

BOWDOIN COLLEGE

BOWDOIN SCIENTIFIC STATION

BRUNSWICK, MAINE 04011

1995 Annual Report

Since the Last Annual Report

On May 22, I ended a sabbatical year at the University of Botswana and flew into Portland, Maine. Six days later, I picked up the summer's students at sunrise in front of Searles Science Building -- somehow we had managed to agree, via e-mail, on a time and place to meet -- and off we set on the 11-hour trip to Kent Island in our packed van, hauling a trailer stuffed with gear, scientific equipment, and two month's worth of food.

For the first time in five years, our group did not include any students from local colleges other than Bowdoin, for 1994 was the last year in which the New England Consortium for Undergraduate Science Education (NECUSE) offered grants for summer research by undergraduates. With NECUSE funding, we were able to bring to the Bowdoin Scientific Station six students from a variety of colleges and to support an additional 1-2 Bowdoin students each year using station fees provided by NECUSE. In 1995, without NECUSE support, we felt fortunate to be able to turn to several important endowment funds (the Minot, Kent Island, and Spear Funds, in particular) to which Kent Island alumni and friends have so generously contributed. And we welcomed the intellectual outbreeding provided by Mike Palmer (Hartwick College), who served as Corey Freeman's field assistant.

The Summer of 1995

Florence Brown was just five-years-old the night the fire started in the chimney of her 1 1/2-story wood frame house. Her mother managed to get all of the children safely outside, and her father, Terrance Robicheau, hired by the McLaughlins to tend sheep on Kent Island, reached through a window to save the Victrola. Then he rowed the family over to "Henry's" (Hay) Island, where they watched their home burn to the ground and made plans to start a new life in Nova Scotia. That was on March 1, 1926. All that remains of the house today is a rough stone foundation, a collapsed root cellar, and a few square nails and pottery shards at the edge of the north field above the well. Florence did not set

foot on Kent Island again until last summer, 69 years later, when she joined our July 15 picnic. The biggest change Florence noticed was that the "steep hill" that she remembered sledding down towards the basin had shrunk. Other Grand Manan neighbors at the picnic were Russell, Joseph, Junior and Howard Ingalls and their families, Bob and Claire Cunningham, and Myhron and Eunice Tate. Everyone arrived on the "Bonus" precisely at the peak of the biggest lightning storm in anybody's memory: more than 2.5 cm of rain fell within an hour. As usual, the event was an occasion to share good food and listen to tales about Kent Island's remarkable history. Particularly poignant was Junior's memory of battling a storm with his father in an attempt to reach Kent Island with medicine for Carey Chase, Ernest Joy's housekeeper. On their arrival, they learned that she had already died. Bob Cunningham recounted how Ernest, legendary caretaker of the Bowdoin Scientific Station and renowned story-teller, used to scavenge building materials washed up on Kent Island's beaches. One day, according to Ernest, he found the entire side of a house -- with a fur coat still hanging on the wall! Then there was the time that Ernest, proudly showing off Grand Manan's first safety razor in front of a dubious crowd, sliced his face "from ear to chin" in one dramatic swipe.

During their many years as caretakers of the Bowdoin Scientific Station, Myhron Tate and his son Bob tried to keep ahead of the Bay of Fundy's abuse of the wharf by replacing 10-20% of the planks each summer. Continuing the tradition, Mark Murray ('75) reached a milestone in his shift as caretaker by finally completing the reconstruction of the entire 125-foot wharf, understructure and all, with the help of a succession of summer assistants plus co-caretaker Russell Ingalls, Russell's brother Joseph, and anybody else willing to swing a hammer or muck around in the pungent basin mud. Except for the spikes, planks, and joists, the entire wharf was rebuilt from weir stakes and top poles found on the beaches. Total cost: less than \$3000. Besides building wharfs, Marney Pratt ('97) and Beth

