



U. S. Fish and Wildlife Service
Anchorage, Alaska



REFUGE NARRATIVE REPORT

April thru August, 1960

ALEUTIAN ISLANDS NATIONAL WILDLIFE REFUGE
Cold Bay, Alaska

SPEC
COLL
NARR
AI/INWR
Apr-Aug
1960

SPEC
COLL
N.F.R.
A.F. 11
A.A. 11

U.S. Fish and Wildlife Service
Anchorage, Alaska



REFUGE NARRATIVE REPORT

April thru August, 1960

ALEUTIAN ISLANDS NATIONAL WILDLIFE REFUGE
Cold Bay, Alaska

Our story centers in an island that, together with the others in its Archipelago, marks the northern limits of the Pacific Ocean and the southern reaches of the Bering Sea. It owes its origin to a fissure in the earth's crust, through which poured one day in a fiery cata-ract the molten materials which, when later uplifted formed the oldest parts of our island. We may be sure that the convulsions attending the eruption of this and other islands in the group would have been noted elsewhere on earth by mankind had he been there. Perhaps his evolving ancestor became aware of the labor pains resulting in the birth of an island and offered prayers to such gods as he conceived to exist. And perhaps some of the prominent faults that outline the perimeter of the Pacific Ocean and still slip sometimes with destructive results were first fractured in that day of violence. But however violent may have been this event, the resulting volcanic deposit had yet awhile to wait before it emerged from the sea; and when it did, if we read the dim record aright, it formed little more than a series of rocks, reefs, and small islands. A meagre invertebrate community is recorded in the fossiliferous rocks from this period.

The next step, and this too must have been signalized with alarming evidence of internal stresses, was the intrusion of hard dikes and sills in the older rock. We cannot discern when this took place but the evidence that it did is very real on the beaches of our island today. Again, finally this time, volcanic activity took place and the island assumed a more imposing facade as it rose near its western end to a height greater than a thousand feet.

Next it was submerged, and the great leveling influence of the sea merged the small islands so that, when once more uplift occurred and our island emerged again into the light of day, it was as a single land mass. It had yet to experience the glacial periods, which seem here to have been more effective in cutting shoreline features at low sea levels than in glacial gouging. It appears that there were a few small glaciers on our island but no great ice cap, and the changes wrought were less marked than on others in the Archipelago. When this period passed the island was in a form that would be roughly recognizable today. Wind and runoff water had yet to make their final contribution, a process that-along with marine erosion-is yet incomplete.

US FISH & WILDLIFE SERVICE--ALASKA

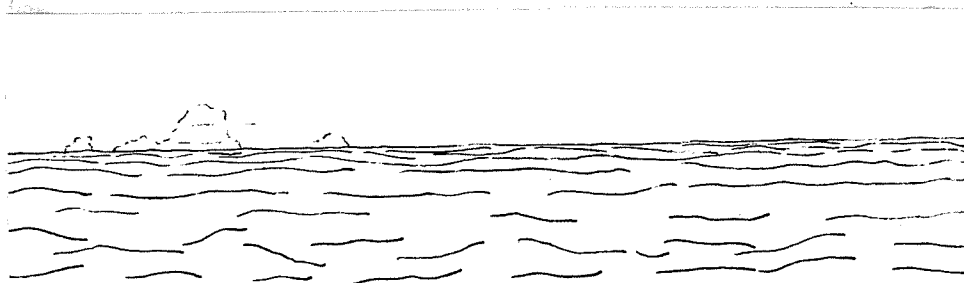


3 3755 000 80946 7

By late Pleistocene our island had thus been formed. No great land mass lay near it and the sea in which it stood was too deep for a land bridge to appear in the great glacial periods. The spectacle of this rock mass unrelieved by vegetative cover and inhabited only by aquatic forms of animal life, nearly all microscopic, is not consonant with our present picture of the island. We can only speculate when and by what means the first plants arrived upon the island and what form they took. If we can judge by present conditions, the development of the alpine-zone-type cover of grass, moss, lichens and heath that now mantles the island must have taken many, many centuries. What is of importance to us is that it did develop, and that in the process evolved a soil type that is colloidal in some of its aspects. The presence of ponds, "many confined entirely by turf sealed with fine mineral and organic materials" has resulted.¹

Aside from the aquatic fossils, mostly marine, there is no window through which we may peer into the darkness enshrouding faunal development on our island. Apparently less than 1,000 years ago, and possibly within the Christian era, the first human inhabitants reached our island from the continent of North America. Just what impelled this migration, or the later one of peoples that came to be known as Aleuts, is not clear. Certain it is that some pressure of an active and compelling nature operated to enforce this difficult and hazardous movement. With the arrival of these people was begun an imperfect record of what they saw in the form of refuse accumulations about their villages. These have been examined by archeologists and from their findings the brooding presence of our island begins to emerge from the mists of the ages.

This author, who has himself sailed both to-and-from the island in a small boat (though under infinitely altered circumstances) finds it absolutely irresistible to speculate upon the thought of these first navigators to reach our island - - - -! There are in this author's mind the images, never to be erased, of the island's profile viewed from three directions rising out of the sea. In spite of knowing of the island's presence, where it lies, how to reach it, when it might be expected to appear and on what bearing, and unhampered by the necessity to bodily furnish the motive power to achieve the island; this writer, nonetheless experienced immense satisfaction and in some cases relief when the familiar shape materialized before him. Let us here record our admiration.



¹ Powers, Coats, Nelson - "Geology and Submarine Physiography of Adchitka Is., Alaska"

We must not assume this long and hazardous ocean passage to have been frequently undertaken. It was probably rarely done, and once having arrived these people would have little reason to retrace their steps. A picture of rejoicing in our island reaches us across the ages. The island's marine resources were at least as good as others of the Archipelago, but there was more (and still is more,) which will become the burden of our tale. The eastern third - that part on which the immigrants first set foot; the oldest part in the main, dating back to its day of violent birth and drowning - had evolved into a substantial marsh and was, if our reading of the dim record is correct, when the pre-Aleut people reached our island an important waterfowl habitat.

The record seems to indicate a longer occupation of the island by the pre-Aleut population than by the Aleuts. We are given no clue as to what happened when the Aleut invasion took place. In view of the long history of fighting among other segments of the human race we are tempted to assume that conflict occurred. At any rate, the evidence points to an ultimate coexistence of both races and to the likelihood that both were present on the island when later the white race arrived. A slightly different culture (if culture it can be called) developed here than in the islands from which the people had come. Considering the inhospitable climate of the area and the severe day-to-day requirement for food, that even the rudiments of a culture were developed is startling. Articles of clothing were made from sea otter skins, bird skins, seals and sea lions. Whales were utilized in many ways, for food, heat, implements, boat frames, structural members of dwellings, etc. Rocks and such driftwood as was carried to the island's shores were fashioned into implements. And this is called a culture!

A noteworthy fact emerges from the refuse heaps. Foxes were not used by the people. Modern records show that foxes were present on the eastern islands of the Archipelago but this author has no record of them having existed on our island until very recently.

We must suppose that some time, perhaps fairly soon after the island was inhabited, it became desirable to give it a name. Nameless, it had evolved through the ages and acquired the things that were to make it valuable; now it was to acquire a name. As to what that early name may have been we can only speculate. Perhaps in transliteration some vestige of the name itself or its meaning is preserved in the name Amchitka by which we know it today. Unfortunately, the earliest chroniclers of the Archipelago are very recent and we can only hope the present name preserves in some way its ancient integrity.

Amchitka developed a substantial population, with the village sites, unlike those of other islands in the Archipelago, distributed all

about the island's shore.¹ It may well have been one of the more populous islands for today we find large and numerous kitchen middens. Presumably it was near its peak when in the summer of 1741 ST. PETER and ST. PAUL, the two ships of Captain-Commander Vitus Bering's "American Expedition" reached the Archipelago. Great changes were in the making.

The prime purpose of the Expedition was to locate and chart the land. And so at last we were to learn where our island lies. This was, however, long to remain in doubt. This author himself watched what may prove to be the making of the final word. It was in 1950 and the workers were from the august U.S. Coast and Geodetic Survey. It seems the island was not where it ought to be and they were replacing it. It is now deemed that Amchitka lies between longitude 178° 37' East and longitude 179° 29' East, and between latitude 51° 21' North and latitude 51° 39' North and is about 35 miles long, and 3 to 5 miles wide. This means that it is almost exactly on the opposite side of the earth from a certain place in the British Isles reckoned as the beginning point for all locations east or west. This concept of location would be in agreement with the view of some temporary inhabitants of Amchitka during the late great war; they thought it was the end of the earth.

Bering's voyage acquainted the old world with the riches of the new. His First Lieutenant, Sven Waxell, and Adjunct Wilhelm Steller placed some lustrous pelts of the sea otter in the hands of the Royal Court in St. Petersburg. This did it! The Russian free lance fur traders, called promyshlenniki, invaded the Archipelago; and in the wake of this invasion, through violence and disease, the human population diminished rapidly leaving many of the islands depopulated. Whether Amchitka was among these is not recorded. It is perhaps not necessary to add that the wildlife populations, particularly those of the fur bearers, also diminished.

