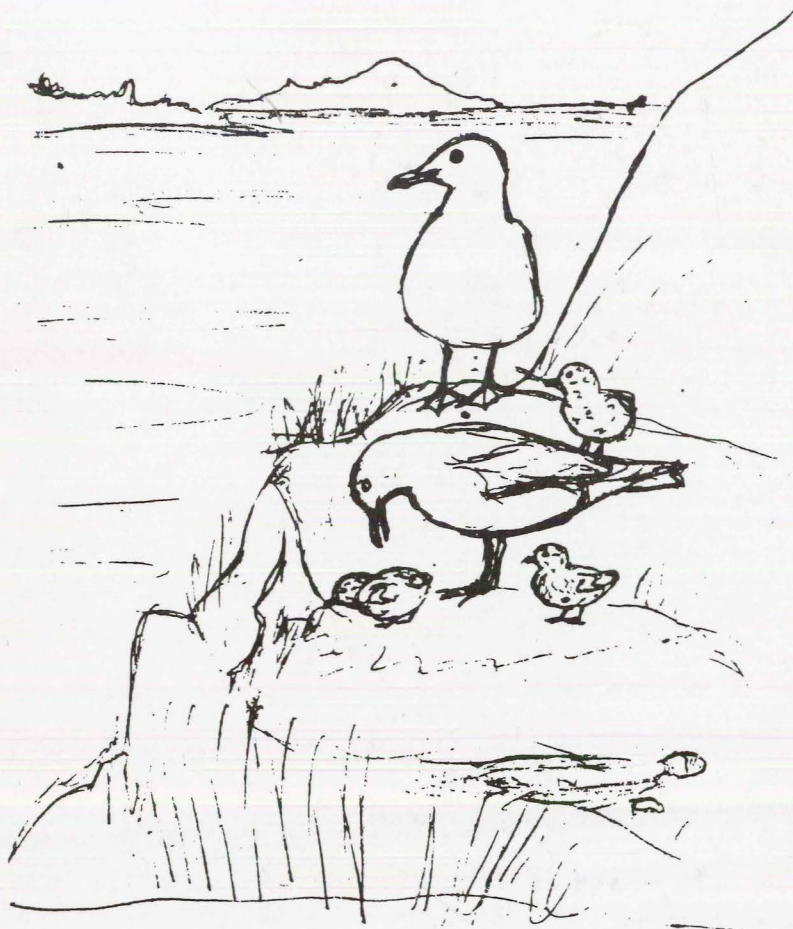


ON THE WINGS OF THE WILD WIND

Zella M. Schultz



Occasional Paper #21
Center for Pacific Northwest Studies

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by
Zella M. Schultz

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EDITOR'S INTRODUCTION

I first learned of the work of Zella Schultz through Eleanor Stopps who lives at Mats Mats Bay on the Olympic Peninsula. Some of Zella's paintings had been reproduced in limited editions, and Eleanor was involved in selling them to laymen such as me. The purpose was not to fill someone's personal coffer, but to raise funds to help save Protection Island from development and other pursuits for our wildlife. It also allowed people like me to enjoy Zella's fine artistry.

My wife and I would take periodic trips to visit with the Stopps; each time we returned home we had several more pictures of birds to adorn our walls, as well as much more information on the continuing effort to have Protection Island designated a wild bird sanctuary. It became evident that Eleanor Stopps, inspired by Zella, was leading the effort. And as those who know Eleanor recognize, she is a person who inspires the best we have to offer: she is not just a one-person crusade for birds. She has depth that is enhanced by persistence and humility, and is a leader who is also willing to follow.

Of course, Eleanor would be the first to admit that she wasn't the only person involved. Many individuals and organizations were behind this effort. However, I feel her persistence on behalf of an ideal of Zella's was what eventually led Congress to designate Protection Island as a wildlife refuge. She is a prime example of "citizen" effecting change.

During one of our conversations, Eleanor mentioned that she had an unpublished manuscript Zella had written, and asked if I would be interested in looking at it; of course I said "Yes." From this I learned that Zella had attended Western Washington University in Bellingham and later the University of Washington where she received a graduate degree in zoology. But what surprised me the most was that Zella was born in Whatcom County and had grown up in Everson. (That's right next door to my home town of Lynden.)

After reading the manuscript--which Eleanor had patiently typed--I suggested that the Center for Pacific Northwest Studies at Western Washington University might be interested in publishing it. As Secretary to the Advisory Board of the Center, I knew the people to call, and the response was affirmative.

What you are reading, then, is something that has evolved over a lengthy period of time, but due to the persistence of Eleanor Stopps, has now reached publication. As editor, I have enjoyed working with the manuscript--and with Eleanor. It has taken me longer than it takes a gull's egg to hatch, but I have greatly appreciated the opportunity to get so close to Zella Schultz through this work as earlier I had through her art. I know you too will be caught up in the acute observations she made. You will gain not only an understanding of Pinkfoot's life, but the life of Zella Schultz as well.

There are many people involved in this production. Gail Fox of the Bureau for Faculty Research, Western Washington University, took the edited manuscript and prepared it for printing. Earlier at Lake Stevens High School, students in Mrs. Jan Christensen's business classes placed the entire manuscript on computer diskettes to allow me more ease in editing. And James W. Scott, Director of the Center for Pacific Northwest Studies offered his assistance in various ways and coordinated the project. Dorothy Siewers and Laura Stopps Walker previewed the manuscript, a task also undertaken by Thais Bock, who also provided Zella's sketches for the book. Other illustrations were made available by Elizabeth Schultz Papove, who loaned us the original painting that is the frontispiece, and Lucille Munz, who provided the photograph of Zella used on the back cover.

Of course Eleanor Stopps deserves the thanks of all of us. Her love for Zella, for the birds of Washington and all other living creatures is exemplary and should be recognized here. The list of sponsors appended to this book is part of her doings. And to provide us with a glimpse of Zella's artistic ability, Eleanor located through Zella's family the painting of the Glaucous-winged gulls you find in this volume. Along with other original black and white illustrations, it adds a special quality to this book and tells us even more about the author, Zella Schultz.

I am sure every reader will come to value "On the Wings of the Wild Wind" and agree that it is a fine addition to publications about the Pacific Northwest.

David G. Tremaine
Lake Stevens, Washington
September, 1986

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A NOTE ON THE ILLUSTRATIONS

The black and white illustrations that appear at the end of certain chapters of the book are original drawings done by Zella Schultz at various times during her life. In almost all instances they were preliminary sketches executed in the field; in all of them she appears to have captured the moment with consummate skill.

FOREWORD

Shortly before the death of Zella Schultz in 1974 she gave me a rough draft of this manuscript and asked that I publish it "some day." For several years the manuscript accompanied my husband George and me on boat trips throughout the Pacific Northwest on our thirty-six-foot cruiser. There is hardly a harbor in Puget Sound, the San Juans, or the Canadian Gulf Islands where we didn't anchor, enjoying not only the magnificent scenery but also many of the same birds, waters, and islands that Zella loved and frequented.

As a scientist, Zella will be remembered for her articles in many Pacific Northwest publications, including **THE MURRELET**, **PACIFIC SEARCH**, and **SEATTLE AUDUBON NEWSLETTER** as well as for a major scientific paper dealing with her lifetime work on Glaucous-winged Gulls, the latter not yet published. Zella will also be remembered as a fine artist whose paintings of birds are enjoyed in thousands of homes throughout the Northwest and farther afield.

The publication of **ON WINGS OF THE WILD WIND** was delayed during the intervening years due to the higher priority of working towards acquisition of Protection Island for a National Wildlife Refuge. For twenty-five years Zella banded birds on this island in the Strait of Juan de Fuca, recognizing it as a very special place for wildlife while at the same time trying to interest various government agencies and private organizations in acquiring it. Lack of funds always seemed to prevent this from happening. Not until bulldozers were actually caving in Rhinoceros Auklet burrows was any positive action taken. First, the Nature Conservancy stepped in to save one-eighth of the island from development. They were followed by the Washington State Game Department which purchased the critical western portion of the island, naming it the Zella M. Schultz Seabird Sanctuary one year after her death.

Having accompanied her on many banding trips to Protection Island and being equally convinced that the island was a treasure of international significance, I strongly felt the need of saving this unique place. It should be noted that the island contains the fourth largest Rhinoceros Auklet colony in the world, the largest Glaucous-winged Gull colony in Washington State, and is the nesting site for over seventy percent of all the seabirds in Washington's inland waters.

After enlisting and receiving great support from individuals, groups, governmental agencies, and Congressmen plus wide media publicity--and after many frustrating delays--bills were eventually passed by the United States Congress which authorized and funded the establishment of the Protection Island Wildlife Refuge in 1982.

Eleanor Stopps

Editor's Note:

For leading the effort to establish Protection Island as a National Wildlife Refuge, Eleanor Stopps was presented the prestigious State of Washington Environmental Excellence Award by Governor John Spellman. She was also awarded the National Gulf Oil Citizen Conservationist Award in ceremonies in Washington, D.C., in 1985. She was named Woman of Distinction by the Port Townsend Chapter of Soroptomist International, and was a nominee for Citizen of the Year Award by the Port Townsend Chamber of Commerce.

PROLOGUE

It had all begun on a lovely March day many years before, with the shotgun blast that had smashed the warm and joyous life from a Thayer's Gull. At the Rocks, along the railroad tracks south of Bellingham, where a sloping ledge of sandstone at one time edged the water, now eroded into fantastic swirls by the beating of surf and the wind, a beautiful adult Thayer's Gull was gliding into the breeze. Winter at its end, the sun was warm, the water blue, and the bird was almost ready to begin the long migratory flight that would carry him all the way across the North American continent to his natal home on the cliffs of Baffin Island in the Canadian Arctic. He had survived the winter in good condition and even now the breeding season clock was starting to arouse the glands that would supply him with the urge necessary for the long migration ahead.

Half-concealed among the rocks below, two young men with guns were prowling, looking for living things they might destroy. They were looking for amusement and living targets, and had already accounted for a somewhat-ailing immature Brandt's Cormorant that had come blundering along seeking a refuge to rest in; a Western Grebe that had worked its way too close to shore; and most recently a Glaucous-winged Gull that had come by as the Thayer's Gull was about to do.

Blam! The gull had no time to be shocked or to feel pain. One instant it was gliding along, the next it was falling from the sky like a crumpled gray and white rag, so dead that it did not even bleed much on the coarse sand as it lay there, already out of mind as far as the young "sportsmen" were concerned. Fortunately, (or unfortunately, depending on the point of view) another beach walker had seen them shoot the Glaucous-wing, and had already departed to find the game warden. When that worthy arrived and took the young men into custody, he also carried away the Glaucous-wing as evidence. He did not see the Thayer's Gull, and it remained on the beach, a battered bit of flotsam already attracting sand hoppers.

Two days later, on another sunny morning, a young woman biologist and bird-watcher from the college arrived at the Rocks. The day was beautiful, with Lummi Mountain forming a backdrop for Eliza Island, and the rest of the San Juans fading progressively paler blue to the westward. In the dense thicket of Garry oak on the top of the rock-cut, Song Sparrows sang lustily, proclaiming territory. In a baylet behind the railroad track, several Common Goldeneyes bobbed in and out of the green water until they caught sight of the human

intruder. They took flight instantly, their wings giving off a sharp, rather sweet whistling sound as they arrowed out over the water and disappeared southward along the shore.

As she walked down to the very small, narrow beach of sand between the rocks and the railroad embankment, she discovered the cold, still form of the Thayer's Gull, its broken wings splayed among the flotsam. Anger surged through her as she saw it had been wantonly shot, a senseless waste of life. Then she bent to examine it more closely. It was clearly of a species unfamiliar to her. It looked much like a Herring Gull, but its eyelids and iris were the wrong color, and its primary tip pattern was very restricted.

Curious now, she picked up a piece of broken glass from a bottle discarded against a rock, and severed the more badly broken wing, a leg and the bill. Later, in spite of her reading, she was unable to be sure that the bird was indeed a Thayer's Gull. She packed the remnants of the bird in a box and sent it off to the Fish and Wildlife Service in Washington, D.C. Eventually she received a letter confirming the identification and suggesting that she look over the gulls more carefully, since not too much was known of the status of this bird along the Northwest coast.

This was the start of a lifelong interest in gulls. If there must be a reason for bird-watching, then here would be reason enough. The many devious paths of biological research are fascinating to anyone who has not lost the natural curiosity that all intelligent persons are born with. Of such are research scientists made!

From one wantonly slaughtered gull came the impetus for long years of research into the lives of gulls, and of Glaucous-winged Gulls in particular. Interest evolved into commitment in a way strangely like falling in love.

It is well for biologists, and particularly an ethologist who studies behavior, to have a deep personal interest in the creatures he is studying. While objective evaluations are his aim, he must also have a sympathetic understanding of the life of his subjects. And while he may attempt to reduce his finding to mathematical formulae, nevertheless, there is always, behind the analysis, the living, breathing creature. A biologist who overlooks this, who treats his animals purely as things, loses some of his human quality, and he forgets that he, himself, is above all, only another animal that has reached a temporary ascendancy over other species and considers himself their superior because of his vaunted ability to think. If he forgets that other creatures, at least of the higher forms, also suffer pain, fear, and other emotions akin to his own, he does himself and Mankind a disservice and an injustice to the animals he studies as well.

The following story is not so much a story of the biologist Marney Hawke (who obviously is Zella Schultz) but of the birds she loved and studied until her death in 1974.

CHAPTER ONE

The gull island lies warm, golden and beautiful under the noonday sun of late June. A faint northerly breeze slides softly through the long bleaching grass of the meadow, carrying the dusty-sweet scent of wild rose bushes downslope and caressing the silken gray and white plumage of the female gull on the nest.

The nest, a mere scrape in the tangle of dead grass and rootlets beside an angular bucket-size blackish rock, holds three large greenish-olive, spotted eggs, one of which is "pipped" and due to hatch within twenty-four hours. As yet the female gull is unaware of the impending birth of the first chick she has ever mothered. She is just five years old and this is her first nesting.

From their standing place atop the rock, now streaked with white, this pair of gulls can see an almost 360 degree vista of the sky, sea and islands. North are the golden, grassy slopes of Lopez Island, crowned by a skyline of firs that are greenish-black in the intense light, with a wild, swift tide running full-force between, and long brown ribbons of kelp streaming away in the deep green channel; west, the blue bulge of Cattle Point on San Juan Island, and the open waters of the Straits of Juan de Fuca, their deep blue muted by reflection from the horizon to the southwest, where pulp mills and oil refineries are pouring a smog of coppery-brassy pollution into the air; still further, to the sharp, snow-lined teeth of the Olympic Mountain range (those that can be seen through the smokey pall of civilization) and around toward the east, where for 60 degrees the view of sea and distant horizon is blocked by the glacier-scoured rocks of the island itself. On toward the east, the rolling, lifting curves of the Cascade Mountains crowned by the sun-glinted dome of Mount Baker complete the panorama.

The rise of rock to the south is criss-crossed by deep crevices which support lines of dried grass in an irregular checkerboard pattern. Over the higher slopes of this rock a myriad of gulls are hanging on the breeze, and to the east their white forms pass and re-pass over the deep blue water.

Mingled with the whispering of the breeze in the grass are the calls of the gulls. The island is never silent. By daylight, moonlight or darkness, some bird raises its voice in reassurance, complaint or warning.

The female gull, having spent four hours on the nest, stirs restlessly and reaches beneath herself to turn the eggs. Although she still does not discover that the first-laid egg has something different about it, in the egg itself the eldest chick-to-be responds. Inside his ears he now has functional and exquisitely

sensitive balancing organs, so necessary to a flying creature. These are tiny particles of calcium carbonate resting on long, hair-like cilia richly supplied with nerve-endings. These organs now send signals to the brain, telling the chick whether his head is level. They do not yet tell him whether he is right side up or upside down; this will come when he is free and able to use visual clues. But his urge to keep his head on an even keel will keep him turning himself if the egg is turned.

This would not help him if he were not already equipped by Nature with a practical device for getting himself out of the egg. To the birth of a mammal the baby contributes little except a stimulus--he is born without any effort on his own part. With a bird it is different. The stimulus to survive must come from within himself; his parents help him little, if at all, in the difficult process of being born. He has a tool for cutting the shell on the downcurve of the upper mandible, a calcified point known as an "egg-tooth." He also has a special "hatching muscle" at the back of his head and neck which will be used only during this time, to raise his head from its down-turned position in such a way as to bring the egg-tooth into firm contact with the shell. When he is mature enough he has an inborn urge to straighten the kink in his neck and uncurl himself from the fetal position.

As the parent birds move the egg, the young bird turns and pries, and eventually cuts a channel of star-shaped cracks around the larger end of the egg about one-third of the way down. This part of the shell will eventually lift off like a lid and release the chick.

But his time to hatch has not yet quite arrived. Some vital changes are still occurring in his body, and these must be completed before he is ready for entry into the world of warmth, cold, wind, rain and sun. One such change is already completed: the shift from breathing via blood vessels on the internal surface membrane of the shell to breathing via nostrils and lungs, with its attendant shift in blood supply. Gradually the blood vessels that took oxygen from the shell membrane and disposed of carbon dioxide there are being closed off.

The remnant of the yolk, part of the food supply that has allowed the chick to grow and prepare for life, is also being drawn up into the abdominal cavity through the umbilicus, and the walls of the abdomen are closing about it. This spot will remain as a bulging, thin area for some hours, but by the time the chick has been hatched for a few days even the scar will have disappeared.

The earth in its daily course carries the island on toward the east; the shadows lengthen, the tide floods in. Covered now are the spring-tide beaches where the gulls forage for clams, cockles, crabs and other marine life with which to feed themselves and their chicks. The island becomes a maze of gray and

white forms rising and falling and the tempo of life picks up in a flood of sound and motion.

Suddenly the female gull lifts her head and turns her gaze toward the south. Among the hundreds of voices about her, she has heard the call of her returning mate. Soon she spies him as he comes sweeping upward toward the home territory, and in a moment he has alighted on the standing place and folded his wings. He ducks his head upside down between his legs for a second, then opens his bill wide and slowly raises his head to an angle of about sixty degrees, meanwhile giving a loud ringing cry which gull researchers have named "the long call." The female replies in kind, although she remains sitting, and for a few moments both birds perform a kind of duet. This greeting ceremony appears to be necessary to strengthen and maintain the pair bonds.

But now the male bird, being well-fed and satisfied with his state of appetite, is driven by another strong urge--that to incubate, by placing the smooth, hard surfaces of the eggs against his three incubation patches. The female's incubation urge is sated, her gullet is empty, and her cloaca is full of indigestible refuse. She rises as the male approaches her, giving a soft mew call. She walks a few steps, defecates and becomes airborne with a few swift flaps of her wings. She must now feed and return by dusk, which is, as yet, some four hours away. She will take the night shift on the eggs.

The male bird slowly steps into the nest, where he stands for a moment as if undecided, then squats slightly, fluffs his feathers and raises the plumage of his underparts that surrounds the three warm, spongy, naked patches of skin, to expose them fully. With infinite caution he bends his heel joints and lowers the incubation patches over the eggs, twitching his body and assisting with the tip of his beak to fit the smooth ovals into their special niches. By the time he is settled and has tucked his bill in between his scapular tract and his back feathers for a nap, the female is five miles away and moving at a steady twenty-eight miles per hour heading south-east toward a garbage dump on Whidbey Island, where she is accustomed to feed whenever she is abroad at high tide.

Here she has fed for three months in the late afternoons, ever since March, when she felt the urge to return to the vicinity of her natal island. As early as mid-January on her wintering area in Seattle, the biological clock built into her system had begun to "throw switches" in preparation for the breeding season ahead.

This would be the first year of full maturity for her. Although in the three previous years, the spring and her built-in clock had caused some minor changes in her body, never before had the hormones in her system risen in such a flood, nor so early in the year.

When, in the previous October, she had returned to Seattle after a

summer of beach-combing along the edges of Hood's Canal and the Straits, with an occasional visit to the beaches of Violet Point on Protection Island where many gulls congregate during high tide, she had already gone through her complete molt and was in winter plumage, with her head, neck and breast feathers marked with dusky shaft-streaks and heavily cross-barred. In mid-January a change, almost magical in its rapidity, began. The feather follicles on her head, neck, breast, sides, upper back and scapulars were activated by the flood of hormones surging through her bloodstream. In the course of six weeks she changed nearly 5,000 feathers for new ones, and her head, neck and breast became a clean shining white. In addition to this, the black pigment that had formed an irregular bar across her bill beyond the nostril, dissolved and disappeared. This bar had partially covered the dull orange spot in the angle of her lower mandible, but now, as the black was cleared away and bright chrome-yellow began to infuse the rest of the bill, brighter pigment changed the gonydeal spot to flame-scarlet. Her eyelids, which during the winter had been narrow, dusky-flesh lines about her eyes now began to widen, to swell out, and to change color, so that they became a deep lavender-rose. Her feet, especially the webs between the toes, brightened appreciably to rose-pink. The irises of her eyes acquired a considerable "dusting" of silvery specks in the dark brown, so that her eyes were paler than in the winter. By March first, she was wearing the finest of courtship apparel.

The changes within matched those without, for her ovary, until now a small, flat J-shaped, pinkish-granular organ, began to swell rapidly. Already some of the granules, which were actually follicles containing germ cells that would ripen into eggs, were beginning to enlarge. The oviduct, the tube which would conduct the developed eggs to the outside, until now an almost invisible thread, began to widen and thicken, and to start ruffling along the edges where it was outgrowing the mesenteries that held it to the center of the back.

Under the pressure of all these changes, the female felt a strong urge to return to her natal island, and a few days later she left Seattle, heading northward. The return trip took her no more than four hours, and soon she was circling and settling down among other gulls on the rocks exposed at low tide at the southwest end of the island.

This area, known as a "club," was a place where birds which were not employed in nest building or establishing territories were resting, and many of them were unpaired birds. Most of them were birds like the female, young and inexperienced in nesting; a few were birds in their second or third years merely prospecting about the colony. Two were old females who had lost their mates just recently to vandals who had shot them from a passing boat, and who had been pushed out of their home territories by the pressure of surrounding pairs. Having no males to do battle, they had been forced to abandon their territories

and return to the club, where they were immediately engaged in attempting to find mates among the unpaired males present.

The females indicated their willingness to pair by walking around a male, tossing their heads up and uttering a soft "Klee-oo" call. This call, plus the generally horizontal position in which they held their bodies, resembled the way they had approached adult birds when they had been youngsters, a method of appeasement which held the adults' fighting tendency in check. Now it signalled to the males that the females would be submissive in pair-formation. The head-movement was a little different; juveniles pump their heads up and down more violently; the females did not stretch their necks so much, but tilted their bills up as they gave the call.

An attraction soon developed between the young female and a large male a year younger than she but entirely mature. When she approached him he spread his feathers to their fullest, making himself look almost double in size. Then he began to challenge the surrounding males, but they had already felt the fury of his beak and wings and walked away, unwilling to face him in a fight.

During the next few days, the female found herself concentrating most of her attention on this male, and before long he bent his legs, lowered his tongue-bone and began to make a series of downward strokes with his bill toward the ground in front of his breast, at the same time giving a low-pitched "Kroh-kroh-kroh—" call. This process, which has been called "choking" by the gull-watchers, immediately attracted the female and she also began to choke by his side. After this it did not take long for the pair-bond to develop to the point where the male began to feed the female when they were both excited. He would regurgitate partly-digested food for her, which she would eat eagerly, sometimes taking it from his bill and sometimes from the ground. They learned to recognize each other, both by sight and by voice, often at a considerable distance. At this point the male began to search for a territory on the island.

Late in the previous August, after most of the territorial boundaries had broken down, he had briefly held a territory near the north end of the island in a small, grassy draw. Now he returned there, but he found an older pair of gulls already in residence, and they had no intention of letting an upstart young couple move in on the territory which had been theirs for years.

For a few days the young pair moved about in a pinball fashion. In the pre-egg stage, territories were often unoccupied for hours on end, but somehow an established pair always arrived to drive the newcomers out. Eventually they arrived in a meadow, where, because of lack of elevated standing places in the long grass, not many gulls cared to take up residence. Ordinarily this territory by the rock would have been occupied, but the previous June two undergraduate students from a nearby marine station, making a nest count on the island, had

been camped fifty feet away. This in itself had made the surrounding gulls uneasy. As they were leaving, however, one of the young biologists noted that the male of the pair occupying this territory was a very unusual-looking bird. He had black primaries, a very dark gray mantle and pale, almost white eyes--in short, he looked more like a Western Gull than a Glaucous-wing.

In this case, indeed, his female parent had been a stray female Western Gull that had attached herself to the gullery on Protection Island to the south and had mated with a Glaucous-wing since there was no male Western Gull for her to choose. The son of this mating was very like her, since the genes for a dark mantle and black primary tips tended to be dominant over the lighter ones of the Glaucous-wing. This proved to be his undoing, because one of the young biologists shot him as a specimen. His mate, who had been standing beside him, was terrified by the shot and the death-throes of her mate. She left the territory, never to return. Now, paired with one of her former neighbors who had also lost his mate, she was nesting thirty yards down the slope to the north, out of sight of her former territory. This was why the young pair had found the area open and had been able to move in unopposed.

Once settled on a territory, the birds had immediately begun the further business of building a nest. In making the scrape both birds had been active, pausing here and there in the territory to sit down and shovel a little with the feet and turn the body around briefly, often choking or mewling as they did so. Occasionally the female would pick up grass and lay it about her with a peculiar sideways motion of the head. The nest, however, never developed into a very elaborate structure, since it was situated in the thick grass already and needed almost no building to accommodate and protect the eggs.

In territories all about, birds were choking, mewling, having boundary squabbles and mating. The intensity of nesting behavior increased almost day by day, and the reactions of all the birds were heightened by their stimulation of each other. By the end of May the nest was prepared, and in the female's body the yellow yolk was growing in the follicles that would become eggs. One day a follicle released a fully developed yolk, the first egg of the young female's life. As it entered the bell-like opening of the oviduct, it met a cloud of sperm from the male, one of which entered the little, pale yellow spot that represented the nucleus of the egg-cell. With it, it carried a single set of chromosomes, the so-called haploid number--that is, half of the number necessary for a complete individual. These chromosomes immediately set about to pair themselves with their opposite numbers in the egg cell, lining up with them and recreating the complete double or diploid number. Soon, these chromosomes duplicated themselves, and the initial cell split into two; these again split, forming four. After a few more divisions, development ceased, and would not be resumed until the proper temperature was reached during incubation.

As the egg passed on down the oviduct, it received a coating of albumen, or white, then a tough membrane, then the limey shell of pale olive-green. Last of all came the pattern of spots, of dark brown, lavender and gray. Early one morning this egg was laid; at noon on the third day the second egg was laid; two and a half days later, the third.

During the time of laying, in both male and female, three areas on the abdomen of each, measuring about one and one half by two inches, had begun to lose their feathers and down. The skin became pale, with a spongy, watery texture. These were the incubation or brood patches, which were to allow direct contact between the bird's body and the eggs.

Once the first egg was laid, the nest was never left unguarded. Crows prowled the island--in fact, in one of the hollowed-out ledges on the western face of the cliff, a pair of crows had nested. These birds were continually on watch for an unattached egg of either gull or cormorant, and any upflight was enough to set them searching for eggs, regurgitated food, or any edible debris. The cormorants usually left the nest at even minor disturbances and always lost more eggs to crows than did the gulls.

The eggs in the nest became a stronger and stronger stimulus to brooding behavior, and when all three were laid, both birds were ready to incubate. Sometimes the drive was so strong that one bird would attempt to push the other off the nest if it was not yet ready to leave. However, as incubation proceeded, a rhythm was set up which satisfied both partners. Sitting through sun, rain and wind, in heat that made them pant with opened bill and wings, and rain that made them withdraw into tight, waterproof balls of feathers, both birds waited, no doubt unconsciously, for the hatching of the eggs for the next phase of their lives to begin.

* * * *

Sunset is long past, the western sky's orange glow has faded to a pale cast low against the horizon, when the female gull arrives back on the island. The wind has ceased and not many birds are moving about as she sets her wings for the long glide back over the rock to her nest. As she enters the air over the island, she gives a mew call, which instantly alerts the male, and he half-rises as she circles in to land. Although he could still remain sitting for some time, he stands during the exchange of long calls. By this time, a second egg has begun to pip. The female mews softly and the male steps out of the nest to allow her to settle upon it.

He walks to the rock, spreads his wings, and jumps up. He turns to face southwestward, where, far away, a dim smear of light shows where Port Townsend lies. He fluffs his feathers and begins to preen them.

Only a few body feathers are growing, for the need for the incubation patches is holding most growth in abeyance at the moment. Nevertheless, he must preen continually to "zip up" any areas of the feathers that are pulled apart, since this lessens both their insulating quality and their water repellancy. In his wings, however, a pair of new primary flight feathers is developing. The innermost pair are fully regrown and hardened; they were shed in mid-May and it has taken them a month to grow out. The second pair are half-grown, long gray cylinders full of blood and developing tissues, with the web emerging from the open end, already flattened, showing the broad white tip and some of the gull-gray below. Gently with the tip of his bill he loosens a little more of the sheath on one of these, and aligns the new vane with the already-opened webs above.