Archie ('97), Mark's apprentices in 1995, learned how to renovate a kitchen. Our second-hand commercial gas stove has been moved to the northeast corner of the kitchen, and a new off-white formica counter now wraps around the kitchen and provides expanded space for piling (and postponing washing) dishes. They also rebuilt the widow's watch (crow's nest) on the dorm, complete with safer access steps on the roof; reshingled the south wall of the cow barn; replaced a door on the lower lab which was ripped off by a winter storm; and constructed an effective cold frame over the garden in front of the dorm, which yielded an abundant and early crop of broccoli, lettuce, zucchinis, spinach, Chinese cabbage, and radishes. Genie Wheelwright and Rebecca Stanley scraped and painted most of the north and east walls of the Warden's house, and Brian Dalzell's crew finished the job in August.

Russell and Mark kept our fleet in fine shape and moved back and forth across the Bay in every kind of weather. Russell's stern man, Mark Wilcox, was a great help on many occasions. The *Misty Maid* ferried us on a memorable trip to Machias Seal Island to visit the Atlantic Puffin and Razorbill colonies, and one day Russell invited Marney, Beth, and Patrick Kane ('96) on a fishing trip, returning with 400 pounds of pollock. With radar, Loran, compass and a bit more experience, we now feel comfortable making the trip to Grand Manan in the *Ernest Joy* even in fog thick enough to cut with a knife, as we did on July 1, when we attended the Canada Day festivities in Seal Cove. None of us was brave enough to try the greased pole event, which inevitably culminates in an inglorious splash into the icy creek. Besides, it was a foregone conclusion that perennial winner Beaver Mullen would take the prize. However, when it looked as if nobody from Kent Island would brave the water, Alex Wheelwright hurled himself off the rope-swing on the bridge, and he and Theron Ingalls turned in a respectable third place finish in the "anything that floats" race. The day concluded with our annual performance of "O, Canada" broadcast over VHF, this year featuring Alex on trombone and Emily on trumpet.

Research in 1995

- Leach's Storm-Petrels

Now in its 42nd year, Chuck Huntington's population study of Leach's Storm-Petrels must be one of the longest continuous studies of any bird

species -- maybe any animal species -- conducted by a single individual. This summer it was Andrea Kudrez ('98) who, under Chuck's tutelage, had the opportunity to learn the trade of grubbing. In 1995, Chuck and Andrea concentrated mostly on his Petrel Path and Crocket Point study plots, filling in the life history details for several hundred known-age birds, a few of them in their thirties. Chuck's definitive monograph on the biology of Leach's Storm-Petrels is now in press.

Bob Mauck (Ohio State University), one of the co-authors on the storm-petrel monograph, couldn't resist returning for a brief fifth field season to gather the last few data points for his PhD dissertation research. As usual, we got the most out of Bob's computer-programming skills, putting him to work refining his wonderful database programs for storm-petrels, Savannah Sparrows, and Tree Swallows.

- Savannah Sparrows

Patrick Kane ('96) worked with me on the Savannah Sparrow project in 1995. Besides the study's long-term goals of monitoring population dynamics, lifetime reproductive success, and heritability of a variety of behavioral and morphological features, this year's focus was on singing behavior. Patrick's honors thesis asks the question, who is the intended audience for singing territorial males? To try to answer the question, Patrick noted the direction that a given male sang in relation to the center of his territory, to the nest of his primary female (about 20% of Savannah Sparrows on Kent Island are bigamists), and to the female herself. Using circular statistics (not to be confused with circular reasoning), he demonstrated that males sing in the direction of their primary females, rather than broadcasting away from their territory centers as might be expected if they were trying to attract additional mates. The story may actually be more complicated than this (knowing Savannah Sparrows, it undoubtedly is), because the width of birds' territories is only about 40 meters, whereas their songs can carry 100 meters or more. In other words, by singing across their territories, males may be informing their mates of their location and dedication, but simultaneously advertising their territories and themselves to other females. This semester Patrick will be working with Dr. Donald Kroodsma (University of Massachusetts-Amherst) to compare song recordings of males and their sons. To date, we have banded about 3500 Savannah Sparrows and

found more than 900 nests.

