

THE SECOND ANNUAL REPORT OF THE BOWDOIN SCIENTIFIC STATION

Bowdoin College
Brunswick, Maine
February 1, 1937

To the President and Trustees
of Bowdoin College and the
Directors of the Bowdoin
Scientific Station

Sirs:

I have the honor to submit the second annual report of the Bowdoin Scientific Station at Kent's Island and a report of the activities of the 1936 Bowdoin College Expedition to the Bay of Fundy.

The progress made by the Station during the past year has outrun any hopes or expectations held at the time of the first annual report. Investigations such as those reported on in this bulletin are being carried on successfully. The equipment of the Station has increased enormously. To our buildings we have added a two-story dormitory and a guest house. But perhaps our greatest achievement is the fact that we have operated an extensive scientific expedition which at one time numbered more than twenty-five men in a region notably hazardous without a single instance of sickness or serious accident.

THE STAFF

A group of ten men including those who sponsored the Station in the very beginning forms the Board of Directors:

Donald B. MacMillan, Chairman; Provincetown, Mass.
Alfred O. Gross, Bowdoin College; Brunswick, Maine
Manton Copeland, Bowdoin College, Brunswick, Maine
J. Sterling Rockefeller, 25 Broadway, New York, N.Y.
Sumner T. Pike, 120 Wall Street, New York, N.Y.
Albert T. Gould, 1 Federal Street, Boston, Mass.
Edward N. Goding, 626 Tremont Building, Boston, Mass.
Alger W. Pike, Lubec, Maine
Henry S. Shaw, 136 High Street, Exeter, New Hampshire
W.A.O. Gross, Secretary, Bowdoin College, Brunswick, Maine

At the present time an organization of Fellows is being planned. This will include scientists associated with the Station's research as well as other friends of the Station.

The society of Fellows will have voting power in matters of Kent's Island policies and in the selection of members of the Board of Directors. Elected Fellows will be announced in the next annual report.

The Staff of the 1936 expedition spent the entire season from June 15th until September 15th in the field. It numbered seventeen men:

W.A.O. Gross, Director; Bowdoin; Brunswick, Maine
Nahum R. Pillsbury, Jr.; Asst. Director; Bowdoin; Braintree, Mass.
Ernest A. Joy, Caretaker and Warden; Wood Island, Canada
Newell E. Gillett, Navigator; Bowdoin; Worcester, Mass.
James E. Levings, Surveyor; Harvard; Paris, Illinois
John A. Crystal, Bird Bander; Bowdoin; Woodmere, L.I.
Latimer B. Hyde, Ornithologist; Bowdoin; Ware, Mass.
Howard B. Miller, Ornithologist; Bowdoin; Turners Falls, Mass.
Henry A. Gleason, Jr., Botanist; Cornell; New York, N.Y.
Thomas Gross, Chief Radio Operator; Bowdoin, Brunswick, Maine
Ralph B. Savage, Jr., Sub-station; Bowdoin; Pittsburgh, Pa.
George F. Chisholm, Artist; Bowdoin; Waban, Mass.
Charles B. Moseley, Zoologist; Dartmouth; Wilmington, Dela.
James W. Botsford, Commissary; Deveau School; Buffalo, N.Y.
Frederick H. Crystal, Radio Operator, Woodmere, L.I.
Michael Gallo, Radio Operator and Commissary, Millinocket, Me.
Orrin C. Pillsbury, Boat Engineer; South Braintree, Mass.

The Scientific Staff consists for the most part of College and University professors and scientists who carry on research activities at the Station for periods of time varying from two to four weeks or more. They also confer with members of the expedition on problems in their respective fields.

Alfred O. Gross, Ph.D., Biologist, Bowdoin College
David Potter, Ph.D., Botanist, Clark University
Professor Philip W. Meserve, Geologist, Bowdoin College
Henry S. Shaw, Radio Engineering, General Radio Company
Ollin S. Pettingill, Jr., Ph.D., Ornithologist, Carleton College
John Cole, Magnetical Research, Somerville, Mass.
Arthur H. Norton, Zoologist, Portland Society of Natural History
Salvatore Pagliucca, Meteorologist, Blue Hill Observatory
Robert E. Stone, Meteorologist, Blue Hill Observatory

Dr. I.W. Kingsbury, Thornton W. Burgess, and Dr. N.R. Pillsbury were among the visitors at the island and were intimately connected with the work. Mr. and Mrs. Richard B. Harding visited the Station and made a collection of bird parasites.

Lester E. Tate, of Ingall's Head, Sherman R. Griffin of Wood Island, and Charles Ramsdell of Campobello Island were employed at various times to assist in the carpentry work and other construction. Mr. Tate proved to be very capable and very much interested in the Station. He should most certainly have charge of additional construction and maintenance work at the island.

Mr. Ernest A. Joy of Wood Island, N.B. is now serving his second year as caretaker of the Station and winter observer. As the sole winter inhabitant of the isolated island during the winter months, his meteorological and wild life records are of considerable importance. I still feel that Mr. Joy is one of our greatest assets.

STATION EQUIPMENT

The most important addition to the Station's equipment is the dormitory building. This structure measures 42' x 24'. It is two stories high. The ceiling clearance of the first floor is eight feet. The first floor consists of a kitchen equipped with a stove, sink, and cabinets; a food store-room in which is also located the Electrolux refrigerator; two laboratory rooms with such equipment as balances, dissecting instruments, scientific literature, and filing cases. The southern half of the main floor constitutes the mess and assembly hall. A brick chimney serves the kitchen stove on the first floor and a heating stove upstairs. The second floor is not partitioned and serves as the sleeping quarters for most of the expedition. All of the wall board needed in the construction was given by President Dahlberg of the Celotex Company. The building is equipped with electric wiring and fixtures. It has been painted with an Aluminum paint which apparently withstands the climate very well. Not yet completed is a platform atop the roof for observation, meteorological, and experimental radio purposes. It will be necessary to secure a new kitchen stove and some twenty new steel cots for next year. The possibility of piping water from the spring which is located 600 feet distant is being considered.

The E. F. Hodgson Co. most kindly gave the Station one of their 10' x 20' portable houses. This fine acquisition has proven very useful as a guest house for Directors and as the summer quarters for the Field Director. In a disassembled condition, it was brought to the island aboard the Scientist from Lubec. The crated pieces were carried by hand to a point about 600 feet northeast of the dormitory. Using posts for a foundation, the entire structure was set up in the course of one day. Besides being the most attractive building on the island, it has proven weatherproof and very comfortable. Its setting in the midst of a clump of spruces overlooking both sides of the island is particularly fine.

The Station's oldest building, the warden's winter house, was repainted this year. It has been equipped with a very fine Kalamazoo stove, which was kindly donated to the expedition by President Blakeslee of the Kalamazoo company. One room of this building serves as the business office and has been recently equipped with a large filing cabinet and desk. Another use for this building is as the meteorological observatory. The observatory instruments have been installed on a platform about ten feet from the doorway.

One of the wharf houses has been reshingled and had several new windows installed. It is now a very livable building. The first floor is used for storage, and the second floor contains four cots for guests. Last year it was occupied by ten different visitors.

Our main need is for a new building to house the electric generator, a darkroom, a carpentry and general workshop, and the radio station. Such a structure should have a single floor measuring about 12' x 36'. Plans and exact specifications are now being drawn up. It is planned to build it of light summer house construction and to mount it on stone buttresses. Using inexpensive lumber from Nova Scotia, the cost of construction should not exceed 300 dollars.

The growing size of the Station and the increased power of the radio transmitter renders our 1000-watt plant completely inadequate. We must by all means secure a 2-Kilowatt generator before the 1937 season begins. Such a plant used in conjunction with our excellent installation of Exide storage batteries, which were presented by the makers, will enable us to fulfill all the power needs of both the present and the future.

The Scientist, the 42-foot cruising boat presented last winter to The Station by Alger W. Pike, is serving well. Newell E. Gillett had complete charge of the vessel. He was assisted by Orrin Pillsbury. No small credit is due to the manner in which Gillett performed the duties of his responsible post of chief navigator. The boat is equipped with two engines. One of these is a new Universal "Superfour" of about 45 h.p. which was secured through the cooperation of the manufacturers. The other motor is an auxiliary automobile engine. The Universal performed very well but the other motor will have to be replaced. The Scientist is now in winter quarters at Head Harbor, Campobello Island, Canada where it is in the care of an experienced man. The 38-foot Pseudo used by the 1935 expedition was sold to the National Audubon Society.

Our smaller craft include an 11-foot Old Town dinghy, a 14-foot flat-bottomed skiff, and a 16-foot dory. For two seasons now the Johnson Motor Company has lent the expeditions a 4.5 h.p. Johnson outboard motor. It would be advisable to secure another dory in the near future. This type of boat is safe, inexpensive, and very useful. It should always be borne in mind that no cost should be spared to render our boating equipment absolutely seaworthy. The Bay of Fundy because of its dense fogs, tidal currents, and magnetic disturbances is one of the most hazardous bodies of water in the world, and we are in the worst part of it!

The wharf at the Station is in very bad condition, and it is not long enough to accommodate our bigger boat. Three hundred dollars could easily be spent to repairing and lengthening it. The wharf

and supply depot facilities at Lubec, Maine are excellent. We have the use of the large Pike wharf, an office, and storage space. Lubec has in every sense proven to be an excellent base.

One of our most useful acquisitions is a Ford V-8 Station Wagon which represents a gift of the Ford Motor Company. This fine car has proven itself almost indispensable as a means for transporting equipment and passengers. Once again the Socony-Vacuum Oil Company generously supplied us with all of our gasoline and oil. And we are indebted to the kindness of many firms among whom the contributions of the following were notable:

Aluminum Company of America
 American Brass Company
 Bell and Howell Company
 Boston-Bostitch, Incorporated
 Carborundum Company
 Carl Zeiss, Incorporated
 Casein Company of America
 Celotex Corporation
 Coleman Lamp and Stove Company
 Dazey Churn and Mfg. Company
 E. I. Du Pont de Nemours and Company
 Electric Storage Battery Company
 Folmer Graflex Corporation
 Ford Motor Company
 General Fireproofing Company
 Hamilton Watch Company
 E. F. Hodgson Company
 Johnson Motor Company
 Kalamazoo Stove Company
 National Enameling and Stamping Company
 Sears, Roebuck and Company
 Serval, Incorporated
 Socony-Vacuum Oil Company
 Western Cartridge Company
 Western Clock Company
 Winchester Repeating Arms Company
 Sparklets Corporation
 Universal Motor Company

COMMISSARY

The new dormitory with its kitchen and storeroom has greatly facilitated the work of preparing meals. Nahum R. Pillsbury had complete charge of the buying of food and general supervision of the preparation of meals. Mrs. Chase, the warden's housekeeper, served as cook. Members of the expedition took turns as kitchen assistants. Michael Gallo was secured to do the dish washing, a task which he performed very well. It will be important to secure a regular chef for future seasons. We are often required to serve more than thirty people and there are at least twenty

boarders throughout the three-month season. Food supplies including fresh vegetables are purchased in Seal Cove at the time of our weekly mail boat visit. We are successfully supplementing our larder with seal meat and codfish. This has greatly helped to reduce food expenses.

The present cooking stove is second-hand and in very bad condition. Another stove such as the Kalamazoo stove in the warden's house would be ideal. The Electrolux kerosene-operated refrigerator which was presented by Serval, Inc. has been of the greatest help. It enables us to keep large quantities of milk, butter, and meats in storage. The importance of having refrigeration available for scientific purposes was demonstrated many times last summer. The National Enameling and Stamping Company gave the expedition a complete set of tableware besides a water cooler and many other metal products.

