SAMPLE

Building the Fisheries Infrastructure of Tomorrow

Anatomy of the Machine That Brings the Sea Ashore

Aiman JoeHanz

Free sample: Introduction & Chapter 1

putrabooks.github.io

Buy the full book:

Carousell carousell.sg/p/building-the-fisheries-infrastructure-of-tomorrow-ebook-pdf-1471323755

Ko-fi

Payhip

Contents

IntroductionIntroduction

Chapter 1: The Stock — Where the Sea Is Counted Before It Is CaughtChapter 1: The Sto

Chapter 2: The License — Where a Boat Earns Its PapersChapter 2: The License — Wher

Chapter 3: The Ground — Where Fishing Is Allowed and ForbiddenChapter 3: The Groun

Chapter 4: The Net — Where the Gear Is Judged Before It Judges the FishChapter 4: The

Chapter 5: The Boat — Where the Crew Is Kept SafeChapter 5: The Boat — Where the C

Chapter 6: The Landing — Where the Catch Meets the ShoreChapter 6: The Landing — W

Chapter 7: The Auction — Where the Day's Fish Is Priced in the OpenChapter 7: The Auc

Chapter 8: The Trace — Where Every Box Carries Its Own PapersChapter 8: The Trace –

Chapter 9: The Patrol — Where the Rules Are Kept Two Hundred Miles From Any CourtC

Chapter 10: The Ledger — Where the Sea's Accounts Are Published to the People Who O

IntroductionIntroduction

A plate of fish arrives at a table, grilled, portioned, priced, and the diner divides the price between the fisherman who caught it and the shop that cooked it, supposing the sea gave its share freely, as a field gives a harvest to whoever planted it. The working truth is that the sea gave nothing freely, or gave it only because a machine stood between the boat and the water and decided, before a single net was shot, how much the sea could lose this season and still be the sea next season. That decision is the least visible act in the whole journey of the fish, and it is the act this book exists to explain, because the machinery behind it is enormous, old, and mostly unknown to the people whose dinners it stocks: the surveys that count what swims before it is caught, the licenses that decide who may fish at all, the closed grounds and seasons that fence the water like fences of land, the gear rules that judge the net before the net judges the fish, the safety certificates that send crews out alive, the landing quays where the catch is weighed and iced, the auction halls where the price is discovered, the paper trail that follows a fillet back to a tow, the patrols that keep the rules where no policeman can stand, and the published accounts that tell a nation whether its sea is being spent or farmed. A reader who keeps only the fisherman-and-shop picture has no way to ask the questions the machine exists to answer: who counted the fish, who let the boats out, which ground was closed and why, and which number, on which desk, decided that this season would be shorter than the last.

What follows dismantles the machine piece by piece, shadowing one small family trawler and its harbor through a single difficult week in which the season's science collides with the town's livelihood. The stock, where the sea is counted before it is caught. The license, where a boat is made known to the machine and given its entitlement. The ground, where the water itself is fenced into zones, seasons, and sanctuaries. The net, where the gear is judged legal before it enters the water. The boat, where the crew is certified to survive what the sea does. The landing, where the catch meets shore, ice, and scale. The auction, where the day's fish finds a price in the open. The trace, where every box travels with its own papers. The patrol, where the rules are kept a long way from any courthouse. And the ledger, where the sea's accounts are read by the people who own the water. Ten organs, each holding a craft practised nowhere else, each guarding a gate no other organ guards, and each failing, when it fails, in its own signature way that the next layer must absorb.