Corey Freeman ('91) completed the fourth and final field season for his PhD dissertation research at Cornell University. Already Corey's and Bob Mauck's thesis work is beginning to appear in a number of prestigious journals (see the "List of Publications from the Bowdoin Scientific Station"). Corey and his field assistant Mike Palmer repeated last year's feather-clipping experiment with the same result: handicapped males did not alter their parental care. Using a statistical technique known as path analysis, Corey has attempted to understand which factors are most important in influencing male reproductive success. Controlling for hatching date and morphology, he finds a weak relationship between male parental care and the number of fledglings produced, but females who receive little help from males in raising young are able to compensate. Based on DNA fingerprinting, it appears that males are motivated to help feed young in the first brood because it buys them female fidelity in the second brood.

• Tree Swallows

Chris Maranto ('97) took charge of the Tree Swallow study in 1995, in addition to conducting several other projects on birds. By now most of the adult swallows in the population have been individually color-banded so they can be recognized without having to be captured when they perch on nest boxes. Only 23 of more than 100 suitable nest boxes in the study area had eggs laid in them in 1995, which was lower than any of the previous eight years. On the bright side, 15 nests successfully fledged 62 young, compared to 0 last year when two stormy days in early July caused the entire colony to abandon their nests. This year's small population size may thus be the result of excessive mortality or poor recruitment last year, which would also explain the noticeable scarcity of Bank and Cliff Swallows on Kent Island in 1995. However, the decrease in Kent Island's Tree Swallow population has been steady for nearly a decade. Hopefully, the phenomenon does not reflect problems on a broader scale such as pollution or habitat degradation in their wintering areas. We are beginning to wonder if our studies have been too disruptive during the sensitive period of nest establishment, especially for a population breeding under conditions that are particularly harsh for aerial insect-eaters. Next year we intend to examine nest boxes only after

most clutches have already been laid, to check nests less frequently, and to wait until later in the incubation period to band females.

• Bird Populations

During the summers of 1979 and 1980, Peter Cannell ('76) and Jeff Cherry ('79) carried out an ambitious migratory bird-banding study on Kent Island (see North American Bird Bander 6: 30-31). By that time, biologists had already begun to suspect that songbird populations were declining across much of North America, but they lacked hard data. Fifteen years later, Grand Manan ornithologist Brian Dalzell attempted to replicate Cannell and Cherry's study with grants from the Bowdoin Scientific Station, the Canadian Wildlife Service, the Atlantic Cooperative Wildlife Ecology Research Network (University of New Brunswick), the Canadian Centre for Landbird Study and Preservation, and a team of volunteer field assistants, including Cara Greenlaw, Dorothy McFarlane, David Hussell, Erica Dunn, Julie Paquet, Halton Dalzell, Laura McFarlane, Falk Huttmann, Tracey Dean, Alain Clavette, Megan Brodie, Ann White, and Tony, Elizabeth and Peter Diamond. Comparisons between the 1979-80 and 1995 studies must be made with caution because of differences in methodology and weather conditions, as well as the fact that a spruce budworm epidemic in Atlantic Canada had occurred in the 1970s. Nonetheless, Brian's results, summarized below, strongly suggest that populations of at least several bird species have decreased over the last decade and a half.

1995 Study 1979-80 Study

First day of netting:	1 August	24 July
Last day:	3 October	13 October
Total days:	55	67
No. nets:	2-11	5-15
Total net hours:	1912	5082
Total birds banded:	2054	5344
No. birds/100 net hours:	107	105
Most birds in a day:	181	396
Total bird species:	69	90

Most Commonly Banded Species

1995 Study

219 Golden-crowned Kinglet

187	Yellow Warbler
167	Red-eyed Vireo
145	American Redstart
108	Northern Waterthrush
99	Ruby-crowned Kinglet
86	"Traill's" Flycatcher
79	Song Sparrow
76	Common Yellowthroat
75	Magnolia Warbler

