological view of what might be desirable.<sup>50)</sup>

During the 1950s, the Scientific Committee clearly was working under difficult conditions. In addition to scant data on stock numbers, which relied almost entirely on information from catches, its members were handicapped by their own lack of expertise in what was largely

an undeveloped field (cetacean management), and also were prevented from bringing outside experts into their meetings due to an insufficient budget. The question of why they allowed their advice to be so heavily influenced by what they thought the commissioners would or would not accept is an important one — particularly in terms of the implications it has for views, like the New Zealand commissioner's, that science is or should be politically neutral — and can largely be answered by looking at the SC's weak position and the dominance of the commission's criterion I priority (i. e. management for maximum financial return in the shortest time possible). Indeed, some observers believe the SC should have been more forceful and lay much of the blame for the excesses of the 1950s at the feet of the commission scientists. Cushing, for example, writes :

the ultimate blame [for excessive catches] must lie with the scientists, who ignored what had happened in the past. Perhaps they were overwhelmed by their lack of exact information and lacked the will to give good advice without it<sup>51.)</sup>

Cushing's assessment, however, is a little harsh, given the constraints the SC was facing and also a historical record that shows the majority of scientists did indeed try to warn the commission of the extent to which stocks were being depleted. Had the commissioners been prepared to listen to the majority of scientific opinion concerning the status of the blue, fin and humpback stocks, it seems likely a more conservative approach to the setting of quotas would have been taken. The majority of member governments, however, clearly were not prepared to take on any advice which would endanger profits and it is for this reason that a more forceful stand by the scientists was unlikely to have made much difference. On several occasions, the Scientific Committee members, with the exception of the Dutch scientists, made their belief in the need for much smaller quotas quite clear. But the growing competition and financial pressures among the Antarctic nations meant there was little chance their advice would be heeded. The Antarctic nations in effect had put themselves in a situation where they simply could not afford the kind of scientific advice that was being offered. And so they rejected it.

The advice of the SC, for this reason, was undermined by the spectre of uncertainty (which is always present regardless of the available data and methods), and the extent to which governments made an issue of it in terms of rejecting scientific advice depended entirely on how compatible that advice was with their existing priorities and goals. In the IWC during the 1950s, scientific advice advocating caution and conservation at the risk of profits obviously was unwelcome and for this reason, rather than simply because of data and methodology shortcomings, the assertion of uncertainty became an important tool in delaying the adoption of lower quotas: a situation well illustrated by the conduct of the Dutch scientists in the SC during its deliberations on the status of the Antarctic's fin whale stocks.

## Seeing isn't always Believing: Scientific Uncertainty in the IWC 1949-1959

When looking at the IWC's founding charter, the ICRW, and its emphasis on conservation, optimal utilization and scientific findings, the post-war era of commercial whaling indeed held promise for a more restrained and responsible approach to cetacean management. But as discussed earlier, the post-war whale oil boom, caused by the fats shortage in Europe and other regions, encouraged a rapid return to pelagic and shore-based whaling under circumstances that quickly placed immense pressure on stocks in the Antarctic and elsewhere — leading to the accelerated depletion of stocks and the demise of commercial whaling. The pelagic whaling fleets, in effect, were hunting themselves out of business.

The major obstacle to the commission realising its goals undoubtedly was the process of over-capitalisation set in motion by the post-war shortage of edible fats and oils. More conservative management initiatives were clearly in conflict with the dominant criterion I imperative for whaling during the 1940s and 1950s (i. e. the high utility of catching as many whales as quickly as possible), which was legitimised by the widespread demand for fats. Even if the IWC accepted that there was greater long term utility in reducing catches and conserving stocks, the adoption of a more cautious approach to hunting still would have been problematised by political pressure stemming from the already established global need for increasing quantities of edible oils and fats.

It can of course be argued that there is little utility in rapidly exhausting a resource that was of such critical importance. But the dominance of the industry and its criterion I imperatives, in addition to the generally weak position of cetacean science and in particular the IWC Scientific Committee at the time, left conservation advocates within the IWC almost entirely without influence during the 1950s. Indeed, the shortcomings of cetacean science at the time effectively served only to make it easier than it otherwise would have been for members of the commission to down-play the risk of over-exploitation by invoking scientific uncertainty. It is, for example, difficult to imagine that even the strongest opponents of lower quotas did not privately suspect the stocks probably were being excessively taxed, given the opinions of the majority of IWC scientists that this was in fact the case, the sharp drop in the number of blue whales in the early 1950s, and also the increasing catching effort required by the late 1950s — in spite of far more efficient equipment — to obtain a significantly smaller number of BWUs than before.<sup>52)</sup>

Problems with the existing data and the inability of scientists to confidently answer critical questions concerning stock numbers, reproductive capabilities and ability to support commercial hunting were, however, nothing new. The extent to which cetacean science and management were hamstrung by a dearth of data and accepted population analysis techniques is well illustrated by the ongoing use of the BWU and also by the arbitrary way in which the post-war limit of 16,000 was first decided in 1944 and then reconfirmed in Washington two years later. As Tonnessen and Johnsen have observed, three of the leading marine

biologists of the period, Remington Kellog of the United States, N. A. Mackintosh from the UK and Norwegian scientist Birger Bergersen, were essentially guessing what the limit should be and seemed more concerned with the imposition of a limit of some kind than they were with the actual number it might involve:

How did they arrive at the exact figure of 16,000? At the 1944 conference it was stated that even though this amount could not be caught during the first season, the intention was "to prevent the present situation being exploited for unchecked building of new floating factories", and secondly, "because there is a desire to create a precedent for total limitation in the future." ... The Norwegian delegate gave an account of these plans at the conference: "We proposed therefore that for this season a total limitation of catching should be established. A total catch of 16,000 BWU was agreed on, i. e. 1.6 to 1.7 million barrels, which it was calculated could be extracted from about 20,000 whales, about half the yield immediately before the war". He relates that he proposed 16,000, instead of 15,000 or 20,000 as proposed by Kellog and Mackintosh, as it "seemed to be rather more reassuring". In this rather fortuitous fashion was this fatal figure arrived at! This impression of chance was further confirmed by the fact that the three gentlemen in question [Kellog, Mackintosh and Bergersen] agreed that "the figure for the total quota was of minor importance", the principle of total limitation being the most important.<sup>53)</sup>

Thus, from the outset, the IWC's brief of basing its policies on scientific advice already had been skewed by a preponderance of uncertainty over stock numbers and also the industry's need to produce a yield of whale oil capable of meeting international demand. Obtaining a better idea of stock numbers was of secondary importance at the time since the priority simply was to provide edible oils while establishing a limit on hunting, regardless of how arbitrarily that limit may have been arrived at.