Two vows govern the telling, and both are renewed deliberately. No nation is

named, no fleet is quoted from any living coastline, no collapse is hung on any real fishery, and no year appears anywhere in these pages, because the anatomy outlasts whichever minister holds the portfolio when the book is read, and a reader in possession of this anatomy can interrogate any fisheries ministry, any auction floor, and any patrol vessel in plain speech, beneath any flag, at any harbor's edge. And the worked material is invented but disciplined: one standing example, a fictional national Fisheries Authority responsible for a stretch of composite coast with one working harbor town on it, a town of perhaps three hundred boats, a shipwright, an ice plant, an auction floor, and a chapel, follows one week of one trawler family's season, a misgraded landing on the Monday, a quota ruling on the Tuesday, a patrol boarding at dawn, and a market that prices all of it by Friday. Nothing in the week hangs loose; every custom, dispute, and account stands on habits fisheries authorities record about their own working, and a reader who stumbles on their own coastline inside one of these cases has read it precisely the way it was built to be read.

Numbers deserve a word before the first one appears. Each figure ahead is a working drill, assembled from proportions the trade itself reasons with rather than from any real survey's printed table; the sums are rounded by design and offered as magnitudes, never as quotations, and the reader who wants a live fishery's actual figures will find the questions, gathered wherever each organ opens, that would pull them out of their own authority's published assessments.

A single sentence underwrites everything ahead, and the volume stakes itself on it. A fishery is not a harvest but a withdrawal from a living account nobody owns and everybody inherits, and each organ downstream licenses, fences, judges, certifies, weighs, prices, papers, polices, or publishes whatever the organ above it allowed, rarely able to see the whole school each box of fish was lifted from. An authority that grasps this runs the count, the license, and the patrol as one instrument; a machine that forgets it lets every organ fish the stock twice, once with a net and once with optimism, the oldest way a fishery dies, and the chapters ahead exist to cancel that second trip, organ by organ, account by account.

The book asks a further patience of its reader, and the asking should be honest about the reward. The machine's organs are described one per chapter, but the machine itself is only visible when the chapters are read as one instrument: the count that licenses the fleet, the fleet that works the ground, the ground that shapes the gear, the gear that carries the boat's risk,

the boat that feeds the landing, the landing that feeds the bell, and the papers, the patrol, and the ledger that keep every one of those links honest in the order they were described, the anatomy being a single argument rather than a collection of essays, and the reader who jumps to the chapter that touches their own trade being welcomed, provided they then walk backward to the organ that set their season's number, since the machine's failures, like its strengths, are always shared between organs, and the complaint that blames the nearest organ for a distant organ's work being the fishery's most common and most expensive misreading.

Chapter 1: The Stock — Where the Sea Is Counted Before It Is CaughtChapter 1: The Stock — Where the Sea Is Counted Before It Is Caught

Counting begins the machine, and the paradox that opens this anatomy sits in the hold of a research vessel: the only commodity a nation counts before it owns it, in the only warehouse nobody can walk, where the goods swim away from the stocktakers, breed between the aisles, and die of old age unsold, is wild fish. The layer's work, compressed into a sentence, is to turn a moving, invisible, inherited population into a number cautious enough to fish from, and almost every collapse the trade has ever recorded began either in this layer's absence or in its presence and its ignoring, a number honestly made and dishonestly spent, which is why the survey scientist, the least photographed officer in the whole fisheries machine, holds the franchise on every fillet the remaining nine chapters will follow.

The survey voyage is this layer's opening organ, and its instrument is the grid. Twice a season, while the fleet is elsewhere, the Authority's research vessel works a grid across the same grounds the trawlers tow, station by station, year after year, the same stations, because comparison is the entire craft: a standard net shot for a standard half hour at a standard speed, the catch sorted and weighed species by species, lengths measured by the hundred, otoliths, the fish's own ear bones, pulled from a sample of every kind, because a fish carries its age in its skull the way a tree carries it in its trunk, and a scientist who reads ten thousand ear bones across a decade knows the year the big classes were born, the year they were not, and, reading the present sample, whether the young are coming up behind the old. Alongside the trawl runs the acoustics, a hull-mounted instrument that pings downward and reads the echoes, the swim bladders of the fish returning a fainter or louder shadow, converting sound into tons per square mile, and the two methods argue with each other on purpose, since a trawl catches what the net can hold and an echo counts what the water holds, and the truth, as the survey's oldest habit goes, swims somewhere between the two.