With the Russians came many chroniclers, of whom perhaps the best is Bishop Veniaminof, but whose writings are unfortunately concerned only with the eastern portion of the Archipelago. We have had occasion to search through some of these and a very remarkable fact emerges: the Aleuts had no name for the Archipelago of which Amchitka is a part.

¹ Sarychev (1897) has this to say about Unalaska:

"Their residences are all fixed on the shore of the sea, and on the north, east, and west side of the island, that to the south being uninhabited;"

Bishop Veniaminof (1840):

"The majority of the settlements is found now, and was previously, on the north side of the islands, facing the Bering Sea, which is richer in fish, other sea animals, and especially whales."

The Russians named it for Catherine the Great, but this name fell into disuse and somehow (the origin is not recorded) the inhabitants came to be known as Aleuts and the Archipelago the Aleutian Islands. Such is the name by which it is known today. In the vernacular, it is frequently called "the Chain" by virtue of its orientation, that resembling a chain or string of beads.

There is little recorded about Anchitka, and almost certainly anything early would be in Russian, so the searching for it is hampered. However, we are disposed to believe that the Russians with their sailing ships did not care much for our island because of its single very poor harbor and reefy coast. This view seems to be supported by the fact of the survival here of the largest remnants of the sea otter populations. We must pass to the archeological research of Dall, Jochelson, and Hrdlicka and the records of Turner. From the kitchen middens on Anchitka have come bird bones as follows:

Diomedea albatrus, Short-tailed albatross, common
Puffinus sp., Shearwater, occasional
Phalacrocorax pelagicus, Pelagic cormorant, occasional
Somateria v-nigra, Common (Pacific) eider, frequent
Somateria spectabilis, King eider, frequent
Larus glaucescens, Glaucous-winged gull, rare
Uria sp., Murre, occasional
Fratercula corniculata, Horned puffin, rare
Pica pica hudsonia, American magpie, rare
Corvus corax principalis, Northern raven, rare

From Turner¹ we have several interesting records resulting from his brief visit to the island in early summer of 1881.

"9. Urinator arcticus Black-throated loon
 These birds are to be found among the Aleutian Islands at any season of the year. At Anchitka Island, a pair frequently were seen in the Bay, during the month of June, but always just out of range for a shot."

"18. Sinorhynchus cristatellus Crested auklet
 I observed several of these birds to the westward of Unalaska Island. They are not rare on Anchitka Island, and in the neighborhood of the Old Harbor, on Atka Island."

"37. Stercorarius parasiticus Parasitic jaeger
 At Anchitka Island I saw several of these birds sitting on the hillocks and tussocks of grass."

¹ Turner, L. M. "Contributions to the Natural History of Alaska", 1886

"42.1 Larus barrovianus Western glaucous gull

This gull is especially numerous at some localities. At Saint Michael's but few breed, while on some of the Aleutian Islands, especially Akutan, Unak, Amchitka, Adia, many thousands breed."

"55. Larus brachyrhynchus Short-billed gull

At Amchitka Island I observed this species frequenting the beach at low tide and securing the sea urchins (Strongylocentrotus drobachiensis) which occur plentifully. The birds seize the prey, carry it several yards into the air and then drop it on the rocks; or as it frequently happens, into the little pools left by the receding tide."

"86b. Fulmarus glacialis glupischa Pacific fulmar

Hundreds of thousands of these birds were seen off Unimak Pass and the eastern end of Unalaska Island; in fact they covered acres of water. The dark form prevailing in number, while the remainder were of the light form. To the westward I have seen them less abundant though still very numerous, near Seguan Island, Kiska, Amchitka, Adia, and plentiful at Semichi."

"123. Phalacrocorax pelagicus Pelagic cormorant

The nests which I observed on Amchitka Island were being occupied June 7."

"132. Anas boschas Mallard

It breeds sparingly at Agattu Island and on the Semichi Islands. A few pairs were also observed at Amchitka Island in the latter part of May, 1881."

"139. Anas carolinensis Green-winged teal

At Adia, Amchitka, Semichi, and Attu it is abundant. At Amchitka Island they were extremely abundant in the middle of May, 1881. At Amchitka Island their breeding-places are among the tall grasses that grow on the sea side of sand-banks thrown up by the ocean, or else on the steep slopes of other hills facing the sea."

"150. Aythya collaris Ring-necked duck

At Amchitka Island I observed a male of this species in a fresh-water lake near the center of the island."

"176. Phalacrocorax canagica Emperor goose

On Adia, Kanaga, Tanaga, Amchitka, and Kiska Islands they are plentiful in January, February, and March."

"223. Phalaropus lobatus Northern phalarope

On the western islands of the Aleutian Chain it is abundant. Many breed on Adia, Amchitka, Semichi, and Agattu. At Amchitka they were very numerous among the little streams which form the outlet of the inland lakes."

"236. Tringa covesi Aleutian sandpiper

This species seems to be most abundant among the Aleutian Islands in the winter season, although I obtained seven specimens in the breeding plumage at Atkha in June and July, 1879, and observed a few at Attu in the summer of 1880, and several pairs at Amchitka in June, 1881."

"247. Euraunetes occidentalis Western sandpiper

At Atkha and Amchitka it is extremely abundant.

"250. Limosa lapponica baueri Pacific godwit

At Amchitka I saw four of this species on May 24, 1881."

"283. Arenaria interpres Turnstone

I saw individuals at Attu, Amchitka, Atkha, and in the vicinity of Belkofsky village."

"302c. Lagopus rupestris atkensis Turner's ptarmigan

They are quite plentiful on Atkha, Amchitka, and Attu Islands."

"349. Aquila chrysaetos Golden eagle

I saw a single specimen on Amchitka Island in May, 1881, and none further west of that place. "

"352. Haliaeetus leucocephalus Bald eagle

At Amchitka Island I saw several pairs of this bird in June, 1881."

"356a. Falco peregrinus pealei Peale's falcon

This falcon was frequently observed on Amchitka Island in the month of June, 1881; and on several occasions on Attu Island, during 1880 and 1881. On Agattu it is reported to be very common; and on Amchitka I knew of three nests on the ledges of the high bluffs, hanging over the sea. The natives had told me that where this hawk breeds there will be found the nests of eiders. I could not believe it until a short stay at Amchitka Island forced me to recognize it as a fact, for, in each instance, the nests of eiders were very abundant in each of the localities where the nest of this hawk was known to be. It is quite probable that the hawk selects the place with special reference to prospective young eiders."

"528. Flectrophenax nivalis Snowflake

Among the western islands of the Aleutian Chain the Snowflake is a permanent resident, breeding there in great abundance at Atka and Amchitka."

"536. Calcarius lapponicus Lapland longspur

At Attu it is very abundant, at Amchitka scarcely less so, and especially abundant at Atkha."

The above are Turner's specific references to Amchitka, but include none of the implied ones.

The next available records are from the period subsequent to the creation of the Aleutian Islands National Wildlife Refuge, much of which is contained in the recently published Fauna of the Aleutian Islands and Alaska Peninsula, North American Fauna series number 61, by G.J. Murie; and in the many unpublished reports of this office.

An episode in the island's history that can only be regarded, from the viewpoint of the utilization of lands dedicated to wildlife purposes, as unwise and unfortunate, began according to our records, in 1921. It was in this year that seven blue foxes were placed on Amchitka by the native Atka residents as "lessee" of the island for fox farming purposes. The actual date from which the presence of these unwelcome animals on the island stems will long be debated but we have yet found no earlier record than the one mentioned. The general practice in the Aleutians, and the one employed on Amchitka, was to release a number of animals on the island and return in about three years to harvest the first crop. There is a blank space in our records from 1921 to 1925 and in the latter year, there is an exact gross of fox skins listed as having been removed from the island. In '26 the harvest is recorded as 172 and in '27 it was not deemed necessary to submit a report. In '28 the take was 516 and in '29, 564. We have no information regarding activities on Amchitka in 1930 except that the "lessee" changed to the Atka Village Community. In '31, 965 skins were taken, in '32, 660 and in '33 it was not trapped. In '34 there were 555 removed, '35 it was not trapped and in '36 an even 500 were taken. This totals 4,076 blue foxes that were pelted on our island as progeny of the original 7, if our records are complete and correct. The total value of these pelts as shown in the annual reports was \$183,360. We do not pass on the validity of these figures but offer them as they have been recorded. It should be remembered, however, that in these years it was not legal to ship fox pelts from the Refuge without them having been sealed, hence the number of pelts taken is, except for illegal shipments, doubtless accurate.

There was at this time a small village at the head of Constantine Harbor which the natives of Atka occupied during the winter months. Near the end of this period in the island's history, the old Bureau of Fisheries erected in the village at least two buildings and placed two "otter wardens" on the island. Although Amchitka produced the largest take of fox pelts, every other island in the Chain, save four, was thus used for commercial purposes and the total sum realized is an impressive figure; by the end of 1936 it was \$1,162,826. Such an enterprise created a substantial commerce in the Islands, and boats and ships drifted up and down the Chain.