Under these conditions, the 16 000 BWU limit was maintained unchallenged for the most part until 1951 when, after the quota had been put under review<sup>54)</sup> in the Scientific and Technical Committee's agenda at the IWC inaugural 1949 meeting, the Scientific Committee<sup>55)</sup> concluded that the quota was probably too high but failed to recommend any adjustment. As mentioned earlier, the Scientific Committee and its sub-committees were ineffective in convincing the IWC commissioners that large reductions in the quota were needed largely because of the unwillingness of the commissioners to listen and also the fact that their intransigence was strengthened by the ease with which some scientists in the Scientific Committee could dispute the threat of over-hunting. Indeed, Sir Gerald Elliot, former chairman of Britain's largest whaling company at the time, Christian Salvesen PLC, recalls the circumstances facing science-based conservation initiatives in the IWC during the post-war period as being very unfavourable:

There had been plenty of work done by British and Norwegian scientists on

Antarctic stocks in the 1930s but their conclusions had been very tentative. All they knew, as everyone could see from the catch figures, was that the blue whales, preferred for their size, were reducing in the catch relative to fin whales, indicating a scarcity, and that greater catching effort was not taking more whales. Professor Mackintosh had initiated some primitive counts of whale sightings... but evidence from these was hardly enough to satisfy governments and whalers. Until the middle of the 1950s there was not even an accepted method of telling the age of whales, an essential element in population dynamics. So the pleas of the Scientific Committee... that the initial 16 000 unit quota was too high<sup>56)</sup> and should be cut received a rough reception in the plenary sessions of the IWC.

From 1949 to 1952, the major issues in the IWC included calls for more research on the Antarctic stocks and the lifting of the Antarctic ban on humpbacks,<sup>57)</sup> the prevalence of catches significantly exceeding both the BWU quota and the species quota which had been set for humpbacks,<sup>58)</sup> and the beginning of a series of warnings made by IWC scientists that the 16 000 BWU quota was too high.<sup>59)</sup> Continuing concern over the status of stocks led to a proposal for the introduction of individual stock quotas, first made at the 1951 meeting by Scientific Committee chairman Professor N. A. Mackintosh, being repeated in London in 1952, but it was again unsuccessful.<sup>60)</sup> By the 1952-53 season, catches of blue and humpbacks had dropped significantly prompting speculation by scientists that blue and fin stocks were in fact being depleted.<sup>61)</sup>

The 1953 meeting, again held in London, was notable for two important reasons: a) the Scientific Committee for the first time recommended a lowering of the quota (to 15 000 BWU); and b) it was at this meeting that Dutch scientist E. J. Slijper, who would become a consistent opponent of the SC's findings and recommendations over the next seven years, began questioning the IWC Scientific Committee's majority opinion that the quota was too high. In addition to advising a reduction in the quota at the 1953 meeting, the SC also recommended the complete protection of the blue whale and restrictions on the operations of factory ships. The Technical Committee opposed the latter two proposals but endorsed lowering the quota to 15 500 BWU. The Netherlands, however, rejected a reduction to 15 000 on the grounds of uncertainty as per arguments Slijper had put forward in the SC.

The main source of data on whale numbers and the status of various stocks during the 1950s was the composition of catches (sex, size and age) and also the catch per unit effort (CPUE) of the catcher boats or catch per catcher-day's work. The CPUE was used extensively as an indication of population abundance until the late 1970s when it was noticed that decreases in the CPUE were only likely to become apparent after stocks had already been heavily over-exploited. The CPUE's use as a gauge for population number estimates, according to Allen, is based on the following two assumptions: a) catch for given effort under given conditions is proportional to population size; and b) the catch from a given population is proportional to the effort index.



Until recently [i. e. the late 1970s] whale population estimates have been based generally on the assumption that the catch per catcher-day's work — that is, the average number of whales caught by a catcher in a day — is, with a correction for vessel efficiency, proportional to the size of the population.<sup>62)</sup>

Norwegian scientist and IWC Chairman Berger Bergesen's warning at the 1953 sub-committee meeting in March that the "stocks of blue and fin whales considered as a whole show unmistakable signs of depletion" was based on analysis of catch composition and CPUE in particular areas of the Antarctic. Slijper's argument against Bergeson's conclusion, which otherwise had the full support of the SC, was based on what he believed to be the unreliability of a catcher-day's work as an accurate unit of effort due to the increasing competition between catcher boats in the prevailing "whale olympics" hunting environment.<sup>63)</sup> Thus, according to Slijper, decreasing CPUE indications were just as likely the result of reduced efficiency caused by increasing competition, as any overall drop in whale numbers, since more ships hunting the same stocks could cause time and effort to be wasted through two or more ships chasing the same whale but only one actually catching it. According to Schweder, Slijper also used population estimates taken from Mackintosh and Rudd to make his own calculations on the current fin whale replacement yield, which conveniently came out to be the same figure as the existing annual take of 24 000 fin whales.<sup>64)</sup> The IWC, however, voted in favour of a quota reduction — though only by 500 BWU rather than the 1000 recommended by the SC — while the Dutch government opposed the reduction on the grounds of uncertainty.<sup>65)</sup>

Concern for the state of the Antarctic populations, particularly the blue and fin stocks, continued at the 1954 meeting in Tokyo where the commission acknowledged the possibility that some species were being over-hunted. The problem anticipated earlier by scientists such as Mackintosh, Bergesen and Norway's Professor J. Rudd was that the apparent decreasing catch of blue whales would lead to extra pressure being placed upon the fin stocks, following the process of sequential depletion that had so far characterised commercial whaling. These concerns were justified since, as the Scientific Sub-Committee noted at its 1955 meeting, the catch of fin whales had increased from 17,474 in 1950-51 to almost 26,000 by the 1954-55 season.<sup>66)</sup> It was also for this reason that the ban on humpbacks earlier had been lifted in 1949 (i. e. to reduce pressure on the blue and fin whale populations) and not reinstated after two seasons as had been originally agreed.<sup>67)</sup> In the Chairman's Report of the Tokyo meeting, the commission explicitly recognised the threat of over-hunting and appeared to make the adoption of a lower quota contingent only upon the existence of sufficient evidence that stocks were in decline:

Having regard to the scientific advice at their disposal and to the catch statistics covering whaling operations in the Antarctic, the Commission expressed the opinion that it may soon become necessary to restrict more severely the Antarctic catch of blue whales, while guarding at the same time against a corresponding increase in the

catch of fin whales. This alone would involve a reduction in the total permitted catch in the Antarctic. If there should be clear signs of depletion of fin whale stocks also, the Commission believe that a further and very substantial reduction of the total permitted catch should be made at once.<sup>68)</sup>

Indeed, by 1955, the majority of IWC scientists already had agreed that blue whale populations in the Antarctic, North Pacific and North Atlantic and also fin whales in the Antarctic were under extreme pressure from hunting. With regards to the Antarctic blue whale stocks, the sub-committee scientists warned that they took “a grave view of the condition of this species. It would appear that the stock is now only a fraction of the original population, and its powers of recovery might already be found to be largely lost even if it received total protection.”<sup>69)</sup> Similar fears were voiced over the condition of the fin whale, based on mortality rate calculations (taken from age determination using baleen plates) made by Rudd and supported by British scientist Dr. R. M. Laws’ mortality calculations using ovaries analysis: “The conclusion is that the total mortality rates, including mortality from whaling, over a series of years, have been in excess of the maximum rate which would permit the maintenance of a stable population, and therefore that the stock of fin whales is in the process of depletion.”<sup>70)</sup> The sub-committee, therefore, “strongly recommended” at its 1955 meeting in April that a proposal for a quota reduction to 14 500 units be put on the agenda for the 1955 meeting in Moscow.<sup>71)</sup>

Slijper, reportedly, “was not disposed to dissent out of hand from this recommendation”. He was not, however, “prepared to endorse it whole-heartedly” either. Slijper refused to accept Rudd’s report until he could study it further and also raised the argument that if catching were concentrated on older whales by raising the size limit, there would “on balance be a net gain in recruitment of young whales to the stock.” However, the sub-committee was sceptical of Slijper’s assertion since it depended upon assumed mortality rates for different ages and in particular upon the maximum ages of whales — issues for which little or no information existed. Another problem was that Slijper’s opinion assumed an undisturbed stock, which clearly did not exist. The general feeling in the sub-committee in response to Slijper’s suggestion was that it would not improve the current situation since “any beneficial effect of raising the size limit again would be long delayed.”<sup>72)</sup>

With the threat of decreasing quotas looming at the Moscow meeting, and the likely appearance of further evidence in support of Rudd and Laws’ findings (as was presented by Norwegian scientist Professor P. Ottestad at the Scientific Sub-Committee’s meeting in March, 1956),<sup>73)</sup> the Dutch scientists intensified their opposition to claims that the fin whale was being over-hunted by suggesting at the Scientific Committee meeting that its numbers probably were increasing rather than decreasing. Slijper and Drion criticised Laws and Rudd’s findings on the grounds that the samplings used may not have been random and added that, on the basis of their own calculations, there was equal reason to believe the Antarctic fin whale population was increasing. According to Schweder, “that the fin whale stock might be on the increase despite the catch of some 24,000 a year, must have caused some lifted

eyebrows ... [Slijper and Drion's] calculations were based on assumptions that contradicted the fact that fin whales have a finite carrying capacity.<sup>74)</sup>

The 1955 meeting in Moscow was largely taken up with the issue of reducing the 15 500 BWU quota to 14 500 units as recommended by the Scientific Sub-Committee in April. The eventual proposal voted on by the commission was divided into two parts: an initial reduction of 500 units to 15 000 BWU for the 1955-56 season; and a reduction of a further 500 to 14 500 thereafter.<sup>75)</sup> Both amendments to the schedule achieved the required majority (11 of the 15 commissioners present voted in favour of both) with only Panama and the Netherlands voting against both parts and Japan voting against the first while the UK opposed only the second part. This apparent victory for conservation, in addition to being weakened by the opening of the Antarctic sanctuary as an apparent concession for the reduced quota,<sup>76)</sup> was, however, to be short lived. The initial reduction of 500 received no objections and was then adopted into the schedule, thereby becoming binding for all member governments. But the second, and longer lasting, reduction received less support. The Dutch commissioner lodged an objection against the quota of 14 500 for the following two seasons (1956-58), which effectively meant no quota would apply to the Netherlands. Fearing the disadvantage this would create for their own fleets, other governments quickly followed the Dutch lead:

Eventually the first reduction, i. e. 15,500 to 15,000 for the season 1955-56 came into operation as from 8 November 1955, but when the second reduction was referred to Contracting Governments, in accordance with the required procedure, the Netherlands Government objected. Their objection was subsequently followed by the following Governments, namely the UK, Panama, South Africa, Norway, Japan, USA and Canada. The result was that the second reduction did not come into force until 7 March 1956 and was not then enforceable against the objecting governments mentioned. It should be mentioned that the bulk of scientific opinion in the Commission was in favour of still greater reduction.<sup>77)</sup>

In effect, the Dutch government had ensured the plan to incrementally reduce the quota by 500 units until a sustainable level was reached (a level which many scientists still believed to be around 11 000 units) would be stillborn, since almost all the governments of the major pelagic fleets except the USSR felt compelled to copy the Dutch stance.

The issue of whether lower or higher quotas were justified depended primarily on the fin whale stocks, since they were now the mainstay of Antarctic whaling — a point already noted by the Scientific Sub-Committee prior to the Moscow meeting when its members concluded “the whole Antarctic whaling industry is virtually dependent on healthy stock [sic] of fin whales.”<sup>78)</sup> Thus, the sub-committee's further observation, based on unanimous agreement, “that definite signs of depletion, such as indicated by [Rudd's and Law's research], point to a very dangerous situation”<sup>79)</sup>, meant that any opposition to lower quotas would need to be based on arguments capable of demonstrating at least that fin stocks were not necessarily being depleted. Equivocation and the emphasising of uncertainty, therefore,

provided readily available means of casting the required level of doubt over the Scientific Committee's conclusions, especially given the very limited resources the committee had to work with, the subsequent weakness of its evidence and also the general reluctance within the IWC to risk profitability through smaller quotas unless it was absolutely necessary to do so. The attitude within the commission that the industry's interests should not be compromised without more convincing arguments from the Scientific Committee was made clear by the UK commissioner at the Moscow meeting: "the position of the whaling industry should be fully taken into account and balanced with scientific requests as far as possible ... unless scientists are able to convince us that a most serious situation will develop."<sup>80)</sup>