For the second time Burnham and Morrill supplied us with food stuffs. The California Fruit Growers Exchange presented nineteen cases of canned California orange juice, a new item for our expeditions and a very successful one. A large quantity of prepared meats was given Swift and Company. Equally generous contributions were made by the following firms:

Burnham and Morrill Company
California Fruit Growers Exchange
Corn Products Sales Company
General Food Sales Company
Hawaiian Pineapple Company
Geo. A. Hormel Company
F. M. Hoyt Company
Lever Brothers Company
Libby, McNeil and Libby
National Biscuit Company
R. J. Reynolds Tobacco Company
Standard Brands, Incorporated
Swift and Company

RESEARCH PROJECTS

Meteorology: Thanks to the cooperation of Dr. Charles F. Brooks and the Harvard-Blue Hill Meteorological Observatory, an observatory has been established at the island. Instruments secured from the Blue Hill Observatory and Mr. Henry S. Shaw were installed last August and observations begun at once. Mr. Joy is taking observations during the winter. A new set of regulations for the Kent's Island weather observations will be in effect by March 1, 1937. A copy of the regulations constitutes a "Special Bulletin" of the Station. It is on file together with a sample of the form used for daily observation data at Brunswick, Blue Hill, and the Station. Monthly weather summaries are to be published in the annual reports, and the daily records will be filed. The instru-

ments of the Kent's Island observatory include a Hygrograph, Thermograph, Maximum and Minimum Thermometers, Sling Psychrometer mounted on a permanent base, and a Rain Gauge. The daily observations include air temperature, relative humidity, dew point, maximum and minimum temperature, wind direction and velocity, visibility, sea condition, sea temperature (occasionally), rainfall, and the occurrence of any unusual meteorological phenomena.

Surveying: James Levings carried out a triangulation of Three Islands from a base line on Kent's Island this year. This triangulation used in conjunction with aerial photographs would enable us to prepare a very fine topographic map. The importance of a map of the island need hardly be pointed out. It will be of service in every investigation that we might undertake. Mr. Bradford Washburn of the Institute of Geographical Exploration at Harvard has expressed a willingness to take the photographs provided the Station secure the use of a plane.

Ornithology: Kent's Island is one of the finest marine bird colonies along the entire coast, and ornithological studies will always be an important part of the Station's research program. Latimer B. Hyde and Howard B. Miller continued their life history studies of the Black Guillemot and the Great Black-backed Gull respectively. Dr. Alfred C. Gross has announced his intention of publishing an extensive paper on the Eider Duck. Dr. Pettengill is completing his paper on the Birds of Grand Manan and adjacent islands. The life history investigations of the Herring Gull, Atlantic Puffin, Razor-billed Auk, Savannah Sparrow, and other species offers great opportunities for research in bird ecology. A complete census of the bird life of Kent's Island will be made next summer during the breeding season.

John A. Crystal succeeded in banding 8000 young Herring Gulls and about 80 birds of other species. The banding of the adult gull should be emphasized in the future as we do not have complete information on the winter migration of the breeding birds. It is highly possible that some very worthwhile work will be done on avian parasitology in the next few years at the island. Mr. Pillsbury will be in charge of such investigations. A sick Herring Gull was examined by W.A.C. Gross and Dr. I.W. Kingsbury. It was found to be infected with an internal intestinal parasite. Preliminary examination by Dr. Tyzzer of the Harvard Medical School indicates that it is a new species.

Botany: Field work by Dr. Potter and Henry A. Gleason during the past summer has greatly increased our knowledge of the island's plant life. More intensive ecological studies, additional plant collections made at an earlier part of the year, and a study of the Algae, Lichens, Fungi, and Bryophytes should be carried out in the future.

Invertebrates: Dr. Pomerat's listing of the littoral life of the island in 1935 and a brief survey of the Mollusca by Arthur H. Norton constitutes the only work done on the subject. Dr. Pomerat describes his list as being very incomplete and in much need of being supplemented. It is also desirable to have an entomological survey made in the near future.

Magnetic Research: The magnetic disturbances near the island are very great, and they have never been studied. Mr. John Cole, who is acquainted with the problem, discussed it with us at the island. He feels that they should be investigated and plotted. If such an expert as Mr. Cole could take charge of the work, some very interesting results would be forthcoming.

Tidal Observations: The Station has the use of a very fine automatic recording tide gauge belonging to Mr. Shaw. The attempt by Levings to mount this on a tripod failed. It would be possible, however, to have a small pile-driver put in a suitable support. The tidal range at the island is about 19 feet.

Machias Seal Island Sub-base: The establishment of a sub-base on this island which is located some 12 miles southwest of Kent's Island has been undertaken. The great colony of Atlantic Puffins and Arctic Terns should be studied extensively. Ralph B. Savage and Charles B. Moseley were at Machias Seal Island during 1936, and Dr. Pettengill has asserted a desire to work there during the coming season.

RADIO COMMUNICATION

The expeditions have always made extensive use of radio communication. It is now the only consistent means of contact between the island and the mainland. The radio station is licensed by the Canadian Government under the call letters of VE1IN. Last summer was the second time that a standard Collins Transmitter was used. The 1936 unit was a model 30FXC of 200 watts output. Our signals were heard all over the world. Cards sent in by short wave listeners include a dozen from New Zealand and more than 35 from England.

Most of the Station's operating hours were spent in handling the large amount of radiograms coming to and from the expedition. Daily schedules were arranged with amateur radio station W1INW in Lewiston, Maine. Every afternoon at 5:30 a schedule was arranged with Mr. Henry S. Shaw, W1FGA, and at that time weather reports and news of personal and general interest were transmitted.

We plan next year to use a frequency of 3885 Kilocycles and change the time of the transmissions to 4:30 A.S.T. This frequency is a very desirable one because being outside of the American phone band and in the Canadian band it permits transmissions nearly unhampered by high power phone stations. We will use this frequency for traffic as well as for the general report schedule.

Our activities were limited by the use of a 1-Kilowatt electric generator. To take full advantage of the Canadian legal output limit of 500 watts, we will have to secure a larger plant. A two kilowatt plant would adequately care for all our needs of lighting and radio transmitting. By floating storage batteries across the generator field and correcting the power factor of the 115 volt line with motor starting capacitors, the regulation was greatly improved and class B modulation was used with very satisfactory results.

The radio operators erected many types of antennae till two were obtained that gave satisfactory performance. The 80 meter antenna was a twisted pair fed half wave hertz and the antenna used for 40 and 20 meter operation was a single wire fed hertz cut to a half wave length on 40 meters. Next year we plan to use a directional antenna for 80 meter work consisting of a director and reflector to increase the signal strength in the direction of North Eastern United States.

Our five meter activities under the direction of Mr. Shaw have proven that we should continue the use of the small five meter transceivers. Five meters have aided the boat in locating the harbor many times when lost in the fog and the boat will probably be equipped with radio apparatus of this sort next year.

The Radio Department is very grateful for the excellent co-operation given us by the following Corporations and Companies which have given us the major contributions of radio apparatus:

AMPEREX ELECTRONIC PRODUCTS COMPANY
 ASTATIC MICROPHONE LABORATORIES
 BURGESS BATTERY COMPANY
 ALLEN D. CARDWELL CORPORATION
 COLLINS RADIO COMPANY
 FRANKLIN TRANSFORMER MFG. CO.
 HEINTZ AND KAUFMAN LTD.
 INSULINE CORPORATION OF AMERICA
 INTERNATIONAL RESISTANCE COMPANY
 RAYTHEON PRODUCTION CORPORATION
 SPRAGUE PRODUCTS COMPANY
 THORDARSON ELECTRICAL MFG. COMPANY
 TOBE DEUTSCHLIANN CORPORATION
 UNITED TRANSFORMER CORPORATION
 UNITED ELECTRONICS COMPANY

PRELIMINARY STUDY OF GEOLOGY AND GEOGRAPHY OF KENT'S ISLAND
 (by Professor Philip W. Meserve, Bowdoin College)

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Kent Island lies about six miles south east of Seal Cove, Grand Manan Island. Politically it is a part of Charlotte County in the Province of New Brunswick, Canada. Its geographical coordinates are approximately $66^{\circ} 46'$ East and $44^{\circ} 35'$ North. The nearest point to Nova Scotia lies less than twenty miles to the south east. (Reference "Canadian Chart, Atlantic Coast, Bay of Fundy, Brier Island to Cape Chignecto, 1926-1928." Or. U. S. C. + S. G. S. No. 1057)

Kent therefore lies upon the eastern side of the Gulf of Maine, near the entrance of the body of water that is called the Bay of Fundy. Indeed at Kent are encountered tides that rise from low water to a height of 19 feet at high water.

Kent lies in a north-south direction; it is about two miles long and half a mile in width at its widest point; on all sides are half-tide ledges and shoals. The island itself is a patch of rocks thinly covered by glacial till that bears evidence of being reworked by the sea water. The shore-line of the island is composed either of rocky sea-cliffs or of storm-beaches in various modified forms. The highest point on the island is probably less than 80 feet in elevation. Having once been human habitation there are abandoned hay fields as well as the spruce thickets and the flag filled swamps.

Three principal types of rock are to be found at Kent and those will be described in the order of their age:

(1) The oldest is undoubtedly a limestone. The limestone is found in two parallel outcroppings running about east and west near the middle of the island. Each outcrop is about 75 feet wide. The limestone is crystalline, highly metamorphosed, and, as might be expected, completely devoid of any fossil remains. On the eastern shore, the limestone outcrops between the high and low tide level, and as may be expected, the outcrop is beveled off to the plane of the beach. On the western shore, the limestone is to be found well above the high tide level, and here formerly, one Kent, the occupant for whom the island was named, quarried the limestone and burned it for the market. It appeared to be a "soft" rock, but no analysis has been made to date.

Less old are the intruded syenites which comprise most of the island. In a private communication to the author, Professor Edward S. C. Smith of the Department of Geology, Union College, Schenectady, N. Y., writes, "I have examined rather carefully the suspected syenite which I received from you the other day and which I am returning under separate cover. I should say from examination by lens that it was a syenite, somewhat granulated by crushing; recrystallization has, I believe, also taken place to some extent."