1979-80 Study

808	Cape May Warbler
799	Yellow-rumped Warbler
326	Bay-breasted Warbler
239	Savannah Sparrow
237	American Redstart
180	Song Sparrow
155	"Traill's" Flycatcher
154	Red-eyed Vireo
148	Tennessee Warbler
147	Yellow Warbler
75	Yellow-rumped Warbler

Spruce budworm specialists such as Yellow-rumped, Cape May, Bay-breasted and Tennessee Warblers are clearly rarer today than 15 years ago. Although the number of birds captured per 100 net hours was similar in the two studies, nets were not operated in 1995 during the slow midday and afternoon hours, to conform with standardized procedures for monitoring and estimate productivity of migratory birds. Brian estimates that the total number of birds of all species present on Kent Island in 1995 was only half that of 1980. Of the bird species recorded by both studies, about 30% appear to have diminished, in some cases dramatically, such as Veeries, Swainson's Thrushes, Gray Catbirds, Blackburnian Warblers, Ovenbirds, Canada Warblers, Scarlet Tanagers, Rose-breasted Grosbeaks and Baltimore Orioles, in addition to the spruce budworm specialists mentioned above.

Brian netted a number of birds seldom seen on Kent Island, including eight Prairie Warblers, three Yellow-breasted Chats, two Yellow-billed Cuckoos, a Golden-winged Warbler, and four Northern Saw-whet Owls. A kettle of 85 Broad-winged Hawks which crossed the island on 25 September was the most ever seen in New Brunswick during migration. A Sora was flushed from the irises on the southern end of the island, Pomarine and Parasitic Jaegers and two Lesser Black-backed Gulls foraged offshore, small

numbers of Long-eared Owls and Dickcissels were recorded, and there were sightings of a Short-eared Owl, Black-backed Woodpecker, Red-bellied Woodpecker, Yellow-throated Warbler, Lark Sparrow, and Yellow-headed Blackbird. Earlier in the summer, Corey spotted an American Oystercatcher winging its way towards Nova Scotia. Sightings of Bald Eagles were a daily occurrence.

In her spare time, Chris Maranto collected blood samples from three migratory bird species -- Yellow Warblers, Redstarts and Tree Swallows -- as part of a collaborative study coordinated by Robert Dawson, a post-doc with Lisle Gibbs' conservation genetics group at McMaster University in Hamilton, Ontario. By extracting microsatellite DNA and screening blood samples for genetic differences, the study aims to determine the extent to which populations from Alaska to Newfoundland have diverged over evolutionary time. Conservation efforts can then be directed towards protecting populations that are genetically unique. Initial results suggest that for certain species (e.g., Swainson's Thrushes), populations hardly differ from east to west, but for others (e.g., Yellow Warblers), birds in New Brunswick and Newfoundland, at least, appear to be genetically distinct. Possibly, the St. Lawrence River serves as a barrier to gene flow, isolating populations of Yellow Warblers with different migratory routes. Laboratory work on Redstarts and Tree Swallows will begin next month.

Each summer during the third week of June, I conduct a breeding bird census in the spruce-fir forest. By that time, most migrants have already passed through the island yet breeding birds are still conspicuous. In 1995, population densities of the common woodland species were larger than usual, and several species ordinarily not found during the breeding season were recorded, such as Least Flycatchers, Magnolia Warblers, Nashville Warblers, and Red-eyed Vireos. As usual, Blackpolls were abundant, and American Redstarts positively thick: Chris banded nine different Redstart males that held territories around the 1.5-hectare north field.

When we arrived on May 28, a pair of Merlins had already built a nest 7 meters up in a white spruce only 15 meters west of the outhouse. Their frequent and noisy copulations, the insistent begging of the female, and the regular alarm calls given by smaller birds whenever the male Merlin returned to offer his mate a Yellow Warbler or Tree Swallow made the pair noticeable, to say the least.