We have the statement of the Atka natives that Canada geese were abundant nesters on Amchitka prior to 1921 and they attribute the disappearance of this population directly to the introduction of foxes. We have Turner's assurance that Canada geese were abundant on other islands both to the east and west but he is silent on this subject as it relates to Amchitka. He speaks thus: "172c. Branta canadensis minima Cackling goose (Author's note: we quote only part of this entry). On Unashka, Amlia,

Atka, Athakh, Kanaga, Tanaga, Kiska, Bouldyr, Semichi, and Agattu are the greatest breeding grounds of the Aleutian Islands. On some of these islands foxes of various kinds are numerous, hence while they are excellent feeding grounds for the geese in the fall, the geese are compelled to rear their young on the nearer islets, where the foxes cannot molest the young goslings, unless there happen to be lakes containing small islands in them."

We must trench upon the future to note that by the time our narrative opens (1960), of all these islands only one, Buldir (Turner's Bouldyr), is still the site of nesting Canada geese and it is one of the four on which foxes were not introduced.

It is difficult in the year 1960 to imagine that a blue fox pelt might ever have become worth \$100 and in some cases even more. Nevertheless, this is what happened and in its wake the entire refuge, save a tiny fraction, was converted into a fox ranch, and consequences disastrous to the wildlife flowed from it.

Fox fur prices had begun to decline by 1936 and it is likely that the end of Aleutian fox farming would have come during the forties but a world shaking event supervened on Dec. 7, 1941 and the Refuge became a battlefield. Our island was occupied by U.S. troops in January 1943 (this writer recalls his own arrival there in February of the same year) and was evacuated in late 1950. Numerous superficial changes took place, some of which will leave their mark for centuries, and another lamentable animal introduction resulted. Norway rats escaped from ships bearing men and supplies, and firmly established a population on the island.

Even while the last chapter of the military occupation was being enacted, another was being prepared. In the spring and summer of 1950, some close-mouthed strangers alighted from their aircraft and began probing the ancient geologic secrets of the island. Uncompromised by the necessity to consider humanity, and armed by an untrammelled use of the secrecy provisions in the Atomic Energy Act they brushed aside our remonstrances and fixed their baleful eye on Amchitka. They meant to explode a buried atomic bomb on the island and by this act of malevolence destroy the wildlife habitat for ever.

Mercifully, because the island proved different than they had believed it to be, the bomb was never delivered to Amchitka, and the task force busy on the island reembarked in their ships and departed.

There is little more to tell. A decision, dated 1940, to withdraw Amchitka from fox production had been communicated to the Atka Native village and they made their final trapping expedition to the island in 1947. This same winter, several other islands in the Chain were trapped but the market for the furs was gone and except for the handful subsequently taken from Atka and Amia, the days of fox ranching

in the Aleutians were over. But the foxes remained.

The military occupation left on Amchitka a vast clutter of temporary buildings and junk, but some of this had salvage value, so several minor forays and two major ones have been made in the interests of salvage. Some several thousand buildings, however, remain.

In the management of the Refuge, we had spent more time and money at Amchitka than any other in the Chain. We had learnt much about the sea otters, abundant there, and were learning more; and we knew a great deal about the bird populations. However, we needed to know more of the factors involving the waterfowl population, and this study was what we proposed for the summer of 1960. We were especially interested in knowing how the foxes and rats influenced waterfowl production and survival.

The Refuge had experimented in a desultory fashion beginning in 1950 with fox elimination on Amchitka. Correspondence dealing with the matter has used the term "control", but this is not in accord with reality. Those concerned on the ground, especially this author, were prepared to accept nothing short of total elimination, if this were possible; and we believed it was. When this narrative opens, in April of 1960 at Juneau, the matter was being hotly debated; and this author, as the principal proponent of a final campaign in the approaching months to finish off the foxes, was hard pressed to marshal plausible arguments. There was a large segment of those present who entertained deep misgivings about the possibility of complete success, without which only failure would result. Some expressed this view and pointed to the many examples that supported these doubts, while others, it now appears, reserved their doubts in silence. The group, unable to reach an agreement, moved to other matters and left the solution of the foxes to events.

All were cognizant that no fox "control" efforts had been executed on the island since 1957 and it was the unanimous opinion (in which this author shared), that in the intervening years the population would have largely recovered from the success of the preceding seven years' efforts. The question was not upon effective control but upon total elimination.

Throughout the sessions at Juneau this was a recurring debate, and elaborate preparations were made to advance to the destruction of the foxes once we reached Amchitka. We proposed to package up the last of them and dispatch the parcels to the "doubting Thomases." Such was the temper of the dispute.

But events had moved far in advance of our deliberations. May 14 was arrival date on Amchitka and as soon thereafter as possible we set out to "roll up" the foxes, but we were shadow-boxing. The fact is that we didn't find one. Our peregrinations took us several times around the island with the expenditure of great personal effort and we found the

tracks of an estimated 6 or 7 animals still living on the island, but nowhere did we discover a den or evidence of reproduction.



Figure 1. Fox trails in the mountainous western end of the island now unused.

We shall pause at this point in our narrative and review the activities that had led to this highly agreeable, though anticlimactic, state in our affairs.

The first reference in our files to fox elimination on Amchitka is dated March 1939. It is an entry in the voluminous document entitled "Proposed Plans for the Administration of the Aleutian Islands Wildlife Refuge" prepared by the then Refuge Manager, H. Douglas Gray. The simple sentence carries an air of finality about it; "Amchitka Island has been taken out of fox farming production." This was a policy, but it left the foxes; and then of course all plans were set aside "for the duration."

It became this writer's duty to face the fox problem in 1948. By this time, he had had the benefit of a 42-month military tour in the Aleutians that included duty on Amchitka, Adak, Ogliuga, Tanaga, Great Sitkin, and Little Sitkin Islands, and knew about the foxes. This writer looks back with some pride on those years for he did not share the general discontent. Of the islands above named; two, Amchitka and Adak (both large islands), the writer explored completely, afoot. On Tanaga is the highest peak in the Aleutian Islands west of Umnak. In October 1945,

this writer with three companions scaled the 7000 foot high volcano and walked the distance both ways from Lash Bay near the southwest corner, to the volcano on the north end of the island. Thus when the future of the foxes in the Refuge came up for decision the writer spoke with some knowledge, and conviction in what he believed was right.

The writer cannot recall that a deliberated decision was early rendered for action in this matter. We opened the record at the page saying the, "island has been taken out of fox farming production." The next pages were blank and we were the actors destined to fill them. We had not shared in the original decision but we concurred, and it was for us to implement it. But How?

In 1950 the first faltering steps were taken. The writer prepared 1000 strychnine pellets made of harbor seal blubber in cubes of roughly an inch dimensions. At that time, foxes were regularly travelling the sand beaches at the head of Constantine Harbor (the site of the pre-war Aleut village) and along the rocky coastline of Kirilof Point, daily leaving fresh tracks. Pellets were first placed along these routes in known locations and then along both north and south coasts for several miles to the westward. Delivery was effected by the writer afoot. There were on the island at this time a large number of foxes plus feral cats and dogs, aftermath of war. Competition for food was so great that the animals were driven to the beaches for the vast amount daily required. A number of rats were taken as food but the "bread and butter" item was the unlimited population of amphipods on all the beaches.



Figure 2. The DIPPER on the beach of what we call Fox Cove. This was one of our modes of travel.

This writer expected immediate results, an expectation that was not fulfilled. The pellets in known locations remained untouched and there was no evidence of fox reduction. Tracks, apparently of the same animals, appeared daily as before on all the beaches, and the writer left Amchitka for Cold Bay, convinced this first experiment was a failure.

We returned in winter 1951 armed with authority to use 1080, but almost the first question asked of us by the "close-mouthed" men of the summer before (these were the atomic bomb men) was, "what happened to the foxes?" What, indeed?

The moral of our story was there in the first experiment, but we failed to recognize it and some of the reasons are still obscure. The fact is that strychnine pellets prepared as above-described are not immediately effective. We have, unfortunately, no continuous records of fox decline on Amchitka because we came in each case to the island, did our work, and departed. Upon returning we were presented a new picture of fox numbers. Apparently, in view of the very slow decomposition of organic matter in the Aleutians, these pellets do not substantially change for many months, and it seems likely that the foxes may be more amenable to taking them in the hard conditions of winter. But, at any rate, from the time of this project's genesis, it proved possible to substantially reduce the foxes by distributing pellets afoot and by jeep on the eastern end of the island.

There was one other phase performed in 1951 that probably destroyed the feral cats and dogs. This was certainly our intent. On the west end that spring we put a small quantity of rat bait on the beach near Aleut Point. 1080 was the lethal agent used and in such quantity as to secure secondary and tertiary poisoning. The results were immediate and remarkable. Within the hour, dead rats began to appear and almost overnight the foxes disappeared from this part of the island. At the same time we left several 1080 bait stations there and one on Bird Rock, an island of perhaps 40 acres lying off Bird Cape.

Following this experience, 200 pounds of rat bait was widely distributed on the eastern end of Amchitka. The carnage of rats, especially in the old military dump, was enormous. After this application, few fox tracks appeared on the eastern beaches and never again were feral dogs or cats reported.