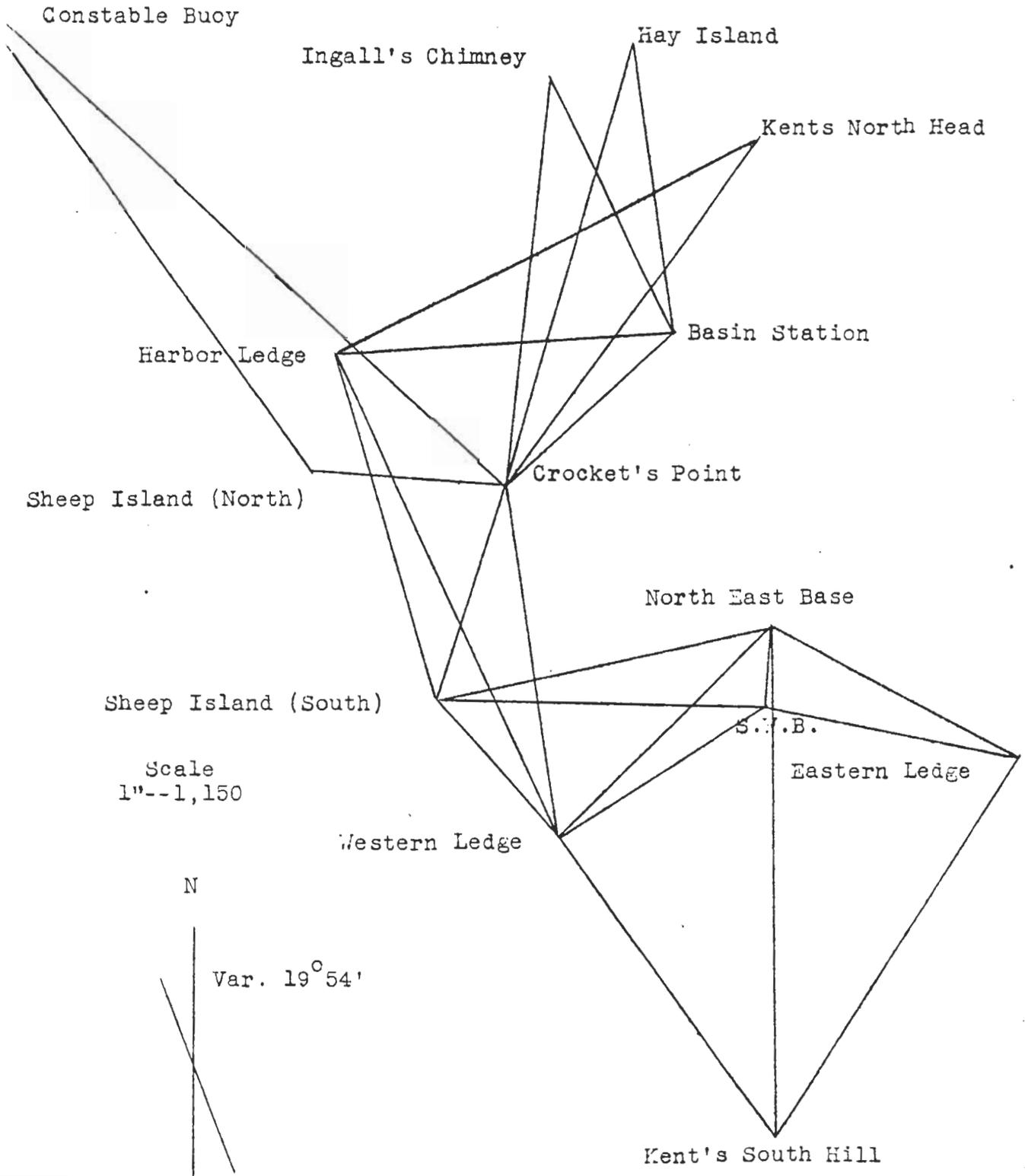
Younger still are the trap dykes that penetrate the island in every direction. They are so numerous and diversified that hours might be spent in attempting to map them. From their close proximity to the great trap outpourings on the west at Grand Manan and on the east at Nova Scotia, it is not difficult to guess their age as Triassic.

Again it ought to be mentioned that all of Kent is covered with water-worked glacial till.

It should also be pointed out that all of the older rocks of Kent, at least the limestone and the syenites have been subjected to an intense metamorphism. All the original crystals have been crushed and recrystallized and the suspected alterations have taken place. For one whose interests have lain for many years along the New England Coast, the rocks of Kent offer a surprising lack of vein quartz.

Kent, whose bones now lie buried on this island, was the first settler. He cut the spruce wood, he quarried and burned lime, he caught fish and he raised mutton. With such bulky exports, depending upon the winds and the tides, he must have found transportation difficult. I have an idea that it will be many years before man will be willing to dispute the rights of the sea-birds who find there such a royal nesting-place.

TRIANGULATION AT THREE ISLANDS
(by J. E. Levings, Institute
of Geographical Exploration)



The Triangulation control has been prepared on a 2'x 2' map on a scale of 1 inch for 500 feet. (A reduced copy of the triangulation is presented herewith.) The Northeast base is the reference origin of all coordinates. This point is near the Administration. Both ends of the base line are marked with copper markers inserted in large blocks of concrete. All other stations have either drilled and leaded holes or chiseled cross-marks.

The latitude and longitude of the Northeast base has been determined by equal altitude of stars with a prismatic astrolabe and altitude of polaris. A Ditisheim chronometer and a Hamilton Elvinor watch were used.

Latitude $44^{\circ} 35' 18.8''$ North

Longitude 4 hr. 27 min. 2.0 sec. West

Using the Northeast Base as a reference point, the coordinates of the various stations as determined in feet is as follows:

Northeast Base	Sheep Island (North)
S. 0.0 N. 0	N. 1305.85
W. 0.0 E. 0	W. 3819.46
Southwest Base	Harbor Ledge
S. 716.38	N. 2261.18
W. 21.31	W. 3626.44
Eastern Ledge	Constable Buoy
S. 1079.06	N. 5414.63
E. 2079.81	W. 6784.94
Kent's South Hill	Ingall's Chimney
S. 4251.34	N. 4589.54
E. 72.98	W. 1886.20
Western Ledge	Hay Island
S. 1752.69	N. 4886.40
W. 1767.80	W. 1255.66
Sheep Island (South)	Kent's North Head
S. 610.99	N. 4096.64
W. 2777.96	W. 172.83
Crocket's Point	Basin Station
N. 1209.61	N. 2459.08
W. 2179.57	W. 983.03

A SEARCH FOR MOLLUSKS
(by Arthur H. Norton)

Through the invitation of Mr. William A. O. Gross, director of the Bowdoin Scientific Laboratory on Kent's Island, Grand Manan, New Brunswick, I passed the week of August 23 to 27 1936, at that fine location for scientific research, engaged in making a preliminary survey of the molluscan fauna of Kent's Island, above low water mark. With this object in view, the entire shore line of the island was covered, tide pools examined as was also the tangled mass of herbaceous and shrubby vegetation covering much of the southern end of the island, the clearings, the woods and woodland paths of the northern end.

The island, about two miles in length, is well covered with peat and vegetable loam which rest on glacial till. Through the agencies of frequent dense fog, heavy dew and frequent rain, this spongy soil was every where damp, except in the clearings on the sloping higher ridges. The woods of the island are composed almost entirely of white spruce, (Picea glauca) through which are scattered a few white and yellow birches, a type of vegetation not the most attractive to terrestrial mollusca. There are no ponds on the island, and no species of aquatic mollusks were found in the shallow rills flowing from the bogs.

The region of Grand Manan, particularly the islands off its eastern side, (of which Kent's Island is one), is rich in its zoological history, a history which probably began, as Harold Herrick declared with the visits of Audubon in May 1833. During that month and year Audubon had gone to Eastport, Maine, where he chartered the staunch new schooner the "Ripley" to convey his expedition to Labrador. While at Eastport outfitting his vessel and expedition which did not sail until June 6 1833, through the cooperation of Captain Cooledge of the U. S. revenue service, Audubon was taken on one occasion on the sailing "cutter" the "Swiftsure" to White Head Island, where he was especially interested in the herring gulls which bred on that island, and on another occasion he sailed on the "cutter's tender" the "Fancy" to Grand Manan. The Fancy laid over night in Head Harbor Bay, and Audubon spent some time on the island of Grand Manan. It appears likely that his son John Woodhouse Audubon, his chief field assistant, remained longer among the islands collecting birds for his father. Audubon was much impressed by the capes, the "eddies terrific" and the counter currents which he observed among these islands.

Among the earlier documents making specific mention of Kent's island was one by the Canadian geologist, Dr. Abraham Gesner, who in 1843 in his "Report on the Geology of the Province of New Brunswick" paid attention to the limestone found on this island.

Grand Manan probably owes more to Dr. William Stimpson, a pioneer in the field of American invertebrate zoology for

bringing her rich field for scientific research to the attention of naturalists, than to any other one person.

At a meeting of the Boston Society of Natural History, held September 17 1851, Dr. Stimpson stated that he had recently spent a few weeks among the islands at the mouth of the Bay of Fundy, and gave a brief account of the marine fauna, of the deep water contiguous to the land, the coldness of the water, the prevalence of fog, and laid emphasis on the boreal character of the fauna as a consequence of these conditions.

Dr. Stimpson also stated that he found the surface temperature of the water among these islands, from fifteen to twenty degrees lower than in Massachusetts Bay at the same time.

Mr. W. C. Redfield, prominent as a pioneer in the field of American meteorology, and "discoverer of the law of storms", was then in the vicinity of Boston, and attended the meeting of the Natural History Society by invitation. In discussing the subject of the coldness of the water there, Mr. Redfield suggested what he termed the "probability of a cold polar current" entering the Bay, a suggestion which Dr. Stimpson agreed was probable. This doctrine of a cold polar current held sway with more or less tenacity for many years thereafter, and though sometimes questioned or even doubted, this "cold arctic current" has been called upon to account for the presence of many of boreal organisms found along the coast of the Gulf of Maine, even in very recent years. This doctrine seems to have been finally dispelled through the careful oceanographic investigations of Dr. Henry Bigelow, under the auspices of the U. S. Bureau of Fisheries in the last quarter century.

Dr. Stimpson returned to Grand Manan the following summer, and he stated that he "resided there for three months". During this time, with light dredges drawn by row or sail boats, he explored extensively around the island, chiefly on the eastern side among the smaller islands, though he ventured to a few outlying stations, as off Moose River, West Quoddy Head, and Eastport in Maine, and Welchpool at Campobello, New Brunswick.

As a result of his work in the region of Grand Manan, he was able in two short papers in the Proceedings of the Boston Society of Natural History, (1851-1852), and that classic, the "Synopsis of the Marine Invertebrata of Grand Manan", (1853), to record 464 species and to describe and name 110 species which were considered new to science. Excepting the foraminifera and the sponges, he touched upon nearly every invertebrate group from the Coelenterata to the Tunicata, both included.

Considering the basic importance of Stimpson's work in the region we give a list of the collecting stations mentioned in his work.

Collecting Stations of Dr. William Stimpson, 1850-1852.

Duck Islands;	Hake Bay.
Boat moorings at,	Hake ground.
East of,	Head Harbor.
Gravel off,	Long Island.
High Duck Island,	Nantucket.
Ledge at,	Point Franklin.
Low Duck Island.	Swallow's Tail.
North Point of,	Ripplings.
Shelly bottom 25 fathoms off,	Rock, 20 fathoms off Moose
Weir at,	Inlet, (Maine) toward Seal
Eastport.	Islands.
Fisher's Cove.	Ross Island.
Grand Harbor.	Welchpool, (Campobello).
	West Quoddy Head.

From that time to the present, Grand Manan, and the more accessible, though less well known region of Eastport has been the bright goal of students of the marine invertebrata.

According to an unpublished manuscript, prepared by the late Dr. Edward H. Perkins from diaries of Professor Charles E. Hamlin, the latter was at Grand Manan from August 20, to 28, 1866, collecting on the shores and with the dredge. No additions to Dr. Stimpson's list of marine species are mentioned, though Professor Hamlin seems to have been the first to record a few terrestrial mollusks which he found on the Island of Grand Manan. He also records a serpent, Storeria occipitomaculata there, not previously reported from that island.