From the roof of the cow barn, Andrea observed their nesting behavior until they suddenly abandoned in late June, leaving four infertile eggs. Undaunted, Andrea shifted to studying Boreal Chickadees. After watching Becky Elden struggle to find their cryptic nests in 1991, and trying my own hand at it with no success ever since, I concluded that attempting to locate Boreal Chickadee nests was hopeless, and was bold enough to offer to cook dinner for Andrea if she could find one. Big mistake. The nest she discovered in a dead white spruce snag was just a stone's throw from the dorm. Later, we stumbled upon a second nest in an unused Tree Swallow box which fledged four chickadee nestlings on June 26.

Jackie Mitchell's ('96) project centered on American Crows and Common Ravens. Like the Merlins and Boreal Chickadees, the crows' breeding behavior was user-friendly in 1995. A pair nested in the thick white spruces only 20 m east of the radio shack. On May 28, three naked nestlings hatched, black-skinned and blue-eyed with vivid pink bill linings; two survived to fledge on June 30. Jackie watched the crows raid Savannah Sparrow nests and recorded a number of other interesting items in their diet, including Herring Gull chicks and rock gunnels. Her most surprising observation, however, was that fledglings from different nests apparently joined common creches. What the genetic relationship of the fledglings might be, or whether adult crows actually protect and feed offspring from nests other than their own, remains to be seen.

Kim Mawhinney, a graduate student from the University of New Brunswick, has embarked on a study of the post-hatch ecology of Common Eiders in the Bay of Fundy, including Kent Island. At her main site, the Wolves Archipelago, 3500 ducklings hatched, but only 12 fledged. The rest were eaten by Great Black-backed Gulls and Bald Eagles. Next summer she plans to expand her research on Kent Island, which is unlikely to have such severe losses because Great Black-backed Gulls are less common than on the Wolves.

We recorded two odd feeding records for Herring Gulls. One night in late June, we could hear snapping noises in the field. Hundreds of gulls were pacing about, seizing low-flying June beetles silhouetted against the bright night sky. In mid-September, both gulls and crows clustered around ant colonies to feast on emerging drones and fat queens identified by Alex Wild ('95) as Lasius pallitarsis.

- Plant ecology

Stefan Gutow's ('96) research focused on the reproductive ecology of the larger blue flag, Iris versicolor. Earlier studies on the same species had described its physiological ecology (Daniel Smith, 1993) and detailed the elaborate way that flowers fertilize themselves if denied pollinators (Andy Zink, 1994). Stefan took advantage of the flowers' big and easily manipulated sex organs to explore a fundamental question raised by Tim Smith's 1993 work on inbreeding depression in island plant communities. Stefan selected four iris clones (aggregations of genetically identical and interconnected plants) on Kent Island. By sealing unopened flowers in bags to keep insect pollinators out, he ensured that the flowers were "virgin" (ironically, bridal veil is the best material to use for the job). Next, to examine the effect of different degrees of inbreeding, he carefully added pollen by hand to the stigmas (female organs) of emasculated flowers (that is, flowers whose stamens were removed before they could open to release pollen), using pollen from one of four sources: (1) the same flower, (2) a different flower but the same clone, (3) a genetically distinct iris clone from elsewhere on Kent Island, or (4) a different iris population, from Hay, Sheep or Grand Manan Island. His results showed convincingly that there is no inbreeding depression in this population: fruit set and fruit size did not vary with treatment. The implication of Stefan's work and the studies cited above is that the isolation of islands, and possibly remote habitats in general, may serve as an ecological "filter," favoring colonization by plant species or genotypes that can breed with themselves or close relatives and achieve reproductive success despite the reduced efficiency or diversity of island pollinators. (Interestingly, Savannah Sparrows dodge the costs of inbreeding by a different mechanism: Bob Mauck and I have yet to find a case of any bird pairing with a close relative, despite the fact that random pairing should result in numerous examples of incest.)