In his left wing, the third primary has been steadily loosening in its follicle for several days. Activation of the feather germ in the bottom of the follicle has caused the relaxation of the walls to some degree. The new pinfeather growing at the bottom, which was at first contiguous with the old feather, has pushed it out somewhat. Now the connection between them has been broken and the old feather has slipped over half-way out of the follicle. A sense of something out of place causes the bird to work over the feather with his bill, and suddenly it falls free. It lies on the rock for a moment, then tips over and slides off, point down, into the grass. Tomorrow night the opposite feather will also come out of its socket and the wings will be equally balanced again.

The male tucks his bill into his back feathers and dozes. Never does he enter a truly deep sleep; his senses are never dulled to the point where he loses complete consciousness. As a wild creature, he cannot afford to do so. But he rests and naps, and this appears to be adequate.

If it were absolutely necessary, he could fly out to forage on the beaches in the dark; his night vision is sufficient to do this. But he has a thick layer of fat beneath his skin, even now, and feeding has not been scanty. There is no reason for him to exert himself.

* * * *

During the hours of darkness, the eldest chick continues to free himself from the egg. Gradually he breaks the shell about the larger end. Once or twice, as if something of the chick's motion communicates itself to her, the female lifts her body and explores the eggs with her bill. She touches the irregularities made by the chick, but other than this, she does nothing. There is, in fact, nothing that she can do. The third egg has begun to pip.

Just as dawn begins to lighten the eastern sky over the Cascades the first chick pushes the "lid" off the shell, and a few minutes later he is outside, lying between the dry, compacted grass of the nest lining and the bare skin of the

incubation patch, with feathers and down all about him, enclosing him in a warm, rather moist air. The female gull half-arises, stirred by the strange feeling of the damp chick that wriggles instead of a smooth dry, hard egg. She explores the chick with her bill and then gently picks up the larger section of shell and drops it over the rim of the nest. She settles back, sitting a little higher than before.

Although she has never been responsible for a newly-hatched chick, her maternal instincts are fully functional. She remains on the nest, while her mate takes off as soon as it is light and departs to feed. He is back within the hour, having been extraordinarily lucky in finding a number of bait fish carelessly discarded by fishermen on a wharf at Anacortes. The female, now restless after her long shift, leaves at once. The male mews as he comes to the nest, and looks down to see the rather scrawny, half-dry thing that one of the eggs has become. He looks closely. The second egg has now been pipped in a half-circle and the male gently pecks at the broken shell. Two small triangular chips fall, leaving a hole, and almost instantly a tiny brown bill tip with the egg-tooth in place protrudes from the hole. The male immediately ceases pecking at the egg and squats with feathers lifted to cover both the eggs and his first-born chick.

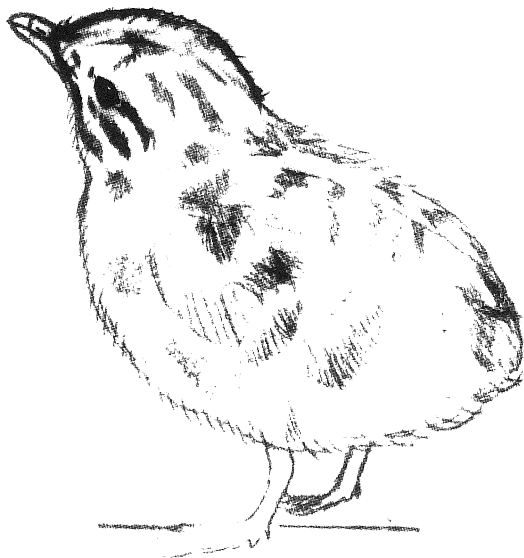
When the female returns in mid-morning the eldest chick is dry and beginning to move about. His down is now a bright cinnamon-buff, spotted with black, and it is very thick and warm, but he will need to be brooded from time to time until he has grown enough feathers to cover his back and wings, so that rain and mist will not wet him. His beak is black, with the outer third a bright brown which will be obliterated by black within two weeks. His heel joints are also black, but from about half-way down both tarsi to and including the toes and webs, the normal black pigment is missing and his feet which should be black, are flesh-pink.

One of the characteristics which distinguishes at least ninety-nine percent of Glaucous-wing chicks from the young of Herring, Western, Thayer's and other large gulls is the black legs and feet of this species. Whether this black pigment has any real significance is unknown, but it persists for at least two years. Its lack will separate this particular gull chick from any others of the generation now hatching on the island. He may well be known as "Pinkfoot" to us. To other gulls he will also become an individual, but not in the same way, nor for the same reasons.

After his mother settles on the nest, she gives a soft mew call, and Pinkfoot staggers out from beneath her breast and begins to peep. He does not know he is hungry, but nevertheless he has the proper responses ready. His mother bends her head down, and he sees the red spot on her lower mandible. He has never seen color before, but red is a stimulus he cannot ignore. He pecks at it, first tentatively, then vigorously, although he is still so unsteady on his feet that he falls on his face. His mother has never fed a chick before, but she knows

what to do. Her instinctive response causes her to arch her neck and after a moment she regurgitates a mouthful of partially digested fish on the ground. She picks up a small piece and holds it in her bill tip. When the chick hits the target next time, he gets the piece of fish in his bill, and after a moment he swallows it. For several minutes the female patiently picks up bits of fish and holds them for the chick, until he has had enough and crawls beneath her feathers for a nap. After a few moments, she reswallows the remains of the fish and settles down to brooding again.

Over the gull island, the sun shines warmly, white wings flutter and swoop, and voices rise and fall, mellowed by distance. In the nest, the second chick is working hard to make good its escape. By sunset, when towering cumulus clouds on the eastern horizon catch and reflect the orange-rose glow of evening, it has released itself. By dawn the third chick is on the verge of hatching, and on this day the adult birds will find themselves freed of the onerous chores of incubation and weighted down with the necessities of providing food for three chicks that will double their birth weight in five days and be ready to fledge in seven weeks. Of all times in their lives, these next seven weeks will be the most strenuous.



CHAPTER TWO

At daylight, as is his custom, the male gull shakes his head, yawns, stretches first one wing and leg, then the other, and shakes his plumage. He stands for a few minutes, until the first rays of the rising sun bathe the top of the island in a pale gold light, then he gives a few mew calls, spreads his wings, and drops downslope toward the nest. Soon he is merely one pair of white wings among a swirl of many over the deep blue water. Everywhere gulls are moving about, their bodies rising and falling, their voices also rising and falling as they come and go.

The female is awake; she shifts herself slightly, but does not rise. Somehow she knows that she has a newly-hatched, still damp chick beneath her that needs warmth for some time yet. She tentatively preens her back feathers, rearranges a few on her lower foreneck, then draws her neck in and closes her eyes again. Beneath her, Pinkfoot wakes and stirs briefly, then he, too, dozes once more.

It is nearly three hours before her mate's call arouses the female to alertness. He swings over the nest, lowers his pink feet, backpedals with his wings, and drops down beside it, his gullet comfortably full of food. He gives a rather abbreviated long call; the female rises, answers him, and steps carefully out of the nest to stand beside him. Gently she stretches her neck, picks up the larger part of the shell from which the third chick has hatched, and drops it to the side. Then, without further ado, she spreads her wings and is gone, leaving her mate to stay with the chicks. For a moment the little ones seem dazed by the suddenly enlarged view of their world. They sit in the bottom of the shallow nest among the bits of egg shell from their hatching, and Pinkfoot begins to peep softly, as he suddenly realizes that there is an empty space within.

He stands, rather wobbly, on his peculiar pink feet, yawns once, and takes a tentative step or two. He promptly trips over his own feet and falls, but his long, springy down cushions him well. Tiny wings waving for balance, he resumes his journey, and makes it at last to his father.

The male bends down to inspect this animated ball of fluff with the loud, persistent peep, and once more the red spot looms over Pinkfoot's head. He pecks vigorously at this attractive color, and his father, unable to resist, begins to regurgitate. With many a peculiar twist of his head and contortion of his neck, he brings up a huge mouthful of macerated clam and drops it to the ground. Bit by bit he picks it up, and Pinkfoot takes it from his bill tip, becoming more and more accurate with practice.

The other siblings, seeing the process, rise shakily to their feet and begin the long trek across the rim of the nest. After much staggering and falling they arrive and, imitating Pinkfoot, soon begin to get bits of food from their father's bill also. Pinkfoot is more quickly satiated; it takes the younger chicks longer because they waste a great deal of effort in just trying to hit their father's bill. In a few minutes, however, their peeping dies away as they become satisfied, and they look about for shelter once more.

For a moment the male still stands with food in his beak, but none of the chicks is hungry, so he swallows the remains of the meal. Then, lowering himself on his tarsi, he drops his wings, fluffs out his feathers, and the chicks crawl beneath him to shelter again. He preens his neck feathers briefly, then turns his head back over his shoulder to rearrange some feathers there. The chicks are sleeping, and the male closes his eyes to doze also. The father might be thinking "Sleep well, small ones--it is little enough sound sleep you will get when you are older and out in the hostile world. Make the most of these few weeks when you are the most important of gulls. It will not be this way for long."

Weak and almost helpless though they are now, deep within each chick burns a fierce fire of spirit which is anything but fragile. Given the proper conditions and a very great deal of just plain good luck, any one of these small balls of gold and black fluff may survive twenty, thirty, maybe even forty years. The potential is there.

But in this world so seemingly benign there are enormous odds against this sort of survival for any one individual. Gull parents are lucky if they can bring even two of their three chicks to fledging. Of those that do fledge, almost half will not live to pass their first birthday.

From the first union of egg and sperm cells, hazards appear to becloud and press in upon the life barely begun. Many things can go wrong, even with an embryo before it becomes a chick. Defects of cell division, fatal mutations of the DNA molecules that form patterns of development, is one thing.

DDT and its metabolites may interfere with the deposition of calcium to make a sturdy shell so that the egg does not become a suitable house for a developing chick to begin with.

The parent birds may be forced off their eggs at some crucial stage of incubation, and the chick may die of the chill, or cook in the sun. The struggle to be born may be too much, if the egg shell is extra hard or fails to become brittle at hatching as it should.

Sometimes the adult birds may even neglect their young and fail to feed them; or a parent bird may become ill, or meet with some accident. And even such minute creatures as insects may kill the chicks.

If by some good fortune they survive to age four, their further life

expectancy is estimated to average about nine and one-half years, or a total of about 13 years.

There are perhaps half a dozen birds on this island that have lived at least twice this long. There are no signs of age that distinguish them from their younger companions--any weakness would already have eliminated them from the breeding population. These old birds are still active and effective members of the gullery.

Although this island is basically a gullery, there are other creatures that share it with the gulls. In some of the dense rose bushes in the gullies to the north and east a few pairs of Song Sparrows nest and forage, and add their cheerful songs to the chorus of bird voices.

Along the steep, rocky ledges of south side, Pelagic Cormorants, shiny black, long-necked birds with green eyes and two crests--one on the forehead, one on the nape--nest just below the rim of the island, above the wild surf from the Straits and the ground swell from a distant ocean.

On top of a steep ledge about a hundred yards west of Pinkfoot's territory is a city of about forty nests of Double-crested Cormorants, some of their stacks of sticks three feet tall, accumulations of many years, cemented together by the excrement of the occupants.

In a few crevices along the rocky walls of the island that are deep enough to shelter the eggs, Pigeon Guillemots are nesting. These are small diving birds, in summer black with white patches and red feet. At one time there were two pairs of Tufted Puffins nesting in burrows in an accumulation of soil on the landward edge of the island, but one summer they were collected by some overly enthusiastic college students, and no other Puffins had found their way back to nest there.

Just above high-tide line on a couple of small, offshore ledges, Black Oystercatchers, sooty birds the size of a small gull with long, flat red bills, yellow eyes and pink feet, are rearing their young.

The pair of crows that nest on the western side of the island are always prowling the gullery looking for unguarded eggs or young chicks, equally quick to pounce on any unfortunate cormorant's egg or chick that may be exposed to the gaze of their keen eyes. Some days the pickings on the island are rather slim, although there is always the possibility of scavenging the feeding places of the gulls for scraps that are left over from courtship feeding.

On this day, the four young crows are about to fledge. Their parents have kept them hungry on purpose, but they must have a conspicuous piece of food with which to lure the youngsters from the nest. The tide is high and they have not found much.

There is, however, a "badger game" that two crows can play. Sometimes

a young or inexperienced gull will fall for it. The first bird they try it on (it must be a single bird either guarding the nest or incubating, preferably the former) is standing by a nest with two eggs. Often gulls begin to incubate with the laying of the first egg, but in this case there is one egg still to come, and the urge to sit steadily has not yet come upon them. The male is waiting for his mate's return so that he can go out foraging; they do not dare leave the eggs unguarded.

As he stands there at the rim of the nest, both crows approach him, one from the front, one from the rear. The male crow, in front, knows his role well—he is the decoy. He runs some slight risk, it is true, but he is smaller and more agile than the gulls at close quarters. He edges nearer and nearer, deliberately baiting the gull to chase him, while the females slips up behind the gull, slyly crouching low and making herself as invisible as possible. The male crow ducks his head as if to make a jab at the eggs, and the gull leans toward him. One step more and the crow is almost within reach of the eggs; the gull spreads his wings and runs two or three steps toward the crow, who caws angrily and retreats very slowly but deftly just remaining out of beak reach. One more step and the eggs are behind the gull's feet. Instantly the female crow makes a dash, stabs one of the eggs with her lower mandible, closes the upper one upon the shell and is gone in a flash of black wings.

The gull, seeing this out of the corner of his eye, wheels in pursuit of the crow escaping with the egg, and the male crow, darting in almost under the gull's flailing wings, snatches the other egg. The female crow is now beyond pursuit, and before the gull can get airborne the male crow is also some distance away with the second egg in his bill.

The male gull screams a long call after the retreating crows; next time he will probably not be such an easy mark. Most experienced gulls merely ruffle their feathers or scream at a crow. They are too smart to give chase. Fortunately for this pair of gulls, there is still one egg to come, which they will keep and hatch successfully, so the cycle can continue unbroken.

Both parent crows return to the nesting area. They do not go to the nest, but alight on a rock surface slightly below the nest and about six feet away, holding the eggs in their bills. This rock surface slants gradually upward to the grassy top of the draw, where the young may hide. They must be concealed at first, because it will be some days before the young are mature enough to try their wings in the wild air currents over the cliffs, and they must be removed from the island as soon as their wings will carry them or certain vindictive gulls may knock them from the air and kill them.

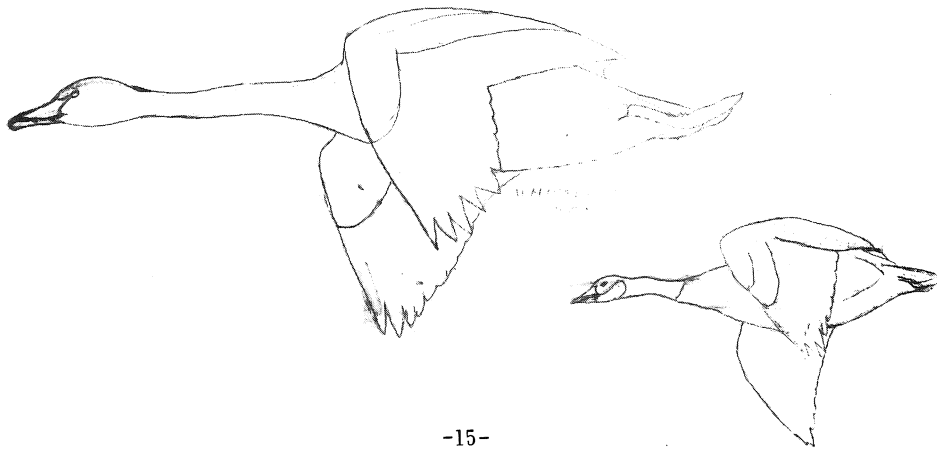
Hunger is the stimulus for nest-leaving, as it is in most birds. The parents stand on the opposite rock with the eggs, but they will not bring them to the nest. At last, after several hungry hours, the most venturesome young crow

makes his exit and lands clumsily beside the parents. One of them takes the egg he is holding and swallows the contents. Then by regurgitation he transfers some of the egg from his bill to that of the young bird, who gives odd choking noises as if his parents were trying to gag him. These sounds tell the remaining young that there is food to be had, and they also one by one make the dangerous passage and are rewarded with gull egg contents.

However, since the ledge is not a safe place for them, the parents entice the young to follow them up to the grass. When at length all four young are safely hidden, the parents can both go foraging again.

But somehow one of the young, the last to leave the post, is still very hungry; he got only a little of the egg, and this makes him restless and dissatisfied with his hiding place. He backs out impatiently and walks unsteadily away to the left. This is his undoing, for he heads straight toward the nest of a gull. The parent gulls both pounce on their enemy without compunction. The struggle is unequal and very brief; one gull gets the crow by the neck and shakes him, snapping his soft immature vertebrae like toothpicks. The body of the young crow lies abandoned on the rock, its feathers ruffling in the wind. The sun shines on it, flies are attracted to it. Whatever function it served in life was very brief, and now it begins the process of disintegration back into the elements whence it came.

The parent crows hear the frightened cries of their youngster but there is nothing they can do; by the time they arrive the fledging is already dead. Good parents that they are, perhaps they may even grieve (as much as any bird can grieve) for the lost one; but they are much too busy feeding and protecting the remaining family to be distracted by this death.



CHAPTER THREE

As the days pass, the three gull chicks grow apace, doubling their birth weight by the fifth day. Although one or the other of the parents is always in attendance to protect them from the cold rain or the heat of the sun, or whatever danger might threaten, the other is diligently foraging the beaches and the offal dump of a nearby slaughterhouse, the litter barrels of a county park, and the garbage scows from a salmon cannery. No possible source of food is overlooked, because competition is very stiff. There are nearly ten thousand pairs of gulls plus innumerable immature birds of all ages cruising these waters on constant patrol for food. Nothing dead that is even remotely edible is overlooked by all these sharp-eyed scavengers. Crabs of all kinds, clams, limpets, snails, sea urchins, even the leathery flesh of chitons, and more go into the food factory for the bottomless gullets of the young.

Yet there are days of scarcity, when the tides are high during the daylight hours. When this happens the male gull departs at dawn on a fifty-mile journey that takes him to a city garbage dump where he can get scraps to carry home to fill those hungry mouths. The trip takes nearly two hours each way, but this is no more time than the birds often spend off-island when hunting is poor. It is a sure source of supply, but the food may lack something in quality, so they do not depend upon it too often.

For Pinkfoot there is a pattern in the days as they pass. They are mostly clear, sunny and warm, the breezes gentle from the north, and the gullery remains undisturbed by Man. For the first week the young are brooded in or near the nest when they are cold; but brooding time grows shorter and shorter as the young become larger and more active. The chicks explore the territory and the grassy areas that surround it. They play with grass stems and weeds, pounce on feathers and let them blow away, only to pounce upon them again. Now and then they duck their heads, raise their wings and bounce about wildly, half-chasing one another in an excess of good spirits. Tiring of activity they come to stand in the shade of one of the big birds, or sit down preening or sleeping.

If some cause for alarm appears such as a Navy helicopter, which all birds hate, or a passing Bald Eagle or blue heron, or a close approach of a fishing boat which makes the adult birds uneasy, they cry "ka-ka-kak! ka-ka-kak!" and the chicks correctly interpret this and run off to hide in little runways they have made under the grass. After the alarm has passed, the chicks back out of their holes and run to the parents, often peeping. They have just realized that they are hungry again.

Living in splendid isolation from near neighbors, Pinkfoot and his family are not confined close by to a narrow territory as are many of the other gulls on the island. And living in the grass, away from the rocky crevices of the headland, they find fleas only an occasional passing irritation. Because of the very dry summer, many pairs nesting along the edges of the rocks are not so fortunate.

One pair with a nest along the west-facing ledge fifty yards away are in a constant state of irritation from hordes of fleas that live in the fissures of the rocks by the nest. The pests find the three naked incubation patches a ready-made dinner table, and swarm so thickly in the nest that soon the egg shell color disappears beneath a crust of dry blood. The birds move restlessly while they incubate and stand up often to relieve their sore and bleeding incubation patches. The eggs are cooled so frequently that their hatching is delayed for many hours.

When at last the first chick emerges from the shell, it is attacked by a seething mass of fleas even before its down is dry. By morning it is too weak to raise its head, let alone peck at the bill of the mother as she lowers her head to inspect the nest. She gives a tentative food call, but the chick is unable to respond, and a few hours later it dies, almost bloodless, and its pathetic, lifeless small body lies beside the two remaining eggs. As these chicks hatch, they suffer similar fates.

The female gull looks down into the nest and nudges a chick with her bill. She does not understand why these chicks do not raise their heads or peck for food. She calls to them and tries to rouse them. Perhaps she cannot feel grief as a human might, but the tide of reproduction is stemmed in mid-flood; the normal sequences of events, the fulfillment of the entire cycle, is abruptly cut off. This in itself is terribly disturbing. Sadly, almost mournfully, the frustrated parents stand near the nest, giving food calls, but there is no response. No chicks come running to receive the offering. Eventually both adults turn away, to stand and preen, to nap, and then to preen again. Now and then they utter soft mew calls; then the male, the female following, flies down to the water to bathe, to soothe the hot, painful skin of the swollen brood patches. It is the first time they have left the territory together for over five weeks.

Their attachment to the nest and territory is not broken at once. Both birds return again and again to the small grassy plot where the dessicated bodies of their chicks lie. Gradually their systems readjust and the attachment weakens. They still sleep at the standing place, and now and then walk about. The male even starts an abortive nest a few feet from the old. But it is too late in the cycle to start anew, and the endocrine system is unequal to the task. Regression of the reproductive structures has gone too far to halt the tearing

down process. Before many days have passed the birds drift apart, the pull of the territory no longer holding them. Their pair bonds disintegrate; each bird goes its own way. Not until early March will they return to the old territory, where they will renew their commitment to one another and the nest. If next summer is a wet one, as is likely, they may have more success; it was the dry summer that defeated them.

* * * *

The day that Pinkfoot is a week old is an important one. He looks three times his hatching size. His legs and feet are large and sturdy, and they will now carry him wherever he wishes to go without faltering. His forehead is flattening as his bill develops and lengthens, and he is losing his round-headed, innocent baby-chick look.

Much more important developments, however, are becoming apparent. The feather germs in his skin have been busily organizing tissue until today, almost suddenly, he has miniature pinfeathers starting to emerge from the follicles on his shoulders, and the hand portion of his wings where the primary flight feathers will be. These are small gray points with whitish tips, and to most of these the down which is being pushed out still adheres like little flags. All over his body in the areas that will have contour feathers these developments have been going on, but more quickly on his wings and upper back. They will provide him with some waterproofing before another week has passed. He will soon be too big for brooding and it is essential that he have feathers to protect him by that time.

Tomorrow the pinfeathers on his breast and sides will appear, and shortly thereafter those of the wing coverts, and a few days later the lower back and tail feathers.

The growth of a feather is an astounding phenomenon in itself. A large blood supply is formed in the skin; then the outer layer sinks inward and forms a follicle out of which the feather papilla grows. This follicle is a permanent structure which produces feathers generation after generation throughout the bird's life. The complex structure of the feather develops inside a horny sheath, pointed at the outer end, which gives it the name, "pinfeather." Inside this sheath the layers of keratin that make up the feather grow in an immensely complex way, producing the feather shaft or rachis, and on either side of this the flat layers known as barbs. These lie close to each other and form the web of the grown feather. Each of the barbs has a row of smaller plates known as barbules on either side. The row of barbules on the side toward the outer end of the feather is flat basally and equipped with rows of minute projections called barbicels. Those on the middle portion of the underside are hooked. The

barbules on the opposite side of the barb, toward the base of the feather, are flat but have no hooks. They form ridges for the hooks of the barbules from the next barb to catch in , to lock the web together. At the same time a color-pattern which matches not only in the opposite webs of one feather, but often in a succession of feathers that together form a particular display of pattern or color, is also developed.

All of these grow in a rolled-up form that must fit together perfectly when unrolled and flattened. It should be noted that when a bird spends time working over his feathers, it is not because he has lice; he is taking absolutely essential care of his plumage, otherwise the mussed feathers would wear faster, and would not repel wind, cold, and rain as they should.

Pinkfoot preens his feathers instinctively, although the movements have little meaning until the pinfeathers have ruptured at the tips and produced a completed web for him to work upon. Then he will remove the loose, dry sheathing on the outer ends of the feathers, and flakes of this will fly like dandruff from his plumage when he shakes himself.

* * * *

Standing in the shadow of his father, Pinkfoot stretches, preens, yawns and falls asleep as his brother and sister have already done. With plenty of food, the three gull chicks will grow very fast in the next three weeks. There is little in Pinkfoot's present world to bother him; few predators either feathered or four-footed come to this steep, rocky island, and the chicks sleep secure in their isolation.

An occasional hawk or eagle can usually be harried into a hasty withdrawal and there are few Peregrine Falcons still about. These occasions are steadily becoming fewer as Man and his pesticides continue to do their deadly work.

The day is a typical summer day, somewhat hazy but warm. The water washes lazily against the southern and western ramparts of the island. There is no indication that the calm waters hide tragedy. But for the salmon hanging in the gill net, it is a slow death eight or ten fathoms under the smoothly-rolling surface southeast of the gull's island.

A Harbor Seal, one of the remaining few in the area, on one of his dives bumps into the gill net and back pedals instantly. Wary now, he still drifts along the face of the net until he comes to the fish. It is already more dead than alive. The seal is hungry. He snaps and tears at the fish until he gets more than half of it, and rises to the surface with his stolen meal, just in time to be seen by the fishermen coming to run the net.

They do not have a gun--well for the seal that they do not--for they yell and shake their fists at him. He dives and swims a long way under water, into a quiet, hidden spot behind a line of rocks where he may eat in peace. When the men find the torn salmon they disentangle the head part and throw it overboard. It lands, fortunately, among some dry seaweed, kelp, and branches washed off a nearby beach at high tide. It lies there glinting in the sun, as the boat moves away.

The pair of Bald Eagles that nest along the southeastern shore of Iceberg Point have two well fledged young, although not for many weeks will these dark young birds be self-sufficient. Today they still demand food with high-pitched, squeaky voices, and both adults are out foraging.

The old male, a venerable bird of some twenty-odd years, at least eighteen inches shorter of wing-span and several pounds lighter than his mate, is by nature a scavenger and seafood specialist. He almost never eats anything else and is an expert at finding it wherever it may be. He cruises slowly across the open water of the channel between Lopez Island and Anacortes and suddenly his keen yellow eyes spot a flash of silver below. A pause, a downward swoop, and he comes upwind over the patch of floating debris. He sees the forepart of the salmon at once, and does not pause to consider how it came there; it is food. In a moment he swings his yellow feet down, drives his black talons into the fish and is airborne with it.

It weighs well over four pounds, and while he does not exactly struggle to stay in the air, it is a rather heavy burden. His direct route to the nest lies over the gull island, and as he approaches the gulls come forth to meet him, voicing their strident alarm calls. He has felt their fury before; he has no real wish to be driven into the water nor does he want to lose the fish. He veers left and beats a way out beyond the gull island, giving it as wide a berth as he can, and although the gulls cry at him none is sufficiently incensed to dive upon him.

He flaps his way to the shore and rises heavily to the nest, where he is immediately joined by both of his young. They squabble over the food, for both are hungry, but the young male, smaller than his sister but a few days older, manages to grab it and mantle it so that she cannot reach it. He stands guard over it, afraid to back off to eat for fear she will rush him and wrest it away.

Meanwhile the old female, larger and heavier than her mate, and also several years younger, has been on a fruitless quest along the fields on Lopez Island. She likes mammal meat, and hunts the big feral European Hares whenever she can. She has less interest in scaled, and almost none in feathered prey, although in times of need she has picked up sick or injured waterfowl and once ate a dead lamb in a farmer's field.

Her hunt has been totally unsuccessful--she has not even seen a rabbit, let

alone had a strike at one. She is hungry, frustrated, and irritable so she is now heading toward San Juan Island where, in the open fields in the center of the island, she can be reasonably sure of securing prey. Her course takes her in a lazy swing back over the gull island to the nest, just to check on things there.

Ordinarily she does not care to stir up the gulls--their defense annoys her and she does not like being followed and dived upon, nor does she like their shrill calls. But today she could not care less what the gulls do. She has more urgent problems to solve.

The gulls rise to meet her, and she plows into their defense head-on. They cry and make passes at her; one bold bird grabs hold of her tail; at length one female gull hits her squarely on the back of her snowy head with both feet. This is going too far; no self-respecting eagle should submit to such an indignity without a protest. The eagle hears the gull's wing-beats as it begins its next dive. She glances up quickly and does a beautiful wing-over. For an instant she is flying upside down. Her talons reach, feathers fly, and she calmly resumes her way toward the nest tree, but now she carries the dying female gull in her claws.

She comes in to the nest on a long slant and literally throws the dead gull onto the platform as she straightens her legs and releases her talons. Instantly the young female eagle pounces upon the gull, before it stops rolling, and mantles it. After a moment she moves to the edge opposite her brother and begins to pluck the bird. Both young are soon eating and the adults are far afield again, hunting against the hunger that is sure to come.