At the time when Audubon brought to attention some of the birds found at Grand Manan, and Dr. Stimpson emphasized the boreal character of its rich fauna, there was no knowledge among ornithologists of the abundant bird life of the far flung islands strewn along the coast of Maine. Grand Manan therefore became the mecca of field ornithologists, including Brewer, 1850, Bryant, 1856, Harold Herrick, 1871-1872, Batty, 1873, Morse and Pearsall, 1879. Another attraction to the region probably is to be found in the work of collecting carried on by Mr. George A. Boardman at Calais, though his collectors extended to the islands of the Bay of Fundy. More potent as an attraction no doubt was that resident of Grand Manan, Simeon Cheney, mentioned by the illustrious Professor Baird as, "a natural naturalist". Cheney seems to have been the guide and helper of all zoologists who turned their steps thither for many years.

When the U. S. Fish Commission was established in 1871, Professor Baird, Secretary of the U. S. National Museum, was chosen Commissioner of Fish and Fisheries. With his characteristic breadth of vision, he saw that a comprehensive study of the American fisheries involved nothing less than a biological survey of the fishing grounds.

He proceeded at once to establish a number of laboratories for such a survey. In 1872 he established a base at Eastport, Maine, "for the purpose of investigating the fish and fisheries of the Bay of Fundy and adjacent waters". He invited Professor Addison E. Verrill, who was familiar with the work through his investigations during the greater part of the six previous summers with the dredge in the vicinity of Eastport to "organize parties and construct apparatus for a zoological investigation of the region". Professor Verrill says that as many as twenty-five volunteers, among them a number of recognized scientists, participated in the field work, though his party usually numbered eight or ten persons. Through the cooperation of the secretary of the U. S. treasury the steam revenue cutter, "Mosswood" was allowed to take his parties to places distant from Eastport and to aid in the dredging and other investigations.

The light dredges such as were used by Dr. Stimpson, Prof. Hamlin and others, drawn by oars or sails, were now superseded by larger and heavier apparatus, drawn by steam power. Various dredgings were made in the deeper waters in the vicinity of Grand Manan, and many new types, or new species were added to the long list of those previously made known by Stimpson, from that section of the bay.

Professor Verrill also states that Professor F. E. Webster and Mr. Charles Pond of Union College, had spent a short time the same summer dredging at Grand Manan "at the same stations where the lamented Dr. Stimpson had dredged in 1850". The value of Webster and Pond's collection, containing many type-specimens was greatly enhanced through the destruction of Stimpson's collection in the great Chicago fire of 1871.

Turning now for a review of our brief reconnaissance of the shores of Kent's Island in August 1936, it may be pointed out that Dr. Stimpson in 1851 placed emphasis upon the variety and richness of the littoral fauna of these islands at that time, a condition which our limited examination would seem to find changed. These shores with tide pools, weed covered rocks and sand flats were surprisingly barren of animal life.

The abundance of the omnivorous herring gull which has existed throughout the year for the last two decades, is believed to be a sufficient cause for this changed condition.

A search of the usual hiding places on the upland, of the larger snails, Succinea, Helix, Polygyra and Pyramidula alternata failed to yield a single specimen of these expected species. The few small pulmonates found, Vitrea binneyana, Zonitoides arborca, Zonitoides exigua and Pyramidula cronkhetei anthonyi were not numerous in individuals, while the rapid disintegration of dead shells indicated a strongly acid condition of the damp soil, unfavorable to these lime-secreting animals. Another indication of this unfavorable factor may be seen in the greater

numbers of the non-shell bearing slug, (Agriolimax laevis campestris ?), which was not rare on the island.

It is to be expected that continued search will add a few more species to this short list. In fact another, a species of the Pupiliidae collected by Mr. H. A. Gleason Jr. is an addition, while still "another land shell" collected by him after my departure may be an addition.

It is probable that an earlier season, May or June, when the vegetation is less rank and matted than it is in August, would be a more favorable time to look for these animals.

PLANTS FOUND GROWING ON KENT'S ISLAND 1935-36
(by David Potter, Ph. D., Clark University)

- Thelypteris palustris Schott. Marsh Fern. No. 7255. Swampy area toward the west side.
- Thelypteris cristata (L.) Nieuwl. Crested Shield Fern. No. 7116. Swampy area toward the west side.
- Thelypteris spinulosa (O. F. Muller) Nieuwl., var. americana (Fisch.) Weatherby. Spinulose Shield Fern. No. 7272 and No. 5029. Swampy area toward the west side.
- Tennstaedtia punctilobula (Michx.) Moore. Hay-scented Fern. No. 7130. Margin of woods at north end.
- Osmunda cinnamomea L. Cinnamon Fern. No. 5016. Swampy area toward the west side
- Equisetum arvense L. Common Horsetail. No. 5015. Swampy area toward the west side.
- Equisetum sylvaticum L., var. pauciramosum Milde. Wood Horsetail. No. 7371. Wet land toward north end. Rh. 20: 129-131 for citation.
- Picea canadensis (Mill.) BSP. White Spruce. No. 7109. Common on both Kent and Hay islands.
- Abies balsamea (L.) Mill. Fir balsam. No. 7112. Swampy area toward the west side.
- Juniperus communis L., var. depressa Pursh. Common Juniper. No. 7115. Open woods on west side.
- Typha latifolia L. Broad-leaved Cat-tail. No. 7257. Margin of pond on Hay Island.
- Sparganium diversifolium Gracbner. Bur-reed. No. 5106. Swampy area toward west side.
- Zostera marina L. Salt water Eel Grass. No. 5094. Growing in the Basin, and No. 7078 in tidal pool on west side.
- Triglochin palustris L. Marsh Arrow-grass. Nos. 5082 and 5092. Shore line on west side and region about the Basin.
- Triglochin maritima L. Seaside Arrow-grass. Nos. 7087 and 7250. Shoreline at north end and region about the Basin.
- Anthoxanthum Puelii Lecoq. and Lamotte. Sweet Vernal Grass. No. 7223. Swampy area toward the west side.
- Muhlenbergia sylvatica Torr. Wood Muhlenbergia. No. 7225. Shore line at north end.
- Phleum pratense L. Timothy or Herd's Grass. No. 7227. Shore line at north end.
- Agrostis alba L. Red Top or White Bent Grass. Nos. 5026, 5027, 5100, and 7349. Common throughout the island.
- Agrostis alba L., var. vulgaris (With.) Thurb. Red Top or Herd's Grass of Pa. No. 7350. Swampy land toward west side.
- Agrostis alba L., var. maritima (Lam.) G.F.W. May. A variety of White Bent Grass. Nos. 7345 and 7346. Growing at margin of woods near shore at both north and south ends.
- Agrostis hyemalis (Walt.) B.S.P. Hair Grass. No. 7351. Margin of woods toward the south end.

- Agrostis perennans (Walt.) Tuckerm. Thin Grass. No. 7348.
Headlands at the south end.
- Agrostis borealis Hartm. Brown Bent Grass. No. 7347. Margin
of woods at north end.
- Calamagrostis canadensis (Michx.) Nutt. Blue-joint Grass. Nos.
5021, 7231 and 7232. Common at margin of woods.
- Ammophila breviligulata Fernald. Beach Grass. No. 7081. At
north end just above high water mark.
- Deschampsia flexuosa (L.) Trin. Common Hair Grass. Nos. 7233
and 7234. Shore line at north end and along west side.
- Danthonia spicata (L.) Beauv. Wild Oat Grass. No. 7224. Swampy
area toward the west side.
- Spartina alterniflora Loisel. Salt Marsh Grass. No. 7088. Mar-
gin of the Basin. Rh. 18: 178 for citation.
- Poa annua L. Low Spear Grass. Nos. 5099, 7229 and 7230. Common
in open areas along the shore.
- Poa compressa L. Canada Blue Grass. No. 7370. Margin of woods
at north end.
- Poa laxa Haenke. Mountain Spear Grass. No. 7352. Margin of
woods toward the south end.
- Poa triflora Gilib. Fowl Meadow Grass. No. 7369. Along the shore
toward the south end.
- Poa pratensis L. Kentucky Blue Grass. Nos. 5097 and 5098. Mar-
gin of woods toward the south end and along margin of swampy
area on the west side.
- Puccinellia punila (Vasey) Hitchc. Alkali Grass. Nos. 5101 and
7355. Along the shore in the region of the Basin and at the
north end.
- Festuca rubra L. Red Fescue Grass. Nos. 5023 and 7353. Common
at the south end and along margin of woods at the north end.
- Agropyron repens (L.) Beauv. Quitch Grass. No. 7354. Along
shore at north end.
- Hordeum jubatum L. Squirrel-tail Grass. No. 7226. Along shore
in the region of the Basin.
- Elymus virginicus L. Virginia Wild Rye. Nos. 7089 and 7303.
Along the shore at the north end just above high water.
- Eleocharis ovata (Roth.) R. & S. Ovoid Spike Rush. No. 5069.
Swampy land toward the west side.
- Eleocharis palustris (L.) R. & S. Creeping Spike Rush. No.
5070. Swampy land toward the west side and No. 7134 at mar-
gin of pond on Hay Island.
- Eleocharis tenuis (Willd.) Schultes. Slender Spike Rush. No.
5071. Swampy area toward the west side.
- Scirpus atrovirens Muhl. Dark green Bulrush. No. 5072. Swampy
area toward the west side.
- Scirpus cyperinus (L.) Kunth., var. *palius* Fernald. Wool Grass.
Nos. 7341 and 7344. Swampy land along the west side and
toward the south end.
- Eriophorum angustifolium Roth. Cotton Grass. Nos. 5078 and
7343. Wet areas on both the west side and north end.
- Eriophorum virginicum L. Virginia Cotton Grass. No. 7342.
Swampy land toward the west side.
- Carex scoparia Schkuhr. Pointed Broom Sedge. No. 5061. Swampy
land toward the west side.

- Carex tribuloides Wahlenb. Blunt Broom Sedge. No. 7337. Swampy land toward the west side.
- Carex tribuloides Wahlenb., var. *reducta* Bailey. A variety of the Blunt Broom Sedge. No. 7338. Margin of woods along the north end.
- Carex stellulata Good. No. 5055. Swampy land toward the west side.
- Carex stellulata Good., var. *ornantha* Fernald. Nos. 5054 and 5056. Swampy land toward the south side and in wooded area near the south end.
- Carex canescens L., var. *sublobiacea* Lacostad. Silvery Sedge. No. 7335. Margin of woods at the north end.
- Carex canescens L., var. *disjuncta* Fernald. Silvery Sedge. Nos. 5057 and 7334. Swampy area toward the west side and along the shore at the north end.
- Carex brunneocens Poir. Brownish Sedge. No. 7336. Margin of woods at the north end.
- Carex vulpinoidea Michx. Fox Sedge. No. 7339. Swampy land toward the west side.
- Carex trisperma Dewey. Three-fruited Sedge. Nos. 5058 and 5059. Wooded area from near the Basin to the west side.
- Carex setacea Dewey. Bristly-spiked Sedge. No. 5060. Swampy area toward the west side.
- Carex maritima O. F. Mueller. Seaside Sedge. Nos. 5065 and 7340. Swampy area toward the west side.
- Carex leptalca Wahlenb. Bristle-stalked Sedge. No. 5062. Swampy land toward the west side.
- Carex grisea Wahlenb. Gray Sedge. No. 5064. Swampy land toward the west side.
- Carex Oederi Retz., var. *pumila* (Cosson and Germain) Fernald. Yellow Sedge. No. 5063. Swampy land toward the west side.
- Acorus Calamus L. Sweet Flag. Nos. 5042 and 5066. From the Basin through swampy land to the west side.
- Juncus bufonius L., var. *halophilus* Buchanan & Fern. Toad Rush. Nos. 5076, 5077, 7079 and 7253. Shore line all around the island.
- Juncus tenuis Willd. Slender or Yard Rush. No. 7356. Swampy land toward the west side.
- Juncus filiformis L. Thread Rush. Nos. 5073 and 7359. Swampy land from the Basin to the west side.
- Juncus effusus L. Soft or Bog Rush. Nos. 5074 and 7358. Swampy land from the Basin to the west side.
- Juncus brevicaudatus (Engelm.) Fernald. Canada Rush. No. 7357. Along the shore at the north end.
- Juncus articulatus L. Jointed Rush. No. 5075. Swampy land toward the west side.
- Smilacina trifolia (L.) Desf. Three-leaved Solomon's Seal. Nos. 5017 and 7111. Swampy land toward the west side.
- Smilacina stellata (L.) Desf. Star-flowered Solomon's Seal. No. 7122. Swampy land near the south end.
- Maianthemum canadense Desf. Two-leaved Solomon's Seal. No. 7262. Woods toward the south end.
- Streptopus amplexifolius (L.) DC. Clasping-leaved Twisted-Stalk. No. 7260. Woods at the north end.

