E. O. Hovey

Guadeloupe

1915

(St. Vincent) "Cluett" voyage 1915-1916

Guadeloupe - pp. 1-54.

Arctic Voyage of the "Ehrett" beyond Guadeloupe pages.

1 Map of Lesser Antilles showing route followed.

2 Map of Grande Terre w. route

Heilprin Exploration Fund

Expedition of 1915

(Guadeloupe)

The Heilprin Exploration Fund was established in 1914 by relatives of the noted explorer and geographer, the late Angelo Heilprin of Philadelphia, for the purpose of aiding geographical work under the auspices of the American Museum of Natural History. On account of Professor Heilprin's well-known work on the 1902-1903 eruptions of Mt. Pelé, Martinique, it was considered particularly appropriate that the first work under the fund should concern the active

volcanoes of the Lesser Antilles, in continuation of the work already done by the American Museum in 1902, 1903 and 1908, through expeditions of the present writer. The object of a new visit was to make a comparison of conditions past and present, in connection with preparing a critical study of all previous observations on the eruptions.

Leaving New York by the "Guiana" of the Quebec Steamship Company's line on 5 February, the city of Pointe à Pitre, Guadeloupe, was reached on the 14th and arrangements were perfected at once for making cross sections of the eastern portion

of the double island which forms the French colony of Guadeloupe. All Guadeloupe has an area of 000 square miles, of which 000 lies in the high western section known as Basse Terre and 000 in the lower portion called Grande Terre. Basse Terre is ~~is~~ volcanic in origin and has mountains rising nearly 5000 feet above sea level, while Grande Terre is wholly sedimentary in superficial character and is low in relief none of its undulating surface being more than 200 (150?) feet in elevation. Between the two portions of Guadeloupe there is a belt of mangrove swamp varying from one mile to three

miles in width, through which runs the narrow tidal river called the "Rivière Salée". A fine highway forty miles long connects Pointe à Pitre, the commercial center, with Basse Terre, the political capital. This road crosses the swamps on an earth causeway and is carried over the Rivière Salée by a pontoon drawbridge.

21
31-B The Rivière Salée, with its bordering swamps, is really an arm of the sea, but it receives much fresh water from several permanent rivers which drain the eastern slopes of the mountains of Basse Terre. Grande Terre on the contrary ~~supplies~~ gives discharges practically no surface drainage into the swamps

except ~~dur~~ intermittently during the raining season. Under the influence of the strong ~~E.S.E.~~ ~~south~~ east southeastern trade winds, a feeble current sets northward through the Rivière Salée. The current is reversed when the wind veers to the east northeast.

At 5 oclock of the morning of the 16th, Tuesday, M. ~~St~~ Sainte Croix de la Roncière, one of the most prominent of the French men of the colony, and I started from Pointe à Pitre for Porte d'Enfer, with M.G. Gaudry as chauffeur. Porte d'Enfer lies on the Northeast coast of Grande Terre and our course to it

(54)

led through Port Louis, where we stopped at 7:30 o'clock for a substantial breakfast with M. Robert Castaigne, local manager of the great sugar and rum mill there, and his wife. The capacity of the mill is 10,000 metric tons of centrifugal sugar and 6,000 barrels of rum annually. Much automatic machinery is in use in this mill. After breakfast, we took M. Castaigne with us in our motor and drove on × three or four miles to Belle Vue, the outermost of the estates belonging to the company owning the Port Louis mill. M. Castaigne had two carriages

awaiting us there and after a short delay to watch the loading of the sugar cane on to the cars of the estate ~~stone~~ railway which collects cane for the mill and ends at Belle Vue, we set out on the remaining part of our journey. From Pointe à Pitre to Belle Vue the road traverses a rather flat country, much of which is devoted to the cultivation of the sugar cane, though great areas are ~~still~~ in a wild state. Toward Port Louis and on to Belle Vue, the acreage in cane predominates.

21-17-A

Our three X mile drive northeastward from Belle Vue lay through an abandoned estate whose land now lies fallow and then plunged us into the mangrove tangle

in the shallow valley which debouches at the Porte d' Enfer. A roadway is maintained thro' the mangroves by cutting away trees and lopping off branches but many stumps have been left ~~on the roads~~ to Linder passage, and there are numerous water holes one to two feet deep even in the dry season through which the carriage must splash on its journey -

21 28 B The Porte d' Enfer is a shallow V-shaped cove in the northeastern ~~coast~~ shoreline of Grande Terre. It and the shallow valley leading to it ~~from the interior~~ are on a fault zone. The fault is marked in the interior of the island by a three mile long, low, east-ward facing fault scarp. This is

continued beyond Porte d'Enfer to Grande Vigie as a bold sea cliff. At the Porte the fault seems to trend about N 25° E (mag), to hade about 70° from the vertical toward the SSW, and to show an uplift of 80 to 100 feet on the western side of the line or zone of fracture. At the head of the cove there is a broad coral beach about 30 feet (9.1 meters) long on which the ~~ancient~~ Caribs used to land their boats on their return from the fishing grounds, before the supremacy of the whites was attained. This landing must have been a somewhat dangerous operation, on account of the surf which beats constantly on the ~~rocks~~ cliffs and ~~today~~ On the day of my visit this formed a barrier across the mouth of the harbor which

~~which~~ would have been dangerous if not impracticable for canoes or other small craft if such it can be called to negotiate. The harbor, ~~has~~ is not ~~been~~ utilized by the French, ~~that of La Moule, 00 miles~~ South ward on the same coast, being larger, more commodious and surrounded by better country for agriculture and commerce, though even it cannot be entered during the prevalence of heavy surf.