The grid's true capital is not any single voyage but the series, the same stations returned to across decades, and the sameness has a reason behind it that deserves stating outright, the survey's deepest engineering being the discipline of repetition. A stock assessed once is a snapshot, and a snapshot cannot tell movement from decline; a stock assessed at the same sixty

stations for thirty seasons is a film, and the film shows the difference between a bad year and a bad decade, between a fishery that wobbles and one that is sliding, the two conditions demanding opposite medicine. This is why the survey vessel holds its grid through boredom and storm alike, and why the Authority refuses to move its stations toward where the fish have gone, the temptation being the oldest one in the counting house, to sample what is easy and call it what is true; the stations are fixed precisely because the fish are not, and a wandering gauge measures nothing but its own willingness to please.

The second organ is the assessment, and the instrument is the model, the working arithmetic by which three data streams become one number. The survey gives the machine its present: how many tons, of what ages, on which grounds. The fleet's own landings give it the machine's account of itself: every box weighed at the quay, every logbook page, the catch per tow falling year over year being the oldest alarm in the trade, the fleet's gear as a survey instrument, unpaid and honest precisely until it is not, since a fleet fishing the same fish harder for fewer fish is either fishing worse or fishing a sea that is emptying, and the model must decide which. And the biology gives the machine its clock: how fast each species grows, how old it must be before it breeds, how many eggs a mature female carries, and the arithmetic that follows, brutal in its simplicity, that a stock fished faster than it breeds is a bank account drawn down, and a stock fished slower than it breeds is interest left on the table. The assessor's craft is to argue these three streams into one another, to publish the argument, and to sign it, and the model's honest output is not a number but a range, the caution band, the admission that the sea was counted through a net and a hull and a guess, the width of the band being the width of the honesty.

The young classes' failures call for a paragraph of their own, since the sea's arithmetic obeys drivers no quota can manage. A fish spawns into a moving room: the current that carries its eggs, the timing of the plankton bloom the larvae must find within weeks of hatching, the temperature band that decides whether the whole investment of a mature female's million eggs survives its first month, and none of these drivers answers to any ministry. A warm decade can starve a stock's offspring three years running while the adult fish, uncaught and healthy, swim over grounds that look full to every fisherman aboard, the emptiness waiting silently in the year-classes that never arrived; and a cold spring, equally unearned, can deliver a class so strong that the scientists who counted it counsel restraint anyway, the great year being a gift

the sea gives at most once a decade and spends in one. The assessment's humility before these forces is not weakness but the model's central honesty: the count is the machine's own instrument, and the ocean's weather is the machine's given world, the fishery managed inside a season the sea sets entirely by itself.

The third organ is the quota, and the instrument is the harvest rule, the standing formula that converts the assessment's range into this season's tonnage before the politics begin. The mature machine publishes the rule before it publishes the number, and the rule's discipline is the layer's whole gift to the fleet below: the rule is written in calm years, when nobody is watching, and obeyed in hard years, when everybody is, because a harvest rule drafted during a crisis is a negotiation, and a rule that bends to a bad season's economics was never a rule, only a delay. Under the rule sits the total, the season's permitted catch, and under the total sits allocation, the share-out among the fleets and ports, the layer's most political hour: how the water's permission is divided among the big operators and the family boats, the near-shore and the deep-water, the town whose fishery is its whole economy and the port that barely notices the season, every allocation a promise made to a community, and every allocation's shadow, the tonnage left unallocated because the rule said the sea needed it back, being the layer's second and quieter product.