It was 1953 before again we distributed strychnine pellets and by this time the fox population had noticeably recovered. We killed a number by rifle fire in the normal course of travelling about the area and distributed 1,000 pellets before leaving in early spring.

In 1954, again in late winter and early spring, we saw but four foxes on eastern Amchitka and distributed 1300 pellets before departure.

1955 saw us once more on the island in late winter and early spring. There were but few foxes noted on the eastern end. This time, however, we revisited Bird Cape and Aleut Point on the western end, and a different picture awaited us. Fox trails criss-crossing the island on the eastern end were little used, but here on the west end they were active. We walked along the beach about 3 miles and without special effort killed 16 foxes by rifle fire. A small number of strychnine pellets were distributed but this was merely a token gesture.

The rest of the tale is short and to the point. In February 1956 we dropped 11,000 pellets by Navy UF along the headlands of the island. In this enterprise we enjoyed the partnership of Jay S. Hammond. Later, at Amchitka, we prepared 1080 bait stations employing fish, a few gulls and a few cormorants as bait materials and these too were dropped from the UF along the headlands. In 1957, a brief trip was made to the island and 30,000 pellets were distributed from the UF.

There seems little doubt that it was these last big deliveries, effective over the whole of the island, that ended the matter.

In 1956, this writer encountered one live fox on the island. This was the last he has seen there (and it was run to earth and killed) although Karl Kenyon and Cal Lensink reported a few in the summer of '56. In '59, a single track was noted near Clevenger Lake by this writer and it is believed this is one of the survivors whose tracks are still being made in the same area in 1960.

In addition to this one track, we found others as follows: The track of a single animal was several times observed near the Western Electric tropo scatter site, 14 miles west of our headquarters in Constantine Harbor. Another was found at what was known in war time as the Foothills Camp, inland from Low Bluff. A third was in the valley crossing the island from Chitka Cove to the White House Cove. At Top Side a single track was found, and not far away in Fox Cove on the island's south side was the most pronounced sign we located. This may well have been more than a single fox but we could find no den. The final one was at Bird Cape. Foxes were no longer present on Bird Rock.

At each of these track locations, strychnine pellets were distributed; and except for Top Side, nearby Fox Cove, and the valley crossing the island, 1080 bait stations were also set. By the time we left the island in August, apparently none of these foxes had been taken, and save for a nocturnal visitation when the Bird Cape fox carefully deposited a dropping 20 feet from our tent door, we were never aware of being close to any of them. Perhaps the pellets will work as in the past and waylay the foxes in winter. On ne sait jamais.

But we have the tail wagging the dog. The project with which this narrative is concerned was to develop knowledge about the foxes and their relation to waterfowl as well as a similar understanding of the rats. This was not to be. In order to learn anything about foxes, it

proved necessary to visit other islands, and this we did, but more of that later. Patently the foxes were no longer a factor on our island.

In our haste to get on with the fox elimination we have abandoned the reader in Juneau, wondering no doubt about the personnel concerned. So we shall retrace our steps, introduce the actors and hasten to Amchitka where at the time of our arrival the ducks were already nesting.

Vernon D. Berns, usually known as Vern, was assigned to the project by the Branch of Predator and Rodent Control because of the strong emphasis placed on fox "control." Vern had served a tour in the United States Marines during which he was hit while on the Korean battlefield. He took a BS in Wildlife Management at Colorado State University and joined the Service in Alaska as one of Maury Kelly's men. At the conclusion of the project, Vern transferred to the Refuge as Assistant Refuge Manager.

Milstead C. Zahn, soon to be known in our circle as "Uncle Millie" but more widely known as Mil, came to us as a U.S. Game Management Agent. Mil had been a parachute jumper in the Army but was first and foremost a musician and voyageur. Two of his trips are of interest, one by canoe down the mighty Mississippi and the other over parts of Europe, notably Italy. We like to think that Millie drew some personal pleasure from our summer together and returned to his own Branch with a greater knowledge of ornithology. No claim is made for an accretion of beauty on the part of our Amchitka headquarters building as a consequence of Uncle Millie's efforts, but he left it "hell for stout." No creaking chair was left unglued and, if we may trench upon the future, in the spring of 1961 there were no leaks in the house, a memorial to Millie's indefatigable zeal in stemming the tide of rainwater. Mil too, had joined the Service in Alaska; on Ray Woolford's team.

John A. McCann, Jack of course, joined the Service in Alaska as an employee of the Branch of River Basins, then went to the office of the Supervisor of Waterfowl Investigations. He came to the project thus, from Hank Hansen's bailiwick. The only married member, he was the most thoroughly educated one of us, having attended the University of Massachusetts and Oregon State College for a total of seven years. This project was to be one of the necessary steps in the achievement of a Ph. D. Jack and Mil worked together in developing the waterfowl record for the summer.

The fourth member of the project, its leader and chronicler, was the Refuge Manager, Aleutian Islands National Wildlife Refuge, the undersigned. Vern and the author worked principally together.

Later a fifth ex officio member joined us from Adak. This was Walt Henry, 19, a college student from the Los Angeles area.

We came together strangers, as much as members of the Service can fulfill that description, and speedily formed a team as men will that

are accustomed to working in the wilderness, giving reliability and placing reliance on it. In the short time at Juneau we measured each other, and as the summer progressed came to know each other reasonably well; and as the project ended went our separate ways as personal friends.

Preparations were begun in Juneau and continued by each of us at way stops, principally Anchorage, and our respective stations; Juneau, McGrath, Fairbanks, and Cold Bay. We disbanded at Juneau the 24th of April and rejoined on Reeve Aleutian Airways DC-4 enroute to Adak May 3. Preparations were concluded there and at 0900 May 13 we departed aboard the U.S.C.G. CLOVER on the last lap. The voyage was completed the following morning at 0200 and we were on the Island.

It was a sorry looking cabin that greeted our eyes. One room was flooded due to an overflowing wash tub carefully placed to receive rainwater from a perennial leak which none of us had yet suppressed, while the entire house was a shambles from troops of rats. This author doubts that a wolverine or even a brown bear could leave a cabin in such dishevelment as an invasion of rats. True, the holes would be larger but they would be in one, or at most two places; but the foulness could not equal that achieved by rats. The author has a clear image of Uncle Millie curling a disdainful lip as he sidled across the floor to sweep and shovel the stuff out. Vern spat over his shoulder and swore a vendetta that was to sweep successive waves from our doorstep as the rat population burgeoned in summer. Jack, at that time given to more restraint, allowed that the rats would have to go.

But, however grim the prospects, mankind has the happy faculty of looking on the brighter side, especially as the prospects become more shining. We worked our way through the mess, dried out the space heater and persuaded it to perform its function, and presently had a pot of coffee steaming on the freshly scoured stove. This was only a beginning but we had a firm foothold, and from it we fought our way upward to a functioning operation.

It took two weeks. The writer has memories of waterpipes ruptured by earthquakes, more pipes ruptured by ice, but above all a gaping split (due to ice) in the water heater. There were balky engines, leaky roofs, water in the gasoline, flat tires, and problems with the radio gear. In all, we were to operate nine gasoline engines and each of these demanded their share of tinkering. We were indeed busy for those two weeks, and occasionally some of the problems reappeared but generally following this period we turned our attentions to other matters.

We compiled the following list of birds observed. The date is our first sighting.

Red-throated loon
Arctic loon

May 18
May 30

| | |
|-------------------------------------------------------------------------------------------------------------------------|---------|
| Black-footed albatross | June 26 |
| Laysan albatross | May 13 |
| Shearwaters (Uncertain of identification as to which of the sooty or slender-billed shearwaters, numerous at sea) | |
| Fulmar | May 13 |
| Forked-tail petrel | June 26 |
| Leach's petrel | July 3 |
| Pelagic cormorant | May 15 |
| Mallard | May 15 |
| Pintail | May 17 |
| Aleutian teal | May 13 |
| European widgeon | May 18 |
| Shoveler | May 18 |
| Greater scaup | May 15 |
| Common goldeneye | May 15 |
| Bufflehead | May 15 |
| Harlequin | May 15 |
| Common eider (Pacific) | May 13 |
| Common merganser | May 18 |
| Red-breasted merganser | May 31 |
| Bald eagle | May 15 |
| Peregrine falcon (Peale's) | May 15 |
| Rock ptarmigan | May 15 |
| Little brown crane | June 13 |
| Black oystercatcher | May 17 |
| Either Black-bellied or Golden plover | May 21 |
| Ruddy turnstone | July 26 |
| Wandering tattler | May 25 |
| Aleutian sandpiper | May 15 |
| Pacific bar-tailed godwit | May 20 |
| Red phalarope | July 13 |
| (noted offshore in a large flock of northern phalaropes) | |
| Northern phalarope | June 4 |
| Parasitic jaeger | May 18 |
| Glaucous-winged gull | May 15 |
| Sabine's gull | June 26 |
| Arctic tern | May 31 |
| Murre (Uncertain of which murre, not numerous at Amchitka) | |
| Pigeon guillemot | May 13 |
| Ancient murrelet | May 30 |
| Crested auklet | May 26 |
| Least auklet | May 28 |
| Whiskered auklet | May 28 |
| Horned puffin | May 25 |
| Tufted puffin | May 13 |
| Raven | May 15 |
| Aleutian rosy finch | May 15 |
| Alaska longspur | May 15 |
| Snow bunting | May 15 |

Jack and Uncle Millie developed the waterfowl record with Vern assisting in some of the rat work. Near the end of the project, an effort was made to try semi-permanent rat control stations. The area selected was a waterfowl area adjacent to the beach in the vicinity of Constantine Point. Empty food tins were used as containers for the bait (1080 as the lethal agent) and these were staked down to prevent wind loss. A pond about 100 yards in diameter was included close to the beach at one end of the area chosen. The stations were set in two roughly parallel rows, one in the grass above the beach and the second on the headlands, a third encircling the pond. Each of these three lines was roughly 1,500 feet long and a total of 75 to 100 stations were used. Prior to this experiment, 100 traps were set in the area for three nights and 42 rats were taken. Sixty-seven (67) of the traps were on the beach and accounted for 39 of the animals, while the thirty-three on the headlands took only three.