The main perpetrators of uncertainty aimed at undermining calls for reduced quotas in the IWC were undoubtedly the Dutch commissioner (and IWC chairman in 1957-58) Professor G. J. Lienesch at the plenary session level and Professor Slijper and his assistant Dr. Drion in the scientific committees. And their reasons for doing so no doubt were part of the Dutch government's plans to intensify its whaling interests in the Antarctic, as was indicated by the introduction of a new Dutch floating factory in 1955.<sup>81)</sup> After the 1955 meeting, the intentions of the Dutch delegation had become clear and their conduct in Moscow and at subsequent meetings appeared to make the Dutch scientists almost synonymous with opposition to reduced quotas and the invocation of scientific uncertainty:

The Netherlands consistently refused to accept the necessity of the proposed reduction every season. In opposition to the unanimous views of all the other ten members of the Scientific Committee, that a catch of 25,000 fin whales a year would rapidly result in the extermination of stocks, the Netherlands asserted that there were equally good grounds for maintaining that stocks of fin whales were twice as large as biologists calculated, and were therefore capable of sustaining a yield desired by the Netherlands [i. e. at least 16 000 BWU].<sup>82)</sup>

At the 1956 meeting in London, the USSR delegate announced that the Soviet government also would not be adhering to the 14 500 unit quota, due to the other objections made. The Soviet announcement followed the distribution of a IWC circular to the commissioners prior to the meeting which made clear the broader implications of the Dutch objection to the quota scheme in Moscow a year earlier:

... it is perhaps desirable to explain that the 15 500 blue whale unit limit has been reduced to 15000 in respect of season 1955 / 56 and to 14500 units thereafter, but seven countries objected to the further reduction to 14500 units and are not therefore bound by this figure, which however is binding on the 10 non-objecting countries. It happens however that the seven objecting countries, as things stand, are not in fact bound by any limit at all after 1955 / 56,<sup>83)</sup> and it is essential that this anomalous position should be put right without delay.

In the same document, written by the secretary to the commission, A. T. A. Dobson, it was suggested that this problem could be solved "by omitting any reference to the 14500 units and leaving the 15000 limit to operate for the future."<sup>84)</sup> This proposal from within the commission itself gives a clear indication of just how much concern the situation had generated and also the extent to which priority was given to the interests of the industry. The commissioners, however, voted to amend the schedule so that the 14 500 quota would only remain in force until the end of the 1956-57 season and would then revert to 15000 BWU for the following season.<sup>85)</sup> The Netherlands commissioner again dissented, in opposition to the lower catch, claiming "there was not sufficient evidence to show that, on the basis of the present calculations, the proposed reduction is necessary."<sup>86)</sup> On this occasion, however, no objection was lodged.

At the 1957 meeting, again in London, the repeated warnings of the Scientific Sub-Committee that the Antarctic fin whales were in decline appeared to finally be taken seriously by the commission, with the notable exception of the Netherlands government, which continued to claim there was not sufficient evidence to justify the sub-committee's conclusions. This time the commissioners from the UK, USSR, Norway, France and Japan all agreed that "although there was no conclusive proof of a heavy decline in the stock of fin whales, the balance of evidence justified a warning that the number of whales taken annually in the Antarctic was dangerously high."<sup>87)</sup> The result of this was for the commission to vote in favour of returning to the earlier plan of keeping the quota at 14 500 units for the 1957-58 season. And while support for this amendment was not unanimous, no formal objections were made at the meeting.<sup>88)</sup> The 1958 meeting in The Hague followed the close of the 1957-58 season, which meant that the quota had automatically reverted to 15 000 BWU prior to the meeting. Again, the majority of commissioners heeded the advice of the Scientific Committee, again with the exception of the Netherlands representative, and agreed to keep the 14 500 limit for another year (i. e. the 1958-59 season) and amend the schedule accordingly. On this occasion, however, the Netherlands objected to the amendment and, as at the 1955 meeting, the Dutch objection was then followed by objections from "the other four governments with whaling fleets in the Antarctic", namely the UK, Norway, the USSR and Japan.<sup>89)</sup> Subsequently, the "effective quota" for the 1958-59 season remained at 15 000.

A common theme of the IWC's meetings from 1953 onwards was the constant opposition from the Dutch delegation to any reduction in catches based on criticisms made by Slijper and Drion concerning the veracity of the evidence used by other scientists to argue in favour of smaller catches. Slijper and Drion's *modus operandi* was also remarkably consistent in that it was mostly based on claims that the Scientific and Sub-Committee's conclusions were based on "insufficient evidence" and that various interpretations were possible — thereby implying that warnings of excessive hunting were largely speculative. Slijper's contemporaries, however, believed that his constant criticism and questioning of the work of other committee members betrayed both a lack of understanding of the issues and, more importantly, a desire to justify maintaining the existing quota regardless of any evidence to the contrary his colleagues might present. Schweder writes that

According to Laws, the prevailing opinion within the Scientific Committee was that Slijper lacked competence in the field of population dynamics and statistics. Slijper kept posing new questions, apparently not to enhance understanding, but rather to foment uncertainty. It is extremely time consuming to address such questions, and the Scientific Committee was often unable to resolve such matters in the course of one meeting. The questions, therefore, were left unanswered, and additional questions were posed at the next meeting. One of Slijper's hypotheses was that the fin whale stock could be increasing in the face of heavy harvesting. Laws recalls that when it was pointed out to Slijper that the hypothesis was inconsistent with the existence of a self-regulatory mechanism, it became obvious that he did not understand the concept of density dependence in population dynamics.<sup>90)</sup>

After 1958, however, concerns over the size of the quota and the reliability of the Scientific Committee's warnings were overshadowed by the notices of withdrawal from the IWC that were posted shortly after the meeting in the Hague by the Netherlands, Japan and Norway, following the failure of the five Antarctic whaling governments to agree on an allocation of national quotas to replace the one quota system. The idea of national quotas had been practised by the Norwegian and British companies prior to the war but was not pressed for in the ICRW largely because of the prevailing free trade ethic and freedom of the seas doctrine, particularly favoured by the US, in the post-war years and also the mistaken belief of the Norwegian and British whalers that they would be able to maintain their pre-war dominance of whaling. The possibility of investment costs spiralling out of control due to the whale olympics mentality had not occurred to the older whaling nations at the end of the war, since they assumed that the number of participants would remain limited and also failed to anticipate the impact that entrants such as the Netherlands, the Soviet Union and the Japanese would have on the industry's profitability. Thus, it was from a UK proposal that the plan for national quotas was first mooted in the IWC at the 1958 meeting after discussions between British and Norwegian companies had begun as early as 1955.<sup>91)</sup>