In the second hour after the venturesome female gull was killed by the eagle, her mate returns with a gulletful of food for the young. As he lands he is set upon by the two ugly pin-feathered adolescent birds. He is nearly bowled over as they are so hungry. They peep and flap and peck at his bill and head. He must close his eyes to protect them, and quickly turns this way and that to escape them until he can regurgitate the food he has brought. They promptly gobble it and run to him, peeping for more. This in itself is upsetting, for if the female had fed them recently they would not have been so ravenous. He jumps up on the ledge of rock that serves as a standing place and sends a querulous call out over the gullery, but it goes unanswered.

The sun passes the zenith, the tide floods and begins to ebb again. Still his mate does not return, and the male is forced to go foraging again to fill his own needs as well as those of his young. He brings back more food for them and again goes out to feed for himself before dark. Still his mate has not come, and sadness fills him. He is used to her company and her help in feeding the young. He misses her calls and her reassuring presence. Their pair-bond extends back five years, and although they do not winter in the same area, their return to the home territory has always reunited them. A certain amount of joy in such a

reunion has always accompanied their re-pairing; they have been almost like two corresponding parts of a well-oiled and perfectly-functioning machine. Their biorhythms have been so well-matched that there has never been any real disharmony between them. Now, like a cog without a matching tooth, the bereaved male is forced to assume the full duties usually shared by both parents. In spite of his distress at the loss of his mate, he has no time to search for her nor to grieve, for he must work twice as hard to finish rearing the chicks. Their developing flight feathers will mark this check in their growth by weak spots paler in pigment than the rest of the feather, showing as light bands and eventually as breaks in the web. These are called "hunger bars" and represent accidents that have created a disturbance in the even nutrition of the feather.

The missing female, a banded bird, had since her first fall spent the winters in Portland, Oregon, where she had found an easy living at window ledges downtown. But this October there will be a certain sadness in the offices she had haunted; their special banded bird will not return to delight the people who had welcomed her happily for nine autumns.

The substances of her physical body are already dissipating, some to the flesh of the magnificent young female eagle, some to return to the soil where it will nurture more life of a different kind in its turn. A third part lives on in the genes of four surviving gulls of various ages which she and her mate have sent into the world as well as the two half-fledged chicks which her mate will rear successfully in spite of his handicap.

* * * *

By the age of twelve days the feather tracts of Pinkfoot's upper back and scapulars are full of developing contour feathers which are fast-replacing the mottled down of his first coat. Suddenly the young birds are no longer fluffy, delightful chicks. They are gangly, long-legged, big-footed adolescents with ragged unkempt coats and scrawny, half-developed wings. They are large enough now to be left alone while the parents are both out foraging, and this is just as well, because with increased size comes increased appetite, and their gullet-size has become almost incredible! Both parents forage widely to satisfy the enormous needs of the growing young.

Now that the brooding season is over, the molt of the old birds also begins in earnest with the feathers of the underparts coming out in a sort of alternate grid so that no area ever becomes totally bare. Drifts of white feathers blow about the grass and catch in the crevices of the rocks as the old ones are shed. New feathers and down quickly appear on the long-naked incubation patches so that by the time Pinkfoot is a month old it would be hard to tell, if one examined

the adults, whether they ever had incubation patches or not.

Their replacement of wing feathers continues slowly and methodically; never more than three feathers are absent or growing at the same time in the old birds. It should be noted that in younger ones, as many as five feathers may be developing at once, but young birds are not geared for the responsibilities of the adults.

Each primary outward is a little longer than the last, and takes a few days longer to grow, until primary ten, the outer one, (which will not be lost until long after the young are fledged and gone) will take sixty days for its complete development. It will be November before the adults' wings will be perfect again.

As Pinkfoot grows, his various appendages grow at different rates, depending upon when he will need them. His feet and legs develop most rapidly because he must walk before he can fly. His wings will grow more slowly; they will not be fully developed until shortly before he fledges, and the flight feathers will not be fully grown until he is nearly nine weeks old. His bill will continue to grow very slowly for a long time, perhaps even for years, since very old birds have larger, heavier bills than younger birds.

As he becomes older, Pinkfoot will exercise his wings more and more, flapping and leaping up and down as if he could not wait to become airborne. His wings are marvelous structures in themselves, for although they are like the forelimbs of mammals and other vertebrates, they are modified for both powered flight and gliding. The hand portion of his wing is well-developed, with ten primary feathers, which are shortest at the wrist and longest at the tip. They are set in such a way that they will rotate to some degree in their sockets. On the upstroke the narrow vane on the outer or leading edge of the feather cuts the air, the wider vane on the inside trails behind and the feathers rotate to let air slide through between them. On the downstroke, the rotation is reversed, the wide rear vane is held up tightly against the next feather, presenting a tight, strong surface impervious to the air. The primaries act as propellers to drive or pull the bird through the air.

The secondaries, the shorter, wider feathers that grow between the wrist and the elbow, have vanes more nearly equal in width and do not rotate in their sockets; in fact, most of these are fastened to the ulna, the forearm bone that makes the elbow by bands of connective tissue that attach to small protrusions called quill knobs. This area of the wing supplies lift like the wing of an airplane, rather than forward motion, although the angle of attack, as it is called, has considerable bearing on the amount of lift the wing is able to achieve. These feathers are molted much more rapidly than the primaries--there are more than twice as many, and they do not begin to molt until more than half of the primaries have been replaced.

CHAPTER FOUR

This is the day that Pinkfoot is two weeks old. Some young on the island are at least two weeks older than he, and there are still a few eggs unhatched, but the vast majority of young are in the same general age group as Pinkfoot and his siblings. In general, conditions have been good for most of this time--calm, clear days with gentle northerly breezes and little or no disturbance.

This day begins as the dawn silhouettes the jagged teeth of the Cascades against the glowing east. The earth's shadow, a dark blue pall with a pink edge, folds back across the sky toward the west like a slow shutter; behind it the day sky is a pale blue. The searching fingers of a dawn breeze rustle in the grasses. Over the island and water the figures of gulls become visible as white dots, weaving intricate patterns as they arrive and depart on their early rounds.

The sun is not four hours high before a dingy white gillnet boat appears in the channel between Lopez and the gull island. Since it is the fishing season, the gulls pay little attention to fishing boats as they ply the waters around the island, but this boat changes course, slows, and turns directly toward the western end of the island. As it approaches, some of the more experienced of the island's gulls recognize the pattern of former terror and begin to make uneasy warning sounds. As the boat continues to draw closer and comes to rest among the kelp near shore, dozens and then hundreds of gulls launch out to circle, crying their apprehension. To some of these birds, this is an old story, and they do not like it at all, for they realize that the human beings in this boat intend to come ashore. Most call the warning "Ka-ka-kak!" but a few of the more nervous birds give the higher pitched, "Kyew! Kyew! Kyew!" Droppings are unloaded as the birds circle, some remarkably well-aimed, or so it appears.

None of this, however, discourages the landing party, and as the excitement and alarm mount all along the island heights, young chicks that have been standing about with their parents begin to move into their hiding places. A dinghy is drawn up alongside the boat and a number of people climb in. With a rattle of oars (and a few appropriate words as the oars foul in the kelp), the dinghy is rowed into a small cove surrounded by barnacle-encrusted rocks. The sheer island cliff looms twenty feet overhead, but by working their way back into the deep cranny and wedging their feet into cracks in the walls, the invaders begin to climb up to the first flat area.

There are very few places where one can land on this island, and even on a calm day such as this, there is always water movement, the ground swell from the distant Pacific Ocean. In spite of a great deal of care, there are some wet

feet before all of the party are ashore.

There are a dozen people, some carrying backpacks and some carrying spotting scopes with tripods. As they assemble on the dry, rocky floor of the first small, ice-scoured ravine, they set down their equipment and pull out various items, among which are maps of the island. Six of these people are banders, and they are soon provided with shiny strings of United States Fish and Wildlife Service bird bands. In strings of one hundred each, some two thousand bands will be placed on the legs of gull chicks in the next few hours. The men and women who are to band the birds are all experienced and know the rules. They know where to find the hidden chicks, and can judge when a chick is too small to band. They know that they must approach the chicks from the rear, keeping their silhouettes as low as possible, and they know that if a young bird is inclined to panic and run, and you do not reach him in time to put a hand or some grass over his head to calm him, you let him go. Banders are only too aware that a running chick does not always return to his territory. If he is caught trespassing by a strongly territorial adult, he may be badly injured or killed, and a band does not contribute much information about a bird if it dies within the hour. The bands will be put on the right legs of the chicks, right side up, so that they can be read by telescope at some later date. They will be very carefully closed by special pliers, so that the ends meet exactly and do not overlap or gap open. After a moment or two of checking, the banders climb up the next ledge and head for the opposite end of the island, where they will begin their work.

The other six people, led by a young woman named Marney Hawke, are band-readers, and besides their notebooks and spotting 'scopes they carry binoculars and maps of the island. Their purpose is to find banded adult birds and to read, if possible, the numbers on their bands. This is a vital part of the research project, because only in this way can they obtain records about the birds actually breeding on this island—the origins of these birds, their ages, whether they return to their home island when they are mature, whether they pair with birds of their own ages, whether they always occupy the same territories, and whether the pair bonds persist year after year. Longevity is difficult to estimate because often the bands wear out and fall off before a bird's life span is over, subjected as bands are to immersion in salt water and the abrasive effects of sand and rock. One bird twenty-two years old had been read the previous summer on Protection Island, but a banded Herring Gull was once recovered after thirty-six years.

Some of the band-readers who are going to cover their assigned areas at distant points on the island have already climbed up the next ledge and disappeared. This island is difficult for both banders and band-readers because of the series of steep rocky ledges that cross the center presenting in some places impossible barriers that must be worked around. In some areas, dense

thickets of wild roses also prevent access directly to the bottoms of the grassy draws. Moreover, the steep cliffs prevent both banders and band-readers from approaching the birds that occupy territories close to the edge of the island.

Marney Hawke, electing to begin her work here, sets up her telescope, and as she raises the tripod to the proper height she is also scanning with her eyes the legs of the birds that are settling all about now that there is only one person left to disturb them. She scans several pairs of pink legs with the binoculars and shortly spots the telltale silvery gray of a band. Turning the telescope she aligns it with the bird and begins her day's work.

Her first look at the band tells her that it is an old one; its surface is dull and pitted, and the edges look worn. The numbers incised into the surface are shallow, but there is sufficient dirt embedded in them to make them fairly easy to read. This band is very old; at least twelve years have passed since this type of band was last used. The small digits used in those days have the threes, sixes, eights and nines, and occasionally the fives as well, all rounded and nearly identical in shape, so it takes a few minutes to sort them out. Four of the eight digits are visible, and after recording these, Marney picks up the tripod and moves about twenty feet to her right. This makes the bird uneasy and it runs a few steps, half-spreading its wings. She realigns the telescope, but the bird has now turned so that it faces her exactly as before. She walks a few steps toward the bird, it leaps into the air and swoops down to the right.

She follows it with her eyes as it circles, turning herself to keep it constantly in view. After it makes two turns it comes back to its standing place. At once Marney focuses on the legs and perceives that the band has now rotated so that two more digits are in view. Once again the bird flies off, and she watches it as before. Occasionally a bird will go off and not come back, and now and then another banded bird will alight where the former one was standing, so the continuity may be lost. Thus she wants to be certain that this banded bird is indeed the one she is trying to read.

This time when it returns, by moving carefully once more she is able to get down the entire number, having double-checked adjacent digits in the process. She writes the rest of the number in her notes and labels it number one, which she carefully spots on her map of the island. A brief scan from the same spot shows her two more bands, quite close together, and she shifts the telescope to these birds for her next attempt.

Slowly, band number by band number, she works her way back and forth up the side of the island toward the crest, moving from ledge to draw and on to the next ledge. In every crevice in the rock there is dry grass; the rock surface is pitted, and covered in places with bluish, greenish, or orange lichens. The rock is angular, blackish, in many places cracked into unevenly rectangular blocks. On

the level grassy spots there are gull nests, some few still containing eggs, but most are old and trampled into the grass; old egg shells lie about, mixed with the eroded shells of chitons, limpets and broken clams; here and there are piles of fish bones, waxed paper and plastic wrappers that the gulls have carried home from some foraging expedition. A dead, dry gull carcass lies in the grass, now nothing but bones and feathers; around its dried feet is a mass of tangled nylon leader. One can only speculate that this caused its death, but it seems likely.

Some gulls have lost their eggs for various reasons--the crows have stolen them, they have broken or rolled far outside the nest, or have been buried in the nesting material. Sometimes territorial squabbles among crowded nests result in broken and lost eggs. There are, because of this, still a few nests with eggs or very young chicks much too small for banding. As Marney walks by one such nest, a very nervous adult bird circles close overhead, calling the warning "Ka-ka-kak!" very rapidly and hoarsely. Suddenly from one of the two eggs in the nest comes a harsh, shrill "Ka-ka-kak!" in reply. Junior is already a gull, and he is perfectly able to scold, even though his shell is scarcely pipped.

Here and there are the decomposing bodies of gull chicks of various ages, dead of unknown causes, but others with battered heads make it obvious that they were victims of the territorial instinct. None of the dead chicks is fresh; they are not the result of the banders' activities, but are part of the normal mortality of the gullery. To be downwind of these unfortunate chicks is to be well aware of their fate.

Meanwhile, toward the southern end of the island, in an open, rocky area with little cover, a young gull about three weeks old becomes panicked by the approach of a bander. He backs out of his scanty refuge in a little clump of dry grass and begins to run. Unfortunately, perhaps, the ground slopes downward rather sharply toward the cliff-edge, and since this is the path of least resistance, he runs that way.

There is little to slow him up, and soon he is running very fast, which undoubtedly saves him from some severe pecks, or perhaps from death itself. His mother, seeing her chick take off, hovers over him, but she doesn't dare to land in a foreign territory. Her chick is the focus of a long line of screaming birds as all the gulls through whose territories he passes give the challenging long call. His mother swoops at him, but nothing is more stubborn than a panicky young gull who has made up his mind to run away.

So he continues downslope, the anger of the adults adding speed to his trip. Twice he stumbles headlong over small ledges, and goes sprawling, but his fall is cushioned each time by thick grass; he gets up and continues his staggering run down to the precipice where his momentum carries him, wildly spinning, out over the edge.

With a shock he strikes the cold green water twenty feet below, but almost instantly he is right side up and swimming sturdily for the kelp bed a few yards offshore. In less than two minutes he clambers out on the kelp, shakes himself, and begins to preen his disarrayed, wet down and half-grown feathers.

His mother lands beside him and stays with him for the perhaps twenty minutes that he remains there. When at last he becomes too restless and dives off, she swims beside him and guides him around the end of the rocks to the only possible place where he can come ashore on the island again. He is a remarkably lucky young bird; if the tide had not been slack, if the south wind were blowing, if his mother had not accompanied him, he would doubtless have been swept away and lost, to die of cold and hunger. As it is, his mother shows him the way across the loose rocks along the shore until they can both walk up a steeply slanting rock face to the top of the island again. He follows her, peeping, but she will not feed him here.

Soon they reach the edge of a territory and his mother flies up once more. She alights briefly ahead of him, and he doggedly follows her, although he is by now very tired. He has 50 or 60 yards to go to reach home, and there are hostile adults along the way. Several of these jab at him, but none actually lands a blow or seizes him. His uphill progress is not very fast, but for some time it is a steady pace. He persists because he is hungry and he must reach the family feeding place before he will be fed.

He peeps most of the time, and his mother swings back now and then to fly over him, but she has two other chicks to check on; they are hungry too. For a time he staggers on toward home, but at last he is exhausted and collapses into the first bit of cover he can find—a bright green, sticky-flowered gumplant. This furnishes some shade and protection, and as long as only his back and tail show, the adults will not attack him. It is his head that will provoke them to drive him away. While he sits here, he is banded.

He crouches in his shelter for some hours. His mother has lost track of him, and it is not until almost evening that he moves again. The female gull of the territory where he is hidden alights and gives the food call for her chicks. He is so hungry that he cannot resist, and he runs toward her although he knows she is not his mother. He snatches a few bites of food before she finishes regurgitating, then turns and runs as she lunges after him. He gives a harsh alarm call, and his own mother hears him. She comes to his rescue, creating a distraction as clearly as if she had planned it, by landing at the edge of this foreign territory. The female on the territory tries to catch her by the wing, and they both give long-calls at each other, but no damage is done, and by this time the chick is several territories further toward home. His mother disengages herself and flies off, only to be struck out of the air by the mate of the female she was provoking. She quickly gets airborne again and moves away. A flying

bird dips toward her but does not strike her. She passes over the young bird and he keeps running. A belligerent adult pecks at him, but it is a glancing blow which only throws him off balance for a moment.

In a few minutes he is back on his territory, and his father feeds him. Shortly he is standing in the old bird's lengthening shadow, preening as if nothing had happened. He is an extremely lucky young gull; any one of a number of factors would have doomed him, but he has survived, relatively unscathed, perils that regularly kill perhaps one chick out of five on the island.

Working gradually up toward the summit of the island, Marney Hawke finds plenty of banded birds to read. Here and there a bird is uncooperative, refusing to turn around or to walk out of the grass; now and then a bird flies away and does not come back. After a self-allotted limit of fifteen minutes, Marney gives up and moves on.

As she moves slowly back and forth to right and to left, she sometimes encounters, at their accustomed places, birds whose numbers she recalls from former years. Here on the eastern end of a shelving rock is the "Binoc Bird," and the difficulties of reading this bird's number are the same as of old. It is on a territory where it is almost impossible to withdraw to a distance and still be able to see the bird's feet. Moreover, the bird is very tame, and it is hard to get far enough away to read the band number even with binoculars. However, at last, the task is accomplished and Marney can move on out of the narrow gully and up to the next ledge.

On a semilunar ridge of rock that slants down steeply on the outside of the face, she finds another old friend, and on the crowning circle of the ridge, two others; an unfamiliar banded bird now stands in a position formerly occupied by another.

Now and then Marney pauses to straighten her back and focus her eyes on the distant scene to rest them. She is completely alone; the banders and band-readers are out of sight over the crest of the island. Above the eastern shoulder of the highest ledge she can see a swirl of gulls in the air, an indication that one of her friends is working there. And here most of the birds have settled except those in whose territory she is presently standing. As she stands there, two Black Oystercatchers come up over the edge of the island and pass overhead, calling a loud, whistled "Pheep! Pheep!" Now and then a cormorant flaps steadily by offshore.

A committed bird-student, Marney Hawke is aware that only in situations such as this does she truly come completely alive. She feels a deep kinship with these beautiful gray and white birds, she feels that she understands at least something about them and their private lives, and she smiles at the thought that anyone could find pure joy on a rocky island covered with excrement, surrounded by noisy, smelly seabirds.

Then she picks up the telescope and resumes her slow progress over the rock.

At length she comes over the top of the island, the cormorant city to her right. Two Double-crested Cormorants are at their nests--the rest have flown. She reads one band here and then moves away so that the cormorants will not be kept off their eggs. In another half hour she reads three more bands and cannot find another, so she edges down the corner of the rock face into the grassy meadow that stretches, like a rug, across the backbone of the island at this point. She walks perhaps sixty feet to a rocky outcrop which is the midpoint of the island, a place known as the "lunch rocks" because it is usually the area where most of the banders and band-readers congregate to eat their lunch.

Here most of the party are already assembled, and some of them are well into their sandwiches. She sets down the telescope and gets her lunch out of her pack as Don, the last of the banders to arrive, walks slowly across the meadow searching for bandable gull chicks as he comes.

Twenty yards away he kneels down for a moment or two, then stands up again.

"Hey, Marney!" he calls. "Come see what I've found. Jerry, bring your camera."

Marney puts down her lunch bag and crosses to where Don is standing. He parts the grass where it forms a little tunnel near a flattened area where a nest has been beaten into the ground, showing Marney a young gull crouched there. Its right foot is extended backward, wearing a shiny new band, but she suddenly realizes what Don is trying to point out to her.

"Its feet are pink!" she exclaims. "That's odd. I've never seen one like that before."

"Neither have I," Don says. "Jerry, take a shot of this."

Jerry bends down to focus his camera, while Don holds the grass back, then pulls out Pinkfoot's left leg, showing it also.

"I've found two other chicks here," says Don. "I expect they're part of the family too because there aren't any other nests within fifty feet. Their feet are black though, not like these."

Marney takes out her notebook and begins to write.

"What are the numbers you put on them?" she asks. "Might be pretty interesting to keep notes on this family."

Don checks the number on Pinkfoot.

"The other two have the next two bands," he says. "I found this one first."

Marney writes busily, also noting that Jerry has photographed Pinkfoot. She looks around. It is just as Don has said: this family lives in isolation, and the

three chicks have a good chance of fledging. The general percentage of fledging in the Glaucous-winged Gulls that have been studied is one chick plus per pair. Here it looks as if there is a good chance that all three will make it. Marney wonders whether they will ever hear from any of them again. If so, she hopes it will be as living birds rather than as mortality figures.

Meanwhile, Pinkfoot's mother has been flying about over their heads, uttering a high-pitched "Kyew! Kyew!" call and gathering her courage. When Jerry walks away with his camera and the odds are down to two-to-one she comes overhead about ten feet in the air, turns and plunges down at an angle, lowering her right foot at the last moment. "Kee-yow!" she screams as her foot smacks into Don's pith helmet with a resounding thwack that makes him jump. Although she weighs only a little over two pounds, her sharp nails would lacerate his scalp were he not wearing the hat.

"Let's go," he says. "After all, we have to eat."

They have not moved more than ten steps before Marney hears the swish of wings, followed by a scream and a sharp blow on her hat. Marney laughs as she ducks, then keeps on walking back toward the lunch rocks.

Good! The intruders are leaving. The mother bird has demonstrated her ability to drive off predators and defend her precious chicks.

Now she lands on the rock, calling "Ka-ka-kak!" Marney looks back, raises her binoculars and discovers the band on her leg. Lunch forgotten, she hurries for the telescope and sets it up at a safe distance.

It only takes her a minute to read the band, for Pinkfoot's mother is still very nervous and she turns about, showing first one side of it and then the other.

"Ka-ka-kak!" she cries, and then jumps down from the rock to walk closer to her chicks and assure herself that they are indeed unharmed.

Pinkfoot's father, who is somewhat less aggressive, has, nevertheless, been flying about overhead, calling "Ka-ka-kak!" (He never was agitated enough to use the higher-pitched "Kyew!" call, and he would never have dived at human intruders in any case.) Now he comes down and lands on the rock, reassured because the female is with the chicks. He stands quietly and Marney Hawke notes that he, too, is wearing a band. In great excitement she focuses on him. It is seldom indeed, even in such a heavily-banded colony as this, that one has an opportunity to know that two banded birds together are indeed a pair.

She reads part of the number, and has to move to the right, for Pinkfoot's father is not walking about as the female did. This sends the female into the air briefly but the male does not fly, and after another move to the right Marney reads the rest of the number. She looks at the male's plumage, which appears entirely adult. She then scans the female, who has landed in the grass nearby, and sees no brown in her plumage either.

Marney studies the two adults carefully for a minute or two, and decides that the more aggressive bird is the female; she is smaller, her bill appears shorter and more slender, and her forehead is much rounder. The male's bill is heavier, he is larger, and his forehead is flatter. Marney notes her estimate of the sexes of the parents by their respective numbers. Her jubilation as she comes back, sets down the telescope and takes up her lunch, is such that she can scarcely eat. What fantastic luck!

Marney, looking at the numbers she has just read, knows that these two birds have been banded within the past five or six years, but not until she gets back to her desk will she be able to check and find that both birds are natives of this island. She will not be able to find out that the female was reared (and banded) on the other side of the "lunch rocks" less than 100 feet from her present territory, and that the male comes from a nest on the northern end of the island, in the little valley where he first attempted to set up a territory the preceding year.

Among the birds that will be read today, is another banded pair that has a very different history. The female of this pair is a native bird, and she is several years older than Pinkfoot's mother. The male is five years old; this is his first breeding season and he is 150 miles from "home."

The female of this pair is a bird that was widowed during the past winter. Shortly after their arrival in Seattle in November, her mate became entangled in a loose piece of nylon leader carelessly discarded by some fisherman at Green Lake. It became snarled about one leg, then the other, and pulled tight, binding his feet together and making it impossible for him to walk.

At first he could still fly, and he managed to survive for some weeks by finding food in the water, but foraging on land was impossible for him. As he became slowly but steadily weaker and hungrier, he reverted to juvenile ways and begged from the female as a chick might have done. She brought him food now and then, but her urge to feed chicks had not yet come upon her, and being a female, she was not geared for courtship feeding of a mate, as the male might have been.

By February the male had become so weakened that he was unable to fly, and this, in itself, hastened his decline because he could no longer seek food. His ability to swim was very restricted and at last the circulation was cut so completely by the tightening of the nylon and the swelling of his feet, that gangrene set in. The agony of this caused him to float weakly, mouth open, panting miserably, wings dragging in the water. The chill of the lake gradually crept into his bones through feathers he could no longer preen or dry to keep waterproof. Hunger racked him and dulled his eyes. One night a strong breeze drifted him to the north shore of Green Lake where he floundered helplessly in

the waves, until a large black dog came along. This dog, running loose and causing havoc at times among the semi-domestic ducks of the lake, seized the gull and shook him violently, breaking his neck and ending the weeks of pain and misery that had been caused by a thoughtless, careless man.

This bird's mate had been gradually divorced from him by the barrier of his misfortune, and her drive to return to the nesting territory soon carried her back to the island. She settled on the old territory, but as a lone female, she could not really hold it. Her search for a mate drew her to propose to any male she met at the club on the south rocks. Most of these birds were already paired and not free to reply to her importuning, but one day she encountered a young male who was still at large, and who had not yet returned to his own home island 150 miles to the north. Her urgency to pair impressed itself upon him and aroused his own desire to form a pair bond, and it was only a few days later until he returned to her territory with her and settled down there.

If he has ever felt out of place, it does not show; he will remain mated to this female and true to this territory until she dies; then he will pair with one of their former neighbors and continue to hold the old territory.

Thus when Marney returns to her desk she will find that one bird of this pair is a Mitlenatch Island bird and much younger than the other but, of course, she will not know how this came about.

After lunch, one of the banders calls Marney's attention to a strange gull on territory at the east end of the island. It stands out among the others, for its back and wings that ought to be gull gray are pure white, and only its wing-tips show the normal gray color. Marney knows of two other white mantled Glaucous-winged Gulls that have been seen over the years, and she correctly assesses this bird to be a close relative of the other two.

This bird's peculiar lack of color is the result of a chance mutation that had occurred in one of her distant ancestors about fifty years previously. In that bird a gene had somehow been altered in the sequence that produces the gull-gray color of the mantle, and this odd gene had been passed on to several descendants. The pull of the natal island, even the natal meadow, had eventually caused two related birds to pair, both of which carried the recessive white gene. This pair had produced eventually one white adult bird which had, in turn, passed these genes to all its offspring; in the past few years, one pair of distantly related birds each of which carried one of these genes, had produced three birds that had white mantles. The one on the island was the only adult currently surviving, but if any of its young survived to breeding age, and they paired with another of the related birds, this mutation would continue to appear. It was now present in perhaps a dozen birds of various ages, none of which showed any evidence of the recessive.

One of the band-readers comes up to look at the white-mantled gull, as he had just read a band nearby. His approach strikes terror into the heart of one of the white-mantled gull's chicks, and it rises to run away. The edge of the island is very close, and it only takes a few steps to start him on his wild, staggering careen down the steep rock face, flapping and bouncing from ledge to ledge until he lands in the water below.

Dazed, he shakes his head and starts swimming to the right, along the edge of the island. Soon he reaches a little cove, where there is access to only a fairly large outcrop of rock. One pair of gulls has a territory here, on this rock, which is sharp and completely without plant cover. Since there are no other territories nearby, territorial defense in this pair is rather lax and they are not very belligerent. This is, in fact, one of the poorest territories on the whole island, because of its lack of cover. If a really strong wind had blown earlier in the season, the nest would have been carried off the rock. Their one chick has no real hiding place, so that his only protection is his parents. Down over the knife edge, however, is a small, flat ledge, and it is here that, on the high tide, the young gull manages to scramble to a resting place.

The single chick remaining to this pair is about the same age as the lost chick, which is fortunate, as it turns out. Hungry as he is, the lost chick hears the mew call of the male bird and climbs over the little barrier. The adult is regurgitating food for his chick, and the lost one rushes over, gobbling up a fair share before he is chased away. At first he drops back to the little ledge, but after a few feedings he does not bother to leave the territory and the adults lose their desire to drive him away. They become acquainted with him, and within a week he has been adopted as a member of their brood. He survives to fledge, again by a lucky chance which does not come to very many lost chicks.

Now that lunch is over, the banders and band-readers go back to work, moving slowly but methodically over the island, finishing up their project for the day. As Marney stands for a few moments on the highest point of the island, gazing back toward the lunch rocks and Pinkfoot's meadow, she is weary but full of satisfaction with her day's work. She is warmed by the thought that there are individual birds here that have long histories, and these known individuals are still alive. Only by band-reading with the telescope are the birds left free to continue their lives relatively unharmed while still contributing data to the study.

The gulls that nest on this island are especially fortunate; the island is so rocky and steep-sided and the water so deep and swift between it and the shore that four-legged predators seldom reach the gullery. On some of the other gull rocks this is not the case.