Figure 3. A European widgeon photographed on Amchitka.

Jack has given us a brief resume of the summer's work from his point of view and we quote it here in its entirety.

"In May 1960 an ecological study of Amchitka Island during its rehabilitation as an ancestral waterfowl breeding habitat was initiated by the U.S. Fish and Wildlife Service. The objectives of the study were: (1) to determine the abundance and distributional patterns of foxes, Norway rats and waterfowl, and other ground nesting birds; (2) To measure waterfowl production under present fox and rat population levels and to determine the factors affecting productivity; (3) To evaluate waterfowl population levels following an intensive fox and rat elimination program to determine the effectiveness of control measures; (4) To establish the ecological complex of the waterfowl habitat on the Island; (5) To determine the place occupied in the national waterfowl picture by birds produced on Amchitka.

"Shortly after our arrival, two census routes were set up (8.4 and 15.2 miles long) to determine the relative abundance, distribution and species composition of the waterfowl on the island. The relative abundance of the species of waterfowl was: Aleutian teal - 49%, mallard - 19%, greater scaup - 14%, red-breasted merganser - 8%, and pintail, loons, bufflehead, goldeneye and European widgeon - 10%. The relative abundance of the eiders and harlequin could not be determined from the census routes but it is estimated the eiders were as abundant as the mallards. Few harlequins were seen. Altogether 45 species of ground-nesting birds were observed on the Island, during the period May 13 - August 25. Some of the larger birds such as the bufflehead, little brown crane, harlequin and European widgeon were probably transitory. Most of the waterfowl nesting occurred around the many small ponds on the south-eastern one-third of the Island. The census trips indicated a waterfowl breeding population density in the ponds area of about one breeding pair of ducks per 2.2 acres. So few nests or broods were found of any one species that production estimates could not be made.

"Of the important birds present only 4 Aleutian teal, 4 scaup, 3 red-throated loons, 1 merganser, 30 eiders, and 8 bald eagle nests were found.

"With all the extensive field work that went on during the summer not a single fox was observed. Scattered signs of about 6 live foxes were found, none of which appeared to be of breeding pairs. Evidently, control measures in the past were highly successful.

"There were eight lines of 100 rat traps set out and observed for three nights each in a variety of habitats during the summer to determine the relative abundance, distribution and affect the Norway rat had on the existing waterfowl population and production. An average of 6 rats per 300 trap nights were caught in traps set in the vicinity of ponds in the interior of the Island. No rats were observed inland during daylight hours. Two series of 100 traps set for three nights along the beaches on the east and west sides of the Island caught 42 and 29 rats respectively. In each of these locations the 33 traps set along the headlands overlooking the beach caught only three rats during the 99 trap nights. Indications are that the rats are concentrated along the beaches. Dropping boards and poison bait stations were used in an attempt to determine rat population estimates but to date have proved ineffective. Little evidence was found that the rats were actually destroying the nests or killing young birds.

"All hands spent considerable time observing and collecting the flora and fauna, becoming familiar with the Island, repairing and maintaining the equipment, and surviving under the adverse conditions present on the Island.

"Over 240 plant specimens were collected, pressed and taken to Southern Illinois University for identification.

"To determine the part that Amchitka avifauna plays in the world's bird populations, all birds that could be obtained were banded. Drives were made in brood and molting ponds to obtain both young and flightless adults. One duck trap in particular was useful in obtaining birds to band. A total of 134 sea gulls, 10 eiders, 12 bald eagles, 45 Aleutian teal, 1 mallard, 4 greater scaup, 1 oystercatcher, 2 merganser, and 2 loons were banded."

We killed a number of harbor seals for various reasons (principally as a food source and for bait station material) and on the third of June we took a very large bull in Kirilof Bay. This specimen was so large that we elected to weigh it. Fortunately, an overhanging rock offered the opportunity to hoist the beast off the ground and we found that it tipped the scales at 315 pounds. It was a much scarred animal, especially about the head.



Figure 4. Barbed wire entanglements erected during the war still constitute an obstacle to operations on Amchitka Island.

On the same date, June 3, we collected a drake common eider. This too was weighed, at $5\frac{1}{2}$ pounds.

June 5th, the carcass of a young walrus was found near South Light and its intact skull preserved.

A curious event, one that made us uneasy, took place the 23rd and 24th of May. At noon of the former we noted a visible tide current flowing into the Harbor. Thoughts of a damaging tidal wave leapt to mind and we watched with anxious eyes, expecting a bore to develop. The current oscillated in and out and we thought it prudent to haul the dory higher on the Island. This we did and continued to watch with apprehension the silent ebb and flow. Clearly the sea was in a state of unrest due to some seismic disturbance. Later we learned of a damaging earthquake at that time on the coast of Chile in South America.

Though we made many pleasant trips afield (indeed we seemed to be coming or going most of the time) one, a visit to Semisopochnoi Island, was perhaps the most pleasant. We loaded the "Dipper" and on June 24th Mil, Vern, and the author crossed the pass and landed on a sandy beach located on the southeast side of the Island. It was our search for waterfowl, particularly geese, that took us to Semisopochnoi. This island is irregularly rounded in outline, about 16 miles in diameter and (unlike any other in the Chain) formed by volcanoes around the perimeter enclosing a central valley. It was this valley that we wished to see for it included a relatively large lake and we knew not what associated marsh.

The name Semisopochnoi is Russian in origin meaning Island of Seven Mountains. The Aleuts pronounce it semi sah-pitch noy and this is the form we use. Its volcanoes are only slightly eroded and preserve the characteristic cone shape. One is still active to the extent of smoking. When visible from Adak (32 miles) the Island presents a striking appearance for it rises to 4,000 feet. We had, of course, admired it on these occasions and looked to the day when we should visit it.



Figure 5. We had just landed at Semisopochnoi Island.

We chose to land on the beach near the stream draining the interior valley despite a vexatious surf. It seems unlikely that this beach is ever free of surf, and in winter a landing would be out of the question. We might have landed in a bight farther north that offers better protection but we wished, if possible, to camp near the stream mouth and explore it to the head. So we selected the point and time of our landing with care and encountered no great problems. The landing involved a few busy moments with Vern passing things from under the canopy to Mil who hustled them up the beach, while the author held the dory's bow into the surf. Vern said she was quite an elevator in these circumstances and he almost fell a victim to mal de mer in these action-crowded moments. But it was soon done and we found ourselves

on a fascinating beach of black sand (as are most Aleutian beaches) that was wind drifted and liberally dotted with fox tracks. Looking down our beach we saw a gentle curve interrupted by the stream and terminated at its southern end by twenty-eight-hundred-foot-high (2,800) Sugarloaf Peak.



Figure 6. Our beach at Semisopochnoi

The stream was large enough to be suitable for a substantial run of red salmon but most such Aleutian Island streams are blocked with a high waterfall not far above the mouth. This stream, unfortunately was no exception; in fact there were two falls, the lower of about 20 feet and the second about 10. Above the second, the stream became level and widened into a marshy lake, very suitable for waterfowl. Our hopes for geese were not realized but there were 8 mallards and 3 Aleutian teal on the lake.



Figure 7. The interior valley of Semisopochnoi Island.

Above the marshy lake the interior valley with the lake at its upper end, opened before us. Meandering across the valley from the larger upper lake, the stream flowed into the marshy lake. Though already late June the valley was just turning green. Apparently winter's icy grip lingers in the secluded amphitheatre surrounded by mountains. The floor of the valley proved to be very wet and marshy, with many rivulets and springs tributary to the large stream. In this marshy ground, marsh marigolds (*Caltha palustris*) bloomed in lavish profusion. Only on the well drained slopes did we find the grass and heath-type cover typical of the Aleutians. Of interest to us was the remarkable development of the alpine willow. Here it was knee high with some specimens (see Fig. 8) reaching lengths of 6 feet. These were recumbent on slopes as shown in the photo.



Figure 8. Alpine willow on Semisopochnoi Island.



Figure 9. Knee high willow stands on Semisopochnoi.

We have speculated at length on the willow stands. These are not isolated instances but a prominent part of the Island's flora. Whether it is a separate species or merely an unusual soil development we do not know; but the spectacle of this one island (flanked by others where the willow is prostrate and almost always buried in the mossy ground cover) with its well developed willows invites speculation.