The five Antarctic whaling members, Norway, the UK, Japan, the USSR and the Netherlands, met in London after the IWC meeting to discuss allocation of quotas. These discussions needed to occur outside of the IWC due to Article V of the ICRW prohibiting the setting of national quotas.<sup>92)</sup> As a result, the IWC had no influence over these discussions in spite of the huge impact they would have on the commission and Antarctic whaling. The central issue behind the proposal for national quotas was the imbalance which existed between the economic pressures of the whaling industries, caused by the exaggerated amount of infrastructure in use, and the biological limitations of the whales themselves, which was under dispute. Given the more secure financial positions the state-run Soviet and state-subsidised Dutch industries enjoyed, in addition to the benefits of strong domestic demand for whale meat in Japan enjoyed by the Japanese companies, the British and Norwegian companies — which had neither state support nor strong domestic markets for whale meat — were clearly at a disadvantage and, therefore, the worst affected by the uneconomical nature

of the competitive single quota system. The intention, then, was to reintroduce a balance to whaling by reducing the number of ships, floating factories and other materials used by the whaling companies to a level that was economically defensible in terms of the number of whales that could be sustainably hunted each year.

Thus, even the allocation of national quotas remained reliant on the adoption of a figure that was deemed suitable by the Antarctic whaling countries as a total annual catch and this figure, it was agreed at the first meeting in 1958, should be the quota adopted under the ICRW. But because the Netherlands continued to insist that a total of 16 500 BWU (including 500 humpback units) was possible, while the other participants believed 15 000 to be the absolute maximum, the question of whether or not fin stocks were in decline remained in dispute. By the end of the 1950s, the situation facing all concerned in the IWC, and in particular the Antarctic whale populations, had clearly deteriorated into a major crisis.

Unfortunately, given the circumstances and environment the IWC was operating in during its first decade, it is hard to imagine how a different outcome could have been possible. Many critics of the IWC and its membership's actions during this period, including Tonnesen and Johnsen, Schweder and Birnie, have suggested — either explicitly or implicitly — that the mismanagement of quotas and collapse of stocks in the Antarctic and elsewhere could have been avoided if only the commissioners had listened to the advice of the scientists. Others, such as Cushing, believe the scientists should have taken a more aggressive stance and presented their findings more forcefully. Elliot, a British whaling industry representative at the IWC, takes a slightly different view again, placing most of the blame upon, firstly, the Soviets and, secondly, the Dutch and also stating that: “The Norwegians and British come out quite well in an historical assessment.”<sup>93</sup>

On the surface at least, the historical records of the period, most notably the IWC documents and opinions from those who were there, generally seem to support the view that the worst excesses of the period could have been avoided if the majority supported advice of the Scientific Committees had been acted upon. But in order for this to have been the case, an almost ideal international environment — one that probably has never existed — would have been required: an environment where governments do not elevate perceived national interests above all others and where tangible short-term benefits are forsaken for more obscure and less certain long-term benefits. This ideal environment would also require scientific advice to be able to unequivocally and objectively predict outcomes to the satisfaction of all concerned. But, as most people would agree, such a scenario remains impossible, even fifty years after the fact. So it seems somewhat pointless to argue in hindsight that a given outcome should have occurred when the environment required to produce that outcome is itself little more than the product of idealist thinking. However, this is not to say that there are no lessons to be learned from past experience. The question is whether we are learning the right lessons, since the identification of past mistakes is not so much the problem as the figuring out of ways to avoid repeating them.

Thus, a major obstacle to the prevention of the kinds of environmental policy mistakes described in this paper has been the perception of policy makers and scientists in general,

and the public at large, of what science represents and what scientific advice can realistically be expected to provide. If, for example, one expects science to be able to accurately describe and predict the real world (as per the conventional view of science), then it is not difficult for governments and organisations, with an interest in doing so, to selectively criticise and reject scientific advice when it conflicts with their needs on the grounds of uncertainty, as was the case with the Dutch delegation during the fin whale debate. But if we accept, for the reasons put forward by Hume, Kuhn, Russell and many others, that certainty is beyond the grasp of science, it becomes much harder for those with political interests at stake to hide those interests behind arguments presented ostensibly on scientific grounds. Indeed, the strategy of arguing against a preventative course of action because we don't know or cannot prove a particular set of outcomes will occur is common enough, as is the more recent strategy of arguing against other courses of action because we cannot prove undesirable outcomes will not occur. But both of these strategies become that much more difficult to implement when it is recognised from the outset that certainty is not available: a situation which forces the political interests that lie at the heart of the issue to the surface in order to argue why one course of action over another is more desirable. Put another way, uncertainty only need be a problem when people believe they can achieve their goals by demanding certainty, and, as the central argument of this study contends, their propensity to demand certainty is determined by the extent to which scientific advice describing possible outcomes conflicts with their priorities, as described by criteria I and II.

The actions of almost all the IWC's member governments during the 1950s reflected this style of reasoning, with the exception of the New Zealand delegation which appeared to be alone in its willingness to reduce the Antarctic quota to 11 000 units as per the Scientific Committee's advice. And while the Dutch delegation was by far the most prolific employer of scientific uncertainty in order to justify their policy choices, they certainly were not alone in this regard. The UK commissioner made his willingness to employ scientific uncertainty as an argument against further reductions clear at the Moscow meeting when he indicated that he still was not convinced of the dangers facing the Antarctic stocks. Other governments also balked at other initiatives intended to prevent the depletion of stocks that may have handicapped the various whaling companies' needs to cover spiralling costs. Examples of this include keeping open the Antarctic sanctuary beyond the three years recommended by the Scientific Sub-Committee<sup>94)</sup> (which had the general support of the commission), the widespread opposition to the Scientific Committee proposal for the protection of North Atlantic and North Pacific blue whales after 1955,<sup>95)</sup> and also the general unwillingness of the Antarctic whaling nations to compromise over their individual shares of the proposed Antarctic quota — thereby causing negotiations to fail.