- Meteorology

The idea of global warming may still have a few skeptics, but Bob Cunningham's long-term meteorological study on Kent Island provides powerful evidence that in the Bay of Fundy, summers are hotter now than a half-century ago. Our high temperature this summer was a sweltering 25.6° C (78° F), just short of the

record of 26.1^o C. Four of the warmest Junes since 1938 have occurred within the last six years. Average June temperatures were relatively high again in 1995 (11.9^o C), although they did not quite equal those of 1994, a year which brought a number of rare subtropical marine species like ocean sunfish and Portuguese men-of-war into the Bay of Fundy. June saw less fog than usual but more rain (11.2 vs. an average of 8.2 cm). Warm weather continued during the month of July in spite of a near record number of days with dense fog -- 25! The fog dimmed the total sunshine for the month to 161 kilowatt-hours/m². August, on the other hand, was very dry, with only five days of fog and little rain after the first few days. In spite of August's shorter days and lower sun angle, total solar radiation for the month was the highest of the summer at 188 kwhr/m². September was equally dry and clear.

Bob continued to study the chemistry of the Bay of Fundy's famous fog in collaboration with researchers from the University of Maine's College of Forestry and Canada's Atmospheric Environmental Service. This year's objective was to compare samples obtained from Bob's old stainless steel collector and the more recently developed standard, a cylindrical teflon string collector. Because the collectors differ in their efficiency at intercepting different fog droplet sizes, and because ions from sea salt occur mostly in larger droplets, the chemistry of the samples collected by the two systems differs slightly, making it difficult to interpret Bob's earlier analyses. Until Mark constructed a plastic hood for the new collector, there was another complication. It seems that a pair of Herring Gulls found the collector an ideal perch from which to keep an eye on their nest. Not only did the birds contaminate fog samples with guano, but their "nasal drip" (produced by salt-excreting glands located between their eyes) altered the chlorine:magnesium ion ratio used to calibrate chemical analyses.

The meteorological observations made on Kent Island support a variety of projects in field biology at Kent Island. Detailed temperature measurements recorded by data loggers at 10-sec intervals around the clock have painted an unexpectedly complicated picture of the thermal environment of ground-nesting birds like Savannah Sparrows. On Kent Island the air flows rapidly off the nearby cold ocean at the same time that strong sunlight heats the ground. There is

relatively little mixing between the air layers. This summer we placed a temperature probe in an artificial nest to determine the difference between temperatures on the ground and at heights where many birds perch and forage (1.5 m). When the vegetation is low and the angle of the sun is high, as it is in June, the temperature of open nests climbs as high as 43.9^o C (111^o F), while air temperatures reach only 16.1^o C, a 27.8^o C difference. The difference between ground and air temperatures is only 5-15^o C in covered nests, and nearly disappears in mid-July as vegetation grows to shade nests. Nonetheless, such measurements demonstrate that early in the breeding season, when air temperatures are still severe, the thermal conditions that incubating or ground-foraging birds actually experience are far more benign than one might expect.

- Archaeology

Grand Manan student Cara Greenlaw had been on Kent Island less than a day, helping Brian net birds, when she took advantage of a lull in activity to hunt for evidence of historical use of the island by indigenous peoples. As recently as the 1920s, Passamaquoddy Indians had camped on Plank Beach while hunting harbor seals, and it was there in shallow soil eroded by winter storms that Cara found charcoal, flakes of stones not normally found in the region, and, most impressive, an axe-head. Excited by Cara's discovery, University of New Brunswick graduate student Susan Blair conducted a follow-up expedition to Kent Island in October. Sue has tentatively dated the axe-head and other artifacts at several thousand years old.