The lake, when we reached it, proved disappointingly sterile. Its beaches were of ash and the water was absolutely clear, lovely to look at and superb to drink, but supporting the most meagre fauna. A few glaucous-winged gulls were resting there but nothing else. The lower lake with its emergent vegetation and shallow area was of greater interest.

Despite the excellent cover and ample supplies of willow buds, neither ptarmigan nor sign of any were observed. Winter wrens were abundant, and song sparrows were noted. No eagles were observed but we recorded seeing 3 Peale's falcons. It is to the sea birds we must turn for the large avian population.

We did not have the time to conduct an investigation of sea bird colonies at Semisopochnoi. We ran straight for the Island and landed, and upon departure laid a return course over the same route. So the only observations we have are based on the few minutes of approaching and departing the Island. This was, however, sufficient to impress us with the huge numbers of least auklets. The numbers we observed near Sugarloaf Head leaves no doubt that this is a major nesting colony. In addition, we observed crested auklets and farther at sea Laysan albatrosses, a black-footed albatross, forked-tail petrels, shearwaters, and fulmars.



Figure 10. Uncle Millie Zahn enjoys a breakfast cup of coffee.

Sea otters were not abundant at Semisopochnoi but we did not observe extensive shallow water areas, a factor that would limit their abundance.

As noted earlier we found fox tracks on the beach but we saw only two of the animals, one on the beach and the other in a lava flow inland along the stream bed about 3/4 of a mile. We formed the impression of a relatively small fox population but the record shows the Island has been a good producer. The record is brief:

| | |
|--------|-------------------------|
| 1922-3 | 3 blue foxes introduced |
| 1925 | 3 blue foxes introduced |
| 1930 | 77 pelts taken |
| 1931 | 131 pelts taken |
| 1932 | 120 pelts taken |
| 1934 | 239 pelts taken |
| 1935 | 186 pelts taken |

According to Murie, sea birds form the principal food supply both summer and winter.

During our stay, a steady movement of Steller's sea lions north along our beach was noted.

We fished successfully for Dolly Varden trout in the stream mouth one evening and unsuccessfully the next.

The weather was favorable and though we should have wished to remain longer we departed on June 26th and returned to Amchitka, passing enroute through a fleet of Japanese whaling ships.

Throughout the period, though we did not conduct an organized study, we noted the marine invertebrate populations as they came to our attention. There were three items of special interest. (1) The reader may recall our previous report that the sea urchin (Strongylocentrotus drobachiensis) population at Amchitka is composed of specimens averaging in the largest sizes only slightly over 40 mm in diameter. This is generally a great deal less than elsewhere in the Chain. At Adak, where we have measured a number, the larger specimens run in the high seventy and low eighty mm diameter. We were quite surprised on May 27 to find, in the intertidal zone of an island in Constantine Harbor, a specimen measuring 85.4 mm in diameter. (2) We had looked in vain at Amchitka for specimens of Katherina tunicata, a large black chiton abundant elsewhere in the Chain in the intertidal zone. On July 10, while engaged in eagle banding, we landed on a pinnacle in Kirilof Bay and found lodged in a crevice of this rock 3 specimens of K. tunicata. These measured 110.9 mm, 105.7 mm, and 95.2 mm in length.

(3) We had found sea urchins in the g.i. tract of common eiders, and Cottam (Food Habits of North American Diving Ducks) lists this as a food item for all North American subspecies of the common eider. The

purple color imparted to the bones of sea otters by the dye echinochrome in the sea urchins they eat was old hat to us. The discovery that this was also true of the bones of the eiders was therefore no very great surprise, and Cal Lensink advises the author that in southeastern Alaska mink bones are similarly colored.

We had been told by the crews of the Fisheries Research Institute boats that rats were present on the larger of the islands in Constantine Harbor, and indeed we found this true. It had, however, been at one time part of a jetty built during the war and washed out by the sea in a heavy northerly storm in 1947. We assumed this accounted for the rats' presence but we found this is not necessarily true. On every islet offshore from Amchitka (that we visited), possessing suitable rat habitat the animals or evidence of their presence was observed. This includes in addition to the islands in Constantine Harbor, Loran Island, Fault Block Island, Chapel Cove Island, and Bird Rock. The latter might have received its introduction of rats from a small ship wrecked there in 1943 but this is not true of the others. It is noteworthy that all of these, save Bird Rock, are the sites of nesting colonial birds; and Bird Rock was until 1951 (when we established a 1080 bait station there) inhabited by blue foxes.

The morning of June 16th Uncle Millie looked out the window and exclaimed, "Oho, somebody sneaked in during the night and made a set!" We all looked, and there sure enough, just outside the Harbor was the unmistakable curve of a line of net floats. Inspection through a telescope revealed that a very large amount of fish net had drifted to the entrance of the Harbor where it appeared to be grounded. As it most certainly would be catching sea otters and anything else that went through the area we realized it must be hauled ashore. This proved a greater task than we at first supposed, and when completed we estimated that about $2\frac{1}{2}$ miles of webbing had been involved.



Figure 11. Unloading Japanese webbing from the dory.

It was clearly Japanese, having the characteristic glass and plastic floats these people use. The web was nylon, of four inch stretch measure mesh, and hung as a gill net. Evidently it had been lost in a storm and found its way to our Island. We released alive from it 3 sea otters and removed from it 3 dead ones, innumerable fish, birds, and 2 Dall porpoises.

The job took two days. We hauled the web into the dory by hand and up the beach by hand the first day. In this we were assisted by two men from the Western Electric site. The next day the FRI vessel RENOWN called at Amchitka and she assisted both with her seine skiff and power block, cutting down the labor involved. Some of the webbing had become tangled around the rocks and islets of Kirilof Point and the Harbor, and all this had to be picked off by hand. For this the dory was better than the seine skiff, so while she gathered a mass of web entangled by a porpoise we worked around the rocks.

We had the first day learned that when a porpoise entangled the web into a sort of bundle it was extremely difficult to get it all aboard the dory. We had succeeded, not only in getting the web aboard but the porpoise as well, resulting in a very greatly overloaded dory. So we were glad to have the bigger boat with greater power handle the second porpoise and associated webbing.

As the whole thing was far too heavy to remove from the beach our final act was to burn the webbing. We feared the storms of winter would wash it back into the sea where it would resume its depredations. Thus \$15,000 to \$20,000 worth of excellent webbing went up in smoke.



Figure 12. The headlands of Anchitka enshrouded in fog.

In the course of our travels both about the Island and to others we encounter many varied experiences. As widely known, the Aleutian Archipelago is in summer obscured by fog. This is a sea fog moving off the North Pacific, which when it encounters a land mass may be deflected. When the island is mountainous, especially if high, a clear region forms on the northeast slopes of the mountains and extends for perhaps a half dozen miles at sea. If this type of weather pattern develops the experienced observer can discern several clues that will guide him in forming an accurate opinion of where he may expect to run in or out of fog. When travelling the north side of Anchitka, which we do most of the time (and this is one of the reasons) we take advantage of this weather phenomenon. We have become so used to running in fog that, while we never disregard it, we set out unhesitatingly even in the densest obscurity.

One day a trip was scheduled down the south side of Anchitka to Fox Cove. Three of us were aboard, Jack, Vern and the author, and within a hundred yards of leaving the beach of St. Makarius Bay we were enveloped in an impenetrable fog. It was utterly calm weather, with only an oily ground swell to disturb the sea's surface. Our course was laid to make a landfall at Windly Island and from there we intended to proceed in contact with the land to Fox Cove, not far beyond. This was one of those occasions that served to remind us we can be wrong. Now and then a puffin or a fulmar emerged from the fog and as swiftly vanished. We crossed a shoal and recognized it by a change in the swell, and once the ghostly shape of a black-footed albatross appeared, circled the Dipper and disappeared in silence. But for these brief distractions we pursued our course uneventfully and dozed when not on watch. The fog was so dense as almost to require the Dipper to part it with her bow even as she did the sea. We thus forged ahead in a tiny world of vision, silent save for the engine.



Figure 13. Loading the Dipper in Chapel Cove, Anchitka Island.

After the lapse of a certain time it became evident that we had missed our landfall and so, knowing the land was to our north we stopped and listened for its sounds. It was there, but much more remote than we had

supposed, so we turned toward it. We ran to where the ground swell was forming a line of small breakers almost on the beach, and from this point of view the land was only a dark shadow. One thing, an occasional tremendous crash off to port, bothered us. It was unmistakably a blind breaker of considerable proportions and we had to feel our way around it. As we crept through the fog, trying to retain contact with the rocky shore, clearing kelp from the shank of the engine, while devoting our best efforts to orienting that blind breaker the whole bit became rather hair-raising. We took successive bearings on the sound of the breaker, now near, now farther off and eventually circumnavigated it. The reader may be sure the author knows now precisely where that breaker lies and how to run around it, but on that afternoon it was a problem that reduced his already limited world of vision to one in which only the face of a mariner's compass, the menacing crash of a blind breaker, and the comforting sound of a reliable engine existed. It is certainly not true that any of us dozed during this episode for the rolling crash of tons of falling water was palpable, blasting furiously out of the fog.