Allocation carries instruments of its own, shapes the reader will want to know before they surface again in every chapter that divides the sea's permission. In the mature machine the shares attach to the boats themselves, a vessel's licence carrying its tonnage, its ground entitlement, and its percentage of the season's total in one folder, so that the fleet's whole claim on the water can be read from a harbor wall. The instruments solve three standing quarrels. The concentration problem, when a holding company quietly buys a harbor's fleet and a town wakes to discover its quota is owned by a distant office, is answered by ceilings on how much one hand may hold. The widow's problem, the half-boat that survives a skipper's death, is answered by transfer rules that let a family keep a share while the family decides whether fishing survives in it. And the newcomer's problem, the young crew with no boat and no share, is answered worst of all, most machines confessing openly that entry to the fishery is nearly closed, the shares having appreciated into the price of a house, a candor that will matter greatly at this book's auction and ledger.

The case this chapter works is the quota ruling, and it should be worked in full,

because it contains every organ at once. The survey voyage, the autumn one, came back with a bad autumn: the acoustic shadows thinner on the deepest stations, the young-class fish nearly absent from the trawl samples, the ear bones agreeing with both. The assessors ran the model, and the range came back lower than any range in the published series, low enough that the harvest rule, the one written in calm years, answered with a season shortened by five weeks, and the Authority announced it on a Tuesday, which is why Tuesday is the week's true hinge even though the book's calendar opened on a Monday quay. The town's response was the response the layer must always expect and can never prevent: the scientists were called desk men who had never smelled a net; the fleet's own skippers produced their logs, which showed, honestly, the best tow of the year in August, and the Authority's answer had to hold the argument in public, which is the modern machine's proudest and least comfortable craft: the good tow was published on the same page as the survey grid, and beside it the arithmetic of what one lucky tow proves and cannot prove, the single rich station against the hundred thin ones, the fish that gather where the last of them can find each other, which is the sea's cruelest illusion, the catch rising as the stock falls, the aggregation that hid more than one fishery's collapse from the very men who were catching it.

The ruling's reception was engineered as deliberately as the ruling itself, and the engineering deserves its own account, because the modern machine discovered that a number nobody co-signs is a number nobody obeys. The Authority's assessment panel seats two working skippers alongside the scientists, elected by the ports, serving fixed terms, holding full voting rights and no veto, and the town's man this season was the father of the family this book follows, an appointment the town had celebrated loudly at the time and remembered bitterly by Tuesday, since the panel's collective signature now sat under the shortened season with his own among them. He defended it at the harbor meeting in the fisherman's own arithmetic, not the scientist's: the survey grid is a net, he said, and we do not shoot our nets where the fish used to be, we shoot them where they are, and the autumn grid towed where they are and came up light; and the meeting hated him for it and re-elected him for it, in the same breath, the panel's co-authorship being the machine's social engineering at its most sincere, the count made governable by being made partly the fleet's own.

The Tuesday ruling's timing was itself an instrument, and the anatomy should record what "in time to plan" actually bought. Announced in autumn, the shortened season reached the town before the fit-out loans were drawn,

before the nets were re-hung and the ice plant was booked, and the family at this book's center made the arithmetic the Authority had hoped households would make: the older boat stayed on its mooring for the five lost weeks, the engines unserviced, the crew lent to the shipwright at winter rates, the younger son's share of the season worked aboard a neighbor's licensed vessel instead, the family's own quota resting unexercised like a field left fallow. None of it was painless, and the chapel's photograph was carried to one harbor meeting in a gesture everyone present understood; but the town planned, the loans held, and no boat was sold at the worst week of the winter, which is the difference between a ruling and a wrecking ball.

The layer's history deserves its paragraph, since the organ is young and the absence is old. Through nearly all of the machine's history nobody counted at all: the sea was called inexhaustible by the very men emptying it, and the first surveys were commissioned by governments who wanted to find more fish, not fewer, the science arriving on deck only after the great flat grounds of one northern sea had folded in a single decade, a fishery that had fed a continent for four hundred years closing like a hand, and the lesson the whole trade wrote down, the sentence every assessment since has carried somewhere in its method, is that the sea's generosity is a stock, the stock is a number, and the number must be counted by somebody whose salary does not depend on the answer. The collapse never fully recovered; the town on this book's coast keeps a photograph of the great fishery in its chapel as other coasts keep their own, nameless here per the volume's vow, and the photograph's caption, the trade's whole history in one line, reads as a question rather than an epitaph, whether the counting came too late everywhere, or only almost everywhere.