On one of the nearby islands some years previously, rats had come ashore,

and eaten gull eggs and chicks, creating a good deal of havoc in the colony. Fortunately for the birds, if not for the rats, when the birds left, there was so little food available to them that the rats (there had been only two) had disappeared rather quickly, as mysteriously as they had arrived.

On Flower Island one summer a pair of mink had swum across from Spencer Spit during a period of slack water, and had remained to feast the whole season long on eggs, which they bit open very neatly and drained--whether of yolk and albumen or gull embryos, and chicks-- as fast as they hatched; and, in the course of the summer, at least fifty adult gulls. The incubating gulls were especially vulnerable during the dark nights when no moon shone and they were more or less anchored to their nests by the need to warm the eggs. The mink would tear out their throats, drink the warm blood, and leave the carcasses on the ground beside the nests. No young gulls, and many fewer than normal young guillemots were fledged that year.

A pair of crows had a nest about four feet off the ground in an Ocean Spray bush. One dark night one of the mink scented the half-fledged young and climbed the bush to get them. Another pair of crows had their nest about twenty feet up a Madrona tree at the other end of the island, and they remained secure until the young left the nest. One of them flapped off into the water and was carried away by the tide, cawing frantically for its distraught parents. They circled it again and again but did not know how to get it back to the island. The other two young landed in the shrubbery and succumbed to the mink in the small hours of the following night. No young crows were fledged from Flower Island that summer.

When living became harder in the fall, the mink departed. One was killed crossing a road at night; the other was trapped while raiding a chicken coop. No other mink repeated the performance, and fledging success the following year for gulls, crows, and guillemots was very good.

On Buck Island, the 120 pairs of gulls that nested there had two enemies to cope with. An old Great Horned Owl with a taste for birds had discovered that gull chicks were especially tempting and tender morsels, and every night after gull chicks had hatched he hunted the island. He occasionally killed an adult gull, but more often he ate the young. When he caught one, he would carry it away if it were quite small; older chicks he ate on the spot. His kills were recognizable because he ate all the bird except the wings and the connecting breast bone between.

In later years, a land otter also discovered Buck Island, and from then on no young were fledged at all from this colony. He seldom killed the adult birds, but, like the mink, his destruction of eggs and young was very thorough. His kills of older chicks were recognizable because he left the heads and the intestines, and ate all the rest.

This little colony appeared doomed; if no young could be reared, and adults birds died at a rate of 10 percent per year, eventually there would be no birds who could call Buck Island "home."

About 2:30 in the afternoon the band-readers have each read an average of twenty bands. This is a good day's work, and, as the wind is beginning to rise and the tide is coming in, it is time that the party left the island. Back down the crevice goes all of the gear and one by one the people climb back down to the landing place. The water is higher than it was, and the dinghy can come in further, but the rise and fall of the swell is also more pronounced and makes climbing into the boat more hazardous. One person skins a shin on the barnacles, as he inadvertently steps on slippery algae and loses his footing. However, it is not long before the people are back safely on board the gill netter, and she pulls out, leaving the gull island in peace once more.

On the barren rocks and in the grassy draws, gull chicks tired of hiding emerge from their places, to be fed by the parents. Many of them now wear bands, which they peck at occasionally. Here and there about the island perhaps twenty chicks lie freshly-dead, most with their heads covered with blood, as a result of their intrusion upon a territory not their own. Here and there displaced chicks that went to ground in areas beyond their home territories are trying to get back, and a succession of squabbles among the adult birds results. Parents try to protect their chicks, and stubborn or confused chicks will not run for home but continue to stumble about from one danger to another. Most of the larger ones will arrive eventually; some smaller ones will die. The total mortality will amount to perhaps thirty young, about 1% of the 3,000 chicks on the island.

This island is a refuge, and no one else will come ashore during the period when Pinkfoot will be there. After the traumatic experience of the banding, the gullery will settle back to normal and life will proceed as before. Sunset will follow sunrise, days will pass into weeks, as the chicks grow steadily and their feathers develop to cover them.

Pinkfoot, after the dreadful experiences he has had, is gradually becoming his usual exuberant self, although the band sometimes bothers him a little, and he pecks or pulls at it occasionally. He will do this for some days, but by the time he fledges it will have become an accustomed part of him and he will no longer notice it.

CHAPTER FIVE

And now it is midsummer. In the sky the Lion passes out of sight in the early hours of the night, and the moon, having waxed and waned once since Pinkfoot's birth, now grows again, rising later and later in the day. These weeks are dry; one dawn finds a high, milky drift of mare's tail cirrus in the sky but it dissolves and vanishes with the sun. Now and again contrails of jets draw lines across the high vault of heaven, but the strong upper winds blow them apart and disperse them even as they slide toward the east.

There is no tinge of green in any of the grasses that cover the island; they are all bleached tawny under the sun. The last lush velvety pink rose petals have long since faded. The lusty patch of cow parsnip that edges the central meadow southwest of the Lunch Rocks is now a gray ruin, its coarse, crispy green stems and huge, rough leaves melted into dull salty rags. Only the seed stalks, made of tougher stuff, still stand, dispensing gold-ribbed gray seeds from their upturned umbels into every passing breeze.

The family of crows left the island weeks ago for safer and better foraging on the Lopez mainland. The two nests made by Song Sparrows in the roses are abandoned and bits of dry rose leaves drift into their grass-lined cups. All but one of the young sparrows have flown away on adventures of their own; only the parent birds and one young one remain.

Along the cliffs the cormorants' grass and excrement nests have disintegrated under the feet of the almost-grown young, like a flock of woolly, half-feathered vertical black sheep, the cormorant youngsters crowd the ledges, their long necks, narrow heads and bills twining and writhing like so many snakes as they wait to be fed. They have no external nostrils, and they lower their tongue-bones and open their beaks slightly, producing a rapid fluttering of the naked throat membranes. Perhaps their black, fluffy down absorbs too much heat and they must ventilate this way.

On the offshore rocks the oystercatchers have four fully-grown young that are learning their life trade. Joining them on the rocks occasionally are other smaller shorebirds, already returned from their sojourn in the Arctic. Flocks of rattling Black Turnstones come wheeling in, a startling pattern of black and white until they settle and close their wings. Then they are chunky, nondescript blackish birds about robin size that poke and pry among the barnacles and algae with their sturdy, slightly upturned bills. With them at times may come Surfbirds, larger, grayer, also stocky, with much less white in the wings and tail; and on rare occasions a plain gray Wandering Tattler, more slender, longer

legged, and with no white whatever in the wings and tail.

When the parent gulls go forth to forage they meet an ever-changing array of early migrants. Here and there are flocks of pigeon-sized Bonaparte's Gulls, the adults still with black heads, that have already returned from their breeding grounds in the stunted spruces that line lakes just south of the tundra. Along the beaches they meet California Gulls, with black wing-tips and yellowish feet, back from their inland gulleries. On the kelp beds they encounter those strange red-billed, black-legged gray gulls called Heermann's that are vacationing over a thousand miles from home. In May they reared their chicks on the hot, rocky islets of the gulf of California, then started a long, leisurely trek north along the coast, perhaps seeking a cooler climate for their molt.

Although the sun has already begun its slow retreat toward Capricorn, the heat seems daily to increase. One searing day when even the northwesterly breeze feels hot, a dense bank of dark smoke drifts steadily southward from Vancouver Island, where a forest fire is out of control. This day, and for many days to come, the sun, a bloody ball of failing light, sinks into a brown blanket of obscurity long before it touches the horizon. For days the northwest wind drifts this smoke to the south and east, so that all far vistas are lost; there are no mountains anywhere and the blue haze softens and blurs even the nearer crests of Orcas and Cypress Islands. The forest is dry; there is no moisture left in the leaves, the moss or the soil, and the fire burns unchecked until even the gulls are affected by the thick air. They flick their nictitating membranes constantly across their burning eyes, or close the lids completely; occasionally a bird gasps or coughs as it feels the sting of smoke in its lungs.

Even after the fire dies, the air will not be clear until there is a hard wind or rain to cleanse it.

During these weeks the gulls' chicks have been growing literally "like weeds." By the time Pinkfoot is four weeks old, he has a solid coat of feathers except for his head. Those on his lower back are still rather short, and the spotted pattern of the down is not yet entirely lost. Elsewhere the down is almost gone except as tattered remnants, wisps clinging to the tips of growing feathers.

At five weeks of age the chicks are almost fully feathered except for their heads, and then, suddenly, almost overnight, the spotted pattern is disrupted and broken by feathers that come in, in three stripes, one from bill over forehead and crown to the back of the neck, and one on either side from the bill over the lores, under the eyes, and across the ears to the back of the head. Feathers creep slowly up the foreneck to the throat and the point between the two rami of the lower jaw. The wing and tail feathers are growing apace; the wing coverts and the secondaries are nearing their full development.

As the soft winds slide over the rocks and dry grass of the gullery, the chicks face into it and flap their growing wings hard, bounding up and down on their now fully-developed feet. It is as if they were impatient with the earth and felt the pull of the untried air that their parents master so gracefully. As the next week passes, Pinkfoot's secondaries reach their full growth; the blood recedes in their bases, the quills dry and harden, and the follicle itself tightens about the quill. The perfected feather now stands ready for use whenever the wings are mature enough to call upon it.

One day, as Pinkfoot flaps his wings hard in the breeze, he is suddenly off the ground. He is so astonished to be airborne that he loses his balance and tumbles back, end over end. He gets back up clumsily, shakes his head, then his plumage, and spends the next half hour reordering his mussed feathers. Then the surge of energy pushes him to flapping once more. There are no more strong gusts, and he does not leave the ground again that day.

In the next few days his inner four primaries reach their full length and begin to harden. Then on a day of stronger wind, Pinkfoot actually finds himself completely airborne once more. This time he flaps and finds himself lifting away from the ground. He calls excitedly and is drifted rapidly downslope by the wind, as he cannot yet navigate. His flight is wavering and unsure, and suddenly his mother is above him. As he flaps further and further toward the dangerous cliffs along the east side of the island, still not really under control, his mother makes his decision for him. She swoops down, strikes him on the back and upsets him, so that he loses his lift and falls, landing in a heap near the edge of the grass.

All over the island young gulls are finding their wings, and certain tragedies are inevitable, as young birds flutter off into the water without parental guidance and cannot get back. Downslope to the east a neighboring youngster becomes airborne, and his mother does not see him until too late to keep him from drifting out over the water. Her only recourse is to knock him down. She strikes him and he falls into the water. She does not abandon him, but lands beside him, between him and the running tide against which even she could not swim. With pecks and pokes she guides him back to the island, and he crawls out on the lower rocks near the landfall where the white-mantled gull's chick managed to get adopted. He finds a standing niche above high tide, and here for several days, his parents feed him. At length he returns to the water, and swims to the landing place. Once he gets back on the upper edge of the rocks, he is able to fly short distances uphill and eventually to arrive home again. His plumage at this time is not very waterproof and it takes a lot of preening to dry out once more.

With the passing days Pinkfoot and his siblings learn how to use their wings properly; they reach the point where they can become airborne at will and are able to turn and to guide themselves so that they need not be concerned

about whether they fly over the cliffs or not. They use the oil from their preen glands to waterproof their feathers, so that a water landing will not be a disaster. They spend much time making short flights around the island or riding the updrafts along the edges, acquiring proficiency in the processes of flight.

One mid-day as the tide ebbs, the parent gulls leave the island and Pinkfoot and his siblings follow. It is exciting to be flying with the old birds for the first time. Peeping constantly, they trail their parents to a beach about a mile from the island, where the tide flat is being exposed by the draining water.

The sensation of muddy sand and water is new and exciting to the young birds. There are depressions on the beach which still hold water, up to perhaps a foot in depth. Some of these are washed out around large boulders, some are full of floating eelgrass. Hesitantly at first, then with eagerness and joy, the chicks begin to explore this new world, as they wade into the cool water and poke into the eelgrass.

In the eelgrass bed is a peculiar array of creatures, many of them edible, and it takes the young birds little time to start finding them. There are long, flat isopods, their bodies the same shade of green as the eelgrass, and they clamp themselves along the blades so that they are not easy to see. There are seaweed limpets, their shells flattened laterally to fit on the eelgrass blades, and much easier to pull off than the limpets on the rocks. There are the strange stalked jellyfish Haliclystis, unable to swim, moving perhaps only a little in their entire lifetimes, and even stranger skeleton shrimp Caprella with its weirdly jointed body and appendages. There are tiny bubble snails beyond number, and their pale yellow swirls of egg cases decorate the eelgrass like flowers. In the sand beneath are quantities of tiny Psephidia clams, and the young of cockles, thin-shell and bent-nose clams as well.

Rough lumps under the eelgrass where the water is very shallow, prove, when probed, to be hard and alive—they rear up, raising murderous claws in self-defense. These may be the large red crab, Cancer productus, or smaller species of the genus, and an occasional Black-clawed Crab. If they are small, the claws are no hindrance, and they are promptly dismantled and eaten piece by piece. Some of the larger red crabs, however, Pinkfoot's father carries aloft and drops, once, twice, maybe three times, until they are subdued enough to hack apart and swallow. The meat is digested away and the shell later regurgitated, assuring that all possible nourishment is derived from these chitinous beasts. The same thing happens to other shelled creatures as well—small clams, limpets, snails, and chitons.

In these little waterways, too, are large numbers of fish up to three or four inches long, especially flat-fish. They move like lightning leaving a trail of stirred-up sand in their wakes, then disappear in a flash. Since they are sand

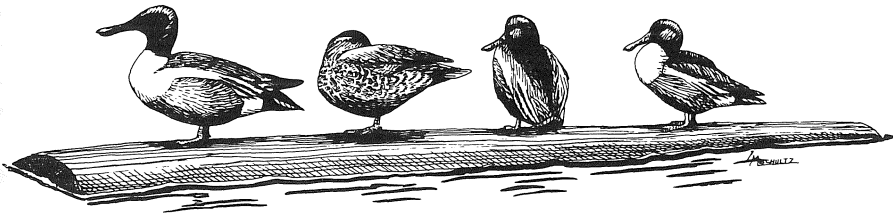
color they are not easy to find, but now and then one stops within the reach of a sharp beak.

Around the rocks is a different kind of hunting. The rocks are covered with barnacles, tube-worm concretions, mussels, squishy greenish sea anemones, green algae, and snails, limpets and chitons of several species. Limpets and chitons are good gull food, but they must be taken by surprise, for their broad flat foot has tremendous sticking power once it is clamped down. If you can hit one at an angle on the very edge where its shell meets the rock, before it can clamp down, and get a bill tip under it, the creature cannot get a firm hold and he is yours.

Also there are countless purple snails of three species, and the lower parts of the rocks are festooned with the pale yellow "sea oats" that are their egg cases. The larger snails are sometimes dropped and broken, but the smaller ones can be swallowed whole. Few are the shells that can resist the digestive enzymes of a gull's stomach!

All of this the young birds are exposed to this day, and then the parents move to a rocky shore and explore the edges of it for a time. Here, in addition to the same animals of the isolated rocks, are clingfish that stick like lumpy black tadpoles to the undersides of rocks, and eel-like blennys that can move very fast. There are flat little porcelain crabs with legs that break off at the slightest provocation, and hordes of purple shore crabs that are very ferocious but not large enough to put up any kind of battle against a hungry gull.

At last the tide edges back in. The family returns to the territory, replete and ready to sleep off full gullets. The chicks have learned much from this expedition. They have a great deal to learn and little time for schooling before they are on their own, quite literally to sink or swim according to their basic sturdiness and the perfection of their instincts for survival, their ability to learn from experience, and a very great deal of just pure good luck.



CHAPTER SIX

Pinkfoot is now seven weeks old, and his feather coat is almost complete; the last down is being lost from the lines above his eyes and along his jaws. His tail feathers and outer primaries are still growing and will be for a number of days. His body feathers are almost all fully grown except a few on his lower back. His head, neck and breast and underparts are all a smoky gray-brown, with some faint whitish tipping on the underparts and neck. His upper back and scapulars are gray-brown with wide light edges and an incised buffy pattern which makes him look mottled there. His wing-coverts are similar to this. His lower back rump and upper tail coverts are all barred with whitish and dark gray in about equal amounts, while his under tail coverts and lower belly feathers have the white bars wider than the dark ones, so that they look lighter than the rest of his plumage. His flight feathers and tail are dark gray-brown, the primaries with faint light tips, the secondaries mottled with buff on the edges and the tip, and his tail feathers with a narrow white tip. The outermost pair have light spots along the edges.

His bill and eyelids are black, his eyes dark brown. The upper halves of his tarsi are sooty black, but his feet are full flesh color. He looks sleek and soft, but nothing at all like his gray and white parents.

Mostly the siblings stand about with their bodies horizontal and their necks pulled in, except when they play, flap, or beg for food. They are full-size now, old enough to stimulate an attack from the parent birds, so this submissive posture is necessary.

When they beg for food, the three chicks now nearly upset the old birds, flapping, peeping, pecking at the adults' bills, and in general behaving in such a way that eventually some of the adults will stop feeding their chicks simply to escape being set upon this way.

The young still bounce about flapping their wings, chasing each other and playing with feathers or grass. They weigh almost as much as their respective parents and could be sexed by their differences in weight. The male siblings weigh about 150 grams more than their sister, and are much alike except for the distinctive feet of Pinkfoot. The female is not only smaller, but paler in color, with more buffy markings on her head and neck as well as her body plumage and wing coverts. This, however, is pure chance, as the color-patterns have nothing to do with sex.

Then comes a crucial day. Pinkfoot is eight weeks old, fully feathered

and able to fly at will. He has followed the parent birds on several more excursions to nearby beaches and learned how to find food there, although it is still much easier to persuade an adult to feed him than to fend for himself.

At low tide the adults and the chicks leave the island and begin a round of foraging on the beaches that gradually lead them further and further from the gullery, until they are at length several miles away on the eastern side of Lopez Island. When the tide begins to flood, however, the father bird flies off, and Pinkfoot also gives a few flaps and is airborne in his wake. He senses some momentous change as the old bird does not head back toward the island, but instead turns in a northwesterly direction and inland. Pinkfoot follows closely, giving an occasional peep; he becomes aware of his brother also on his flank, following.

Below the steadily-beating wings of the three gulls spread the rolling contours of Lopez Island. The land below is partly rock-ribbed where the gray skeleton of the island shows through. A wide, irregular sea of buff, yellow and pale silvery green grass washes up the ridges and ends in a surf of dark fir trees. The winding waters of the bays and inlets are blue or green in turn as the light changes with the direction of their flight. These scenes imprint themselves like charts on the senses of the young birds, although, of course, they are totally unaware of this. Even as it happened to Pinkfoot's father in a bygone autumn it is happening to Pinkfoot now.

Ahead suddenly appears a round blue lake with brightly-green edges well-dotted in the center with white birds. Pinkfoot's father sets his wings for this on a long slant, and the young glide after him. He makes a tight circle and touches down amid a flurry of bathing gulls in Hummel Lake.

Pinkfoot has never tasted fresh water. He dips his bill and drinks, as do the other gulls, and then is overcome with a sudden urge to bathe, as the birds all about him are doing. He dips his head into the water and flaps his wings in a sideways motion, which throws water over his back in large shiny beads. Over and over he does this with great enthusiasm; it feels exciting to a bird born to be as much one with the water as with the land or the air. Now he is one with all three elements of a gull's life, and it is stimulating.

He follows his father to a floating log where many gulls are standing to preen. All three give their newly-washed plumage a thorough treatment with the oil in the gland at the base of the tail. They press it slightly with the bill tip to force the almost colorless thin oil out of the nipple into a tuft of brush-like feathers on the end, then roll their heads over it, picking up a film of oil which they then rub on the rest of the feathers. A bird without oil in its "preen gland" quickly loses all ability to repel the rain, and the feathers fray out so that the bird could die if it could not replace its feather coat soon enough. They nibble

the bases of the almost completely grown-out primaries and tail and shake themselves, sending little clouds of discarded sheathing over the water. Adults near them are also discarding many feathers, especially fluffy underpart feathers, a miniature sailing fleet of white that the breeze carries over the water. A few adults are even beginning the head and neck molt, and will shortly begin to show dark flecks of winter plumage on the forehead and face. Most of these adults have lost at least seven of their ten pairs of primary feathers, and some of these are losing inner secondaries, which molt in the opposite direction, from the wrist toward the elbows. One or two have already lost at least two pairs of these, and are starting to lose their tail feathers. All of these birds look ratty and worn, some much more so than others.

There are a few yearling birds among them, and they look nearly as dark as the juveniles but not so mottled, especially on the back and wings. Two or three of these show traces of gull-gray on the upper back and/or the middle secondary coverts. They have almost completed their molt and look fairly sleek already.

There are also some two-year-old birds, which are lighter, with a gull gray back and most of the wing surface, and the underparts mostly, if not all, white. One shows his inner four primaries as he preens; these are new and gull gray with white tips. The outer ones, not yet full grown, are much browner. The bills of these birds are mostly flesh-color or ivory-yellow and some still have quite a lot of black on the outer half; their feet are mostly dull flesh color.

One three-year-old bird looks like an adult except for two brown old primaries and an old, faded brown-banded tail already missing the central feathers.

These various plumages are new to Pinkfoot, but these birds "speak his language"; he will have to pass through all these stages himself before he is mature.

His father, with a final shake of his plumage to settle all feathers into their proper relationship, spreads his wings and takes off into the north breeze. The siblings follow. They are all rested and fresh, and they rise higher in the air still proceeding in a northerly direction, for the old male has a goal in mind, and he is heading for it in a business-like manner. It really does not matter to him whether the young follow or not; he is aware of them, but now that they have left the area of the colony his feelings of parental solicitude will steadily diminish. Had they remained behind on the territory they would have been fed for some days, but they are old enough to be on their own, and he instinctively knows this.

They are over the channel between Lopez and Orcas Islands, heading slightly west to stay over the water, rather than pass over the high land. They

travel up the length of East Sound, that lovely deep fjord that nearly slices the island in two, and across the narrow neck of land that is the northern edge of Orcas. Here they pass up President Channel, with Waldron Island on their left. The high rocky cliff at the south end of this island, Pt. Disney, has a colony of gulls standing white upon its tumbled boulders, and here and there the black, angular forms of cormorants accented by the whitewash on the rocks about them.

Flying easily and steadily at about 25 miles per hour, the three gulls continue northward, past Bare Island and Skipjack to the west. Here are more nesting gulls, more cormorants on the ledges, and a scattering of Tufted Puffins along the northern edge where the rocks drop sheer into the water.

Suddenly off to the left, with a loud hissing sound, a pod of eleven Killer Whales breach and blow, one after the other rolling the black and white sides out of the water, the males showing their high, triangular dorsal fins as they pass in succession.

A line of drift is dotted with silver specks that are Northern Phalaropes, small swimming sandpipers that whirl about in endless figure eights as they pick up floating plankton of various kinds. They have already come a thousand miles or more, and will spend the winter at sea far to the south—tiny, brilliant flickers of life adrift on the vast, heaving, stormy breast of the Pacific.

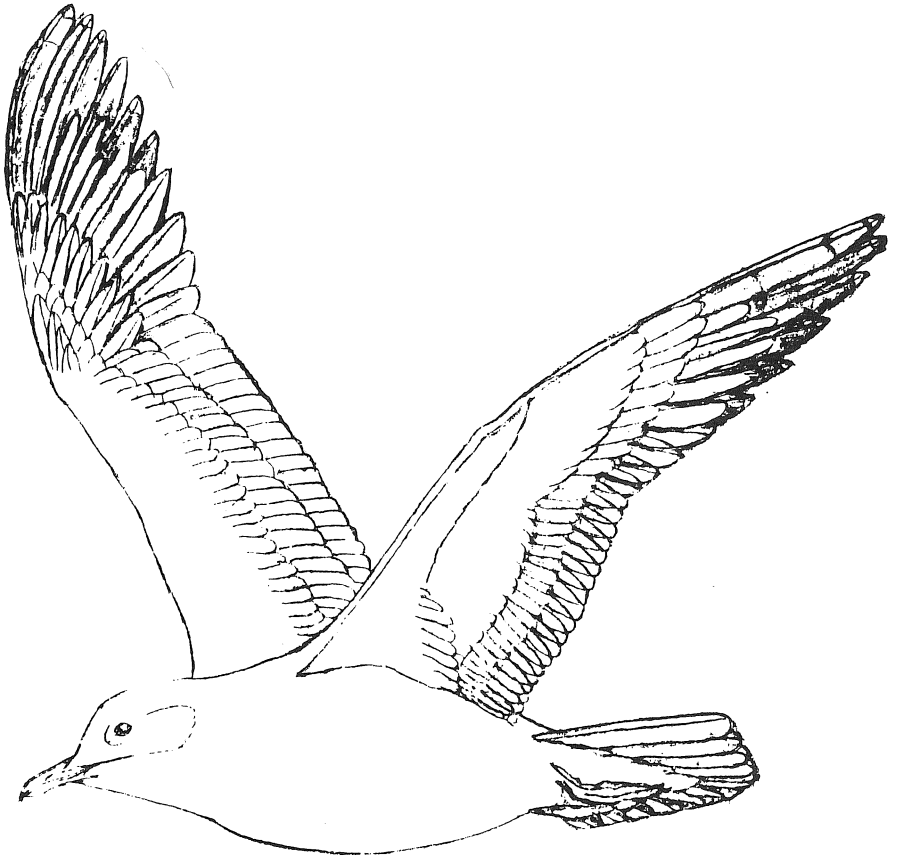
Steadily northward move the gulls, across the tide-torn channels to the Sucia Islands, long noted for their marine fossils, and for the incomparable beauty of the long, narrow bays. Between here and Patos Island are some of the wildest of tidal upwellings, circles, boils, and whirlpools that form, break and reform in constant agitation. Sea birds feed on the edges of these—black and white murrelets with long, slender bills; puffins with their absurd red beaks, white faces and long yellow streamers; smaller guillemots, in their black and white; and pairs of Marbled Murrelets, brown and mottled little birds that either dive or skitter away over the surface as a boat approaches.

Point Roberts to the left, Boundary Bay on the right, the flying trio cross the international boundary and proceed across the shallow bays, and at length over the land, a low, flat land full of meandering water courses. The young birds have now flown nearly fifty miles north of their birthplace, but journey's end is near. As the male birds begin to lose altitude, the pall of industry hazes the sky ahead. Soon they are circling over an area where hundreds of gulls are milling. The old bird comes in and alights on a pile of fresh earth near where trucks are dumping garbage, and the young birds, although fearful, also land there. After a few moments the male throws himself into the screaming fluttering melee of birds at the dump site.

The siblings stand on the mound and wait. After some minutes their

father returns to them and feeds them, somewhat reluctantly, it is true, but their demands still hold some responsibility for him. Twice more he flies into the scramble and emerges with food for them. The fourth time, he does not return. He fills his gullet and departs back the way he came, leaving Pinkfoot and the other juvenile behind. Thus simply, the family ties are broken and the two male chicks are on their own.

Meanwhile, Pinkfoot's sibling who remained on the beach with her mother has finally succeeded in allaying her hunger. When her mother spreads her wings, the daughter follows her back to the island. They settle first in the club area, exposed by the tide, where they rest and preen among a crowd of other gulls, both adults and juveniles. At length as the rising tide drives the birds from the rocks, they return to their territory, where at dusk the male joins them.



CHAPTER SEVEN

Now that his ravenous hunger is sated, Pinkfoot looks about him, seeing details which were not clear at first. This is a temporary resting area, a wide, flat space at the side of what man euphemistically calls a "sanitary fill." It is not "sanitary" in any sense, but fulfills man's need to dispose of his trash and garbage. In the process man is steadily filling up once lovely (but "useless") marsh which will never again produce bobbing broods of ducklings, tuneful Redwinged Blackbirds nor furnish a resting spot for travel-weary migrants on their journeys.

At the moment there are hundreds of gulls wheeling, screaming, almost flying under the blades of the big bulldozers that are covering the trash. Fortunately for the gulls, these machines are moving slowly; their operators are aware of the danger of tipping over among the uncompacted refuse. This usually gives the gulls ample time to flap aside, but now and then a very hungry, unalert or injured bird is overwhelmed by the blade and its crushed body joins the rest of the trash in the fill.

Standing all about, a little apart from the glaucous-wings, are many smaller gulls. These are chiefly California Gulls, some already hundreds of miles on their way to winter quarters, who have made a side trip north.

The adults are gray and white with black tips on their long, slender wings. They have yellowish-green feet and their bills usually have a black spot beside the red spot at the lower tip. Deep in the molt, these birds have already reared their chicks and flown from their inland traveling stations. Many wear bands, as Pinkfoot does, and to the band-reader who comes to look for them, they reveal their migratory patterns. Here are birds from the vast colonies at Great Salt Lake, distant grandchildren of the birds that saved the Mormons' crop in 1848. They will never know that there is a monument in Salt Lake City commemorating the "marvelous" feat of their ancestors. "Seagulls" should not be nesting in the midst of the arid salt flats, yet this has been their summer home for eons.