In effect, the Antarctic whaling members, who largely dominated the IWC's policies during this period, were applying the central tenet of what would later become recognised as the precautionary principle in reverse, which is to say that rather than stipulating that uncertainty should not be used to prevent measures being enforced to avoid possible environmental damage, they were instead arguing that advice involving uncertainty should not be used to



enforce policies which could damage the industry. Ironically, both positions are essentially precautionary in their intent with the only major difference being the designated focus of the intended protection (i. e. the environment or the industry). Over the next two decades, however, a significant change in the IWC's focus and priorities occurred and the effects this change had upon perceptions of scientific advice and uncertainty within the commission is an issue that will be examined in some detail in later papers.

#### Notes

- 1) K. R. Allen, *Conservation and Management of Whales* (Seattle: University of Washington Press & Butterworths, London, 1980), pp. 12-14.
- 2) For detailed discussions of the economic circumstances of whaling in the post-war period, see J. N. Tonnessen & A. O. Johnsen, *The History of Modern Whaling* (Berkeley: University of California Press, 1982), chapters 28-31, and G. L. Small, *The Blue Whale* (Columbia University Press, 1971), especially chapter 1.
- 3) During the 1930s, in response to the huge Antarctic catches being made during this period and the effect this had on the price of whale oil, several international agreements intended to regulate the whaling industry were reached. These included the 1931 Geneva Convention for the Regulation of Whaling (several whaling countries including Japan, Germany and the USSR did not sign), an agreement between the whaling companies in 1932 to limit whale oil production, which led to the adoption of the Blue Whale Unit (BWU), a bilateral governmental agreement between Norway and Great Britain to limit their national industries in 1936 (several additional countries agreed to these limits in 1937 at a conference created by Norway) and the signing of further protocols on the original convention in 1938 and 1939. See J. E. Scarff, "The International management of Whales, Dolphins, and Porpoises: An Interdisciplinary Assessment (Part One)", *Ecology Law Quarterly*, vol. 6, No. 323 (1977), pp. 349-51; R. Gambell, "The IWC and the Contemporary Whaling Debate" in J. R. Twiss Jr. & R. R. Reeves (eds.), *Conservation and Management of Marine Mammals* (Washington: Smithsonian Institution Press, 1999), p. 181; Tonnessen & Johnsen, *The History of Modern Whaling*, chapters 24-26; and D. H. Cushing, *The Provident Sea* (Cambridge: Cambridge University Press, 1988), pp. 155-56.
- 4) See Scarff, "The International management of Whales, Dolphins, and Porpoises", pp. 349-51; and Tonnessen & Johnsen, *The History of Modern Whaling*, chapters 24-26.
- 5) Tonnessen & Johnsen, *The History of Modern Whaling*, pp. 512-520.
- 6) *Ibid.*, p. 492.
- 7) Whales, generally classified as Cetacea, can be separated into the two main groups: baleen (Mysticeti) and toothed whales (Odontoceti). There are ten species of baleen and sixty-five species of toothed whales (the largest being the sperm whale). The three families of baleen whale are: a) the medium-sized and slow swimming right whales. The larger species inhabits only the northern hemisphere and is known as the Greenland right whale or the closely related bowhead whale, while the smaller species, the southern right whale, inhabits only the southern hemisphere; b) the gray whales, which inhabit only the northern hemisphere, and the humpback whales which are found worldwide. Both these whales are also medium-sized and also relatively slow swimming; and c) the mostly larger and faster swimming rorqual whales, including the blue, fin, sei, Bryde's whale and the much smaller minke — all of which belong to the genus Balaenoptera. See Allen, *Conservation and Management of Whales*, pp. 2-3.

- 8) Sperm whale oil is actually more like a form of liquid wax and is often referred to as "sperm oil" to distinguish it from the edible whale oil taken from the baleen whales. Thus, sperm oil was used only for lighting and as a high-grade machine oil. The meat of the sperm whale, unlike that of the baleen whales, also was not favoured for consumption by the Japanese although some meat was sold on the domestic market. Allen has suggested that the adoption of mineral oil over sperm oil for lighting, etc, that occurred after the discovery of oil in Texas in the mid-1800s, may account for the decline in sperm catches at this time. Allen adds, however, that the situation is unclear and also could have been caused by depletion of stocks. See Allen, *Conservation and Management of Whales*, pp. 12 & 16; Tonnessen & Johnsen, *The History of Modern Whaling*, pp. 7 & 228; and Small, *The Blue Whale*, p. 96.
- 9) Allen, *Conservation and Management of Whales*, p. 12.
- 10) See note 9 above.
- 11) By the beginning of the 20<sup>th</sup> century the whaling industry looked as though it would die a natural death due to the growing scarcity of whales and also declining demand for whale oil, caused by the discovery of mineral oil substitutes. Two important factors, however, allowed whaling to survive: the opening of the Antarctic made possible by the new ship building technology and hunting methods; and the invention of a practical hydrogenation process, which made whale oil — previously used only for lighting and industrial purposes due to its "fluid form, poor quality and objectionable smell and taste" — suitable as a fat for producing margarine. In 1900, the world production of whale oil stood at only 87 300 barrels. But by 1910, the year the hydrogenation process reached mass production capability, world production had increased to 316 300 barrels in response to the burgeoning global demand for edible fats, particularly margarine. See Tonnessen & Johnsen, *The History of Modern Whaling*, pp. 227-36.
- 12) The 1931 Geneva convention, which was not widely observed, protected right whales and females with calves in addition to requiring the licensing of whaling vessels and the collection of statistics. The 1937 agreement (also known as the First International Whaling Convention) had more support from whaling nations than the 1931 agreement and added grey whales to the list of protected whales, while also establishing the first "defined" Antarctic season. This agreement, which lasted for only one year, was renewed in 1938 with the added provisions of protection for southern hemisphere humpback whales (though only from pelagic and not coastal whaling) and the establishment of the Antarctic Sanctuary area, which remained in place until the 1950s. See Allen, *Conservation and Management of Whales*, pp. 23-24 and Tonnessen & Johnsen, *The History of Modern Whaling*, especially chapters 24, 25 & 26.
- 13) Tonnessen & Johnsen, *The History of Modern Whaling*, pp. 513-18.
- 14) *Ibid.*, pp. 526-29.
- 15) The Blue Whale Unit (BWU) was adopted for the first time in the 1932 production agreement between whaling companies that was intended to avoid a reoccurrence of the 1931 drop in prices caused by over-production of whale oil. The blue whale had the highest yield and therefore became the standard against which other whales were measured (i. e. one blue whale unit=one blue whale=2 fin whales=2.5 humpback=6 sei whales). Shore stations and floating were restricted to quotas (the first time quotas on production and whales killed had been introduced) based on the number of barrels which must be extracted from each BWU taken. The intention was to reduce the 1930-31 season's barrel total by two-thirds or more and to also make more efficient use of each whale. Thus, the number of BWUs was arrived at by dividing the number of barrels desired by the number of barrels required to be taken from each whale (110 in 1932 and