- Marine Ecology

Marney Pratt and Beth Archie teamed up to study the marine algae and invertebrates of the intertidal zone at Kent Island, following up on Caroline Campbell and Samara Walbohm's 1992 study. At 100-meter intervals along the shore of the entire island, they located permanent markers corresponding to the grid system used in the north and central fields. Perpendicular to each marker, they established 50-150-meter transects towards the ocean and described the topography, substrate, and ecological communities at 1-meter intervals. The culmination of their work was the first detailed map of Kent Island's intertidal zone. Along the way, they documented the occurrence of a number

of elusive marine invertebrates, including the elegant Scarlet Psolus and the humble Sea Potato, and some perplexing distributional patterns. For example, the epiphytic alga *Elachistia*, which grows in bulky tufts on another alga, knotted wrack, occurs most densely on the exposed eastern side of Kent Island rather than in protected areas on the west as predicted. An intertidal "first" for me was to walk across the exposed eel grass all the way to Sheep Island on a 1-foot low tide.

Glyn Sharp of Fisheries and Oceans Canada reports that his team's 1994 study of the marine invertebrates inhabiting algal canopies around Kent Island helped set aside the Three Islands as a waterfowl protection area within the management strategy for rockweed harvesting in New Brunswick.

Kent Island Life

In late June, a high-level delegation flew into Grand Manan International for a day of discussions on Kent Island about Bowdoin's planned Coastal Studies Center on Orr's Island, Maine. Architect Rick Renner, Bowdoin faculty Ed Laine, Frank Burroughs, and Amy Johnson, and Executive Assistant Dick Mersereau observed the Bowdoin Scientific Station in action and contemplated some of the pros and cons of the Kent Island model. One of the useful outcomes of the sessions was an appreciation of the value -- educational as well as environmental -- of simple, functional, field-oriented labs powered only by the sun. A number of other visitors made it out to the island, including Marney's family and Beth's parents, my mother and Nancy Ellis (sister of George Bush, but better remembered, at least by Genie and me, for her "take no prisoners!" game of bridge and her gung ho hike to the South End in a rain shower). Bowdoin alumni Ruth Fogler ('78) and Darragh Brady ('77) brought husbands and children for a visit in August. A Victor Emmanuel Nature Tour spent an afternoon on the island, and Russell guided an Elder Hostel tour late in the summer.

Like a number of local fishermen, White Header Barry Russell has begun to diversify his income by boating ecotourists around the Bay, so we saw him often, as we did Grand Mananers Jack and Elizabeth Ingalls and Frazier and Lillian Shepherd. One exciting morning two mysterious visitors wearing decksuits and sporting crewcuts were unloaded from a dory rowed soundlessly through the fog near the Moustache. No, they

weren't Canadian Wildlife Service agents but rather provincial fisheries officers. After asking for directions to Hay Island, they snuck up on a pair of embarrassed clammers illegally working the flats in the harbor. Although the authorities don't monitor flats on the Three Islands and other outlying islands, they are generally closed to commercial clamming because of red tide in several sites around Grand Manan. (Chuck and I feel it our duty to conduct periodic tests of clams from Kent Island -- a tough job but somebody has to do it.)

I wish I had been along on the spring ornithology class trip led by my sabbatical replacement, Seri Rudolph. Accompanying her was Sue Johansen, who, as departmental coordinator in Biology, has long facilitated operations on Kent Island but had never before seen it. A special feature of the early May trip was that Louise Minot came along with son Ed, plus Midge, Hannah and Ethan, visiting from New Zealand. Louise first knew the island in the 1930s, with her father, Alfred Gross, famed ornithologist (and Chuck's and my predecessor at Bowdoin). Back then, in deference to the "males only" policy on Kent Island, Louise had to spend nights with Hannah Cheney on Hay Island. Ed completed his masters thesis on Common Eiders on Kent Island and Midge served as cook one summer. Four generations of Grosses and Minots have left their mark on Kent Island during most of the decades of this century. Carrying on the family tradition, Ethan introduced the game of cricket. The bat he crafted hangs over the door in the Club Dingleberry, complete with instructions engraved on the shaft for those of us who (despite a year in southern Africa) still consider cricket like baseball played in a coma.