Here also are birds from Honey Lake in Nevada, and birds from Yellowstone National Park in Wyoming; birds from Hanford in the Columbia, and the Snake River in Idaho; birds from Montana, and birds from Last Mountain Lake in Saskatchewan. They have all flown, probably by way of water courses most of the distance, but always westward, until they reached the ocean. Once at the shoreline, they spread out both north and south. Here in Vancouver, they are about as far north as they will go, although some that have not found the

easy pickings at the dump or the parks will be north at least as far as the northern tip of Vancouver Island before they reverse their course.

Once the weather changes and the days begin to shorten appreciably, these birds will almost all feel the pull of south and disappear, moving down the ocean beaches in flocks, picking up recruits as they go. Thousands upon thousands of them will eventually drift to the beaches of California for the winter.

To Pinkfoot these birds register as different, and he will be interested in them only if their shrill food calls awaken his appetite or their harsh alarm notes tell of danger. The young birds are much smaller and darker than he is. Already, their feet are flesh color and the basal part of their bills are pinkish, a condition that Pinkfoot will not reach for a long time.

Also at the dump but in lesser numbers are Ring-billed Gulls, another interior-nesting species. Ring-bills are widely distributed in North America, and nest across the whole continent, so that not all of them travel west at the end of summer. Many of those that are here are birds from the same colonies as the California Gulls. Smaller, paler, with pale yellow eyes, yellow feet, and yellow bills with a black bar across the angle, Ring-bills nest and travel on the fringes of the California Gull flocks. On the nesting ground they seldom nest mixed among the larger birds, nor do they pair with them.

The young Ring-bills are much lighter than either the Californias or Pinkfoot; after this fall molt their backs will already be gull gray and their underparts white, a condition that Pinkfoot cannot possibly achieve until he is at least two years old.

Ring-bills, too, will remain for a few weeks, feeding on the summer richness at the edge of the sea or from Man's wastefulness, but as thousands of Glaucous-wings move in, in late September and October, most of the Ring-bills will also turn south. They will drift down Puget Sound, cross the gap between Shelton and Aberdeen, travel out Gray's Harbor to the ocean beaches. By November, when the cold and hungry season sets in in earnest, most of them will have found a more moderate climate for their wintering. Thanks to man and his wasteful ways, more of all the types of gulls will survive the winter than would be able to do so under natural conditions.

In the late afternoon Pinkfoot and his brother, driven once more by hunger, move into the area where garbage is being dumped and secure some food for themselves. When the dump site is finally covered with earth for the day they follow a little band of Glaucous wings of mixed ages southwestward. Strange sights and sounds assail the senses of the young gulls, but the older birds fly steadily along, and Pinkfoot and his brother follow them as they settle down on log booms for the night.

Night on the log boom is a strange experience to the young gulls. It never becomes really dark, for the warm glow of the city lights is over the area and reflects pink ripples from the black water. The sounds of Man's activities never truly cease—factory sounds and whistles; now and then the deep-throated moan of a ship in the harbor arriving or departing; the distant sounds of traffic, and, over all, the thunder of jet planes. The black water sucks, gurgles and slaps at the logs, and they move restlessly to the wakes of passing boats. This, almost more than the other things, disturbs the young birds, because they are used to the solid rock of their island.

At first dawn Pinkfoot awakens from his uneasy sleep. He stands up, shakes himself all over to rearrange his feathers, then stretches first one wing and leg, then the other. Then he steps off the log into the water and bathes vigorously, as many other gulls are doing. He half-rises out of the water, flaps his wings, then goes back to tossing water over his back and ducking his head into it. After a few minutes he jumps back up on a log and shakes, preens a little, then flies off with a group of other gulls. The roost is fast emptying as gulls in tens and twenties rise and head in a northeasterly direction, back toward the garbage dump.

For some days this is his pattern; to the dump at earliest light, sometimes to wait until the first garbage trucks dump their refuse, if they are late in arriving. Then he leaves the dump with a full gullet, usually off to the west, where he wanders along the shore, south as far as Tsawwassen where the ferries depart for Schwartz Bay on Vancouver Island, north along the beaches toward the Sea and Westham Islands and on to Iona Island near the airport, then across toward Vancouver City, following flights of other gulls hither and yon, becoming acquainted with the area, not always in the same place as the day before. He and Brother are not always together, but they still meet fairly often at the dump in the early mornings. A certain restlessness seems to carry Pinkfoot further afield than Brother is willing to go.

And now, suddenly, at the age of 62 days, when all the sheaths have finally been removed from his outer primaries—when his juvenile feather coat has reached its finest stage of perfection—he begins a molt. The follicles in the center of his shoulder tracts, the middle of his upper back, the base of his neck, his sides and flanks are activated and his brand-new juvenile feathers begin to come out. In a few days his head feathers too begin to molt, although he has had them no more than four weeks.

In juveniles of many other birds this is indeed reasonable. A young robin or sparrow has such a loose, woolly, disorganized juvenile feather coat that it is scarcely rain-repellant, and its wearing qualities are very poor indeed. These feathers would never last through a winter of hard wear, let alone until the following summer. The speckle-breasted robin begins to lose his spots within

three or four weeks of fledging, and by the fall migration season he looks like the adults and has an adequate coat to repel cold and rain.

But Pinkfoot's first feathers are far from inadequate, and some individuals of his age that for some reason fail to shed these feathers at this time do not seem to suffer for it. It is no real hardship not to shed these feathers; in fact the molt puts considerable stress on a young bird just learning how to cope with his environment. Advantage? Who can tell? Yet here is the molt in full swing, and before this molt is ended Pinkfoot will have replaced almost all the plumage on the front half of his body except wing and mid-underparts, and the outer rows of scapulars and upper back feathers.

As the fresh feathers on his back emerge, they carry a new pattern. The old buffy incised markings disappear, and a soft, blended buffy and gray pattern that looks like watered-down bars takes its place. Most of the new feathers on head, neck and breast are not much different from the old ones, but the side and flank feathers have more small buffy and almost white blotches near their tips.

He will lose no feathers from wings, tail or the rear half of his body. These wait for another round of molting many months away.

Westham Island, low and flat, holds considerable interest for Pinkfoot because of all the other birds that crowd into Reifel Refuge at the outermost tip. This area has dikes and wire pens where hundreds of ducks and geese of many species, both pinioned and free-flying, are in residence. Now in early September ducks from the wild begin to respond to the lure of easy living and drop into the refuge. Shorebirds in large flocks, principally Dowitchers, those long-billed sewing machines of the mudflats, but also other sandpipers, yellowlegs, snipe and plover, feed and doze among the ducks. Flocks of Canada Geese come honking over the trees of the dike to land in the ponds where pinioned birds set up a welcoming gabble. Out over the marsh Short-eared Owls course back and forth looking for mice, and white-rumped Marsh Hawks sweep low over the drying marsh grass and cattails, seeking whom they may devour. Redwinged Blackbirds rise and fall in swirls, and suddenly over the outer dike there is a wild flurry of wings as teal take off in panic.

A brown young Bald Eagle with whitish mottlings on breast and underwings comes flapping laboriously along the shore, spots a female mallard dying of lead poisoning and comes down to feast.

All of this activity lures Pinkfoot back again and again, although he seldom finds much to eat here; he does not care for the grain put out for the ducks. But the spell is broken one afternoon as he circles aimlessly over the tree-lined dike at the northern end of the refuge, enjoying a small updraft. A crow-sized, swiftly-moving dark bird appears out over the water to the northwest and its shape, although unfamiliar to Pinkfoot, nevertheless fills his

heart with terror. Instinct warns clearly of the short neck, the long tail and the sharply-pointed wings of the Peregrine Falcon. Pinkfoot slips down toward the duck ponds out of the falcon's sight, although it quickly appears over the trees behind him, closing in rapidly. Then, with a rush of speed, it turns and bullets after a teal rising from the marsh, and Pinkfoot's panic dies. The falcon loses interest in the area, passes on to the east, and does not return.

One day as Pinkfoot stands among the other gulls at the dump, he is not far from a yearling bird that is obviously very ill. It spends most of its time sitting down, bill tucked under its scapulars, apparently sleeping. Even when a loud crash startles most of the gulls into the air, it barely raises its head. When in little groups the congregated birds leave the area in the twilight and wing out to their night roosts, it cannot follow. It stands weakly, looking after the last departing flock, then sinks back to the ground in despair. It is too weak to fly. It is strange that it has not already been killed by some prowling night predator, as it has been anchored to this spot for some days by its illness.

A few weeks before at the dump, a load of contaminated and moldy grain had been thrown out, and before it was covered, a few of the gulls had either eaten some or stirred it up with their wings. There were not more than fifty birds present at the time, and only five or six had had any actual contact with the material. Of these, two had come to grief because of it.

In the molds among the wheat there had been several kinds, all but one of which was innocuous. There had been, however, one colony of Aspergillus fumigatus, a blue-green mold found on cereal grains, and this particular mold, although related to the mold that produces penicillin, has a quite different effect.

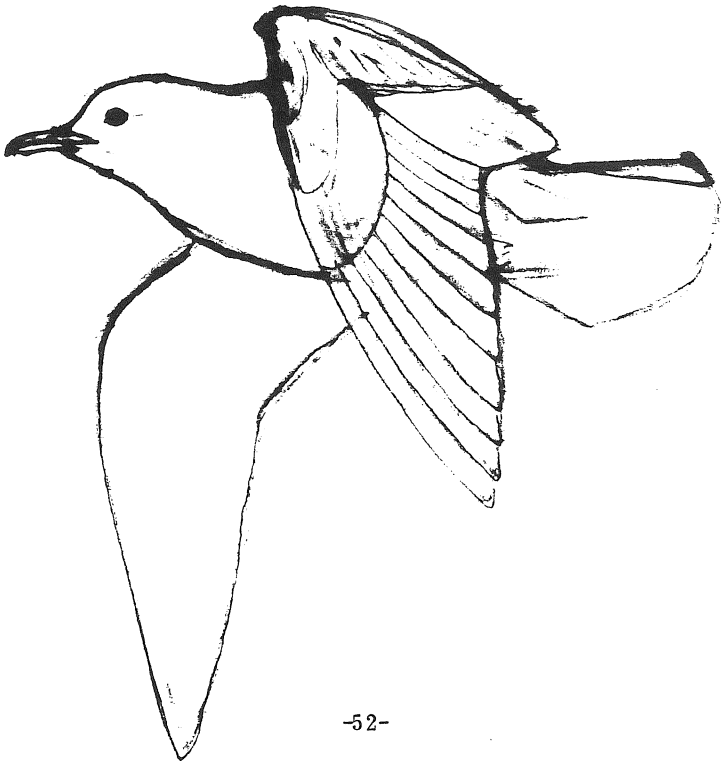
As the gulls stirred up the grain, two of them inhaled spores of this organism, which were carried into the air-sacs and lungs. There Aspergillus found conditions to its liking: warmth, moisture, and unlimited food. It quickly began to grow, making odd circular lesions about the area where each spore had landed. The air-sacs, extensions of the lungs that receive the inhaled air and then return it to the lungs warmed and moistened, fill all the bodily spaces not occupied by the viscera, some extending even into the bones of some birds. This constant flow of air makes a bird's respiratory system more efficient than that of a mammal, but in this case the air sac membranes were being digested by the mold. It poured forth secretions that would break down the tough circular membrane and convert it into food.

One of the two birds was not in very good condition anyway, as the result of a glancing collision with a car that had left various minor injuries. The mold found little resistance and spread like wildfire; in six days the bird was dead. The other bird, perfectly healthy, was at first able to hold the mold in check, but

the poisons produced by the parasite had a telling effect. The bird lost its appetite and ate only enough to keep it alive, and this caused its condition to worsen steadily until it approached the starvation level.

By morning the bird cannot even lift its head, and at noon when the other gulls are resting nearby, it suddenly stiffens and begins to thrash about in its death throes. This panics the other gulls and they fly to settle some distance away, while the unfortunate bird's body sinks back limp and lifeless to begin the process of disintegration. It is no danger to the other birds because the mold has not yet reached the fruiting stage when it would pour forth more spores to carry on the cycle.

Parasitism for many of Aspergillus' spores is a self-defeating way of life, for the mold dies with its host. This does not prevent it from constantly infecting living creatures, however, and many gulls as well as other birds die from it. The spores are in the air, and any creature who has no resistance, such as the Antarctic penguins or salt-water divers confined in zoos, are easy victims. It can be passed to song birds in moldy bread . . . one of the many hazards Man inadvertently creates for the living things about him.



CHAPTER EIGHT

Having disposed of the two older siblings, the parents continue their care of the young female for several more days; it is far easier to feed one chick than three. Her eagerness to find food drives Sister to mimic her parents as they feed, a form of "teachy" or "learny" which is not deliberate, but nevertheless effective. Some young must get along without this training, as their parents simply fly away one day and do not return. Their territorial bonds, loosening since the young are on the wing, suddenly are not strong enough to return them to the island. During the growth period these ties act like rubber bands always snapping the adults back to home base and the young they must feed. Now the bands break and the parent birds are few. The female chick remains, however, near the island for almost two weeks.

One dark, moonless night, far out in the Pacific, a ripple of low pressure becomes the swirling center of an ever-expanding wind system. By morning it has become the first of a long series of North Pacific lows that will in a steady procession move from west to east across the ocean during the winter months. As it moves into the Gulf of Alaska it influences the flow of air over thousands of miles of ocean.

As the first influence of this vast storm touches the Coast, the Pacific High, which has dominated the scene for weeks bringing the lovely, clear skies and gentle north breezes, is forced away to the southwest. The north breezes die, and after a brief lull, the wind shifts 180 degrees and a wind smelling of the land, comes rustling through the dry grass and probes beneath the feathers of the sleeping gulls. The wind carries the scent of autumn leaves and woodsmoke; it speaks of purple asters and the end of summer. The fall in pressure comes near dawn; and the birds stir restlessly, turning to face into the wind from the southwest. The pale stars disappear one by one as a heavy cloud bank, forerunner of the storm, moves in.

Almost at once the sea sounds change; with the north wind there has not been much wave activity on the southern and western faces of the island, but now, suddenly, the marching waves begin to smash against the cliffs under the deserted cormorant's nests, and the Pacific groundswell, charging down the Straits under the push of the low pressure system, begins to work with the wind to send tons of water smashing into the exposed ramparts of the island. Spray flies up over the edge of the cliffs, dampening the plumage of the nearer gulls.

A late, colorless dawn shows tossing gray waves with curling white crests. The mountains are hidden by the lowering gray sky and dark rags of torn

scud fly low across the face of the rolling clouds. On a sunless morning, windy and cold, the gulls depart to feed at first light, the parents and sister finding a sheltered cove along the shore south of Anacortes, where they hunt for a time. Eventually the female parent decides to head for the garbage dump on Whidbey Island, and she becomes airborne in that direction. The female youngster lifts after her, but suddenly all desire to follow her mother disappears, swept away in a sort of wild desire to use this wind for her own purposes. Soon she catches an updraft and all else fades beside the exhilarating feeling of riding the wings of the wild wind.

Everywhere about her the other gulls are traveling on this, the first great Low of the fall; she is not alone in her enjoyment of this wild ride. And as she goes, she is learning: how to alter the shape of her wings and tail to suit the strength of the updrafts, how to use the energy it gives to move forward at an angle to it, how to use all her faculties to balance and control her flight. Wings, tail, even feet and head are brought into play to perform the exquisite adjustments needed for this kind of flight.

Basically she plays with her strength and her instinctive abilities, finding the way of a gull in the air, as every young creature must find its own way in whatever medium it requires--a fish, a porpoise, a penguin in the water--a deer, an antelope, or a snake upon the ground--or even a hummingbird or an albatross in the air even as she.

Her flight carries her south at an angle to the wind which is strong from the southwest. It blows both steadily and in gusts, and soon rain spatters her plumage, beads and slips off the trailing edges of her wings, her body and tail. She half-closes her eyes, flicking the nictitating membrane from the forward corner of her eyes to clear her lenses, and continues to fly.

She passes down the long, high Whidbey Island shore, riding updrafts along the bluffs, and now she slides across the low, open shore of Keystone Harbor where the ferry plies between Keystone and Port Townsend on the west. The smoke from the smokestacks there is being whipped flat and torn away in fragments to dissipate in the swirling gray of sea and sky. Here a crossing would be easy, but she continues along the shore. Other gulls are passing low over the waves, both white ones and dark ones like herself.

She is now thirty miles on her way, and it is raining in earnest; occasionally some water enters her nostrils and she shakes her head to remove it. On and on she glides, and suddenly Double Bluff, the bluff she has been following, turns to the east signaling the end of easy travel for a time. This requires a choice, and she turns more directly into the wind and beats her way low over the waves across Puget Sound toward another shore five miles away.

Here in the welter of the gray-green waves, sea ducks, Surf- and White-

winged scoters and a scattering of scaup are diving through rollers, seemingly playing with the sea. A little beneath the surface of the water the storm reveals itself only by the slow surge of water flowing with tidal currents. In the shallower water these birds feed, and sleep and spend their entire winter untouched by the land.

She turns at the point of Foulweather Bluff and wings her way directly down Port Gamble Bay southward. However, the passage across the water has left her feeling tired, and when she sees ahead a protected dark cove with a sandspit covered with resting gulls, she swings over, lowers her feet and comes to rest, a full fifty miles from the beach on Fidalgo Island where she fed with her parents for the last time.

As the stormy day passes, birds come and go, answering their inner needs for food or rest, or simply moving on. Eventually the tide ebbs once more, near dusk, and she forages the beaches for what food she can find. In the bay, a group of small, dark diving birds—Rhinceros Auklets—finds a school of small herring and "ball" them up toward the surface. The panic-stricken fish crowd together and swirl in a circular motion, rising as they are driven from below by the birds. A roving gull notes the appearance of the fish and gives a loud food call. Instantly all the gulls from the sand bank are on the way to the feast, including Sister, who in spite of the fact that she has never fed in this way, manages to learn very quickly to lunge headfirst into the water. She misses her stroke as often as she succeeds, but before the boil of birds and fish has subsided, she has fed well enough and she follows a group of replete gulls to a log dump at Port Gamble for the night. Here she settles down into a waterproof, windproof ball of feathers and sleeps. She is so tired from her day that she has little trouble with the strange sensations of sleeping on a floating roost instead of the rock of her home island.

The morning is still stormy, and it takes a long time before she has enough food in her gullet to satisfy her. Eventually she rises again into the wind and resumes her journey. Port Gamble Bay is a dead end, and she travels with the wind back north, around the point, and enters Hood's Canal, across to Case Inlet, then southwest to Totten Inlet, then west to Grays Harbor to glean there for a few days, then on down the coast.

Steadily, 50 to 60 miles a day, she travels southward, feeding as she goes on each ebb that uncovers the beaches. Her flight takes her to the Columbia mouth, to Tillamook Bay, Oceanside, Netarts, Depoe Bay, Florence, Coos Bay, Cape Blanco, Port Orford, Gold Beach, Crescent City, Humboldt Bay, Eel River estuary, the hills along the ocean, Point Reyes, Bolinas Lagoon, and finally, to San Francisco Bay.

CHAPTER NINE

On the same morning that Sister finds herself called away by the wind, Pinkfoot, having fed well at the dump at the earliest hours after daylight, finds the lure of the wind also beckoning him northward across Vancouver city. He glides along the shore of Stanley Park and across Burrard Inlet. He eventually makes a landfall in Horseshoe Bay where he forages with gulls from nearby Christie Island in Howe Sound. Here he meets banded gulls, birds that have drifted down from Mitlenatch Island, far up the Straits of Georgia, as well as birds from Christie Island, and an occasional wandering bird from the gullery on Mandarte Island, off Sydney, near Victoria—much closer to home.

For a week Pinkfoot roams the beaches north of Vancouver city, no two days in exactly the same place. He follows the ferries across to Nanaimo, scavenging galley scraps. All this time the waters are gray, the wind fitful and full of the approaching chill of deep autumn. As he drifts he encounters more gulls of the year, some perfectly independent, some still seeking food from any passing adult, some still attached to a parent. Already the birds of this fledging are dying; he finds one on a beach, waterlogged, with an adult skinning it.

One day as he forages a rocky beach north of Horseshoe Bay, a beautiful Bald Eagle appears. Other gulls on the beach call uneasily. As the eagle approaches, they all fly off except for one young bird struggling with a fish half-eaten in its throat. It is unwilling to disgorge and the fish is too large to swallow completely. Suddenly the eagle turns and darts diagonally downward at full speed, wings somewhat furled. The gull flaps wildly in the air, still encumbered by the fish. The eagle strikes, feathers fly, the gull falls dead to the beach with the eagle following it down.

"Kyew! Kyew! Kyew!" the other gulls cry, circling overhead. Not for nothing do the experienced gulls give the Bald Eagle considerable respect. For so large a bird, the eagle can move very fast. Any gull who does not know this may not live to profit by the lesson.

One day while Pinkfoot is ranging north of the city, a misfortune occurs at the dump. Among the food scraps that are briefly uncovered are some that have been spoiled by botulism, and Brother swallows particles of this. It is not more than a few minutes later that he begins to feel upset, and flies somewhat unsteadily out to the resting area. Here it takes only a few more minutes for the first effects of the poison to gain ascendancy. He loses control of his neck muscles and his head flops loosely; he is unable to raise it and keep it there. This symptom is known as "limberneck." Ducks often drown when they are overtaken

by this weakness while swimming.

Fortunately, Ken, one of the American band-readers, arrives at this moment and as he walks across the open area he sees Brother struggling feebly, unable to run away. Walking over to the bird, Ken picks him up, noting that he is a young banded bird. He recognizes the symptoms and, being basically a kind-hearted soul, he carries Brother back to the car, puts him in a box and drives across town to a friend who works with sick and injured birds.

Brother is still very much alive and very frightened, but he is completely helpless as he is bundled out of the car and into the house. The woman receives him and quickly sets to work to save his life if she can. His feet are now paralyzed and he lies on his breast, his head curled around, his feet sticking straight out behind him. She puts a layer of old cloths in a narrow box that is about eight centimeters deep. She adds a hot water bottle under some layers of cloth, and then cuts and pads a niche in one end of the box with foam rubber. Here she anchors Brother's head with a piece of adhesive tape across the top, making sure that the soft sponge rubber beneath his throat will not cut off his breathing. He would struggle free if he could, but he is now so paralyzed that he can move only feebly and without control.

Quickly she takes several teaspoonfuls of vinegar diluted half with water, and fills a plastic turkey baster, which she eases down his gullet and slowly squeezes the bulb, pumping the acid solution into his digestive tract. His head, of course, must be kept high or the liquid will run back up his throat and choke him.

After perhaps five minutes, she repeats the process with a mild epsom salts solution; five minutes later she gives him a solution of white corn syrup and evaporated milk.

About twenty minutes later she examines him and notes that his digestive tract appears to be cleaned out fairly well already. Twice in the next hour she administers the corn syrup and the evaporated milk, now mixed rather heavily with a vitamin-mineral powder and some antibiotic.

In late afternoon, Brother manages to pull his feet back beneath him, and the good samaritan knows that he is recovering. She injects a mixture of strained baby beef plus the other things, and once more when she looks at him she sees that he is able to move his head a little. When she examines him later in the night he can hold his head up in wobbly fashion so she removes the tape, since he is no longer in danger of choking.

By morning light Brother is standing, with his body back under control. She moves him to the basement, into two paper towel boxes end to end. In this, directly under a 40-watt light bulb, she places a very heavy dish with water and lots of bits of bread.

After she leaves, Brother decides he is thirsty. He sees the water, drinks, and eats part of the bread. Later he eats the rest of it, and when she feeds him more bread, along with a the few bits of raw beef heart, he eats it all.

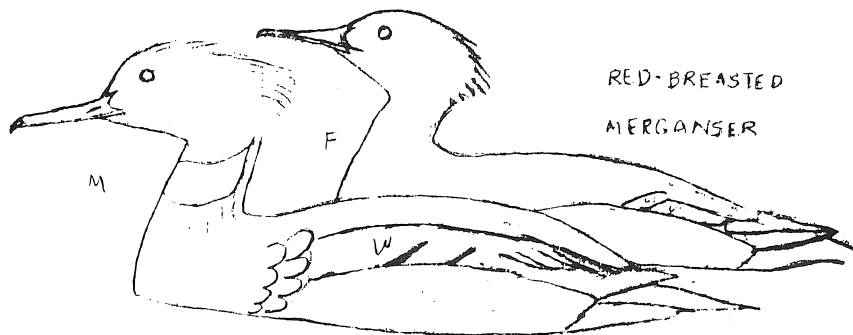
By the next day, he is trying hard to get out of the box and she has to put an old window screen over him. He eats well, but is very restless, and in the afternoon, as she takes off the top, he flies out and across the room to a bench beside a window.

"Okay," she says, "If you're that frisky, I guess you can go." She opens the basement door, and shoves him gently in that direction. He runs across the floor, flies up the steps and lands in the lawn in the backyard. For a few moments he looks about, taking in the partly cloudy sky and the soft breeze, then he leaps into the air and circles the neighborhood several times. When he is high enough, he sees the silvery gleam of water to the northwest and sets off to find it.

It does not take him long to cover the distance to the waters of Burrard Inlet, and he comes in low, to land at last in Lost Lagoon at Stanley Park. Here hordes of ducks, wild, semi-domestic and tame, Mute Swans, and many gulls, are standing, sitting and swimming. People are tossing food to them, and brother immediately feels at home.

Although he has survived a great and nearly fatal crisis in his life, nevertheless something has happened within him that quenches for the time being, any desire to wander. For the next six months the park will be his steady home, and although he may travel as far as the fish docks and cross Burrard Inlet or follow the shoreline out to Point Grey, he will not leave the city, even to go to the dump. There are many handouts in Victory Square and Oppenheimer Park as well as along the shorelines, and the fish docks and the kind-hearted people who feed gulls at their windowsills will suffice to keep him through the winter.

Pinkfoot's pattern develops differently. All three birds are individuals and they go their separate ways.



CHAPTER TEN

In the third week of September, the sun in its yearly course stands directly over the Equator. Days and nights are the same length over the entire earth from pole to pole; the autumn Equinox in the Northern Hemisphere, the spring Equinox in the Southern.

The Equinox signals the real turn of the year. In the valleys along the coast, the Bigleaf Maples begin to turn a deep, glowing golden yellow; along the streams the Northern Black Cottonwoods assume a light shade of the same color. In the cutover land and the wastelands of open shrub where forest succession has not yet appeared, the brilliant splashes of orange and red Vine Maple are accented by the purplish red of Dogwood.

Among the flowers only the Purple Asters persist, and the unmown fields are dry and pale with sere grasses; on closely grazed paddocks and city lawns the grass is a light, antiphonal green.

Offshore, perhaps warned by the shortening length of day and a built-in clock of their own, the Sooty Shearwaters, dark gull-sized birds with tubed nostrils and stiff, silvery-lined wings, glide by in thousands and tens of thousands, preparing for the long flight south across the water to their breeding grounds in the far reaches of the South Pacific near New Zealand.

Out of the north, millions of temperate-zone birds are on the move to warmer climates. The more delicate, like the five-inch Yellow Warbler with its chestnut-streaked breast, and the vireos, the flycatchers and the tanagers, those outflinders of more southern blood, the hardier pioneers of the great dispersal, have left the lands of their birth, and are already far on their journeys. Behind them, moving by night as is their inclination, are speckle-breasted thrushes; the southern buntings such as the Lazuli, that lovely silvery-blue, orange-breasted summer inhabitant of brushy hillsides; various migrant sparrows; and the swallows in vast flocks of mixed species, feeding by day as they slowly circle southward.

Already miles upon their journeys are most of the shorebirds; a flood of them moves southward along the coast, or through the interior, wherever there are beaches of any nature that support life or shallow marshes where tired, hungry migrants can safely rest and feed. In their flocks, small and large, Western and Least sandpipers, Short- and Long-billed dowitchers, Lesser and Greater yellowlegs, Whimbrels and godwits, phalaropes and plovers, pour down from the Arctic as soon as their nesting duties are fulfilled. In May they rushed

north for their single throw of the reproduction dice for the year. Those that were unsuccessful for any reason have no second chance in the ephemeral Arctic summer. They long since returned to the beaches to work their way southward, leaving their more successful brethren and offspring who now follow in their wake.

Far out over the ocean as well as over the land, sometimes all night long, ring the honks and gabbles of geese, and their long, wavery lines and V's stretch from horizon to horizon. There are the White-fronts, called "specklebellies" because of the irregular black bars across their underparts; there are the Snows, those lovely white birds with black wing-tips; and last, but far from least, the black neck stockings and white checks of the Canadas, in all sizes and colors, from the huge to the tiny and from the very light to the very dark.

The Snows that pass down the coast, when Pinkfoot will see them over Ladner and down the delta of the Skagit, have come from a truly great distance. Among the hunter-kills, one finds bands put on by Russian wildlife investigators in the flats and marshes of Siberia.

And thus, as the sunlight lessens in the north, Pinkfoot too finds a restlessness that responds to the wind. At the edge of autumn, he begins to work into the flow of air moving up from the south. There is not so much a strong migratory urge, perhaps, as in his sister, but there is a desire to travel, to ride the wild wind wherever it may take him.

In deep September when the next gray storm moves inland, he lets his desire take him into it. From Vancouver city, he lets the strong current of air support him as he passes westward and southward to the shores of the Fraser delta. Where there are flats exposed, he explores them. A sewer outfall from a treatment plant at Iona Island pulls him down to feed in the gushing outwash.