- then 115 in 1933). This formula resulted in an overall quota of 18 584 BWU for the 1932-33 season and 17 074 for the following season. See Tonnessen & Johnsen, *The History of Modern Whaling*, pp. 402-05.
- 16) See the Schedule of the inaugural 1949 IWC meeting in IWC Report 1, 1950, p. 15.
  - 17) Small, *The Blue Whale*, pp. 91-93.
  - 18) Although some discussions of whaling during this time have given the impression that whaling ceased during the Second World War, Britain and Norway did in fact continue pelagic hunts in the Antarctic and elsewhere during the war but at greatly reduced levels. According to Tonnessen & Johnsen, "During the four seasons 1941-45 a total of some 7,000 whales were killed in the Antarctic, less than a fifth of the last peace-time season, 1938-39." While whaling continued "without serious restriction" off the coasts of South Africa and Japan, "the two largest whaling grounds outside the Antarctic." See Tonnessen & Johnsen, *The History of Modern Whaling*, pp. 472-77.
  - 19) Tonnessen & Johnsen, *The History of Modern Whaling*, pp. 529-34 & W. G. Beasley, *The Modern History of Japan* (London: Weidenfeld and Nicolson, 1981 3<sup>rd</sup> ed.), p. 291.
  - 20) Nineteen countries attended the Washington Conference with fourteen sending delegations and five sending observers. Of the seventy-two people in attendance, twenty-nine came from the US (9), Great Britain (12) and Norway (8), representing the largest delegations at the conference. See Tonnessen & Johnsen, *The History of Modern Whaling*, p. 499 and Scarff, "The International management of Whales, Dolphins, and Porpoises", pp. 352-53.
  - 21) The 1944 London conference was the first agreement where the 16 000 BWU quota was mentioned. The 1945 meeting was better attended than the previous year's meeting with "forty-six delegates from twelve countries and was focused primarily on the issue of the European fats crisis and the creation of a control system for whaling capable of dealing with the shortage. See Tonnessen & Johnsen, *The History of Modern Whaling*, pp. 490 & 494 ; also P. Birnie, *International Regulation of Whaling: From Conservation of Whaling to Conservation of Whales and Regulation of Whale Watching, Volume I* (New York: Oceana Publications, 1985), pp. 131-41.
  - 22) See IWC Report 1, 1950, Appendix I, for the full text of the 1946 International Convention For the Regulation of Whaling.
  - 23) Tonnessen & Johnsen, *The History of Modern Whaling*, pp. 492-93.
  - 24) Another whaling operation to have remained undaunted by Norway's efforts was that of Aristotle Onassis whose ships were registered under the flags of Panama and Honduras and crewed by Germans and Norwegians. Onassis' whaling operations, which continued until 1954, significantly increased the competition for the 16 000 BWU and also were unrestrained by the IWC's attempts at regulation. See Tonnessen & Johnsen, *The History of Modern Whaling*, pp. 534-38.
  - 25) *Ibid.*, pp. 521-525.
  - 26) Allen, *Conservation and Management of Whales*, p. 15.
  - 27) Tonnessen & Johnsen, *The History of Modern Whaling*, p. 521.
  - 28) Japan's whaling industry, unlike any of its competitors, benefited from both government financial assistance and exclusive access to a strong domestic market for whale meat. See Small, *The Blue Whale*, pp. 100-03 & 154-55.
  - 29) Australia, Canada, France, Iceland, Netherlands, Norway, Panama, South Africa, Sweden, the UK, USA, and the USSR. IWC First Report, 1950, Appendix 1, p. 3.
  - 30) *Ibid.* p. 10.
  - 31) *Ibid.* p. 9.

- 32) Ibid. Article III, p. 10.
- 33) Ibid. Article V, p. 11.
- 34) Ibid. pp. 11-12.
- 35) See Sidney Holt, "The Whaling Game", *The Siren*, 35 December, 1987.
- 36) S. Andresen, "Science and Politics in the International Management of Whales", *Marine Policy*, (April 1989), p. 102.
- 37) According to the notion of "integrative bargaining and the veil of uncertainty", which is often cited in the regime theory literature, uncertainty, flexibility and ambiguity in negotiations make it easier for parties to co-operate on problem issues by promoting "intergrative or productive bargaining rather than distributive or positional bargaining." According to Young and Osherenko, "The veil of uncertainty refers to all those factors that make it difficult for individual participants to foresee how the operation of institutional arrangements will affect their interests over time. Individual parties' inability to predict a regime's impact on their welfare increases incentives to formulate provisions that are fair and equitable, which raises the probability that the parties can come up with institutional arrangements that are acceptable to all." Thus, "those engaged in regime formation may ... act to thicken the veil of uncertainty by lengthening the time that the regime is expected to remain operative, enlarging the set of issues at stake, changing the membership of the group ..., or devising ambiguous provisions open to later interpretation." See O. R. Young and G. Osherenko (eds.), "The Formation of International Regimes: Hypotheses and Cases" in *Polar Politics: Creating International Environmental Regimes* (Cornell University Press, 1993), p. 13. See also P. Birnie "International Environmental Law" in A. Hurrell & B. Kingsbury (eds.), *The International Politics of the Environment* (Oxford: Oxford University Press, 1992), pp. 52-54 ; and T. Brenton, *The Greening of Machiavelli* (London: Earthscan Publications, 1994), p. 102 for similar modes of bargaining concerning the Convention on International Trade in Endangered Species.
- 38) R. Gambell, "The Management of Whales and Whaling" IWC (publication details not known), p. 4.
- 39) Tonnessen & Johnsen, *The History of Modern Whaling*, p. 511.
- 40) IWC First Report, 1950, pp. 4 & 6.
- 41) IWC Third Report, 1952, p. 4.
- 42) According to Gambell, "The Scientific Committee meets during the two weeks before the Commission meeting; it may also hold special meetings during the year to consider particular topics. The information and advice it provides on the status of whale stocks form the basis on which the Commission develops whaling regulations. The Technical Committee is effectively a meeting of the entire Commission during which major items can go through a first round of discussion and, if necessary, be recommended to the Commission by simple majority. R. Gambell, "The IWC and the Contemporary Whaling Debate", p. 182.
- 43) See Birnie, *International Regulation of Whaling: From Conservation of Whaling to Conservation of Whales and Regulation of Whale Watching, Volume I*, pp. 177-79 for a succinct overview of the Scientific Committee's organisation up to the mid-1980s.
- 44) T. Schweder, *Intransigence, incompetence or political expediency? Dutch Scientists in the International Whaling Commission in the 1950s: Injection of Uncertainty*, IWC Scientific Committee paper SC/44/0 13, 1992. p. 6 and also Note 13.
- 45) See IWC Seventh Report, 1956, p. 18 for delaying of and eventual withdrawal of Scientific Committee request for conference funding in 1954 ; and also IWC Second Report, 1951, p. 6, for