- Iris versicolor L. Larger Blue Flag. Nos. 5001, 5014, 5087 and 7254. Common in wet spots.
- Sisyrinchium angustifolium Mill. Pointed Blue-eyed Grass. No. 5044. Swampy land toward the west side.
- Habenaria obtusata (Pursh) Richards. Small Northern Bog Orchis. Nos. 5036 and 7142. Wooded areas at west and north ends.
- Spiranthes Romanzoffiana Cham. Hooded Ladies' Tresses. Nos. 7280 and 7281. Swampy areas in the region of the Basin.
- Epipactis pubescens (Willd.) A. A. Eaton. Rattlesnake Plantain. No. 7084. Spruce woods at north end.
- Listera cordata (L.) R. Br. Heart-leaved Tway blade. No. Wooded area toward west side.
- Myrica Gale L. Sweet Gale. No. 7239. Along the shore at the north end.
- Betula papyrifera Marsh, var. cordifolia (Regel.) Fernald. Variety of the Paper Birch, No. 7292. Woods at the north end.
- Alnus crispa (Ait.) Pursh, var. mollis Fernald. Green or Mountain Alder. Nos. 5085 and 7274. Margin of moist areas, west and north ends.
- Alnus incana (L.) Moench. Speckled or Hoary Alder. No. 7269. Swamp just south of the Basin.
- Urtica gracilis Ait. Slender Nettle. Nos. 5052 and 7131. Margin of swamp on the west side and margin of woods at the north end.
- Rumex occidentalis Wats. Western Dock. No. 7141. Margin of swamp on the west side.
- Rumex crispus L. Yellow Dock. No. 7332. Shore line at north end.
- Rumex mexicanus Meisn. Dock. No. 7331. Along shore at the north end.
- Rumex verticillatus L. Swamp Dock. No. 7330. Along the shore at the north end.
- Rumex Acetosella L. Sheep Sorrel. Nos. 5005, 5045, 7139, and 7243. Common about the island.
- Polygonum Fowleri Robinson. Knotweed. No. 7140. Common along the shores of the island.
- Polygonum exsertum Small. Long-fruited Knotweed. Nos. 7085 and 7332. Along the shore of the north end.
- Polygonum prolificum (Small) Robinson. Knotweed. No. 5104. Rich soil at the south end.
- Polygonum amphibium L. Water Persicaria. No. 7135. Margin of fresh water pond on Hay Island.
- Polygonum Hydropiper L. Common Smartweed or Water Pepper. No. 7136. Margin of pond on Hay Island.
- Polygonum hydropiperoides Michx. Mild Water Pepper. No. 7118. Along the shore at the north end.
- Atriplex patula L. Spreading Orache. Nos. 7072 and 7323. Common along the shore of the island.
- Atriplex patula L., var. littoralis (L.) Gray. Spreading Orache. No. 7080. Along the shore at the north end.
- Atriplex glabriuscula Edmonston. No. 7073. Along the shore at the north end.
- Salicornia europea L. Glasswort. No. 7071. Along the margin of the Basin.
- Suaeda americana (Pers.) Fern. Tall Sea-Blite. No. 7075. Common along the shores of the island.

- Suaeda linearis (Ell.) Moq. Sea-Blite. No. 7074. Along the shore at the north end.
- Spergularia rubra (L.) J. & C. Presl. Purple Sandwort. Nos. 5011 and 7273. Headlands at the south end.
- Spergularia marina (L.) Griseb. Salt-marsh Sand Spurrey. Nos. 7077 and 7247. Along the shore in the region of the Basin and at the south end.
- Spergularia canadensis (Pers.) Don. Northern Sand Spurrey. Nos. 7076 and 7248. Shore line from the Basin to the north end.
- Sagina decumbens (Ell.) T. & G. Pearlwort. No. 7362. Along the shore at the south end.
- Sagina procumbens L. Procumbent Pearlwort. Nos. 5105, 7298, and 7299. Common along the shores of the island.
- Arenaria lateriflora L. Blunt-leaved Mochringia or Sandwort. No. 7249. Along the shore at the north end.
- Stellaria borealis Bigel. Northern Stitchwort. Nos. 5108 and 7322. Along the shore about the Basin and at the north end.
- Stellaria uliginosa Murr. Marsh. Chickweed. No. 7321. Along the shore at the north end.
- Stellaria longifolia Muhl. Long-leaved Stitchwort. No. 7325. Field above the Basin.
- Stellaria media (L.) Cyrill. Common Chickweed. Nos. 5009, 5079, 7099, 7293, and 7324. Common about the island.
- Cerastium vulgatum L. Mouse-eared Chickweed. Nos. 5010, 5080 and 7100. Swampy area on the west side and on the headlands at the south end.
- Ranunculus cymbalaria Pursh. Sea-side Crowfoot. No. 5086. Sea beach at the Basin.
- Ranunculus acris L. Tall Crowfoot or Buttercup. No. 5018. Swampy area toward the west side.
- Capsella Bursa-pastoris (L.) Medic. Shepherd's Purse. Nos. 5040 and 7124. Margin of swamp on the west side and on the headlands at the south end.
- Cakile edentula (Bigel.) Hook. American Sea Rocket. No. 5053. Common along the shores of the island.
- Roripa palustris (L.) Moench. Marsh Cress. No. 7287. Margin of pond, Hay Island.
- Drosera rotundifolia L. Round-leaved Sundew. Nos. 5043, 7086 and 7244. Swampy area toward the west side and in moist woods at the north end.
- Sedum roseum (L.) Scop. Roseroot. Nos. 7301 and 7302. Among the rocks at the south end and along rocky shore on Hay Island.
- Ribes cynosbati L. Prickly Gooseberry. No. 7333. Woods toward the south end.
- Ribes glandulosum L'Her. Skunk Currant. No. 7291. Woods at north end of Hay Island.
- Spiraea latifolia Borkh. Meadow Sweet. No. 7114. Margin of swamp toward the west side.
- Pyrus sitchensis (Roem.) Piper. Western Mountain Ash. No. 7288. Woods at the north end.
- Fragaria virginiana Duchesne. Strawberry. No. 7103. Margin of woods at the north end.
- Potentilla Anserina L. Silver Weed. Nos. 5002, 5088 and 7240. Common along the shores of the island.

- Potentilla norvegica L. Rough Cinquefoil. Nos. 5004 and 7098.
Rich soil, headlands at the south end.
- Rubus idaeus L., var. canadensis Richardson. Raspberry. Nos. 5035 and 7261. Wooded areas on the island.
- Lathyrus maritimus (L.) Bigel. Beach Pea. Nos. 7289 and 7290.
Along the shore at both the north and south ends.
- Trifolium repens L. White Clover. Nos. 5008 and 7102. Rich soil, headlands at the south end.
- Oxalis montana L. Common Wood Sorrel. No. 5038. Wooded area toward the south end.
- Callitriche palustris L. Water Fennel. No. 7275. Pond on Hay Island.
- Empetrum nigrum L. Black Crowberry. Nos. 5039 and 7235. Margin of swamp toward the west side and margin of woods at the north end.
- Impatiens biflora Walt. Spotted Touch-me-not. Nos. 5107 and 7123. Rich, moist soil toward the south end.
- Hypericum virginicum L. Marsh. St. John's-Wort. Nos. 5081, 5091 and 7128. From swamp southwest of the Basin to the north end.
- Viola cucullata Ait. Meadow or Hooded Blue Violet. Nos. 7283 and 7327. Swampy land toward the west side and in moist woods at north end.
- Viola pallens (Banks) Brainerd. Sweet White Violet. Nos. 7268 and 7361. Moist woods at the north end and in wet regions toward the south end.
- Epilobium palustre L. Marsh Willow-herb. Nos. 5049, 7127, 7259, and 6363. Swampy areas toward the west and south ends.
- Epilobium Hornemanni Reichenb. Hornemann's Willow-herb. Nos. 5103 and 7138. Swampy areas toward the west and south ends.
- Epilobium angustifolium L. Great or Spiked Willow-herb. No. 7101. Margin of woods toward south end.
- Circaea alpina L. Smaller Enchanter's Nightshade. Nos. 5030 and 7104. Wooded areas toward the north end.
- Hippuris vulgaris L. Mare's-tail. No. 7256. Margin of pond, Hay Island.
- Aralia hispida Vent. Bristly Sarsaparilla. No. 7113. Swampy land toward the west side.
- Ligusticum scoticum L. Scotch Lovage. Nos. 5048 and 7265. Margin of swamp toward the west side and along the shore at the north end.
- Angelica atropurpurea L. Purple-stemmed angelica. No. 7294. Margin of woods at the north end.
- Cornus canadensis L. Dwarf Cornel or Bunchberry. No. 5034. Wooded area toward the south end.
- Moneses uniflora (L.) Gray. One flowered Pyrola. No. 5028. Wooded area toward the south end.
- Monotropa uniflora L. Indian Pipe. No. 7237. Woods at the north end.
- Ledum groenlandicum Oeder. Labrador Tea. Nos. 5020 and 7110. Swampy land toward the west side.
- Rhododendron canadense (L.) BSP. Rhodora. No. 7120. Swamp toward the west side.
- Kalmia angustifolia L. Sheep Laurel. Nos. 5019 and 7241. Swampy land toward west and south ends.