We had made landfall at Aleut Point (this is where the breaker lies) and the bearing of the land, which we were following closely, was changing rapidly. This fact we could only learn by relating the sounds of the sea striking against the land to the compass headings and it was a nicely balanced problem. Eventually we reached a headland that the author vaguely recognized through a hole in the fog, and then a rock used by the sea lions for a hauling ground that was clearly recognizable. Thus we camped that night at Bird Cape instead of Fox Cove.



Figure 14. The monkey flower (Mimulus guttatus) is a bright spot on Anchitka.

When returning to Anchitka from Semisopochnoi we ran for three hours in fog. Then, as under all the other similar experiences, our world was narrowed, and the face of the mariner's compass became the dominant image. This five inch circle assumed a relative importance all out of relation to its size and one carried away an exaggerated impression, as if the dory herself had been mounted in the gimbals.

Vern and the author on July 27th set out on an expedition that was intended

to take us to Buldir I. Once more we were in search of Canada geese. We camped at Bird Cape and spent the whole of the 28th there awaiting enough visibility to swing the compass before crossing Oglalla Pass. On the 29th this became possible and we crossed to Rat Island in fog, which lifted briefly just as we completed the passage. No sooner did we orient ourselves and start down the north side of the Island than a storm struck with high initial wind velocities. We were happily in the lee of the Island and we ran into Gunner's Cove half way down the coast.

The mountains of Rat I. produce furious williwaws and the anchored dory was buffeted first from one side and then the other. The winds produced rough seas that would have made a landing on Buldir I. quite adventuresome so we returned to Anchitka when the wind abated on the 31st.

While thus weather-bound we collected ten blue foxes, eight adults and two kits, of which only one adult was female. Most of their stomach contents were amphipods but one contained a single rat. We did not see any rat sign.

One day, while entering a narrow slot in an offshore rock misfortune befell us. Just as we were about to reach the entrance, a swell set the dory off her intended course and the port hydrofoil struck a rock. She ran on into the slot and calm water where we conducted an inspection. The hydrofoil was gone, sheared off as neatly as if done deliberately.



Figure 15. Recovery of the hydrofoil.

The foil is of 1/8-inch stainless steel plate bolted with 3/8-inch brass machine screws to extruded bronze hinges that are in turn bolted to a stainless steel plate screwed to the bottom of the dory. When it struck squarely against a rock with the weight of the moving dory, the six

brass bolts sheared and the whole thing fell away. The dory continued on her way without slackening her speed.

The offshore rock (we call it Loran Island) is of bedded rock tilted with a dip of very nearly 45° . It is extremely rough and where one bed has been irregularly broken it produces a long straight v-shaped slot in the rock. So it was with the slot we chose to use as a little harbor. The island was of interest to us because it was the site of nesting gulls, petrels, and eiders and the hauling ground for several hundred Steller's sea lions, mostly bulls. Our hydrofoil had fallen in the entrance to the slot and our problem was to retrieve it.

It fell in about 15 feet of water which is no problem to a skin diver except that in this case there has never been a moment in our experience when there is no surge around the island. The surge washing in and out of the slot aerates the water and its appearance is similar to that of milk. So we waited for the calmest day we could reasonably expect and returned to the island. We couldn't judge the reaction of a sea lion bull to a man in the water so Vern and Uncle Millie with their rifles took up stations on either side of the slot at its entrance to ward off any incursion. Recovery of the hydrofoil was effected without difficulty but a moment of excitement occurred when a sea lion evaded the rifle fire and entered the slot. It might have come in peace but we could not know, especially as it suddenly found itself surrounded. It seemed prudent to dispense with the animal and accordingly it was shot.

We watched with surprise a young sea otter (July 25th) catch a teal duckling. We had surprized a hen and brood on shore and they swam out about 40 yards. A sea otter showed interest in them and upon his approach they scattered and one dove. This, of course, was not a successful method of escape from a sea otter and the duckling was quickly caught. We thought the otter was eating it but apparently was just looking it over for presently the bird swam away.

We had become aware of the presence of a bald eagle's nest on Fault Block Island in Kirilof Bay, and as it was readily accessible once we were ashore, we decided to band the young birds. This was done on July 1st more as a departure from routine than anything else. There was no intent to band any appreciable segment of the Amchitka eagle population.



Figure 16. Bald eagle nestlings banded on Fault Block Island in Kirilof Bay on July 1st.

However, an inspection of the nest's contents revealed, in addition to the two young eagles, the pelts of 3 sea otter pups. This set us off on a quest for more information concerning the feeding habits of eagles and before the summer was over we visited seven bald eagle nests and banded 12 young birds. Figure 17 is a chart showing the location of these nests.

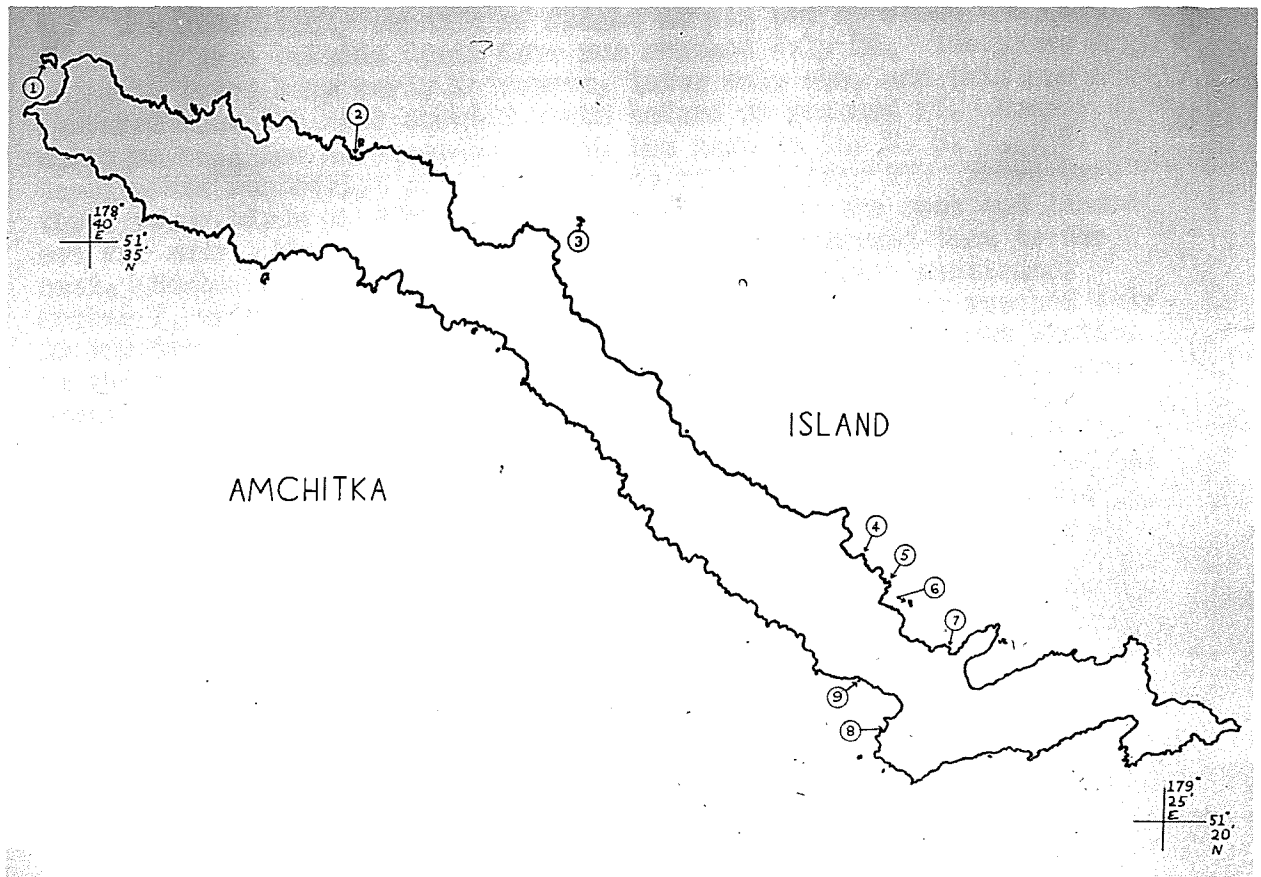


Figure 17. The location of known bald eagle nests around Amchitka Island.

At nest number 1, on Bird Rock, two eagles were banded July 15. Number 2 in Chapel Cove was observed on August 15. There were two young birds still occupying the nest but practicing flight at that time. While we watched, they alternately flew for several minutes in a hovering flight above the nest. We did not approach, hence do not have information of the nest contents. Nest number 3 on Vista Island had one large nestling visible from the dory as we passed on August 17th. As this bird too, was undoubtedly capable of flight we did not approach the nest. Number 4, just outside Cyril Cove was reached July 22. Two young eagles had been noted here early in summer, later only one, and this one disappeared from the nest about 2 weeks before we reached it. Number 5, which we call Boe in accordance with the name on the U. S. C. & G. S. topographic manuscript of Anchitka, was visited July 23. There were three young birds present, all of which flew from the nest and landed not far away. We gathered them up, banded and returned them to the nest. Number 6 is the Fault Block Island nest already mentioned. Number 7, which we have come to know as Millie's Hat, was reached July 10 and two birds were banded. Lem, a pinnacle near the Loran Station is the site of nest number 8, reached July 24. Two young birds were present and both flew from the nest. One was a capable flier and could not be overtaken; the other was caught, banded and returned to the nest. The 9th nest, across St. Makarius Bay from Lem, was reached the 25th of July and two birds were banded. One of these left the nest and was returned.