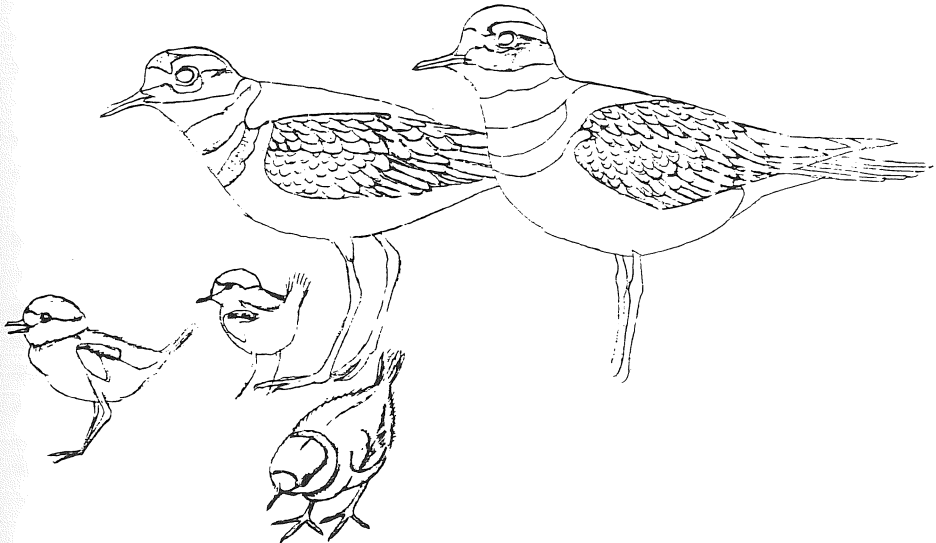
There is a constant swirl of motion as gulls crisscross the flow, stooping to pick up bits with their legs dangling, or sit on the water and plunge their heads under, being carried steadily outward until they pick up and fly back to the outlet again.

Pinkfoot is one of very few Glaucous-winged Gulls, but there are many birds here, nevertheless. Most of these are little Mew Gulls, about one-third his size, with long black-tipped wings, delicate plain yellow bills and feet. Also among them are Bonaparte's Gulls, even smaller, and now all in winter plumage with only a little spot of black on the ear coverts. Their feet are orange, their bills black, and they show on the outer edges of the outer primaries a white slash that marks them from afar. On the day Pinkfoot is there, two Franklin's Gulls are also there—birds from the far Prairie Provinces of Canada similar to Bonaparte's but a little larger, with reddish bill bases and black feet. These are young birds, and they have a heavy brownish-black hood over the head.

Here too, he meets Thayer's Gulls for the first time--they are pink-footed, looking much like small Glaucous-wings, except for the little bit of black on their wing tips. Glaucous-wings are already all in winter plumage, but these Thayer's heads are still white. He will see these birds repeatedly at Green Lake in Seattle, even though they come from a continent-width away. Some strange, perhaps glacial period pattern of migration draws most of these birds to the Pacific coast to winter even though they nest on Baffin Island in the far northeast.

From Iona Island he goes south to Point Roberts where he crosses the water to Point Whitehorn south of Birch Bay, then southeast to Sandy Point and Lummi Bay. He curves over to Bellingham and travels south to Samish Bay and Padilla Bay, then follows the Swinomish Channel into Skagit Bay.

Skagit Bay is very shallow all along the eastern half and he spends some time there among the maze of sloughs and marshes of the Skagit Game Range near Stanwood. Stanwood is exactly opposite Penn Cove with the wide top of Camano and a lot of water between. He crosses to the deep water of Penn Cove and Saratoga Passage heading south past the western shore of Camano Island and the eastern shore of Whidbey Island and into Everett. From Everett he travels southwest through Possession Sound, past Possession Point, South Whidbey and Cultus Bay, then on south through Puget Sound, passing Edmonds, Richmond Beach and, finally, reaching Seattle.



CHAPTER ELEVEN

Week by week the days become shorter and grayer. It rains and drizzles and the south wind blows. There are cold, gray days without rain, and once in a while a bright, cold day when the wind blows from the north. The starvation time is upon the land and sea, and young birds of the year are dropping by the wayside. The weak, the ill and the injured, the unwary and the just plain unlucky add their deaths to the total mortality rate of about 50 percent of the yearly hatchlings that will not survive to their first birthday.

Pinkfoot, however, is among the more fortunate of the young birds in that he soon discovers that there are places where food can regularly be obtained with little effort. One day while circling over the buildings, he spots a little cluster of eight or ten gulls perched on the roof of one of them. They are obviously excited; he hears food calls, and drops down to investigate.

Across the street from the roof, three gulls are walking about on a window ledge, and soon the window is opened, and a woman spreads food on the wide stone ledge. Immediately the gulls converge on the food, gobble what they want, and are immediately replaced by other birds from the rooftops. In about fifteen minutes all the birds of the group receive a considerable amount of scraps--bread crusts and dry food of this type, but also some odds and ends of cheese, meat, fat and eggs, including a few shells, which certain of the birds devour as greedily as the food.

Gathering his courage and his appetite, Pinkfoot drops down to glean the crumbs. As he does so, and sweeps up to the ledge, his band makes a little tinkle which is heard by some of the office staff.

"Ah-ha!" says one of the men, looking at Pinkfoot. "We have a prize here! That bird is wearing a band!" He moves to get a better view and Pinkfoot, seeing him so close at hand, panics and flees.

However he remembers the food and the next day he is on hand at the hour when the staff feeds the gulls during their morning coffee break.

It takes only a few days for him to become accustomed to feeding on the ledge with people looking at him from just inside the window. He soon becomes bolder than some of the timid females, that even though they are adult birds are more wary because of longer experience with Man. Moreover, Pinkfoot is a strong, confident and aggressive young bird and he quickly works his way up the feeding hierarchy to a position about four birds from the top, so that he is able to feed very well.

He is admired and his band number is read and sent away to the Banding Office in Laurel, Maryland. Thus the bander, Marney Hawke, learns that one of the three "special" gulls that had been banded as a brood is in her town for the winter.

It has sometimes been assumed that young gulls are "low man on the totem pole" but this is not necessarily so. A strong, aggressive, independent young bird can bluff and intimidate its way toward the top of the "peck order" if it desires to do so. Pinkfoot is able to do this fairly readily, even though all but one of these birds is older than he: two of them are second-year, and one a third-year. The others are fully adult in plumage, and several are older adults that live in the city and nest near the waterfront on the tops of buildings overlooking the sound.

The top bird is an old adult male that had at one time been struck by a car and injured, so that he has a rather odd, sway-backed stance and limps on a leg that has mended slightly off-center. But "Bossbird" is a very strong bird, nevertheless, and perhaps his physical handicaps make him more aggressive than he would be otherwise, for he dominates the dozen birds in no uncertain terms.

The one other juvenile bird in this group is his chick, likewise a strong young bird, but still under the wing of his father. "Bossbird" stands aside and allows "Jimmy" to feed on the ledge, meanwhile "talking" to him in soft, reassuring, throaty sounds. "Jimmy" had been injured earlier by a gust of wind which had caught him and flung him against a wall, breaking his right leg. Bossbird had been nearby and had actually brought food to the unfortunate youngster for two or three days until his body had thrown off the shock and he was able to move about again. Now Jimmy's leg is quickly healing, and he will soon be able to walk again. His father looks after him most of the time, maintaining a bond far long after most of the ties have been severed in other families.

Jimmy, too, is a banded bird. Marney Hawke and one of her friends had made a special effort to climb to the rooftops and band gulls nesting there. She had been told by one of the office staff that one of "their" gulls--old Bossbird--had a nest that was visible from the office windows, and that the staff had been putting out food for him, which he promptly carried to his chicks at their nest on a warehouse roof half a mile away. As soon as the chicks were flying well, the female and one chick apparently went away, but Bossbird brought Jimmy to the ledge where he has been feeding ever since under the watchful eye of his father.

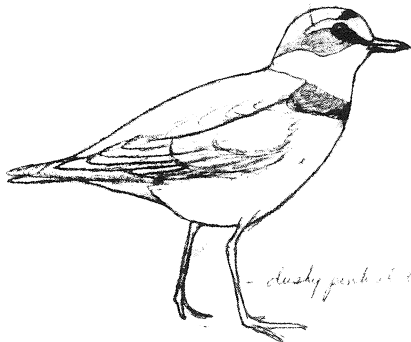
Pinkfoot finds that at least some of this small "flock" of gulls have other productive window ledges about town and he follows them in their visits. Bossbird seldom accompanies them to other windows. Since he feeds first, he usually has a full gullet and does not need to go the rounds. Since not all people

feed the birds at the same time, there is a period of several hours during which Pinkfoot ranges over the downtown business district from window to window looking for "handouts."

He soon learns about weekends, when only the windows of apartments produce food. On these days, he alters his daily schedule somewhat, spending more time in two other areas and less downtown.

Over the winter months the "steady" birds at these various places about town have come to know each other, very much as people who ride the same bus day after day become acquainted. Just as one comes to recognize his fellow travellers who are regular commuters, so the gulls learn to recognize the other birds who share their winter territories. Some, of course, are mates; a few are parents and children or siblings; most are just individuals who, in the course of their sojourn, have settled into a certain daily rhythm of places and times to be. Each has his own pattern, except in the case of related birds, who usually share the same rhythm. Thus each bird participates in a fairly wide circle of relationships. Pinkfoot knows that at Lakewood, on Lake Washington, there is a big, old adult bird that is dominant and cannot be challenged, and he immediately defers to this bird if it arrives while he is feeding or if he is standing where it is accustomed to stand.

Aside from strangers who are often just passing through, each bird knows his "place" in any given hierarchy at a feeding or resting site. This may not be true where there are hundreds of birds. But in areas where at any one time there are not more than twenty to fifty birds, there may be half of these who always spend a particular part of their day there. They know each other by sight and often by voice—especially the aggressive individuals who are likely to demand the top places. Pinkfoot, although a young bird, is one of these. He is strong, aggressive and sure of himself. Only the very toughest of old birds, such as Bossbird, can cow him to any extent. This gives him a real edge in the fight for survival.



CHAPTER TWELVE

One cold, bleak December morning the late gray light sees Pinkfoot withdraw his head from his scapulars, yawn, rise to his feet and stretch, first one wing, leg and half his tail, then the other. He flaps his wings vigorously a few times, leaps into the water for a quick bath, tossing water over his back, then he flaps again and is airborne.

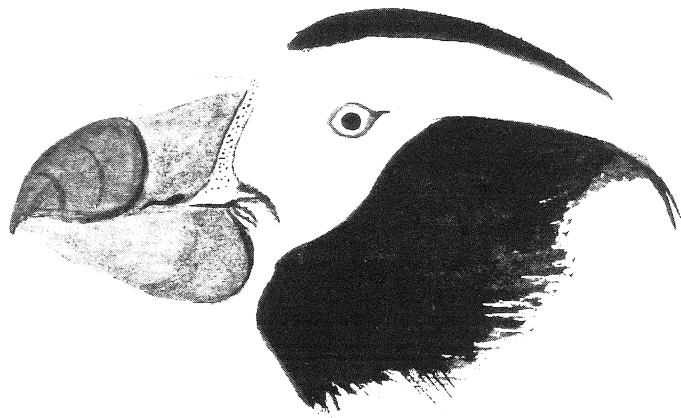
Off over the waking city he heads directly for Green Lake, always his first port of call. He circles the lake, then heads for the Aquatheater, comes in on a long slant and lands in the water twenty feet from shore. He is surrounded by ducks, chiefly mallards, the white domestic mallards called Pekins, and crosses between these which are bizarrely marked. There are all-black, greenly iridescent drakes with white chests, huge mallard-looking drakes with gray rather than red breasts, and even female-plumage birds with white neck rings. Among these are also two Chinese geese, gray and brown of feather with black knobs on their bills. Along the shore are numerous slaty coots with white bills, black heads and red eyes, and a few wild ducks--three wigeon, a shoveller, a drab gadwall with a crippled wing, and two Lesser Scaups.

The birds sit quietly in the water, on the float, or on the shore, because they all know that a handout will shortly arrive. Indeed, it is not long before a red Volkswagen pulls into the parking area. Its driver, a tall young man, removes a telescope from the back seat, adjusts its tripod, then brings out a bag of dry bread. Some of the birds recognize him and swim, waddle or fly toward him. He tosses out some bread and begins to scan the dozen or more gulls that are now out on shore to look for bands.

He is a young biologist--more correctly an ornithologist--deeply involved in the plan of total research, whose name is Ken. His involvement with gulls began, much as Marney Hawke's did, with a curiosity about the life cycles of these birds. His emphasis, however, is not movements, as with Jim and Emmet, nor behavior, as with Marney. His concern is the plumage that can change a graybrown, mottled young gull with black bill and feet, into a clear gray and white adult with a bright yellow bill and a red spot. He is anxious to know exactly how this change takes place, and now he is involved in studying the molt and the changes it brings about. At every garbage dump, sewer outfall and resting place, at Lakewood, Seward Park, Green Lake, Alki and Golden Gardens, Ken appears with his telescope and note pad. Every dead gull that comes his way he carries back to the laboratory and studies it feather by feather. Every live, banded gull whose number he can read, he describes in minute detail in his notes.

In a moment he sees Pinkfoot, and swings the scope to look at him. He reads as much of the number as he can see, then tosses more bread, which causes Pinkfoot to change positions, and shortly he has the whole number. He pulls out a card upon which is xeroxed the outline of a gull in the center, a bill in the upper right corner, and a spread tail in the lower left. He sketches in what he can see of Pinkfoot's new plumage, noting this also on the margin. He studies the bird's feet, and fills in the appropriate area on the card with pencil to show the dark pigment. This find excites him because it is obvious that as long as Pinkfoot's feet remain in this condition he will be sure of him without having to read his band number.

After reading and describing two other banded birds, Ken packs up and leaves. Since it is likely that Pinkfoot is a resident who will, according to the habits of gulls, be in this place at about the same time every day as long as he is in town, Ken resolves to look in at Green Lake fairly regularly to study him.



Tufted Puffin
August 12, 1948

♂

CHAPTER THIRTEEN

The year turns, not the artificial year of man, but the year of Nature, as the sun passes its farthest penetration to the south, and begins slowly, slowly, at first only seconds per day, its long climb back from the depths of Capricorn.

No more than a week after this--before Men tear the old year from their calendars--there comes a break in the long procession of Pacific Lows, and down from the black cold of the Arctic night comes a towering mass of chilled air, moving like a glacier over the Pacific Northwest.

A large low has been holding over the coast, and its last gasp is still flinging rain in sheets across the city on the wings of a southeasterly wind. Far to windward a clear streak of green sky with a gold edge begins to slide up behind the cloud-banks. The wind never ceases, but even as Pinkfoot starts for his roost on the logboom, it veers sharply toward the west. The long, straight edge of the cloudbank passes very swiftly overhead and out of sight, leaving a sky of cold, hard blue, already darkening in the east, as the wind continues to shift. By the time the gulls are getting well settled on their roost it is blowing hard from the northeast. The temperature which was 54 degrees Fahrenheit during the day, plummets to 30 degrees Fahrenheit within the hour. The city lies fast in the bitter grip of a "northeaster."

By morning with the pale cold light of dawn, the city looks dry but otherwise little different. The windward logs are sheeted with ice where the waves splash. Some of the gulls have moved to more sheltered positions during the night, and inside their warm coats they merely turned to face the new wind direction. Now as they stand, the cold air slices about their bellies and feet. Today when they are airborne they will pull their feet into the belly feathers rather than hold them back by their tails as usual--a procedure that causes some speculation among ferry commuters who wonder how "footless" gulls make a living--until one lowers its landing gear from its body feathers and the mystery is solved.

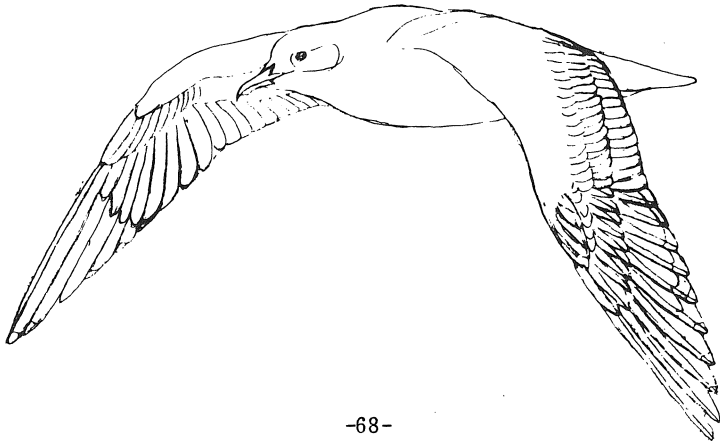
As Pinkfoot heads for Green Lake, he notes a white layer of ice on the shore, and although the wind is whipping the lake into waves, the surface freezing is beginning to pile up on the south edge of the lake. Conditions are not especially to his liking, and he sits on the frozen shore, pulling his feet up among his feathers and resting directly on his underparts. Many ducks are also doing this to keep their feet warm. The grass itself is frozen and it is a cold job to secure enough to stoke the furnace and supply the extra heat to stay warm.

The gulls are not handicapped much by the cold; there is still plenty of food available. People bring more food to the feeding places, and the usual sources are not cut off by the weather. Pinkfoot, with his visits to the window ledges all over town, makes out very well. He scarcely needs to call on his fat resources for any deficit in calories.

Weather such as this bothers the diving birds that feed on animal food very little; if the vegetable feeders can reach their food, they also are not in difficulty. The lake, however, does not really have an unlimited supply of water plants, and birds such as coots and Wigeon who graze on the lawns near the water to get their subsistence, are affected more seriously.

After three days of bitter wind, the pressure systems come to an equilibrium and the winds cease. One cold night freezes almost the entire surface of Green Lake except for an area at the northern end where the birds—large numbers of mallards, wigeon, ruddy ducks, scaup and coots, plus a scattering of such birds as shovellers—keep the water open. The Game Department brings 100-pound sacks of mixed grain for the birds, and, of course, the usual number of people bring stale bread and other edible items. A few ducks come to grief on the ice. They sit on it and it melts and then refreezes, anchoring them by their feathers to the surface, or they climb out on it with some water still on their underparts, which also freezes quickly. Here and there a coot, perhaps in less than perfect condition, gets its feet frozen and is unable to walk or swim.

Any creatures that are unhealthy are not likely to survive this bitter weather, and as they die their flesh serves as food for others. Pinkfoot finds a dead coot along the Lake Washington shore, and with a sure instinct uses the sharp, cutting edges of his beak to skin the bird and eat its muscles and viscera. Sick and injured gulls and ducks also succumb and are disposed of in the same way. The winter world is a hungry place where only the fittest survive.



CHAPTER FOURTEEN

For days the bitterly cold Arctic High holds the land in its freezing grip. The ground is iron-hard, the water is locked in ice, and still the north wind blows, rattling the black, lifeless leaves on the madronas and rhododendrons, sending dry leaves skipping down the streets along the lake.

The day slowly draws toward sunset, and about 4:00 p.m. the old female Great Horned Owl begins to rouse herself. She is sitting in a very big twisted Madrona tree on a woodsy hillside overlooking Lake Washington. She lowers her eyelids, disclosing her big, lemon-yellow irises, with their contracted black pupils. Her "horns" are laid flat and her head is drawn down, concealing her white collar; her feet are out of sight beneath her long, soft, barred flank feathers.

She blinks slowly a few times, flicks the nictitating membrane across her eyes. She opens her bill wide in a yawn, disclosing the gap that can engulf a good-sized rat at one gulp.

She shifts slowly, then stretches her left wing, left leg and the left half of her tail backward and downward. After a moment she stretches on the other side. Then she settles back, with her head and ear tufts erect.

The pupils of her eyes are small compared to their night-time size, but she can see perfectly well in the daylight. Through the Madrona leaves she can see the cold, gray-blue lake, and the shore of Mercer Island. Ahead, stretching away toward the left and the island shore, she can see the long straight line of the floating bridge already very heavy with traffic, its red and green lights gradually growing brighter in their competition with the fading day.

Insulated with a dense layer of down beneath her feathers, and with legs feathered to the toenails, she remains warm and comfortable even in the bitter cold of the northeast wind.

Her face is a warm reddish-buff, with a black rim, the flat facial disk of the typical owls. Below and behind her eyes are her ears--her finest and most delicate sense organs--the devices that allow her to find prey in the pitch-blackness of a moonless, starless night. One ear opening is larger than the other, and this asymmetry is helpful in determining the exact location of a sound.

The sounds impinging upon her hearing tonight are those to which she is accustomed; she is an old city-wise bird who has wintered along this shore for five years. Many of the traffic sounds are below her hearing range, for her ears are tuned for a higher level of vibration. Sounds such as rustling leaves and the

squeak of mice come in clearly, while the rumble of thunder or the deep hollow drum-beat of a spring Ruffed Grouse are below her level of attention. She hears a far-off siren, the voices of children in a yard nearby, the creaking of tree-limbs rubbing together.

She begins a process which most owls find necessary some hours after they have eaten. Last night she consumed three house mice and one large water mole, and their bones and fur have been rolled into a pellet in the upper part of her stomach with the bones inside and the fur forming a more or less smooth filling around and between the bones. In about four minutes, the reverse peristalsis which she is able to control brings the pellet up and she regurgitates it. Lightened and once more hungry, she is now ready to set forth on another nocturnal adventure.

As dusk settles down she looks about and suddenly is airborne. She swoops on silent wings through the lakeside woods from tree to tree, looking and listening.

Many things fall within her food pattern. In the past weeks she has eaten feral pigeons caught roosting on an exposed beam in a boat-building drydock along the ship canal; starlings roosting beneath a bridge; a few coots captured along the lake shore; a large number of rats of various sizes; house, white-fronted and meadow mice; a flying squirrel; a crippled mallard; a Saw-whet Owl; a hare; a Spotted Skunk; and two house cats.

Tonight she hunts the lake shore without really finding much that appeals to her. As she slips silently out across the little channel by the Lakewood Boat House she spies a long V-shaped wake in the quieter water and swings that way, but the Muskrat sees her coming and dives, to come up under the trees along the bank. She has lost him, and flies on toward Seward Park.

Her travels take her around the park, where she strikes at, but does not catch, a large feral hare, who escapes into a blackberry tangle. Giving up, she flaps on across the lake to Mercer Island and around its shore, still hungry.

By chance, on her way northward toward Newport Shores, she swings over the logboom where Pinkfoot is roosting. She can see the gulls sitting in rows on the logs, and for once they are too tempting to pass up. She comes in on a long slant, throws her feet with their steely black talons extended, and strikes an adult gull, guided to her target by its whiteness in the dark.

The gulls do not see her coming because her approach is below the skyline of the hill, and her silent flight gives them no warning. As she zeroes in on her target, a white shape in the dusk, her left wing brushes Pinkfoot. He cries out and leaps to the left, wings flailing, as the owl strikes her quarry, and the stricken gull gives a muffled squawk. Pinkfoot bowls over two or three other gulls in his panic and all of them thrash about trying to regain their balance and flee right-

side-up away from the danger area.

The immediate danger is over, however, for the owl's widespread talons have driven into the victim gull behind the shoulders, and the mighty grip of her powerful feet are wringing its life out as she bears it away. The panicked gulls settle back on their roost, but their sleep, never really deep at any time, is a little more uneasy tonight. The restless north wind prowls over the lake and the icy waves slap against the boom-sticks.

The old owl is a creature of habit, and does not care to eat her catch here in alien territory. She flies heavily back across the water and over Mercer Island with her prey, weaving through the wind-whipped treetops and on across toward the west side of the lake. At last she slants up onto the steep hillside and comes to rest on the broad horizontal limb of a Madrona not far north of the floating bridge near where she roosted.

Here she turns the gull about and begins to feed. She does not really pluck her prey, but white and gray feathers are borne in puffs away from the tree on the wind, to filter through the bushes below. When she is finished, she drops the wings, attached by the remains of the breastbone, and flies off to her usual roost a few blocks away.

Much later, rummaging through the fallen leaves below, a white-footed mouse finds an inch-long piece of skin and fat with perhaps two dozen warm, fluffy feathers attached. She wrinkles her nose and flicks her whiskers as she sniffs the bit of skin, then picks it up in her teeth and sets off through the woods. The down makes her sneeze as it tickles her nose; twice she wipes minute bits from her large black eyes. It is well for her that the wind rustles and rattles through the undergrowth; it overrides the sound of her progress from the acute ears of a Screech Owl as it wings silently by on the lookout for such prey as the little woodland mouse.

At length the mouse reaches a Red Elderberry bush, which lies at the bottom of a deep, narrow, blackberry-tangled draw. Here she draws her six-inch length up one of the slanting branches to an old Swainson's Thrush's nest. This nest, built last summer of wet leaves, moss and mud, is still firm and sturdy, and the pile of leaves on top, which looks like wind-drift, is a cleverly-fabricated roof which keeps out wind and rain. The little mouse slips quickly through her small, round doorway, into the warmth and security of her shelter. It is heavily lined with feathers of various kinds, from those of jay to those of duck; loose fur from domestic dogs and cats; and a great deal of dryer lint from beneath a nearby house.

In this snug nest the mouse blissfully curls up and chews happily until she has completely consumed the skin and fat that held the feathers, and the loose down and feathers add another layer to the warmth of her home.

CHAPTER FIFTEEN

Early one cool, sunny January morning, a station wagon with six students and their professor arrives at one of the garbage dumps slowly devouring the marshes in San Francisco Bay. There is a gull resting area at the side of the dump, and the students proceed with preparations for a study in progress. Gull movements in relation to airports on the Bay are their concern, and they wish to trap and mark a number of gulls that can be watched for some time to trace the patterns of their travels in the area. The proximity of garbage dumps and airports is a serious problem, for which common sense (in general a rather uncommon phenomenon) is the only solution.

Along one edge of the flat area, the students deploy a large, rolled-up net. This net is attached on its forward or top edge to three rockets, one in the center and one at either end. These rockets are inserted into small "cannons" that are loaded with a powder charge, and all three are wired to an electric circuit with a switch so that they can be fired simultaneously.

When this set-up is completed, the ground is baited in front of the net and the people return to the station wagon to await results.

From a speaker mounted on the window of the car come gulls' feeding cries. These calls are almost irresistible, and hungry gulls begin arriving very soon, to find the bait and begin working in closer and closer to the net.

Among the gulls that have arrived to feed are slatey-mantled Westerns, gray Herring Gulls with pale eyes, Glaucous-wings in all plumages, and a few male California Gulls. Among the Glaucous-wings is Sister, and her first intimation of trouble is the boom of the cannons and the swift rise of the net. Some of the gulls on the outside are able to get airborne and dash out from beneath the net in time, but those in the nearer end are pinned down in an instant. Sister struggles helplessly, but she cannot really stand nor flap her wings. She is thoroughly enmeshed.

One by one the students unsnarl the captured birds and carry them back to the station wagon. Each is examined carefully to determine the species and, if possible, its general age class. Then each bird is banded with a standard Fish and Wildlife Service band, and a plastic back tag is put on.

The back tags at this particular dump are green, made of heavy nylon and plastic, and are anchored by a strap going around the breast and another behind the wings, to keep them flat and prevent the birds from pulling them off. Each has a code number and letter. After the data is recorded, the bird is released.

When it is Sister's turn, she is lifted and carried, struggling, to the car where one of the students discovers her band. She is examined, her band number recorded, and she is immediately tossed into the air.

"Hey!" says the professor. "You didn't tag that one?"

"No," answers the student. "You said that if a bird was already banded, we shouldn't, and that one was."

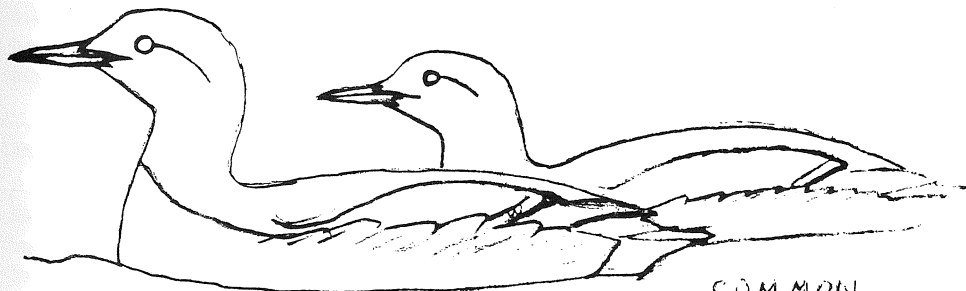
"Okay. Fish and Wildlife frowns on the records getting fouled up by somebody else marking a previously banded bird."

Sister flies away, shaking her feathers in flight to remove the feeling of being held and to get them back in place. She lands far across the Bay, settling down among gulls some of which were with her and tagged before she was handled.

Her band number is entered in the log; in a month it is sent to the Maryland Banding Office along with schedules for the rest of the marked birds. But Sister is far from San Francisco when the bander receives his computer card with this "encounter" upon it, and, being busy, he files it and pays no attention to the number at the time.