The handoff to the layer below should be stated exactly, since the remaining chapters inherit it. The stock layer passes downward a number and a permission, the season's tonnage, split by allocation, and it passes the fleet upward its own data, the landings and logs without which the model is half blind, the fleet and the science being one machine's two hands holding the same fish, the gear of one the gauge of the other. The handoff's failure mode is inherited too: the number travels with its caution band, and every layer below will be tempted to spend the point of the range and ignore its width, the temptation being the machine's oldest leak, authority after authority having fished the optimistic edge of a cautious science until the band, and the fleet, closed on them.

A drill in rounded figures belongs here, the reader's first, run on the trade's

own arithmetic. Take a stock whose unfished weight, the tonnage the water held before any boat worked it, is set at a round one hundred thousand tons; take the growth engine, the surplus the stock adds each year through breeding and fattening, at a working fifth of the stock's present weight; and take the harvest rule at the cautious half of the surplus, never fishing more than half of what the sea grew last season. In the first modelled decade the stock settles and the fleet lands ten thousand tons a year, the interest, sustainably drawn. Now let the reader mismanage honestly: raise the catch to the full surplus and the stock holds, on paper, exactly steady, but with no margin, and let one bad breeding year, which the sea provides without being asked, cut the young class by half, and the reader watches the arithmetic tip, the surplus shrinking under the stock, the same catch suddenly a withdrawal of principal, the band that was once caution now collapse's doorway, and the drill's lesson, worked with the reader's own pencil, is the one the harvest rule exists to make automatic: that the difference between fishing the interest and fishing the stock is a fifth of a tonnage, one bad year wide, and invisible to anyone counting only the landings, which is why the machine counts the sea and not the quay.

Let the reader run the drill's second movement, the recovery, since a stock that fell is the ordinary case and the rebuilding is the machine's real work. Cut the catch to a tenth of the surplus and hold it there through the reader's own impatience: the stock climbs at the growth engine's own pace, not the fleet's, and the arithmetic returns a fishery rebuilt to working weight only after the better part of a decade, during which the same fleet, boats and loans and crews, must live on a tenth of the catch that sank it. This is the drill's hard discovery, and the machine's hardest office: the recovery is always slower than the collapse, the stock spent in five seasons rebuilding in fifteen, and the town that loses five weeks of one season should count itself lucky against the town that must survive a decade at a tenth, the Tuesday ruling being, in the arithmetic of the whole trade, the cheap version of the sea's discipline.

What the layer cannot do must be said plainly, because the organ's honesty is the whole book's foundation and foundations should be audited. The count cannot see everything: the survey grid samples a sea that moves through it, the acoustics misread the deep scattering layer, and the model, for all its ears and echoes, is a careful argument about a warehouse nobody can walk. The count cannot act: the assessment produces a range, and a range has never arrested a boat, the power living in the nine layers below, and a brilliant science feeding a weak patrol is a thermometer informing nobody. And the

count cannot outrun the sea's own tempo: a stock assessed in autumn is fished on a decision drafted years earlier, the model's lag being biology's, the fish breeding at their own speed regardless of the deadline the fleet's banks prefer, so the layer's deepest limit is time, and the machine's answer to it is the standing grid, the same stations, year over year, patience as instrumentation.

One further limit belongs to the models' own disagreement, since the modern count is less a number than an argument among models. Where one assessment runs a single set of equations, the mature authority runs several, each built on different assumptions about how the young recruit and the old die, and publishes the spread among them as the number's own shadow, the honest authority trusting the models most when they agree and the science least when a single model stands alone; and the reader should treat any assessment that reports one confident figure without its ensemble the way a harbourmaster treats a single sounding in fog, as a reason to slow down rather than a promise of depth.