- Chamaedaphne calyculata (L.) Moench. Leather-leaf. Nos. 5050 and 7121. Swampy land toward the west side.
- Chiogenes hispidula (L.) T. & G. Moxie Plum. No. 7236. Wooded areas at the north end.
- Vaccinium pennsylvanicum Lam. Low Sweet Blueberry. Nos. 7042 and 7278. Woods toward the south and north ends.
- Vaccinium vitis-idaea L. Cowberry or Foxberry. No. 7300. Margin of woods toward the north end.
- Vaccinium Oxycoccus L. Small Cranberry. No. 5047. Swampy land toward the west side.
- Lysimachia terrestris (L.) BSP. Bulb-bearing Loosestrife. No. 7238. Along the shore from the Basin to the north end.
- Trientalis americana (Pers.) Pursh. Star Flower. Nos. 5031 and 7263. Wooded area toward the south end.
- Glaux maritima L. Sea Milkwort. Nos. 7082 and 7137. Seashore in the region of the Basin.
- Mertensia maritima (L.) S. F. Gray. Sea Lungwort. No. 5041. Common along the shores of the island.
- Scutellaria epilobiata Hamilton. Marsh Skullcap. No. 7125. Common along the shores of the island.
- Lycopus uniflorus Michx. Bugle Weed. No. 7107. Open woods toward the north end.
- Lycopus virginicus L. Bugle Weed. No. 7326. Swale toward the south end.
- Euphrasia americana Wettstein. Hairy Eyebright. Nos. 5084, 7277 and 7279. Common.
- Euphrasia purpurea Reeks, var. Randii (Robinson) Fernald and Wiegand. Nos. 7284, 7285 and 7286. From the region of the Basin to the north end.
- Rhinanthus Cristi-galli L. Rattle-box. No. 5046. Common in open places.
- Plantago major L. Common Plantain. Nos. 7108 and 7360. Along the shore at the north end.
- Plantago Rugelii Donc. Rugel's Plantain. No. 5012. Rich soil at the south end.
- Plantago juncooides Lam., var. glauca (Hornem.) Fernald. Sea-side Plantain. Nos. 5013, 5095 and 7270. Common along the shores of the island.
- Plantago juncooides Lam., var. decipiens (Barneoud) Fernald. Sea-side Plantain. Nos. 5090 and 7271. Common along the shores of the island.
- Galium trifidum L. Small Bedstraw. Nos. 5083, 5093, 7266 and 7276. Common.
- Solidago sempervirens L. Sea-side Golden-rod. Nos. 5067 and 7090. Along the shore at both the north and south ends.
- Solidago rugosa Mill. Tall Hairy Golden-rod. Nos. 7093 and 7096. Margin of woods toward the north and south ends.
- Solidago graminifolia (L.) Salisb. Fragrant Golden-rod. No. 7296. Open woods toward the north end.
- Aster longifolius Lam. Long-leaved Aster. Nos. 5046, 7091, 7292, 7305 and 7366. Common.
- Aster umbellatus Mill. Tall Flat-topped White Aster. Nos. 7364 and 7365. Margin of woods along the west side and at the north end.
- Aster acuminatus Michx. Mountain Aster. Nos. 5068 and 7095. Common in open woods.

- Aster nemoralis Ait. Bog Aster. Nos. 7092 and 7367. Margin of woods toward the north end.
- Anaphalis margaritacea (L.) B. & H. Pearly Everlasting. No. 7132. Margin of woods toward the north end.
- Gnaphalium uliginosum L. Marsh Cudweed. No. 7143. Shore at south end.
- Ambrosia artemisiifolia L. Roman Wormwood. No. 7148. Rich soil at south end.
- Bidens discoidea (T. & G.) Britton. Small Beggar-ticks. Nos. 7328 and 7329. Margin of woods toward both south and north ends.
- Bidens cernua L. Stick-tight or Nodding Bur-Marigold. No. 7264. Margin of pond, Hay Island.
- Achillea Millefolium L. Yarrow. Nos. 5003, 7129 and 7147. Common.
- Matricaria suaveolens (Pursh.) Buchanan. Pineapple-weed. Nos. 5007 and 7097. Rich soil at the south end.
- Senecio sylvaticus L. Wood Groundsel. No. 7083. Common along the shores.
- Cirsium lanceolatum (L.) Hill. Bull Thistle. Nos. 7094 and 7282. Open fields at north and south ends.
- Cirsium arvense (L.) Scop. Canada Thistle. No. 7133. Field toward the north end.
- Leontodon autumnalis L., var. pratensis (Link.) Koch. Fall Pandelion. Nos. 7144 and 7145. Field toward the south end and along the shore at the north end.
- Taraxacum officinale Weber. Common Pandelion. No. 7368. Along the shore at the north end.
- Hieracium floribundum Wimm. & Grab. Hawkweed. No. 7117. Field toward the south end.
- Hieracium pratense Tausch. King Devil. No. 7295. Open field toward the south end.

(Editor's Note: Numbers refer to Plant numbers in Dr. Potter's collection at Clark University.)

A BOTANICAL REPORT ON KENT'S ISLAND
(by H. A. Gleason, Jr., Cornell Univ.)

The whole of Kent's Island has been cut over at one time or another. Added to this has been the disturbance to the vegetation caused by the gulls, cultivation and grazing. As a result there is very little of the island which is anywhere near in its original condition. At the southern end the gull colony has very completely destroyed the original vegetation, and is effectively preventing the growth of any other than species which can grow on broken and disturbed land. In the central part of the island the land has been comparatively recently cultivated, and today is open fields supporting mostly grasses and introduced weeds as Leontodon autumnale, and Rumex acetosella. The northern and western parts are wooded, but except in the wetter areas have been grazed by sheep, so that the native ground cover has been totally destroyed in places, and very badly disturbed elsewhere.

The most abundant native species is Oxalis acetosella which is abundant throughout the woods. Aster acuminatus is also very abundant, but decreases sharply in the more shaded parts. In the western part of the island is a small Sphagnum bog. Here Kalmia angustifolium, Ledum groenlandicum, Vaccinium angustifolium, Picea mariana, Oxycoccus quadripetalus, Drosera rotundifolia, and other typical bog plants are found. On the more exposed rocky parts of the island Empetrum nigrum and Vaccinium Vitis-Idaea are found. Above high tide on the beaches Lathyrus maritimus, Mertensia maritima, Cakile edentula, and Senecio vulgaris occur. Below this there is a zone of halophytic species including Atriplex hastata, Salicornia europaea, Plantago maritima, etc. This zone extends down to and often overlaps the upper edge of the zone of Fucus and other kelps.

There is a small area of fir woods along the western side of the northern part of the island which is probably nearer the original condition of the island than any other part. Abies balsamea and Picea mariana are the most common species of trees. The Abies seems to be replacing the Picea, as most of the older trees are Picea, whereas most of the younger trees, and almost all of the seedlings are Abies. First year seedlings of Picea are found, but second and third year seedlings are very scarce. Betula and Sorbus americana are also present as scattered small trees. There is only a sparse phanerogamic ground cover. Lysiella obtusata, Ophrys cordata, Chiogenes hispidula Monotropa uniflora and Epipactis sp. are the commonest species in the wetter parts. In the less boggy parts Oxalis acetosella, Maianthemum canadensis, Moneses uniflora, and Trientalis americana are more frequent. The most important elements in the ground cover are the large mosses. The most common are Dicranum scoparium, Hylocomnium splendens, Pleurozium schreberi, Bazzania trilobata, Mnium hornum, and Tetraphis pellucida. The latter is found almost solely on decaying wood.

Since the mosses play such an important part, and the usual one meter quadrats can not show very much about them, one decimeter quadrats were used. Frequency indices based on the count of one hundred such quadrats in the wetter part of the area are as follows:

Hylocomnium splendens	76	Lysiella clavellata	8
Dicranum scoparium	65	Bazzania trilobata	8
Pleurozia schreberi	56	Ophrys cordata	6
Abies balsamea	44	Chiogenes hispidula	6
Peltigera canina	18	Mnium hornum	5
Sphagnum sp.	14	Tetraphis pellucida	4
Dicranum sp.	12	Picea mariana	3
Sphagnum girgensohnii	12	Oxalis acetosella	3

The first three species of mosses constitute well over three-quarters of the ground cover.

On the edge of the area where the ground is slightly higher the following counts were made:

Dicranum scoparium	52	Mnium hornum	19
Abies balsamea	46	Moneses uniflore	15
Oxalis acetosella	44	Trientalis americana	12
Hylocomnium splendens	36	Dicranum sp.	8
Maianthemum canadensis	28	Sorbus americana	6
Pleurozia schreberi	20	Heterophyllum hallanianum	6
Tetraphis pellucida	20	Picea mariana	4

The very high frequency indices of the phanerogramic species is noticeable. In meter quadrants several of them would be very near 100. There are also a great many more species present. (27 as against 19). In all of these counts the small species of Bryophytes which constitute a second layer beneath the layer of mosses were disregarded. Very probably a number of these smaller species would have run very high if it had been possible to count them.

Hay Island is for the most part wooded. The woods have not been as heavily grazed as they have on Kent's. There is a very great diversity in the woods on the island. Studies were made on two rather different areas. The first of these was a rather wet Abies woods which had been cut considerably, and had quite a large growth of five or six year Abies. The large amount of young growth of this age is probably due to a heavy cutting about six or seven years ago. The number of seedlings is however very small, due probably to the denser shade caused by the heavy growth of young trees, and prevalence of Sphagna. Counts were made both in meter and decimeter quadrants.

Meter quadrats

Abies balsamea	100	Carex sp.	28
Oxalis acetosella	91	Picea mariana	19
Lysiella clavellata	52	Moneses uniflore	6
Trientalis americana	49	Sorbus americana	4
Unidentified species	47	Dryopteris sp.	4
Ophrys cordata	45		

Decimeter quadrats

Dicranum scoparium	55	Abies balsamea	34
Hylocomnium splendens	54	Mnium hornum	12
Sphagnum sp.	53	Unidentified species	7
Oxalis acetosella	46	Carex sp.	6
Sphagnum girgensohnii	39	Trientalis americana	5

The second area was a dryer area in which the ground was almost devoid of cover in the more shaded parts. A very high percentage of quadrats contained absolutely no vegetation. The area had, however, several more open spots in which the vegetation was very dense.

Meter quadrats

Abies balsamea	92	Sorbus americana	8
Oxalis acetosella	90	Picea mariana	8
Trientalis americana	79	Streptopus amplexifolius	8
Circaea alpina	71	Ribes sp.	8
Aster acuminatus	43	Rubus sp.	7
Dryopteris sp.	39	Maianthemum canadensis	4
Lysiella clavellata	31		
Solidago macrophylla	26		

Further botanical work at Kent's Island ought to include a more extensive and detailed ecological survey, taking account of the smaller species of Bryophytes if possible, and involving comparisons with similar areas on the Island of Grand Manan, where larger homogenous areas may be studied. Besides this a more thorough collection of plants ought to be made, with a special effort to collect early in the season. The marine and freshwater algae, lichens, fungi, and bryophytes ought to be included.

LIFE CYCLE OF THE BLACK GUILLEMOT (*Cepphus grylle grylle*)
(by Latimer P. Hyde)

The Black Guillemot is a common resident of the Grand Manan Archipelago. The colony on Kent's Island numbered about 70 pairs. Two neighboring islands, Sheep and Little Green, had colonies of 20 and 60 pairs respectively. The majority of the nests are located among the jagged rocks and ledges between the line of vegetation and a line approximately four feet above the high tide mark. In 1935 there were 40 nests and in 1936 45 nests were found on Kent's Island. Thirty-nine of the nests occupied during the 1935 season were again in use in 1936. The nests are simple structures being merely collections of small pebbles which serve for drainage during the frequent wet spells. Three of the 45 nests found in 1936 also contained bones of fish and gulls.

The Guillemot in summer plumage first appears around the breeding grounds about March 12. They remain on the open water until about April 18 after which they may be seen on the rocks of the breeding colony. Mating was first noted by Ernest Joy on May 21 and at that time was taking place on the water. The mating act takes place both on the water and on the rocks of the breeding area. The male is the aggressor but the female leads him a long chase. She swims off with him in close pursuit. She dives and he follows, both using their wings for propulsion under water. On the land the female occasionally succumbs to the male's ardor by allowing him to climb upon her back in an awkward fashion. All their activity is accompanied by constant squeaking, their only vocal accomplishment. The nuptial performance continued well into the month of July.