Sister, meanwhile, has travelled steadily northward along the coast, and now, in May, she is working the beaches of Gray's Harbor, where she will remain for the summer, feeding along the edges of the ocean and the bays, scavenging dump areas, picking up discarded bait, and occasionally joining in the mad feeding flurries that sometimes arise offshore. She will on occasion follow the California Gulls in August fifty miles out to sea to visit the Russian fish-processing factory ships, whose discard attracts the albatrosses, shearwaters and fulmars as well as hundreds of gulls. Her first summer will be a very successful one. She will escape the myriad hazards of life that beset gulls, and return in full vigor to San Francisco in the autumn.

COMMON LOON



COMMON
MURRE

CHAPTER SIXTEEN

For some days a Pacific Low has been moving steadily eastward and southward. It now comes to a halt out from the coast, like some uneasy animal testing a tight fence, with the hunters coming up behind. Along the line of contact between the two air masses--one cold, clear and dry, the other warm, misty and wet--tremendous pressures are built up, resulting in mad swirling winds, towering thunderheads, lightning, hail, and snow. Gradually the Arctic air retreats, but reluctantly, as if jealous of giving up its dominion. At length, in over the land, the high cirrus-like wisps spread. The coming moisture in the air, sliding up the slope of the high pressure to great heights, produces first "mares-tails," then "mackerel scales." The sun sinks behind the Olympic Mountains with long scarlet and crimson streamers pouring across the green and gold sky. The waters of the bay and Puget Sound are a deep violet blue, the wave-crest reflecting back the lurid sunset. The water quickly turns to black as the cloud-deck moves in over the mountains.

The north wind has died and now the first few slight breaths of a warm wind from the sea sweep over the frozen land. The gulls roosting on the logs turn to adjust their plumage to the new air flow. Moderating temperatures allow them to pull their feathers tighter, and this is well for long before the first gray light, the moisture in the low clouds begins to fall, thawing the frozen plants and soil. The imprisoned violence of the storm-fronts is turned into a steady wind from the southwest, bearing such quantities of moisture that floods will follow the freeze, and life will return to its coastal norm once more.

Day after day the south winds blow, day after day the gray clouds weep. Now and then there may be a break, a few hours or a day or two, when the sunshine warms the sodden earth.

The gray skies soon give way to early morning fogs that move under gentle northerly breezes; the afternoons are warm and sunny. All at once the vanguards of spring appear. The frogs awake from their watery sleep, and everywhere near ponds and pools their chorus rings out. Even during the middle of the day, their roar of many voices drifts down the wind.

In city and country gardens alike, the Snowdrops and the Crocuses push through and spread their white, gold and purple petals under the blue sky. The grass begins to green and in the wood edges, the Indian Plum buds burst to release first a cluster of whitish flowers, then a torch of green leaves. Near water the pussy willow catkins begin to swell, to pop out of their bud scales and shine silvery in the sun.

High overhead, both day and night killdeer make the empty spaces ring with their silvery voices; even in the moonlight they wing swiftly overhead, calling.

The Great Horned Owl that roamed the hillside near the lake has settled down with her mate in a steep gully on Mercer Island, and in an old crow's nest they now have two eggs. Nightly the male brings her food, chiefly rats and mice, but now and then a muskrat, or an unwary coot. Inside each egg stirs the beginning of new life, the earliest of the season for the birds. Should everything proceed according to plan, this will bring the jay out to forage when the callow young of all sorts of creatures are most easily caught.

All about, Pinkfoot sees change. The adult gulls that fly and feed with him have now all entered the molt that clears away the mottled winter plumage. Some are already almost finished with this molt, their heads white except for a few dark feathers on their faces as if they had been probing in mud up to their eyes. Bills are turning bright yellow, orange spots are coloring toward vermillion, eyelids are flushing and widening, and pair bonds are being renewed among the birds that already have mates. On every rooftop and pier downtown, pairs of gulls are standing together, choking and repeating all the necessary steps toward the ultimate act of reproducing themselves.

Even the younger birds are touched by this, and suddenly one day in late February, Pinkfoot joins the molting crew, as feathers from his flanks, sides and collar begin to fall. Many of these are old juvenile feathers that were missed in the fall molt. But before he is done, his entire head, neck, breast, sides, flanks, upper back, and all of his scapulars but the very longest, will be new.

Although Pinkfoot is not aware of this, in late February the first real migrants come. Leading the parade of birds back toward the north are the Tree Swallows. Steely blue of back and silvery white of underparts flash as they cruise over the lake, their liquid chirps adding new dimension to the season. Close on their tails come the earliest of the Violet-green Swallows, smaller and vividly colored on the upper parts in shades of violet, bronze and green. It's strange that such completely insectivorous creatures should lead the vanguard. There must be some clear advantage to this, even though there are years when the cold descends in March, or even in April, and the swallows die by the hundreds because all insect life is too chilled to fly.

In the backyards the robins, most of which had been wandering about not many miles away seeking food during the winter, now settle back in their old places. For days their sharp scolding notes ring out from the trees about sundown, before they are finally sufficiently inspired to sing. It will not be long before they turn to the real business of nest building.

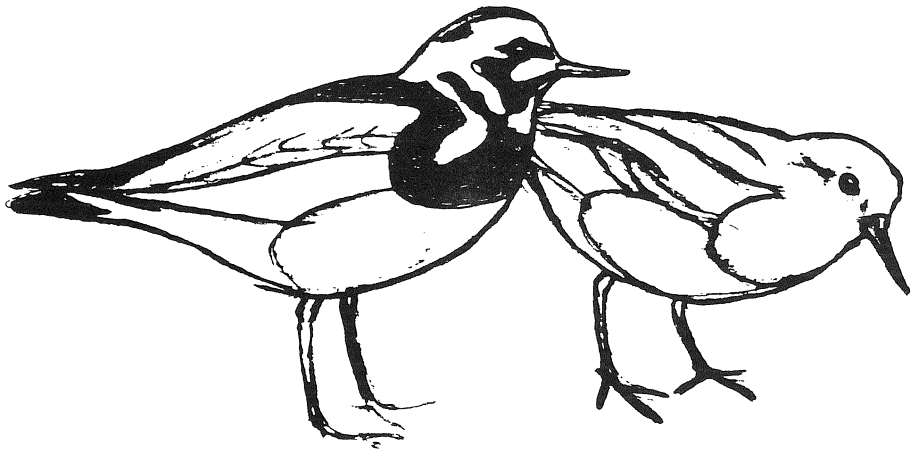
Bewick's Wrens and Song Sparrows, territorial all winter, and singing on

warm or sunny days, now begin to proclaim territory in earnest. Juncos add their musical bells to the chorus, and even the handsome towhees, although their songs are no particular musical addition, sing some sort of counterpoint.

At Green Lake, Ken sees Pinkfoot pulling loose feathers free and letting them blow in the wind. In a matter of a week or two Pinkfoot sees a change; the old bleached brown feathers are disappearing and new, darker ones are coming in. Slowly and methodically, the new dark gray-brown, white-flecked feathers spread up his neck toward his head, just as they do in adult birds, but more slowly. His side becomes paler; his back and scapulars look darker but much fresher. A look at him now shows exactly which feathers are new, and Ken takes careful notes.

The gull population shrinks almost daily. The birds that make the rounds of window ledges downtown are almost all local birds and they will remain. But on the log booms the population is dwindling to immature, crippled and ill birds. The healthy adults are all busy with the coming season, and many have left for their northerly breeding areas a long time ago.

Even the duck population on the lake begins to thin out. Many of the wintering waterfowl are also starting their journey to nesting grounds whether they be inland or northern. Some nights the cries of Canada Geese ring from the dark sky as they begin their long trek. A flood of Black Brant pours into the coastal eel-grass beds, until the whole population of the species, perhaps 150,000 birds, crowds into the Washington shoreline on the way to the high Arctic. The promise of spring is everywhere.



CHAPTER SEVENTEEN

It is a beautiful March day. For some time now Pinkfoot has felt increasingly restless, though his yearning has not been definable in terms of action. Today, however, as he swings down to the Aquatheater, he is seized by a longing to go somewhere else. He spills the air from his wings to drop into the edge of the water among the mallards, white ducks, coots, and a few wigeon who make way for him as he comes in. Someone is coming from a car with a bag of food, and in a few moments all the birds are crowding about. The two Chinese geese are even reaching into the bag, and the girl laughingly hands out pieces of stale cake, doughnuts, rolls and bread to all the birds who will take it from her hand. Then she tosses small pieces generously in the middle of the crowd of birds, so that nearly all of them will get some. Pinkfoot comes eagerly into the center of the group no more than fifteen feet from her and gets more than his true share, because he has now become an expert at jumping up, wings spread, and catching the pieces in midair, out of reach of the ducks.

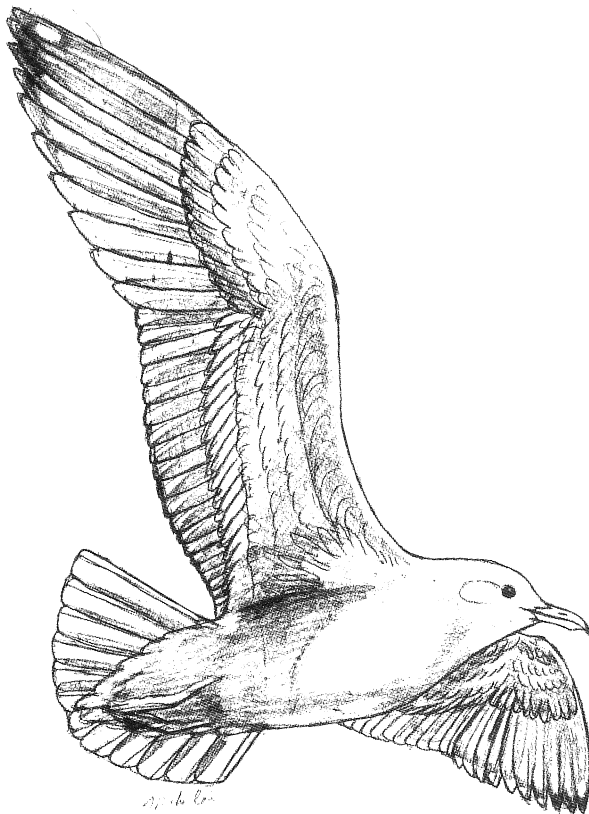
The girl, who comes here at least once a week, works in a bakery and saves the unsaleable merchandise for the birds. She is greatly amused by this gull because she considers him clever to have figured out how to get more than his share, and she deliberately tosses the food in his direction to reward him. She recognizes him by this and by the fact that he wears a band. He is also the only one of the brown, mottled birds that has the lower half of his "legs" and his feet flesh-color rather than black.

Soon along come three boys on bicycles. They decide to enjoy the sensation of scaring the birds, so they aim their bicycles directly at the feeding flock and pedal hard. Used to being chased by dogs and children all day long, the birds scatter in a wild flurry of wings. One crippled female mallard trips and falls in her panic, and one of the boys hits her, not so much on purpose as because his reactions are not fast enough. He flies over the handlebar and ends up on his face in the gravel. The duck is fluttering feebly; her back and both legs are now broken and she is dying of shock.

The other two boys stop as soon as they realize what has happened, and come back to help their friend to his feet and dust him off. His nose is bleeding, and one of his bike wheels seems to be slightly out of alignment. All three of them look at the duck, now nearly dead, as the girl bends down to examine her. She looks up at the boys reproachfully and shakes her head, too choked up with grief and anger even to tell them what she thinks. They leave as fast as possible, hoping no one in authority has seen what they have done. They are chastened

and somewhat frightened by what has happened because they were not really intending to do any harm to the birds. But now the mallard is dead, and the girl sadly puts her in the empty food bag and carries her off to bury her.

Pinkfoot had had plenty to eat by the time the boys came, and this sudden disturbance is all it takes to bring his discontent to the fore again. He circles a few times on a rising column of air along the shore and then beats westward toward West Point. He has broken with his winter routine by the simple act of flying beyond his usual range, and now out over the water, he is free to go wandering, to satisfy his urge to be elsewhere. He will not see Green Lake again for many months, and his friend with the bakery goods will miss him and wonder if he has died or only gone away.



CHAPTER EIGHTEEN

As he crosses Phinney Ridge, Pinkfoot can see the Lake Washington Ship Canal on his left, and ahead, the Government Locks and Shilshole Bay. He does not even consider Golden Gardens today; he is not hungry. He veers slightly southwest, to cross the mouth of the canal and glide along the rising air of Magnolia Bluff where the Pigeon Guillemots are already looking into possible places for burrows for the coming summer. He slides out westward where the beach swings to West Point and the lighthouse. Years ago there was a sewer outfall here where many gulls, especially the little Mew and Bonaparte's gulls, would winter by the hundreds. A sewage treatment plant had ended this, and now these small gulls have ceased to come here in any numbers.

A Great Blue Heron perches in a tall tree near the beach, and a Red-tailed Hawk glides by on the updraft, but neither has any meaning for Pinkfoot. He is just realizing his freedom and, as a young bird with at least three years of immaturity before him, he has no real pull toward the colony of his birth. He only knows a restlessness akin to that which, long set in motion nearly half a world away, is sending a flood of migrant birds toward the north. He will not return to the San Juan Islands for this summer. Beaches from Mud Bay south of Olympia to Boundary Bay on the north will know his presence at some time during the six months of his wandering, but the islands are the domain of adult birds, and he will not go there.

Pinkfoot, coasting the updrafts along Magnolia Bluff, comes at last to where the bluff ends. In one sweep he leaves the land and beats steadily south to Alki Point, across the mouth of Elliot Bay. Here gulls stand on lampposts on the sea wall and on the roof of the bathhouse, but Pinkfoot does not care to join them. He is not yet weary of his game nor replete with flying. The edge of his tension remains.

Beneath his wings as he travels, the shoreline unwinds and spring in all its color assails his eyes. Rockeries along the sides of Beach Drive are in bloom--the snowy white of Aralia and perennial Candytuft, the purples and pinks of Aubretia, the softer pink of heathers, the light sulphur yellow of Basket-of-Gold, and countless blues, lavenders and purples, magentas, red and pinks of Azaleas and various bulbs, marked here and there with the gaudy splash of brilliantly scarlet early tulips. The backdrop is of glossy-leaved Camellias and Rhododendrons, and the lovely lime-green and chartreuse fountains of Weeping Willow. All along the hillsides the Red Alder is blooming with catkins that explain its name; cottonwoods are bronzy green with early leaves, and even the

Bigleaf Maple is starting to show yellow in its flower buds.

The beaches are fringed with the blackish and white forms of Black Brant, feeding in the surf, riding offshore in pairs and lines, or standing on the beach to preen or doze in the warm sunshine. Here a flock of perhaps twenty Sanderling flash silver as they twist and turn, almost as one, and then settle into the gravelly beach further along. A pair of Harlequin ducks, the male blue-gray and reddish with bizarre black and white markings, dives in the shallows off Lowman Beach Park.

But none of these interest Pinkfoot much. He is full of the urge to travel, to explore. As he sails around the point of Lincoln Park he sees the Fauntleroy Ferry pull out for Vashon Island and Southworth, and it becomes his passport to further adventure. He rises along the windward side to the upper deck level, glides back, sweeps downward and around the stern, passes forward at wavetop level and then suddenly kites back to his high position as he crosses the bow and catches the lift of the wind along the side of the ferry. Now he turns and hangs almost motionless, letting the rising column of air along the side of the boat carry him forward with it. He has never done this before, but finds it exhilarating. He uses the air currents for his own purposes and, as long as he knows the proper techniques, they respond perfectly to his will.

After a few minutes, the ferry pulls into the dock at Vashon and Pinkfoot glides away westward and around the point with never a backward glance. A free agent, he now turns himself to a new phase of life in an untried environment. In most of the survival techniques he needs, he is well trained. There is a sureness now to his actions, which was not so the last time he responded to his restlessness.

March passes into April and finds Pinkfoot foraging far south, past the Narrows with its high-flung bridge, and in the muddy bays to the west. On occasion, he meets a few adult birds, since this is well within the flying range of a colony of gulls breeding on an old pier in Tacoma. He also meets immature or otherwise non-breeding gulls of other species on the tide-flats.

He has long since learned the trick of picking up a cockle or other clam and dropping it to break it open. He has learned to recognize the telltale signs of these beneath the muddy sand. He has learned to surprise limpets and chitons with one swift blow before they can clamp down tightly with their broad suction feet. He has even eaten starfish for the small amount of protein that clothes their horny skeletons. He forages in the beds of eelgrass exposed at low tide, pecking at suspicious lumps and often being rewarded with crabs hiding beneath the green covering. And everywhere, he finds small fish and crabs under shore rocks which he pries up with his bill.

Of course, he also ranges city waterfronts, and one day he finds a fine

meal of small herring spilled from a live box on the dock at Tacoma, before the local birds can get them. At times he ransacks open garbage cans. His food requirements are met in all possible ways. As this time passes he is technically hardly more than a flying stomach.

The third week in April finds Pinkfoot cruising the waters of Hood's Canal, and suddenly another molt is upon him. Since he molted most of his head, neck and body plumage in March, he has been replacing only a few of these feathers. As he perches on the roof of a boathouse looking out over the placid deep green waters, he feels something out of place in the wrists of his wings. By gently manipulating the inner primaries with his bill, he removes them from his wings. In each follicle is developing a new primary, a few millimeters long which in two days will emerge from the empty socket and begin to replace the lost feathers. Before the spring molt is completely over, Pinkfoot is involved in a new molt which will replace every feather on his body, including those he has just acquired.

And it is about time, for the tops of his outermost primaries are frayed and worn down to the shaft; his elbow secondaries that help to close the gap between his wing and his side and also repel the rain, are threadbare. The process now initiated will take almost four months, and total replacement will require six. Thus an early start while he has only to find food lends a margin of safety for the onset of the winter cold and hunger.

As April passes into May, Pinkfoot ranges the beaches of Hood's Canal north to the Straits and comes at last to the beaches of Protection Island.

On the island perhaps five thousand pairs of Glaucous-wings nest, mostly on a sandy spit only a few feet above high tide which is called Violet Point. Driftwood edges these beaches, and behind them is a flat, covered with grass and tall weeds, particularly Gumweed with its yellow daisy-like flowers. On the beaches gulls congregate by hundreds, breeding and non-breeding, from immature California and Ring-billed gulls, and slatey, white-headed, red-billed Heermann's to Westerns with their dark gray mantles, and Glaucous-wings of all ages. Pinkfoot feels at home here, although he must remain close to the water's edge, even at the point, for gulls are nesting almost down to the tide-lines.

He stands among the others, a ratty, bedraggled bird, now molting middle secondary coverts, so that there is a line of bare shafts where his greater coverts are exposed. After a week or two, the new feathers begin to appear, dark, sooty, only slightly mottled with buff, making a dark stripe across his wings.

Near the gulls are the small, ducklike Pigeon Guillemots that nest under the logs along the beach and also in burrows on the bluff. In this plumage they are dull black with white wing-patches, but their feet are brilliant red, and as they open their bills to scream at each other, the mouth lining also shows red.

Pinkfoot returns here again and again but he does not linger very long at any one time. The gulls of this colony are nervous and excitable because their gullery is being sold for beach homes, and jeeps and other vehicles are often driven down the road where they are nesting. People stroll through the gullery driving birds off their eggs, even stepping on eggs and young, and chicks are frightened out of their territories.

This beautiful island with its marvelous colonies of Rhinoceros Auklets, Tufted Puffins, Pigeon Guillemots and cormorants, its unique history and its enormous ecological value, is being sold for homesites by people with little appreciation for any of these things, who too often think only in terms of the money to be made from this rare treasure. This land should never have been allowed to pass into private hands; it should have been saved for all, to be enjoyed by all, and to be held in trust for the future!*



* A year after Zella's death in 1974, the west one-eighth of the island was rescued from bulldozers by The Nature Conservancy and then purchased by the State of Washington Department of Game. It was named the Zella M. Schultz Seabird Sanctuary.

In 1982 President Reagan signed the Protection Island National Wildlife Refuge bill and funding was provided by Congress in 1982 and 1983. At the present time the Fish and Wildlife Service is in the process of actually establishing the refuge on the remaining seven-eighths of the island.

CHAPTER NINETEEN

Suddenly it is summer. Over the fields and pastures lies a froth of delicate white daisies; along the hillsides where there are little openings to the sun, tall foxgloves sway in the breeze, lopsided wands of snowy white or deep magenta, or varying shades between. In the wastelands, pyramids of pink fireweed add their color, and in marshy areas buttercups lie like golden rugs over the open spaces. Even the dark trees of the forest--the firs and the hemlocks--wear a shimmering mantle of bright, new green as the fresh growth of the year unfolds.

Along woodland trails, in the openings of the canopy or adorning old stumps, the waxy four-petalled blossoms of Mock Orange, with their gentle golden hearts, send forth an exquisite musky perfume and their color contrasts sharply with the scarlet pyramids of Red Elderberry fruit. The elderberry fruit, loved by birds, is being harvested by such varied creatures as warblers, vireos, thrushes, robins, and waxwings. Band-tailed Pigeons assume ludicrous positions as they crane their long necks after distant berries and Ruffed Grouse cling precariously to slender branches. Even more ludicrous than the pigeons is a beautiful Pileated Woodpecker, who, in his eagerness to reach the fruit, stands upside down on the end of a branch too fragile to support him rightside up.

Orange honeysuckle hangs in bright festoons from the trees and blackberries, gone wild, and with pinkish blossoms, cover the neglected fence-rows and stumps.

Young birds are everywhere. In the bushes, Song Sparrows give their raspy chirps, and some speckle-breasted baby robins are already on their own.

Day by day the season changes as June edges into July. With July comes a mature fullness of the season which was only a promise in May and a still-distant goal at midsummer day. Over all the fields and pastures ox-eye daisies still spread their white loveliness, now mingled with much bright gold from dandelion-like composite flowers of various kinds. Pearly Everlasting in white clusters blooms in waste places. Honeysuckle that was lush in early June is nearly done, and hummingbirds begin to drift off to higher elevations where mountain flowers bloom in carpets on the timberline meadows. Already the male Rufous Hummingbirds have gone, to be seen no more until March.

In fencerows and brushy pastures hordes of White-crowned Sparrows forage, many young-of-the-year still in ratty juvenile plumage, and the adults only slightly less disreputable as they begin the molt that will replace all the old,

worn feathers and bring them into sleek freshness for their fall travels.

Flocks of juvenile robins, many in the process of losing their spots, move in ragged formations over the ground, and in the evening, groups and stragglers all head off to communal roosts in secure places.

At Violet Point, on Protection Island, thousands of gull chicks have emerged from their eggs and are hiding in the weeds and under the driftwood. The Pigeon Guillemots have fluffy black chicks in their dark burrows for which they bring home strings of silvery candlefish. The Tufted Puffins and Rhinoceros Auklets, in burrows on the bluffs, have also hatched their eggs and are busy feeding young. The puffins fly in and out by day, but toward evening the auklets gather off shore, each holding a silver fish in its bill which it will deliver as soon as darkness falls.

The wild rose flowers are fading and their petals are borne on the wind like gull feathers. The grasses are past their bloom and hang ready to fulfill their final function of the year. The gumweed is in bloom and, along the dry areas above the beaches, the tall magenta spires of fireweed glow.

His first birthday passes, and Pinkfoot is now a yearling. He has survived hazards that have taken perhaps fifty out of every hundred chicks that fledged with him a year ago. He looks anything but handsome at this point because his old, faded plumage is heavily blotched with new, incoming darker feathers, his tail is molting, and his head looks ragged once more as new winter plumage begins to make its appearance first on his face, then gradually back over his head to meet new feathers coming in up his neck.

Pinkfoot's greater coverts and his threadbare elbow secondaries are being replaced by new, smooth, sooty graybrown feathers. On scapulars, back and underparts, the new feathers are dark against the faded ones. His new head plumage is whiter than the old, but heavily barred with dusky. Pair by pair, his big flight feathers fall and are replaced, until by mid-July he has only one pair of primaries left to shed. He has lost almost half of his secondaries and all of his tail. For some days he does not travel very far, for without the lift of all these feathers, flying is harder work than it is wont to be. When he launches himself it takes many more strong beats to get aloft, and gliding is difficult.

But the feathers grow rapidly; it is only a month until most of the feathers are grown out, and by the middle of August his new plumage is fairly complete (although it will be September before he is completely done with this molt). Flight becomes easier again and with it a new urge to travel.

One day on a beach near Anacortes, Pinkfoot and his mother meet. There is recognition of a sort, but, of course, there are no longer any strong bonds between them. They exchange long calls and stand near one another for a brief time, then each goes its own way. Nowhere does Pinkfoot encounter his sister.

Her survival is of no concern to him, of course, since she was left behind on a beach nearly a year before. He does not know that she is spending the summer along the ocean beaches. Caught in an urge to move, a restlessness akin to that which freed him from his winter routines, she traveled north along the coast until she reached the mouth of the Columbia River. From there to Cape Flattery she ranged until the migratory fever pulled her back to San Francisco once more. Pinkfoot forms temporary bonds with birds he meets in the areas he frequents, but these are not lasting and each bird goes wherever its feelings impel it to go.

In August there is dust in the air and spider webs that glitter. Once more the goldenrod and senecio are in bloom and everywhere the ripeness of summer is becoming more and more evident. Swallows are flocking in hundreds on roadside wires. White-crowned Sparrows flood the brushy fencerows and bracken-grown fields. Almost no birds sing, for it is molting time, and all energy is needed for growing the new coat of feathers. All nesting activities draw to a close as the robins and sparrows rear their last broods to fledging and independence. Young guillemots, murrelets, murrelets, auklets and puffins are learning to fend for themselves; young Glaucous-wings are learning to fly. The fruit of the season is ready for plucking.

August draws to a close; fireweed has seeded, and now goldenrod and the fall scarlet of vine maple color the landscape. On clear days the silvery parachutes of thistle down fill the air thickly downwind of weedy areas, some of the seeds carried far aloft by the breeze. Young Glaucous-winged Gulls by the hundreds are leaving their gulleries and traveling as Pinkfoot did the year before. He, too, becomes restless as the molt draws to a close and the energy requirements of growing feathers taper off. He is full of quick eagerness to be awing in the wind.

He abandons Protection Island and begins to move westward along the Strait. Here are open beaches and good hunting, pilings or sandbars for sleeping, and a freedom of movement which might well be the envy of most tourists.

He traverses sandbars and beaches at Sequim Bay, moves off to the maze of channels and bars at Dungeness. From there he coasts on westward to Ediz Hook and the log booms of Port Angeles. Here on the logs and the beach are hordes of shorebirds--yellowlegs, plovers and many sandpipers. There is one pathetic Black Brant with an injured wing. This game little goose makes a difficult living here, but he has hung on grimly ever since January when a shot pellet broke the radius of his left wing. Never in good condition since, he fights the battle of pollution and too little good food. He has sad-looking plumage which is now being replaced by fresh, new feathers. If he can survive until these are fully grown--long after the normal period for molt--he may be able to leave this inadequate prison for the better pickings of Dungeness to the east.

There are almost daily surface boils of small fish which Pinkfoot exploits to the utmost; his plumage needs all the good nourishment it can get.

Moving slowly, often in a more or less spiral pattern day after day, he pushes westward along the Strait, from bay to bay and headland to headland. Always on the way he meets many other birds of various species, some traveling, some still on breeding territories. On stormy days vast flocks of shearwaters cut into the Straits, flying in undulatory masses over the waves, sliding down into the troughs, then suddenly kiting up to perhaps twenty feet, then sliding down over the edges of the waves again.

Dowitchers "stitch" madly on the tide-flats, "peeps" run in and out with the waves, busily probing in the overturn at the edges of the surf. Semipalmated Plovers, like small, dull Killdeer with one breast-band, call their musical "Too-lee!" and run up and down the sand. Larger, heavy Black-bellied Plovers, mostly in winter or young plumage, but with here and there an adult still showing its black face and underparts, prick in the tidepools. In the shallows, yellowlegs wade and probe. Even a Willet, larger and heavier than the yellowlegs, and plain gray until it spreads its spectacular black and white wings, roams the tide edge. Whimbrels give their wild cries. Ruddy Turnstones, still in their summer calico dress of redbrown, black and white, flip over small stones in their endless quest for food.

One day, after feeding in a herring boil-up, Pinkfoot is leisurely flying toward shore when a dark bird only slightly smaller, with a white flash in the primaries and blunt, twisted central tail feathers, comes flashing down upon him. This dark, hawklike bird seems a real threat. It is a Pomarine Jaeger and it takes after him, doubling swiftly and keeping close, so that no matter what ruse he attempts, the jaeger counters with ease. It harries him back and forth until finally, to get away, Pinkfoot lightens his gullet by regurgitating part of the fish he has just swallowed. Instantly, the jaeger dashes after the fish and Pinkfoot flies to a sandbar, with much less of a satisfied feeling in his interior, but the panic subsiding quickly as the dark form of the jaeger alights on the water to scavenge up the last scraps of Pinkfoot's meal.