The string of amazing summer cooks continued unbroken by Andrea. Each night her 3-4-course dinners were on the table precisely at 1800, leftovers were unheard of, and our menu was wonderfully diverse (although some of us still wonder how 12 people managed to consume 40 pounds of cheese in less than three weeks). Popular recreational activities in 1995 included croquinolle, cribbage, "Prairie Home Companion," and juggling. Chuck was unconquerable in the game of Trivial Pursuit, as usual. Cornell graduate student Adrienne Gallant provided consultation on statistics and knitting during her time on in the island. In honor of Corey and Adrienne, who tied the knot October 21, our end of the summer song was (what else?) "Goin' to the Chapel." Ian

Stewart ('96) and Marney introduced 10 enthusiastic first-year students to Kent Island as leaders of the preorientation trip in late August. My ecology class field trip was the last major one before Brian wound down his banding program, Bob retrieved his meteorological equipment and Mark closed up the station on October 15 for the winter.

Addenda to the List of Publications from the Bowdoin Scientific Station

More than 120 articles have been published in peer-reviewed journals based on research on Kent Island. Those authored by students are indicated by asterisks. Numbers in parentheses represent Contribution Numbers from the Bowdoin Scientific Station.

Danforth, B.N., C.R. Freeman, S. Bogdanowicz, and B. May. 1994. Chemiluminescent DNA fingerprinting using PCR-labeled M13 and Jeffreys probes. *Biochemica* 11: 17-19.

** Wheelwright, N.T., and C.B. Schultz. 1994. Age and reproduction in Savannah sparrows and tree swallows. *Journal of Animal Ecology* 63: 686-702. (110)

** Wheelwright, N.T., G.C. Trussell, J.P. Devine, and R. Anderson. 1994. Sexual dimorphism and population sex ratios in juvenile Savannah Sparrows. *Journal of Field Ornithology* 65: 520-529. (111)

Mauck, R.A., and T.C. Grubb, Jr. 1995. Petrel parents shunt all experimentally increased reproductive costs to their offspring. *Animal Behaviour* 49: 999-1008. (117)

Danforth, B.N., and C.R. Freeman-Gallant. DNA fingerprinting data and the problem of non-independence among pairwise comparisons. *Molecular Ecology*. In press.

Freeman-Gallant, C.R. Microgeographic patterns of genetic and morphological variation in Savannah sparrows (*Passerculus sandwichensis*). *Evolution*. In press.

Freeman-Gallant, C.R. DNA fingerprinting reveals female preference for male parental care in Savannah sparrows. *Proceedings of the Royal Society, London, Series B*. In press.

Huntington, C.E., R.G. Butler, and R.A. Mauck. Leach's Storm-Petrel (*Oceanodroma leucorhoa*). In The Birds of North America (A. Poole and F. Gill, eds.). Philadelphia: The Academy of Natural Sciences; Washington, D.C.: The American Ornithologists' Union. In press.

Mauck, R.A., and T.C. Grubb, Jr. Monogamy in Leach's Storm-Petrels: DNA fingerprinting evidence. *Auk*. In press. (118)

** Conrad, K.F., P.V. Johnson, R.J. Robertson, N.T. Wheelwright, P.T. Boag, and B.J. Leach. Reduced occurrence of extra-pair young in a low-density insular population of Tree Swallows (*Tachycineta bicolor*). *Condor*. In review.

** Wheelwright, N.T., J. Lawler, and J. Weinstein. Nest-site selection in Savannah sparrows: using gulls as scarecrows? *Animal Behaviour*. In review.

Wheelwright, N.T., and R.A. Mauck. Philopatry, natal dispersal and inbreeding avoidance in an island bird population. *Ecology*. In review.

** Wheelwright, N.T., T.M. Smith, and R.A. Zink. Self-pollination in an island plant community. *Journal of Ecology*. In review.

** Zink, R.A., and N.T. Wheelwright. Facultative self-pollination in island irises. *American Midland Naturalist*. In review.

Nathaniel T. Wheelwright
Director, Bowdoin Scientific Station
January 10, 1996