The first egg found by Ernest Joy, during the season of 1936 was June 4. One egg was laid as late as July 2nd. A pair of birds raise a single brood during the year. In the course of two summers 92 nests were observed. Of this number 81 contained 2 eggs; 8 contained 1 egg; and 3 nests contained 3 eggs. The ground color of the egg is white frequently with a greenish or bluish tint. Small spots and blotches are generously distributed over the entire egg but are concentrated about the larger end. The larger spots average about 12 mm in diameter and are umber, fuscous, rufous-brown, or pale lavender in color. One hundred sixty-two eggs were weighed and measured. The following measurements represent the extremes. The extreme measurement in each case is enclosed in parentheses.

Long Diameter	Short Diameter	Weight (grams)
(66.5)	37.5	---
55.5	(49.5)	44.3
(51.5)	38.0	35.5
58.8	(35.0)	47.4
65.0	41.0	(57.2)
57.0	38.5	(35.0)

The average dimensions of 57 eggs were long diameter 58.6 mm. and short diameter 39.7 mm.

The time interval between the laying of the two eggs varied from 2 to 5 days. The first chick usually hatches two days before the second although it is not unusual for both eggs to hatch on the same day. Rarely the interval may be as much as 4 days apart. This variation is due to the difference in individuals as to the time of beginning incubation with reference to the laying of the two eggs.

Both birds incubate the eggs. This was definitely determined by banding birds captured on the nest. Incubation continues over a period of about 27 days. In one nest the first egg was laid on or before June 18. This egg hatched July 24 a period of at least 26 days. The second egg in this nest hatched after a period of 27 days. In another nest both eggs hatched on the 28th day of incubation.

During the period of incubation the eggs lose weight to the amount of .2 to .3 grams a day until the egg becomes cracked when the weight decreases rapidly. The total loss in weight of 4 eggs was 10.3, 5.2, 8.1 and 9.9 grams respectively.

Hatching takes place over a period of 4 days the details of which are as follows; First day: egg is cracked but not punctured. Second day: egg is pipped opening is about 5 mm. in diameter. Third day: Size of the opening is increased to 7 X 20 mm. Fourth day: At 1:00 A.M. the chick under observation in this series of observations emerged from its egg. During the preceding six hours the hatching activity was most pronounced. At 6:00 P.M. the hatching work of this particular chick was carried on chiefly by the use of the egg tooth. At 10:00 P.M. the opening had become enlarged and one wing extended. At 11:15 P.M. the tarsus protruded from the hole and was used as a lever to break the shell. Shortly after 1:00 A.M. the chick freed itself from the shell. It was able to move about, its eyes were open and was alert and active.

Daily measurements, weighings, and temperature readings were made of the growing chicks. A table showing the progress in the growth of the body and feathers in one of the chicks is presented below,-

Age (days)	1-2	1	5	10	12	15	20
Length	115	111	130	172	200	192	213
Extent	95	107	130	220	270	300	331
Wing	20	20	23	33.5	36.5	51.5	66.0
Culmen	12	12.5	12	15	16	18	20
Bill-gape	19.5	19.5	25	30	31.5	34	35
Bill Depth	5	5	6	8	8	8	8
Eye-nostril	10.5	11.5	12	15	15	16	17
Eye diameter	2.5	4	5	6	6	6	6.5
Tarsus	20	20	22	29	29.5	30	31
Toe	17	17	21.5	31	34	34	35
Nail	4	4	5.5	7	7	7	7.5
Web	14	15	18	22	22	22.5	24
Primary	--	--	--	5	12.5	18	22
Secondary	--	--	--	6.5	15	19	21.5
Tail	--	--	--	2	6	6	8
Temperature F.	92.0°	95.6°	100.4°	105.5°	107.4°	103.3°	103.0°
Weight grams	33.0	32.0	52.6	136.4	191.0	176.5	238.9

Age	25	30	35	40	Adult	Adult
Length	242	232	263	295	300	345
Extent	435	485	506	511	500	565
Wing	99	122	123	134	157	165
Culmen	22	24	25	27	27	30
Bill-gape	39	41	44	46	48	46
Bill depth	8	9.5	10	10.5	11	8
Eye-nostril	18	20	19	19	19	19
Eye diameter	7	7	7	8.5	8	6
Tarsus	32	34	34.5	33	31	31
Toe	33	33	34	33	35.5	33
Nail	8	8	8	9	10	10
Web	26	28	29	29.5	27	27
Primary	53	68	71	83	96	88
Secondary	49	55	56	62	57	64
Tail	25	34	36	52	50	50
Temperature F.	107.9°	106.8°	107.5°	108.8°	106.8°	---
Weight grams	293.6	398.9	367.9	328.0	-----	461.0

Temperature readings were found to vary considerably in individuals and in birds of identical ages. The lowest recording was that of the half-day old chick which did not register on a thermometer with a minimum reading of 92° F. The highest recording was that of a 35 day old chick which was 110° F. As the chick grows its temperature goes up gradually, the adult generally having the higher temperature. The average of twelve adult readings was 105.5° F, the lowest being 102.2° F. and the highest 107.0° F. All of these readings were the results of second or third trials after the birds had ceased to struggle and had become accustomed to the procedure. First readings were often as high as 108° F when the bird was much excited and struggled to get free.

The Guillemots fish singly or in pairs off the outer sea islands. Their goal is a 5 or 6 inch rock eel (Gunellus gunellus) or perhaps a small red sculpin. The procedure in fishing is to dive under the surface for a 30 to a 60 second period when they return to the surface and rest for about 15 seconds. The parent birds vary the size of the eel in accordance with the age of their offspring as a young chick might choke to death in an attempt to devour an eel larger than itself. As the chick grows older the parents coax it out of the nest by dangling a rock eel just out of its reach. At the time of leaving the nest the chick is usually about 40 days old, 67 days from the time the egg was laid. After leaving the nest the chick immediately leaves the breeding colony for neighboring fishing territories, not returning to the island until the breeding season of the following year.

On these outer sea islands of the Bay of Fundy the Guillemots have only two real enemies, the crows and the tides. The former in two years destroyed six out of a total of 85 nests. The extreme tides of this region took a heavier toll. Sixteen of the 85 nests were washed away by a combination of high tides and stormy weather. Except for these menaces the Black Guillemot leads a comparatively undisturbed and peaceful existence on the islands of the Bay of Fundy.

BIRD BANDING 1936
(by John A. Crystal)

During the summer of 1936 the Bird Banding Department carried on its operations on Kent's, Sheep, Little Wood and Big Wood Islands and the Yellow Murr Ledges. A total of 8,080 birds were banded which includes 8,000 Herring Gulls and 80 of fourteen other species of birds. Banding operations started almost as soon as the Station opened for the summer, and the banding of Herring Gulls started on the 22nd of July. Of the total number of Herring Gulls which were banded 6,000 were banded on Kent and Sheep Islands and 2,000 were banded on Big and Little Wood Islands. It was hoped that more birds could be captured on the latter two islands, but because of a change in the Canadian Laws permitting the robbing of Gull's nests the number of young hatched this year was less than half of the number of previous years. Practically all of the birds on these two islands were banded.

In the future it is hoped that there will be an appropriation to buy the necessary materials for constructing a large number of traps for small birds. Up to the present the capture of small birds has been more or less accidental and practically all the effort was put into the work on the Herring Gull. In the future it is hoped that work may be carried on with the vast number of migrating birds which stop at Kent's Island.

The following table contains a list of the species of birds banded during 1935 and 1936.

1935	1936
Herring Gull-----6804	Herring Gull-----8000
Leach's Petrel-----96	Barn Swallow-----42
Black Guillemot-----57	Black Guillemot-----13
Barn Swallow-----55	Great Black-backed Gull-6
Tree Swallow-----37	Razor-billed Auk-----5
Savannah Sparrow----18	Leach's Petrel-----3
Razor-billed Auk----11	Robin-----2
Spotted Sandpiper---11	Spotted Sandpiper-----2
Flicker-----6	Chimney Swift-----1
Robin-----3	Cat Bird-----1
Arctic Tern-----2	Savannah Sparrow-----1
Eider Duck-----1	Tree Swallow-----1
Black-backed Gull----1	Northern Water Thrush---1
	Black-billed Cuckoo----1
	Arctic Tern-----1
Total 7102	Total 8080

The following are the recoveries of birds banded at Kent's Island and not previously reported in Station Bulletins.

C 2306 Savannah Sparrow banded at Kent's Island July 10, 1935 found dead at John's Island, Charleston, S. C. March 14, 1936.

34-26804 Chimney Swift banded August 23, 1936 at Kent's Island was trapped and released on September 20, 1936 by Harold S. Peters at Opelika, Alabama. This bird flew at least 1,500 miles in 23 days. (See Bird Banding, 1937, vol. 8, p. 23.)

Three Barn Swallows banded by Burton Whitman at Kent's Island were captured and released at their nesting sites on July 15. H 15706 and F 71450 were banded June 25, 1934 and 34-26601 was banded June 29, 1934.

Three Leach's Petrels banded on Green Island by Burton Whitman in 1934 also returned to their former nesting grounds. 34-124620 and 34-124623 were banded July 18, 1934 and 34-12555 was banded July 5, 1934.

Of the 6804 Herring Gulls banded during the summer of 1935 fifty-nine recoveries were listed in the Annual Report, Bull. No. 1, p. 13-14 issued February 1, 1936. Including the 99 recoveries listed above we now have 158 recoveries reported to date, which is about 2.3 % of the total number of gulls banded in 1935. None of the returns from the 8000 Herring Gulls banded during the summer of 1936 are listed in the present report.