The duty owed downward closes the layer, and the debt should be named as the book's first. The count owes the fleet the truth early: the shortened season announced before the boats are fitted out and the loans are drawn, since a quota cut delivered after the gear is bought is not management but confiscation, and the Authority's Tuesday ruling, whatever else it costs the town, was published in time for the town to plan, which is the difference between an authority and an ambush. The count owes the fleet its method: the grid, the rule, and the band published as the fisherman's own inheritance, the old skipper in this week's case, the father of the family the book follows, having sat on the Authority's assessment panel for one term and voted against his own town's interest exactly once, which is the layer's quiet triumph, a fisherman's signature on a scientist's caution. And the count owes the sea a future with fish in it, which is the organ's whole reason for existing, the survey grid's second and final product, after the tonnage, being the next decade's baseline, the count being the one instrument in the machine built to outlive the fleet that pays for it, the sea counted today on credit from the sea of twenty years on, the ledger of the living borrowed from the ledger of the unborn, and the first chapter's debt, like the volume's first organ, is the one all nine that follow stand on.

The interval deserves its own drill, because the public reads the count's figure and never its spread, and the spread is where the machine's honesty lives.

Suppose the survey reads the stock at a round hundred thousand tons, with an honest interval running from eighty to a hundred and twenty: the quota set at the point of the estimate is a number, and the quota set at the interval's floor is a policy, the difference between the two being a season the sea may or may not be able to afford, and the mature machine's settled choice — argued from every fleet's hardest years and never regretted loudly — is the floor, the count's uncertainty being charged to the fleet's patience rather than to the sea's capital, since the interval narrows every year the surveys continue and never forgives the season it was ignored, the reader who runs the arithmetic both ways discovering the whole modern quarrel about precaution in one afternoon of pencil work, and the fleet that was given the larger quota discovering, in the lean surveys that follow, that the interval was the cheapest thing it ever borrowed against.

The survey's two instruments deserve a final comparison, because the modern count is built from their disagreement rather than from either alone. The research tow drags a measured net through a measured water and counts what it catches, converting sample to sea by an arithmetic the whole fleet can audit; the acoustic survey reads the water with sound, painting the fish that never see a net as echoes on a chart, converting echo to biomass by an arithmetic only the physicists can audit in full. Each instrument corrects the other's signature flaw — the net misses the fish that avoid nets, the sound miscounts the fish that look like water — and the mature machine runs both on the same water in the same season and publishes the gap between them as part of the count's honest interval, the reader who wants to know whether the science is trustworthy being invited to watch two instruments that cannot collude disagree by a working fifth every season and still, over the decade, tell the same story, the disagreement being the audit, and the count that reported perfect agreement between two different instruments being, in the machine's whole experience, not a triumph but a forgery.

The count's timing is its own honesty, and the paragraph should defend the calendar, because the sea is not equally readable in every month and the machine's honesty lives in the schedule's discipline. The survey run before the season counts the stock that will face the fleet; the survey run after it counts the stock that survived, and the two figures bracket the season like a hand around a pulse, the machine's settled custom being to count on the same water in the same weeks every year, since a count moved to the convenient month is a count that can be argued with about the weather rather than about the fish, and the survey's whole credibility resting on the fleet's certain

knowledge of when it happens, the way the auction's rests on the bell's hour: not because the date is sacred, but because an instrument that moves is an instrument that can be moved.

ABOUT THE AUTHOR

The author writes the infrastructure behind ordinary life, the systems so constant they escape notice. This series and its companion volumes have opened the machinery of work, money, learning, healing, travel, faith, and government; the present book turns to the harvest of the sea, the only larder the human race never planted, and the ten-organ machine that keeps the harvest from being a raid.