- commission's rejection of funding request for publication of Scientific Committee reports.
- 46) Allen, *Conservation and Management of Whales*, p. 26.
  - 47) IWC First Report, 1950, p. 11.
  - 48) IWC Sixth Report, 1955, pp. 18-19.
  - 49) See IWC Seventh Report, 1956, pp. 23-24 & Birnie, *International Regulation of Whaling: From Conservation of Whaling to Conservation of Whales and Regulation of Whale Watching, Volume I*, pp. 227-228.
  - 50) Tonnessen & Johnsen, *The History of Modern Whaling*, p. 565.
  - 51) Cushing, *The Provident Sea*, p. 162.
  - 52) Tonnessen & Johnsen, *The History of Modern Whaling*, pp. 487-488.
  - 53) *Ibid.*, p. 491.
  - 54) IWC First report, 1950, Appendix III, p. 22.
  - 55) T. Schweder, "Distortion of Uncertainty in Science: Antarctic Fin Whales in the 1950s", *Journal of International Wildlife Law and Policy*, vol. 3 : 1, (2000), p. 78.
  - 56) G. Elliot, *Whaling 1937-1967: The International Control of Whale Stocks* (Massachusetts: Kendall Whaling Museum Monograph Series No. 10, 1997), p. 8.
  - 57) The ban on pelagic hunting of humpbacks was lifted in 1949. At this time the humpback became the first species to be managed by a species-specific quota which was set at 1 250 at the 1949 meeting. The rationale behind the lifting of the ban, which allowed humpbacks to be hunted in the Antarctic for the first time in a decade, was to relieve pressure on the blue whale stocks. Australia, however, where humpbacks were hunted from land stations on the eastern and western Australian coasts, opposed the move. IWC First Report, 1950, p. 28.
  - 58) See First (1950), Second (1951) and Third (1952) IWC Reports.
  - 59) Berger Bergersen quoted in Birnie, *International Regulation of Whaling: From Conservation of Whaling to Conservation of Whales and Regulation of Whale Watching, Volume I*, p. 217.
  - 60) *Ibid.*, p. 217.
  - 61) IWC Fourth Report, 1952, p. 8 and Birnie, *International Regulation of Whaling: From Conservation of Whaling to Conservation of Whales and Regulation of Whale Watching, Volume I*, pp. 219-20.
  - 62) Allen, *Conservation and Management of Whales*, pp. 64-66.
  - 63) T. Schweder, "Distortion of Uncertainty in Science: Antarctic Fin Whales in the 1950s", p. 78 and Birnie, *International Regulation of Whaling: From Conservation of Whaling to Conservation of Whales and Regulation of Whale Watching, Volume I*, p. 221.
  - 64) T. Schweder, "Distortion of Uncertainty in Science: Antarctic Fin Whales in the 1950s", p. 79.
  - 65) See IWC Fifth Report, 1954, p. 3 and Birnie, *International Regulation of Whaling: From Conservation of Whaling to Conservation of Whales and Regulation of Whale Watching, Volume I*, p. 221.
  - 66) IWC Sixth Report, 1955, p. 20.
  - 67) Tonnessen & Johnsen, *The History of Modern Whaling*, p. 549-552 and IWC First Report, 1950, p. 28.
  - 68) IWC Sixth Report, 1955, p. 15.
  - 69) *Ibid.*, p. 19.
  - 70) *Ibid.*, pp. 19-20.
  - 71) *Ibid.*, p. 20.
  - 72) *Ibid.*

- 73) IWC Seventh Report, 1956, pp. 23-24.
- 74) Schweder, "Distortion of Uncertainty in Science: Antarctic Fin Whales in the 1950s", p. 80. See also Birnie, *International Regulation of Whaling: From Conservation of Whaling to Conservation of Whales and Regulation of Whale Watching, Volume I*, p. 228.
- 75) IWC Seventh Report, 1956, p. 6.
- 76) Ibid.
- 77) Ibid. The situation here is unclear in that the IWC annual report and other sources report only seven objections (see IWC Eighth Report, 1957, p. 12) and do not include the original Dutch objection I have quoted on page 24 (which makes a total of eight). It appears highly unlikely that the Dutch commissioner would not have maintained an objection to the quota reduction and that the other governments would have done so alone, given the Dutch propensity for opposing quota reductions and also the fact that the Dutch commissioner initially voted against the reduction while some of the objecting governments originally voted for it. 78) IWC Sixth Report, 1955., p. 20.
- 79) Ibid.
- 80) UK commissioner Mr. Wall speaking at the Technical Committee meeting during the IWC's 1955 annual meeting in Moscow. Quoted in Birnie, *International Regulation of Whaling: From Conservation of Whaling to Conservation of Whales and Regulation of Whale Watching, Volume I*, p. 229.
- 81) Tonnessen & Johnsen, *The History of Modern Whaling*, p. 575.
- 82) Ibid., p. 564.
- 83) IWC Eighth Report, 1957, p. 12.
- 84) Ibid.
- 85) Ibid., p. 19.
- 86) Ibid.
- 87) IWC Ninth Report, 1958, p. 3.
- 88) Ibid.
- 89) IWC Tenth Report, 1959, p. 3.
- 90) Schweder, "Distortion of Uncertainty in Science: Antarctic Fin Whales in the 1950s", p. 88. (personal correspondence by the author with Laws)
- 91) Tonnessen & Johnsen, *The History of Modern Whaling*, p. 585.
- 92) IWC First Report, 1950, p. 11.
- 93) Elliot. *Whaling 1937-1967: The International Control of Whale Stocks*, p. 11.
- 94) This recommendation to open the sanctuary was opposed by the Soviet commissioner. See IWC Sixth Report, 1955, p. 19.
- 95) IWC Seventh Report, 1956, p. 19.