RECOVERIES OF HERRING GULLS BANNED AT KENT'S ISLAND

Number	Banded	Recovered	Place of Recovery	How Recovered
35-548111	8-1 -35	11-4-35	Fleeton, Va.	Caught on Hook
35-548136	8-1 -35	11-9-35	Eastchester Bay, N.Y.	Found Dead
35-548147	8-1 -35	2-28-36	Veracruz, Mexico	Captured
35-548183	8-1 -35	2- 9-36	Galveston, Texas	Found Dead
35-548247	8-1 -35	3-15-36	St. Francisville, La.	Found Dead
35-548332	8-1 -35	7- 5-36	Digby, Nova Scotia.	Found Dead
35-548494	8-1 -35	1- 1-36	San Antonio Bay, Tex.	Caught
35-548671	8-1 -35	3-12-36	Beaufort, N.C.	Found Dead
35-548678	8-1 -35	1-19-36	Shreveport, La.	Shot
35-548840	8-1 -35	- - -	Decatur, Alabama	Wing Broken
35-548989	8-1 -35	1-22-36	Long Beach, New York	Found Dead
35-549067	7-22-35	12-2-36	Ingomar, Shelby Co. N.S.	Found Dead
35-549074	7-22-35	5-29-36	Steubon, Maine	Found Dead
35-549206	7-22-35	5-28-36	Savannah, Ga.	Found Dead
35-549208	7-22-35	2-15-36	Onion Bayou, La.	Caught in Trap
35-549273	7-22-35	7-15-36	Kittery Point, Maine	Found Dead
35-549349	7-22-35	12-27-35	Pascagonla, Miss.	Caught in Trap
35-549382	7-22-35	9-14-36	Rehoboth, Del.	Found Dead
35-549435	7-22-35	10-7-36	East River, N.Y.	Found Injured
35-549528	7-22-35	11-1-35	Ocean City, Md.	Caught
35-549567	7-22-35	2-27-36	Lake Worth, Fla.	Found Dead
35-549680	7-22-35	2- 9-36	Mobile, Ala.	Found Dead
35-549689	7-22-35	4- 3-36	Pine Beach, N. J.	Found Dead
35-549694	7-22-35	10-5-36	Boston (Airport), Mass.	Found
35-549835	7-22-35	3-30-36	Sea Island Ga.	Released O.K.
35-549854	7-22-35	9-19-35	Gander Bay, Newfoundland	Caught
35-549867	7-22-35	3-17-36	Morhead City, N. Car.	Cripple
35-549872	7-22-35	3- 8-36	Spring Grove, Va.	Found Dead
35-550066	8-10-35	1-14-36	Orleans Parish, La.	Caught in Trap
35-550333	8-10-35	2- 1-36	Silver Lake Res., N.Y.C.	Killed
35-550390	8-10-35	11-1-35	Port Monton, N. S.	Found Dead
35-550457	8-10-35	1-19-36	Orleans Parish, La.	Released O.K.
35-550509	8-10-35	5-10-36	Newport News, Va.	Caught in Pier
35-550573	8-10-35	3-15-36	Beaufort, N. Car.	Frozen
35-550588	8-10-35	1-13-36	Longstreet, La.	Captured
35-550613	8-10-35	2- 4-36	Biloxi, Miss.	Found Wounded
35-550655	8-10-35	7-29-36	West Pembroke, Me.	Shot
35-550708	8-10-35	5-25-36	Brunswick, Georgia	Found Dead
35-550711	8-10-35	3-11-36	Carrabelle, Fla.	Captured
35-550812	8-10-35	11-1-35	Newport News, Va.	Caught on Hook
35-550831	8-10-35	1-15-36	Hackberry, La.	Caught
35-550873	8-10-35	11-15-35	Hilton Head Id. S.C.	No Information
35-550958	8-10-35	2-24-36	Tampa Bay, Fla.	Found Dead
35-551032	8-1 -35	2-15-36	Lake Ponchartrain, La.	Caught in Trap
35-551074	8-1 -35	5- 1-36	Beaufort, N. C.	Found Dead
35-551269	8-1 -35	4- 6-36	New Haven, Conn.	Found Dead
35-551434	8-1 -35	3- 8-36	Fort Monroe, Va.	Found Dead
35-551497	8-1 -35	2-11-36	Freeport, Texas	Caught

35-551546	8-1 -35	1-15-36	Three Ids. Grand Manan	Shot
35-551558	8-1 -35	1-21-36	Pensacola Fla.	Caught
35-551659	8-1 -35	1-16-36	Mapton, Va.	Found Dead
35-551663	8-1 -35	8-30-35	Port George, N. S.	Dead-Fish Net
35-551670	8-1 -35	4-14-36	Edgemere, L. I.	Found Dead
35-551673	8-1 -35	9-15-36	Portland, Maine	Caught in Net
35-551702	8-1 -35	5-30-36	North Cape, Michigan	Found Dead
35-551722	8-1 -35	9-13-36	Middletown, Del.	Found Exhausted
35-551890	8-1 -35	1-30-36	Morgan City, La.	Captured Released
35-551987	8-1 -35	1-15-36	High Island, Texas	Found Wounded
35-551997	8-1 -35	4-19-36	Mobile, Ala.	Found Dead
35-552101	7-29-35	9-27-36	Manchester, Mass.	Found Dead
35-552127	7-29-35	10-12-35	Saint Andrews, N. B.	Found Dead
35-552247	7-27-35	1-16-36	English Lookout, La.	Caught
35-552249	7-27-35	Spring-36	Stony Brook, L.I., N.Y.	Found Dead
35-552509	7-29-35	11- 1-35	Charleston, S. C.	Caught Released
35-552525	7-29-35	1-12-36	Galveston Bay, Texas	Caught Released
35-552661	7-29-35	1- 3-36	Pilot Town, La.	Caught Released
35-552667	7-29-35	8-23-36	North Head, G.M., N.B.	Found Dead
35-552730	7-29-35	1-15-37	Vacherie, St. J. Parish, La.	Found Dead
35-552770	7-29-35	2- 1-36	Canabelle, Fla.	Caught Released
35-552787	7-29-35	2- 2-36	Jersey City, N. J.	Found Dead
35-552862	7-29-35	3-22-36	Pensacola, Fla.	Found Dead
35-555124	8-25-35	9- 3-36	Norwalk, Conn.	Found Dead
35-555315	8-25-35	1-15-36	Cumberland Id., Ga.	Caught on Hook
35-555338	8-25-35	8-19-36	Cape Ann, Mass.	Found Dead
35-555415	8-25-35	3- 9-36	Pensacola, Fla.	Caught
35-555452	8-25-35	3- 2-36	Cortez, Fla.	Found Dead
35-555480	8-25-35	5-30-36	Beals, Maine	Found Dead
35-555584	8-25-35	1-20-36	Monmouth Beach, N.J.	No Report
35-555700	8-25-35	7-11-36	Sea Bright, N. J.	Found Dead
35-555756	8-25-35	6- 3-36	North Jetty, Mass.	Found Dead
35-555815	8-25-35	1-19-36	Montegut, La.	Injured
35-555843	8-25-35	1-25-36	California, Md.	Found Dead
35-555890	8-25-35	6- 3-36	Devils Id., Halifax Co. N.S.	Caught
35-555982	8-25-35	7-29-36	Freeport, Digby Co., N.S.	Found Dead
35-555959	8-25-35	1-16-36	English Lookout, La.	Caught
35-555876	8-25-35	11-15-35	Biloxi, Miss.	Found
35-556223	8-27-35	3-14-36	Georgetown, S. C.	Caught in Net
35-556282	8-27-35	12-4-36	Pensacola, Fla.	Found Injured
35-556315	8-27-35	1-19-36	Sabine Pass, Texas	Found
35-556323	8-27-35	1-28-36	Olga, La.	Band Removed
35-556446	8-27-35	2- 8-36	Virginia Beach, Va.	Found Frozen
35-556475	8-27-35	12-14-36	Atlantic City, N. J.	Found Dead
35-556684	8-27-35	5-16-36	Cape Fourchu, N. S.	Caught Released
35-556819	8-29-35	12-21-35	Hillview, Newfoundland	No Report
35-556925	8-29-35	1-23-36	Norfolk, Va.	Found Dead
35-556929	8-29-35	10-9-35	St. Albans, Nfld.	Found Dead
35-556969	8-29-35	2-10-36	Brunswick, Ga.	Found Injured
35-601478		8-15-35	Montague, Mass.	Caught
35-601553		Winter-35	Daphne, Ala.	Found Dead

METEOROLOGY REPORT 1936

Month 1936	Jul	Aug	Sept	Oct	Nov	Dec
Mean Temp.	---	54.7	52.9	51.4	35.1	28.7
Mean Max.Temp.	69.5	67.4	59.2	55.4	42.9	39.2
Mean Min.Temp.	48.2	49.0	49.2	43.2	31.7	24.6
Highest Temp.	79.5	86.6	68.0	59.8	55.0	50.0
Lowest Temp.	44.3	43.5	39.0	25.4	10.4	8.0
Ave.Rel.Hum.	----	88%	85%	82.8%	79.9%	76.%
Precipitation	1.21"	2.76"	6.62"	2.33"	3.08"	5.63"
Ave.Wind Vel.	3B	2.1B	2.4B	2.9B	3.2B	3.8B
Ave. Wind Dir.:						
North	2.8%	10.1%	10.3%	28.8%	26.67%	25.3%
Northeast	2.8%	6.6%	30.5%	16.4%	18.3%	21.%
East	8.6%	3.3%	1.5%	2.%	5.%	3.3%
Southeast	11.4%	6.6%	0.%	2.%	3.3%	14.3%
South	25.6%	16.4%	11.7%	3.%	5.%	11.6%
Southwest	22.8%	31.8%	25.%	5.%	8.4%	3.3%
West	26.%	16.4%	11.7%	6.%	10.%	8.6%
Northwest	0.%	8.8%	10.3%	23.3%	21.7%	12.6%
Calm	0.%	0.%	0.%	1.6%	1.6%	0.%
Days with Fog	3	14	9	3	3	3
*Days with Rain	6	8	6	4	7	6

The foregoing meteorological data will be discussed as regards accuracy and other phases in the next annual report. In the July observations only July 19th to 31st inclusive are available. The October observations do not include October 18th to 28th inclusively. * Day with ".1" of rain.

CONCLUSION

Our greatest need is for funds for the following purposes: (1) Building for tool shop, power plant, and radio station; (2) A 2-Kilowatt Electric Generator; (3) Major overhaul of the Scientist; and (4) Wharf repair and extension. It is also to be hoped that we will be able to secure a regular chef for the summer season.

A prospectus of the 1937 Expedition will be issued by June 1st. It will outline the completed program and list the members of the staff. I can assure you that our next expedition will increase the prestige of and carry on the full tradition of the Station.

Messrs. Nahum R. Pillsbury, Jr. and Newell E. Gillett have on the basis of their last summer's service been appointed Assistant Director and Chief Navigator respectively. They will help form the nucleus for our next expedition and will discharge numerous offices of pre-season organization.

The Kent's Island Station should have a very bright future. It is fast becoming one of the best-known institutions of its kind. Our efforts are being felt in many fields of scientific research. The undergraduate members of the expedition are getting a new kind of education that will be invaluable to them. To assure the perpetuation of this work would mean a small endowment to cover the minimum annual expenses of the Station. I sincerely believe that funds for Kent's Island would produce more results in the way of research and undergraduate education and character building than any other investment.

In concluding, the Station and the College extends its thanks to Messrs. Sumner T. Pike, Henry H. Pierce, J. Sterling Rockefeller, and Henry S. Shaw for the kind contributions that have made the expeditions financially possible.

Respectfully submitted,

WILLIAM A. O. GROSS
(Field Director)

FINANCIAL REPORT

The "Kent's Island Fund" was established last year to finance the Station. Its affairs are conducted through the Bursar's office of Bowdoin College. Any contributions will, of course, be highly acceptable. The funds for the 1936 season were derived from the gifts of friends, a College appropriation, the fees from the Staff, and the net profit on the sale of the Pseudo:

Henry Hill Pierce	50.00
Summer T. Pike	500.00
J. Sterling Rockefeller	300.00
Henry S. Shaw	500.00
Bowdoin College	500.00
Fees from the Staff	1060.00
Sale of Boat	<u>200.00</u>
Total	3110.00

There has been a net increase in the Station's annual receipts of 1,690.00 over last year. However, this does not approach the value of the new dormitory. We can, therefore, feel certain that the increase in our income has not at all equalled the increasing value of the Station's equipment or the additional cost of our expanded research program.

Next year will see the completion of our building program and the securing of all major equipment additions. This will reduce expenses on the island to Insurance, Warden's Salary, and Repairs and Painting of Buildings. Such items as Food, Chef, and Boat expenses will be largely determined by the scope of each season's activities. The proposed budget for 1937 is based on the past season and estimates on the cost of the new buildings and equipment:

Warden's Salary	\$ 300.00
Food	900.00
Insurance	100.00
Chef	150.00
Generator	250.00
Boat Overhaul	150.00
Boat Expenses	300.00
New Building	300.00
Wharf Repair	200.00
New Stove	75.00
Radio Fund	35.00
General Expense Fund	<u>200.00</u>

2950.00

To carry out the proposed aerial mapping of Three Islands would cost about 300 dollars. It is hoped that funds for this purpose will be made available.