Figure 18. A bald eagle nestling banded on Fault Block Island in Kirilof Bay, July 1st.

In every one of the seven nests visited we found pelts of sea otter pups. In most cases the pelts were torn into so many pieces it was

impossible to determine the number of animals concerned. In all save one, eider duck remains were found. Rat remains were present in all seven. Fringed greenlings were noted in most of the nests, but such fish remains are rather impermanent. We formed the opinion that greenlings fell easy prey to the incredibly sharp-eyed eagle and may prove to be a principal food item for such an eagle population as exists at Amchitka. Feathers of sea birds were common in and around all the nests.

Bald eagle nests are, of course, all placed on the ground at Amchitka. The reader will recall that our island has an alpine-zone type cover of grass, moss, lichens and heath in which trees are not native. Most of the nests, however are on pinnacles which may or may not be isolated by water. Nests numbers 1, 3, and 6 are exceptions to this as they are sited simply on a jutting headland of offshore islands and are readily approachable. The pinnacles (Fig. 19) baffled us at first as they are steep and the rock (decomposing conglomerate in most cases) is not sound enough for conventional climbing methods. We learned, however, that a spinning rod and reel would cast a lead weight over these pinnacles quite admirably. Using the 5# monofilament line as a starting point we successively drew nylon twine, $\frac{1}{4}$ inch manila line, and finally our $\frac{5}{8}$ inch nylon anchor line over the pinnacle and climbed this line to the nest.



Figure 19. Bald eagle nest (number 4) on a 75 foot high pinnacle. The young eagle is clearly visible.

Millie's Hat is an isolated 100 foot high pinnacle of sound joint blocks and is quite climbable by ordinary methods. Nest number 7 was sited on this pinnacle almost at the summit. Uncle Millie ascended the pinnacle twice, the first time on July 1 to see if there were young birds in the nest. We approached it in heavy fog steering by compass and this may have deceived the eagles. At any rate, all was quiet so we decided to have a look. The climb is in five stages, first and ascent of joint blocks, followed by a traverse to another brief ascent of joint blocks. This is

surmounted by a tilted slab (see Fig. 20) which when crossed places the climber at the foot of a short chimney. Emerging from the top of this chimney he is looking straight into the nest. So it was with Millie but he found himself looking straight into the eyes of a very surprised adult bald eagle. It would be difficult to assess which, the eagle or Millie, was most surprised but the doubts of those of us waiting at the foot of the silent, fog-shrouded pinnacle were erased. We could see neither the outraged bird nor the man but we heard both. Apparently the bird all but fell off the perch and Millie ducked back into the chimney.

When we returned on the 10th of July to band these birds (we have since carried more than just enough bands for one nest) no such element of surprise existed. The adults saw us coming and were angrily circling the pinnacle when we landed. These birds were, unlike the others, aggressive and considerably delayed the climb. Uncle Millie went up first and rigged a line up which Vern and the author ascended. While this was in progress ashout went up from Millie and we all looked up in time to see one of the adult eagles carrying his hat in its talons. This is the only time in our experience when an adult eagle has physically struck a man approaching the nest. Mil said it felt much as if he had been struck with a pillow. Generally we disregarded the adults but of this pair we became rather wary.



Figure 20. Uncle Millie descending the tilted slab on Millie's Hat, Vern beyond.

There were many other eagles on the Island of which we attempted to keep no record. Moreover, it must not be assumed that this is a complete record of eagles nesting on Amchitka, quite the contrary. For various reasons the bulk of the coast of Amchitka has not been

searched for eagle nests and we have no record of inland nesting birds. It is not possible to run the dory along the Island close to the beach because of a dense growth of kelp, hence most of the nests have been found by land search afoot.

We have two records of large aggregations of eagles. The first was on June 9th when 15 juvenile birds were observed on the shore of Island Pond. No reason for the presence of this group could be adduced. The second was in the bight south of Top Side on August 15th. Fifteen eagles were standing on the beach and seven more were in the air. For this aggregation there was an obvious cause, part of a whale carcass lying on the beach.

Worthy of note was the sighting of about 100 northern phalaropes about 2 miles offshore from the Crown Reefer on July 15.

Also worthy of note was the appearance by mid-August of pink salmon in two of the creeks of Amchitka, one at Burr House Cove and other at Cyril Cove. We did not attempt to discover how widespread was the distribution of those fish on the Island.

The hatch of common eiders appeared in Constantine Harbor immediately after July 12th. There were many large broods and the Harbor was literally alive with the birds, but the broods were immediately reduced to small size with two or more hens accompanying them. Patently mortality is high. We observed one taken by an eagle.

Before closing this narrative the author wishes once more to draw the reader's attention to the status of the Canada goose on Amchitka. We endeavored quite energetically to discover if any of these geese were visiting or nesting on the Island. This enterprise was pursued throughout the duration of the project and we regret to write that the result was entirely negative.

In all, we banded 222 birds broken down as follows:

| | |
|------------------------|-----|
| Red-throated loon | 2 |
| Mallard | 1 |
| Common teal (Aleutian) | 45 |
| Greater scaup | 4 |
| Common eider (Pacific) | 10 |
| Common merganser | 2 |
| Bald eagle | 12 |
| Black oystercatcher | 1 |
| Glaucous-winged gull | 145 |

Our guests included visitors from the Naval Base at Adak. These people brought us mail and supplies and sometimes remained awhile to fish. Walt Henry, mentioned earlier, remained with us several weeks and took part in many of the activities recorded on these pages. Ben Jones and Al Hart, both of the Fisheries Research

Institute visited us in their vessels the RENOWN and COMMANDER. Hank Hansen, and Dave Spencer both of our Regional Office paid us a visit in August. Anchitka may be regarded as a terminus rather than a way stop on the world's travel routes. We saw only those who had some reason to come to the Island and these are never many.

We are, of course, deeply interested in the welfare of the band of caribou on Adak. The reader will understand why if he reads our reports of how we introduced them as calves in 1958 and 1959. We are therefore happy to learn that in mid-June Lt. Terry Turner, U.S.M.C. and a party of men from the Marine Barracks were going to the Caribou Peninsula on Adak to check on the animals.

This author knows from personal experience that it is difficult to find the caribou on the Peninsula unless they should come of their own accord. Therefore, he understood how very much effort went into the following brief note received from Lt. Turner.

- "1. '58 and '59 herds now split.
- "2. (13) animals in '59 group (1 cow missing).
- "3. '58 bulls (2) are travelling alone.
- "4. '58 cows helter-skelter over western Peninsula/we spotted 1 cow with calf!! Others surely are present!!
- "5. UF for 3 days unable to pinpoint remainder of '58 cows and calves."

The significance of this is that the cows introduced as calves in 1958 (they reached Adak as suckling calves in late June and were released in late July) have, at least in the one instance, born calves when just two years old. We have no information as to the total number of calves but the "helter-skelter" distribution of cows described by Lt. Turner suggests there are more than one.

Mr. Terry van Tebs, of the Dept. of Zoology, University of British Columbia, Vancouver, B.C., visited the Aleutian Islands on a study of cormorants. He was in the field both on Attu and Adak and has furnished a report of his observations, parts of which are as follows:

Common loon - seen in ones and twos on inland lakes at both Attu and Adak Island.

Red-faced cormorant - 400 to 500 pairs found nesting at Chichagof Point, Cooper Island, and Gibson Island, Attu. About 200 pairs found nesting on the NW cliffs of North Island, Adak.

Tufted duck - 5 males and 2 females were seen on a pond at the base of Murder Point, Attu.

Common eider - nesting almost everywhere both on the main island and the offshore rocks in large numbers at Attu Island. It was found to be comparatively scarce at Adak Island.

Peregrine falcon - 1 pair with 2 plus chicks was seen nesting 200 feet up on the NW cliff of North Island, Adak.

Bald eagle - not seen at Attu Island. Very abundant at Adak Island.

Rock ptarmigan - was found to be present on both Attu and Adak

Island where ever we went.

Black oystercatcher - A nest with 2 eggs was found at the south end of North Island. This bird was not observed at Attu Island.

Harris's sparrow - 1 seen near the Loran Station, Adak. 1 seen near Finger Bay, Adak.


Submitted by:

Robert D. Jones, Jr., Refuge Manager

This is a progress report dealing with the long term objective to restore nesting waterfowl to the Aleutian Islands National Wildlife Refuge. It is provided in lieu of the standard narrative report. During the entire report period, the Aleutian Refuge staff was occupied in field operations on Amchitka Island, hence their field of view has encompassed matters at variance with those normally documented in Refuge records.

July 8, 1961

Approved by:


David L. Spencer, Regional Refuge Supervisor