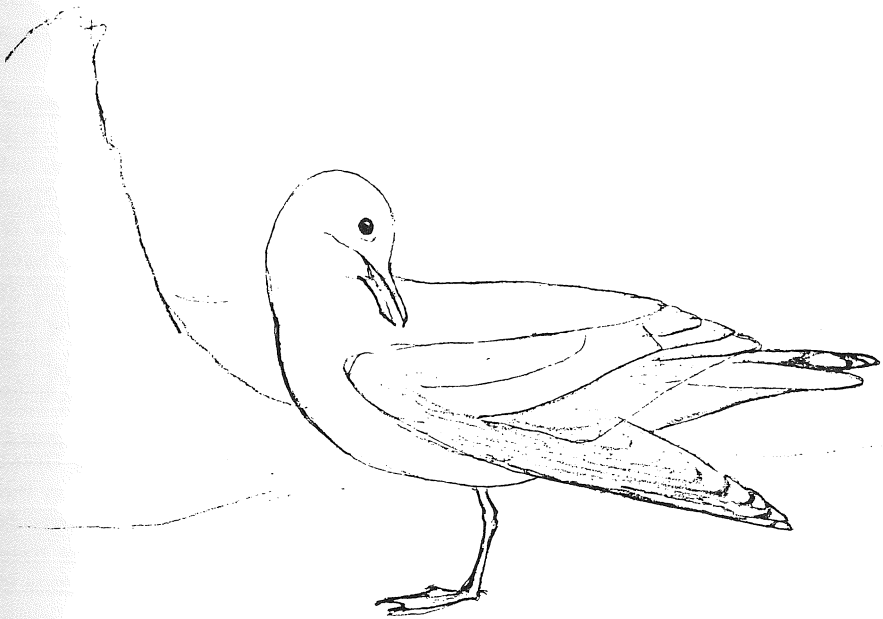
Smaller Parasitic Jaegers are abroad, too, and they repeatedly harry the Common Terns and Bonaparte's Gulls, but they leave Pinkfoot alone.

At last Pinkfoot comes to the end of the northwestern shore of the Olympic Peninsula. Here at Neah Bay he explores the area, and travels out to Tatoosh Island, that rocky outcrop off the far point of land. The wild waves and tides swirl and roar in and out of the undercuts and caves in the sandstone, and spume leaps high under the push of the wind. But this does not hold him for long, and on a day of northerly breezes he heads across the Straits of Juan de Fuca for the west coast of Vancouver Island which he can plainly see stretching northwestward.

He makes landfall north of Barkley Sound, and begins to move back in an easterly direction along the northern shore of the Strait. Feeding in tide pools and rocky ledges is especially rewarding, but he does not linger long in any one place. Bald Eagles appear and Pinkfoot gives them a wide berth. Ever since he watched a gull die under the talons of an eagle he has been wary, and whenever one appears he removes himself as quickly as possible.

From Victoria he crosses again, following the ferry to Tswassen and the city of Vancouver, where he arrived with his father the year before.

Vancouver is a familiar place to Pinkfoot, and he immediately settles into the old routine of the previous fall. One day at the dump he finds himself standing beside a banded bird of his own age, and recognition somehow suddenly occurs to both of them. Brother has not left the city since his bad experience with botulism, other than to roam as far as Point Roberts and Mud Bay to the south and Howe Sound to the north. The two siblings exchange long calls and for some days fly together, Pinkfoot following. Brother has become an expert at food-finding in Vancouver and the two birds range about to all of his familiar places: Brockton Point, Stanley Park, the dump, the fish docks. It is a shared companionship which seems to satisfy both birds. Then, somehow, the restlessness, unsatisfied, swells again in Pinkfoot's breast, and he feels the need to return to winter quarters. The call of the wind is strong, and Pinkfoot answers.



CHAPTER TWENTY

On a cool, windy day in late September, Pinkfoot heads southward into an approaching storm, gliding wildly up the wind, passing and re-passing along the shore until he tires of the sport. After a short flight across Birch Bay, he sails into the wind along a narrow shore, turns eastward, and shortly comes to Bellingham. Here, late in the day, he settles to roost with hundreds of other gulls on a log boom near the shore.

A day or two is spent here, exploring the possibilities of the city dump and the sewage treatment plant, but before long he again feels the call of the wind and, like hundreds of other gulls rising and falling across the expanses of gray, tossing water, he is off again toward the south.

These shores are familiar to him from his first fall travels, and he had touched some of them again during his summer wanderings. Out on the tidal flats, Pinkfoot meets Mew Gulls, the same small, delicate birds he disdained at Green Lake. They now come to wet areas by the edge of the sound and move their feet up and down in rhythm, about two beats per second. This is called "paddling," and it sometimes causes creatures to appear which are then eaten. European Herring Gulls do this on marshy ground, where it is supposed to cause earthworms to emerge from their burrows. Glaucous-wings often eat earthworms, but less frequently than Mew Gulls which gather on the wet grass and devour them, especially after a heavy rain.

Bonaparte's Gulls, too, are about in numbers. These small gulls, no larger than pigeons, have already returned from the north and most of them will continue to move southward. They sometimes feed at the edge of the tide, but more often they forage out in the channels, picking food from the water. Often they hawk about over lakes and marshes pursuing a hatch of aquatic flies or termites over the land, for they are largely insectivorous birds. The adults have lost their black hoods of summer and now have only dark spots on the sides of their heads; the young are light but have a narrow dark bar across the wing and another at the end of the tail. The white outer primaries of the adult birds twinkle as they beat steadily over the water or sweep downward to inspect some floating object, making them distinguishable from a great distance.

Samish Island, with its vast expanses of mudflats and its stalking Great Blue Herons, holds him for a day, while he walks the tide-lines far out on the mucky flats, finding an abundance of sea life for the taking. His body is beginning to build a winter supply of fat under his skin to help him over the time of greatest stress, and he eats ravenously. He will not pass up anything edible if

he can cram it into his gullet. After all, who knows where the next meal is coming from, or when it will be?

The estuaries at La Conner, the Skagit mouth, the flats near Fir Island--all these he surveys carefully. One tide he spends on a sand bar in LaConner, with many California Gulls. One wears a three-inch orange plastic tag on its wing, held by a stainless steel rivet driven through the skin flap between the shoulder and the wrist. This tag, with a black number and a letter, was put on the bird two years before when it was a chick in Wyoming. When it left the area of Yellowstone Park, it traveled westward to the Snake and the Columbia Rivers, and by these waterways came to the Pacific Ocean at Astoria. There it turned northward and in its wanderings found this selfsame bar, using it for a time as a rest area. Now, for the third fall, it is standing on the sandbar in the estuary, dozing and ruffling its plumage. It looks almost adult and will have only a little brown in some of the wing coverts and a slight bar in its tail to show that it is in its third year. As Pinkfoot forages, this bird is often nearby, but he ignores it. Although it is older and more experienced than he, it is of a smaller species and does not interest Pinkfoot unless he can steal something from it.

Once it carries a cockle aloft and drops it too close to Pinkfoot, who is there in an instant before the marked gull can descend. He snatches the cracked clam and carries it for some distance, where he lets it fall again, then drops to eat it on the sand. Others he loses in the same way to other gulls and to crows, for this is one lesson that requires a good deal of insight. "Do not drop your food too close to other birds or they will beat you to it" requires judgment, which is not acquired easily by a bird.

Around the steep shoreline past Carkeek Park, to swing down at last to the blacktop parking lot at Golden Gardens, Pinkfoot later arrives at his chosen winter home.

He has not long to wait, before Ken, the ornithologist, arrives with bait and telescope. As Pinkfoot feeds, Ken views him with delight. He does not know, of course, that Pinkfoot has just arrived; he only knows that he has not seen him for six months at any of his accustomed places. His plumage is sleek and new, and Ken immediately sets about describing it in his notes. Many of the gulls that Ken observes repeatedly are old friends, but he has a special feeling for Pinkfoot, perhaps because he is "different." For the next six months he will find the bird readily back at his old "stands" at Golden Gardens and at Green Lake.

CHAPTER TWENTY-ONE

As Pinkfoot settles in for the second winter in Seattle and takes up his old routine, he finds living conditions very similar to the year before. As October passes and November arrives, literally thousands of Glaucous-winged Gulls pour into Puget Sound to spend the winter. The adults, which make up by far the largest percentage of these birds from the north, are mostly returnees coming back to their old areas for another winter. The younger birds tend to travel farther down the coast than the adults.

Some miles to the south, however, trouble is brewing for the wintering gulls in the person of a round-faced, squinty-eyed bulldozer operator at a sanitary landfill. Far, far back in Slim's life he had acquired a deep hatred of all animals, exactly why even he could not say. An uncontrolled temper, a need to hate someone or something, in order to enforce his own ego perhaps, might be the reason. But, at any rate, his hatred for gulls always rises to fever pitch in late fall as the birds pile into the dump area for the winter.

There had been talk before of ways to control gulls at dump areas and at airports, where their resting areas and flight patterns create hazards for aircraft. But one day when his face receives the third splattering of sticky, smelly gull voidings his rage reaches its peak. He stops his machine and walks over to the foreman, wiping his face on a very soiled red handkerchief.

"I've had it," he says. "Either those blankety-blank birds go or I do!"

The foreman is somewhat sympathetic; he is tired of having to clean gull splatterings from the windshield of his car every day, tired of having to wash the car every Saturday, and perhaps a little tired of being kidded by his friends about the condition of the car in between washings. It is hard enough to get the smell of garbage off, let alone the decorations that go with it. Besides, he likes Slim; he is a good operator. So he takes up the problem with his superior in the Sanitation Department.

Slowly, as the weeks go by, the ponderous machinery of bureaucracy begins to grind and in the next month they receive permission to "do something" about the gulls. A few more negotiations and they have their plans laid. Slim can hardly wait to avenge all the insults and indignities the birds have heaped upon him over the years.

However, not all dump employees are in favor of the plan. One young fellow has a "pal" gull that comes to visit him each day and he always shares his lunch with "her." He thinks of the bird as a female because it is graybrown; he

does not know that it is a young bird and that all adult gulls are gray and white; nor that one cannot tell male from female except under the best of conditions.

Two or three of the other employees are either somewhat opposed or do not really care much one way or the other.

So at last it is all set up. The poison bait is prepared and at the crack of dawn the foreman and Slim arrive to spread it near the area where the gulls rest.

The first birds to arrive are a dozen Rock Doves that rest and nest on a nearby bridge. They have scarcely landed near the bait when four crows, residents of a nearby grove, also arrive for their share. Close behind them comes the first contingent of gulls, fifty or more.

Among the hundreds of newly-arrived adult gulls is the Binoc Bird. She has wintered here since her first migration ten years ago. The dump is regularly her first port of call in the morning. On this fatal day, she arrives with the vanguard only moments behind the first pigeons and crows. It is unusual to find all this food spread out before them, but birds eager for breakfast do not hesitate to take advantage of it. Hungrily, the Binoc Bird begins gulping down the poisoned bait along with the rest of the birds.

Suddenly the pigeons, almost simultaneously begin to thrash in their death throes. An alarm cry rings out and most of the gulls fly up in panic, including the Binoc Bird. She hasn't traveled twenty yards before the poison strikes her vitals with a white-hot, searing pain. She cries out; her breast muscles go into spasms and she starts to fall. Almost instantly it grows dark before her eyes and she is dead before she strikes the ground. All about her the other birds are tumbling from the air as if shot.

A brief reflexive flutter is given and she lies on her back, her feet in the air. Will the garbage men see her band and retrieve it? Would they care enough to look more closely if they did see it? Of course not. To them she is only another dead shit-bird. Good riddance! Who cares if she is banded?

A group of incoming gulls has heard the warning cry. The whole situation screams "Danger!" and they disappear over the ridge. In a few moments all is quiet but it is not long before a new contingent of gulls arrives.

They are somewhat wary, but dead members of their own kind do not especially frighten them. They are uneasy because there are no other gulls flying about or standing beside the bait, but they are hungry too, and the scene is repeated again.

At intervals all morning while garbage trucks arrive and dump their loads, while Slim runs his bulldozer, covering the trash with earth brought in by the dump trucks the afternoon before, he watches with a smirk of satisfaction on his face. He looks about and stops to light a cigarette. The entire dump area is dotted with the silent white forms of gulls. In some places nearer the bait they

are piled two- and three- deep. Here and there the breeze waves an extended wing, but there is utter silence. Death and destruction are everywhere. Nowhere is there a graceful white form gliding on the updraft over the ridge.

At lunch time, the "pet" gull fails to appear. "She" is lying dead a hundred yards away among the others and "her" friend shakes his head sadly. He is suddenly filled with loathing for the foreman, the bulldozer operator, and the job itself. When he goes home tonight he will never return to the dump.

Slim, looking about again, considers it a good day's work. His blow for the superiority of man and his revenge for countless indignities has been a telling one. How long he thinks this "treatment" will last is hard to say. If he does not realize that in a week more gulls will come in to take the places of the dead and that there will be no more permissions for such drastic measures, he is woefully ignorant of Nature and her ways.

"Jees!" says one of the other employees, "I never dreamed it would be like this!" The foreman, embarrassed by the obvious overkill, turns and snarls to Slim, "Okay, you wanted it. Go bury that bait and clean up the mess! We ain't got all day!"

"What's eatin' you?" Slim growls under his breath as he climbs back into his cat. "We done a good job here!" And he turns his blade to scraping up dead gulls, earth and bait, shoving them into the face of the landfill to be covered. Not for him the appreciation of silken snowy breasts, pastel gray backs or the beautiful curves of airfoils shaped by fifty million years of evolution; nor any respect for a faultless design for a chosen way of life. No indeed! Nothing but satisfaction that he has eliminated the dirty, noisy birds.

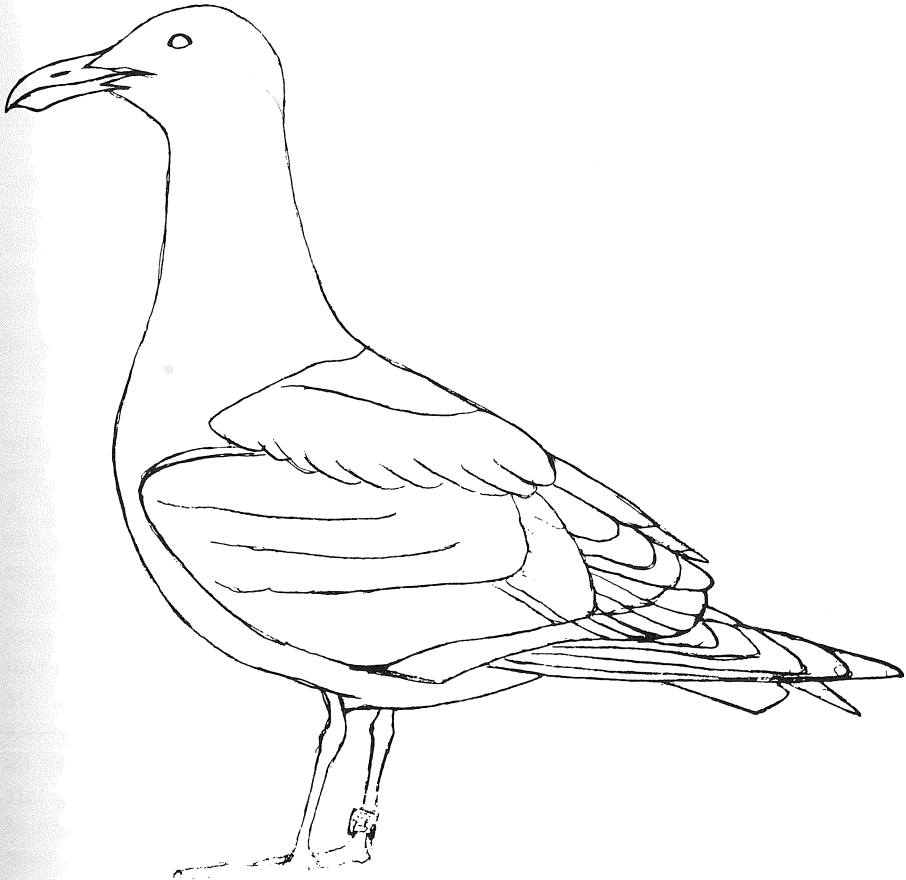
This is the catalogue of death, a roll call of the gulleries represented by these silent, feathered forms being scraped up and buried with the garbage.

Far, far to the north, from the fog-shrouded bird cliffs of St. Paul Island deep in the Bering Sea, across a heaving gray-green ocean, along rocky, fir-clad shores that show no touch of man for many miles, gray-brown wings had beat and glided two thousand futile miles to lie dead in the mud of a city landfill. From Bird Islands in Cook's Inlet opposite the city of Anchorage, where the swift tides flood across the flats faster than a man can run, gray wings have found their journey's end. From named and nameless bird rocks along the fjord-coast of southeastern Alaska, from Glacier Bay and Juneau, past Cape Scott and down the west coast of Vancouver Island to Quatsino Sound, where the lovely blue-green water and white surf wash the marvelous tide pools and undersea gardens, came birds, south to die helplessly in a death that makes no sense.

From Race Rocks, with its light station warning shipping in the Strait; from Chain Islands off Victoria, where the resident gulls meet the Princess boat from Seattle halfway across the Strait and escort her into the harbor; from

Mandarte Island, where live some of the gulls from Pinkfoot's home island; from Mitlenatch, far up the Strait of Georgia; from Cluster Island in Howe Sound; and from the San Juan Islands. From Protection Island standing at the mouth of Discovery Bay; and from the piers, pilings and rooftops of Seattle and Tacoma—all these places count their dead among the birds littering the ground of the landfill.

The wind from the south sighs and rattles in the dead weeds and moans through the young firs and alders across the fence. It sings a dirge, a requiem for senseless slaughter.



CHAPTER TWENTY-TWO

Another year passes, with Brother remaining in his old haunts in the Vancouver area, Sister wandering up the coast in the summer and wintering in the Bay area, and Pinkfoot alternating between summer wanderings and wintering in Seattle. Having survived the first crucial years, all three have excellent prospects for a life expectancy of up to thirty years or even more.

As December passes into the new year, which will be their fourth, the biological clock ticks on toward an inevitable Spring. In Pinkfoot's body changes are occurring at an ever-accelerating pace. Hormones begin to pour through his system; the follicles on head, neck, breast, sides and back become activated, the feathers loosen and come out. New pure white feathers grow in on the head and neck to replace the mottled winter ones. The thick layer of fat beneath his skin begins to change to an oilier form; the bone marrow and the fat become tinged with a rich orange red. The black band across his bill fades and dissolves rapidly, the orange spot gets brighter day by day, and the flesh-color becomes first ivory, then yellow. Eyelids widen, the dusky fades into flesh and the flesh turns rose. The faint silvery speckles in his irises become larger, and more appear, perceptibly lightening his eyes. His feet now become truly pink and the webs almost red. By the end of February Pinkfoot is a fine figure of a gull. Only the most intimate examination would show the very faintest of brownish wash in the second alular feathers, the longest of the elbow secondaries and also the webs of the two central tail feathers about an inch from the outer ends. In plumage he is otherwise mature; in all other aspects of life he is completely so.

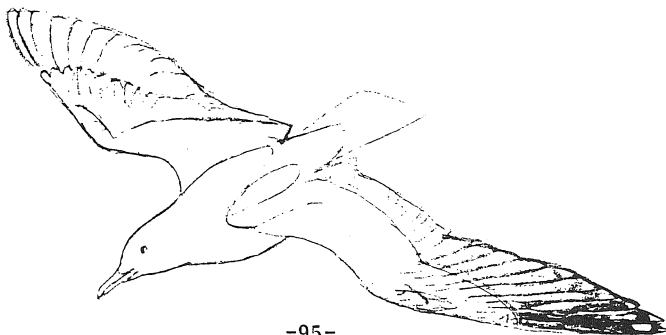
See how the restlessness grips him! The warm breeze, sliding over the awakening spring landscape, the sun that is encouraging the pussy willows, the alders, and the daffodils, fires the gulls with its benevolence! Awing! Away! A great circle of birds rides an updraft over the south end of Mercer Island. As they turn, they flash silver in the sun, alternately showing dark against the blue sky and the billowing thunderheads to the northeast. As they reach the top of the rising bubble of warm air, the birds split off in various directions--some west toward the city, some merely at random. But a dozen birds suddenly feel a pull toward the north, and are soon winging in that direction at a steady pace. Do they know where they are going? Who can say? But they fly, in a loosely-knit group, as if they did. An hour's flying time takes them over Everett, with its pulp mill pall in the air and its sanitary fill, which is, more and more, being left to the lame, the halt, the ill and the immature, as the adult birds feel the lure of the nesting grounds. It holds no interest for these traveling birds, and soon, over

the nearby water, they are joined by a dozen more birds who have felt the same pull and are ready to respond.

A formation gradually develops an echelon of birds with a few stragglers to the side and the rear. A number of these are old ones, and among these are three long-standing pairs of birds that have not been separated from each other for more than a few days for several years. They are somewhat late in traveling north, but they are all virile birds that will have no trouble settling down on their old, accustomed territories when they arrive. Others are, like Pinkfoot, young and untried, birds that have yet to experience the full measure of maturity. They cannot know why they fly north or where they are going, but they are obeying the ancient instinct to return to the natal area, the natal colony, perhaps even the natal meadow. Whether the place they seek will be open to them is unknown, of course, but they must try.

Another hour, and the wide blue expanse of Admiralty Inlet passes beneath their wings. Some of the flock have already swung away on a more northwesterly course that will carry them across the Strait of Juan de Fuca to the Canadian Islands where they were born; a few have turned in a more westerly direction; several have already found their area of desire on the spoil banks near Anacortes. Pinkfoot and several others continue on, steadily covering the miles toward a long, narrow, rugged island that appears to their keen eyes much sooner than it might even to the pilot of a plane heading over the water.

Soon it lies before them, still barren and gray, without the greenery that will soon be called forth by the sun—such as the cheat-grass, and the beach grass, and the ultimate pinkness of the wild roses in the draws. But even now, more than two months before the very first eggs will be laid, the island is dotted with the white forms of gulls, two by two, on many of the standing places. With a wide circle over the island, steadily losing altitude, Pinkfoot surveys the scene. It attracts him like a magnet. At the southern end of the island where the barren, jagged rocks stick out of the water at low tide, scores of gulls are preening, resting, calling or courting. It is the "club." Pinkfoot spills the air from his wings, back-pedals and lowers his feet. The band makes a little jingle as he settles on the barnacle-encrusted rock. Pinkfoot has come home!



EPILOGUE

The time is a late October afternoon. The scene is an office on the campus at the University. It is only three o'clock, but the lowering sky outside has made it so dark that the lights are on. Wind moans around the cornices of the building and rain is flung in gusts against the high windows.

Seated at a wooden table in the middle of the room are five people, all of whom we have met before. They are Don, the young man who discovered Pinkfoot; Jerry, the photographer; Ken, the band-reader and plumage student, who rescued Brother; Emmett, combined band-reader and computer mathematician; and Marney Hawke, whose office it is.

Scattered over all the available work space on the table are papers, computer printouts, IBM cards, and other cards of various kinds. Marney holds a sheaf of paper in her hand. "Emmett," she says, "Here are the readings and recoveries you wanted. 'Encounters' I guess is the word. I've pulled all the records of birds that were coming up four years old last July. Then I checked back to see what former encounters there might be with these."

"Yeah?" says Don. "Okay, you're excited about something. Find a bonanza? The keys to the kingdom?"

She grins at him.

"Remember Pinkfoot? The chick with the pink feet?"

"Oh sure," Jerry cuts in. "Is he still around?"

"Well," says Marney, "We've got some really good recordings on all three of those birds. One of them was the bird Ken picked up with botulism. Your friend saved his life and let him go. He turned up last March on the seawall at Stanley Park. So he made it that far, at least. The other one was caught with a cannon-net at a dump near Berkeley in January of the first winter. Since he was already banded, the professor turned in his number and let him go without putting on a back tag. It was that bird on the beach at Protection Island that Ray read last summer."

Jerry whistles, but says nothing.

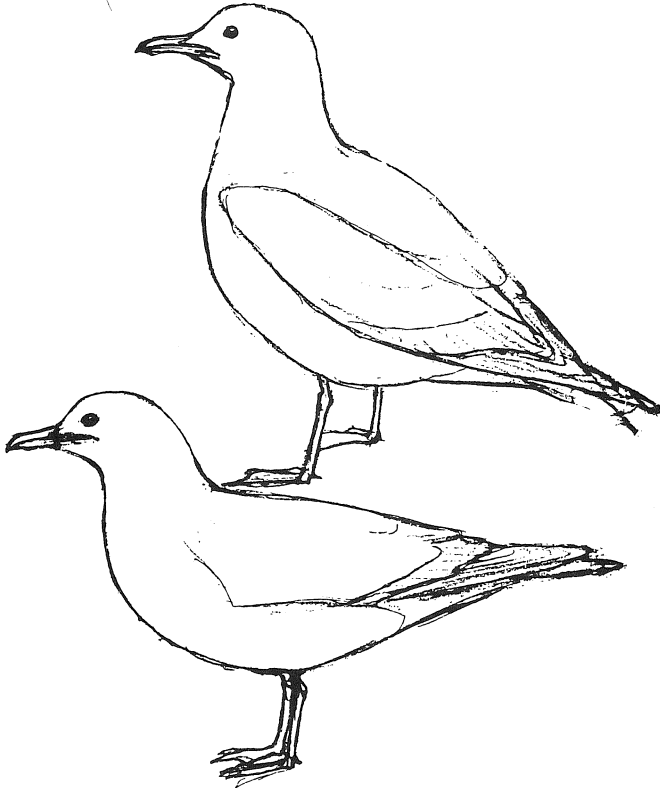
"Then, Pinkfoot, you know, has quite a record," Marney says. "He's been spending his winters, at least, in Seattle. Ken's seen him often at Green Lake and we've got half a dozen readings from him because he must sit on all the window ledges in town. But--" she pauses for a moment, "Last summer he was in territory about a hundred feet from where he was hatched. I read him!"

Emmett raises his eyebrows. Marney leans back for a moment and looks out the window, where gray gulls are sliding down the wind against the stormy sky.

"Oh, I know it doesn't prove anything," she says, "Emmett, to you these birds are numbers on little cards, all punched out neatly. You can drop them into that machine of yours and maybe get back some statistics or other, proving or not proving something or other. But to me, each one of these cards stands for a bird, an individual with a life of his own, problems of his own. Some of them like old 221 and the Binoc Bird seem like old friends when I see them again. Not just a band number on an IBM card."

She pauses. "I suppose you'd write me off as sentimental," she adds, slowly, "but don't you think that the two approaches just might be complementary?"

She shoves the stack of IBM cards toward Emmett and leans back, a smile on her face, watching as the gulls ride the wild wind past the windows.



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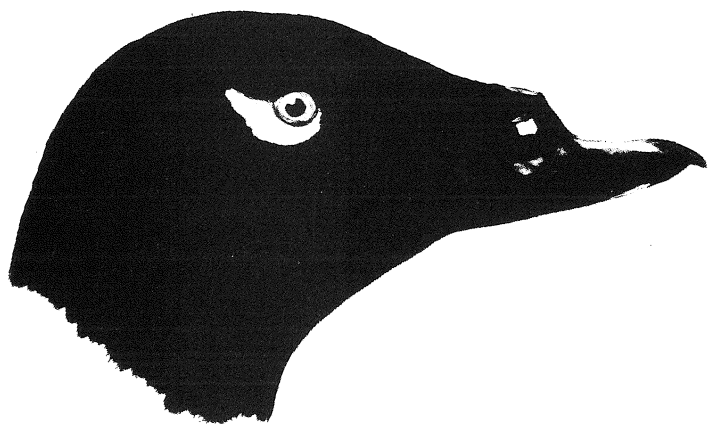
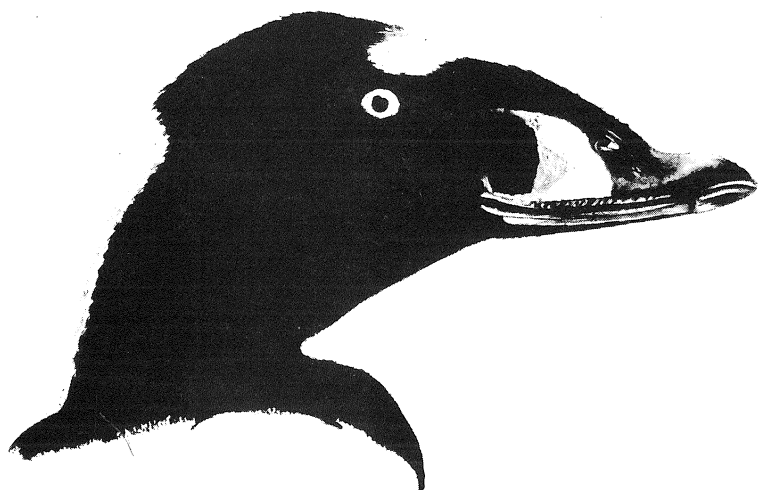
Mildred and Frank Soderling

Jody Sutherland

Mrs. Methyl (Peg) Shearer

ABOUT THE AUTHOR

Zella M. Schultz was a native of Washington and studied both art and biology at Western Washington College, where she received her Bachelor of Arts degree in Education in 1946. Her thesis for a Master's Degree in Zoology, awarded by the University of Washington, was on the plumage of gulls. She is nationally known for her beautiful bird paintings as well as for her vast knowledge of birds, particularly the Glaucous-winged Gull which she studied for 30 years. She also illustrated numerous books, wrote many articles and poems, and painted originals for hundreds of educational slides. She died on May 21st, 1974. A Seabird Sanctuary on Protection Island has been named for her.





Zella Schultz at work in her studio

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