21 30-A Porte d'Enfer received its French name from a natural arch at the east side of the entrance which had been carved from the limestone cliff by the action of the waves. Some years ago the top of the arch was broken down during a

a heavy storm, leaving a a detached pillar to guard the cove. The Grande Vigie, ~~at~~ the extreme northern point of Grande Terre, is a similar detached column standing out from the mainland like a man on guard. The process of ~~formation~~ making such an arch is illustrated in a ~~little~~ small cove ~~two~~ hundred yards east of the Porte, where the sea has excavated and is enlarging a pretty little grotto. The work is aided by the jointing of the limestone.

21
30-B In this region the upper 60 or 70 feet of the limestone ~~consists~~ is an agglomerate composed of large masses of Meandrina and other corals

cemented together by indu-
rated lime sand originating
from corals, ~~and~~ other marine
animals and algae. The lower
exposed portion of the cliffs ~~is~~
consists of ~~more~~ finely comminu-
nuted material and seems to lack
masses of
coral ~~seem to be absent~~, or at
any rate they are rare in it. ~~are.~~ This fine bed
is at sea level and is greenish
black in surface color from its coating
of plant ~~growth~~ life whose growth
is ~~due to~~ fostered by constant wetting by
tide and waves.

The whole surface of the
limestone ~~is~~ has been deep-
ly corroded, wherever the sea
can reach it by wave or spray.
The result is an intricate
network of cirque-like hollows

and long or short, narrow channels. The cusps left between these depressions are sharp and trouble-some to walk over. The rough character of this surface is ~~shown~~ indicated in photos 21, 28 & 30 A. The upper surface of the cliffs is barren of vegetation for fifty to one hundred yards back from their edge, where the heavy surf casts its spray. The photographs give but a suggestion of the force exerted by the heavy surf.

Looking southeastward from the point at Port d'Enfer one sees at the base of the cliffs a narrow horizontal shelf of rock ~~at #~~ just above mean sea level. This shelf is still wave-swept but it suggests a comparatively

tively recent elevation of Grande Terre.

Another day was devoted to examining a section farther east across the island. Our route led eastward from Pointe à Pitre to Ste Anne, thence northward to Le Moule on the northeast coast and returning ~~so~~ by way of St. François on the southern coast. The traverses were over a slightly rolling country, somewhat ravined along the south shore, where hills 60 to 100 feet high were observed. The rock exposed in the road cuttings is all a soft limestone, occasionally agglomeratic in character, containing ~~frag~~ numerous pockets that yield Tertiary invertebrate

fossils. The beds show a gentle dip of about 10° toward the west northwest. The soil is fertile and much sugar cane is raised, except near (within two or three miles?) the northeastern coast, where there is too much salt in the atmosphere, on account of the strong trade winds blowing off from the ocean, ~~and the rainfall is scanty~~.

15

The town of Le Moule has the only practicable harbor on the windward coast of Grande Terre, but its use is curtailed by the danger due to the breaking of heavy surf on the coral reefs near its entrance. The cliffs characterizing the Porte d'Enfer region are

backing bank and the shore slopes ~~very~~ gently to the sea. The surface rocks are like the upper beds at Porte d'Enfer, a coarse agglomerate containing large and small masses of Meandrina and other corals cemented together by calcareous mead. The region is partly devoted to agriculture & cane growing - 21-21-A The illustration shows the sharp-pointed forms resulting from the corrosion of the limestone by the waves and spray. There are dangerous coral reefs off Le Moule and the harbor can be entered only under favorable conditions of wind and surf. A red flag flying on the old redoubt indicates that the harbor is impracticable.

A third day was de-
voted to visiting the Pointe des
Chateaux, the eastern extremity
of the island, which is at the end
of a peninsula 10 miles long
stretching out into the Atlantic
Ocean toward the small island
of Desirade, from which it is
separated by a strait 10 miles
wide. Desirade and Marie
Galante, the latter lying 20 miles to the
south, are described as being
composed of limestone ~~[illegible]~~
like that forming Grande
Terre. The Pointe des Cha-
teaux is a rugged cliff rising
vertically on the south, more
gently on the north, to the
height of about 70 feet above
mean ~~low~~ sea level. Like

Porte d'Enfer it is composed of a heavy bed of brain-coral agglomerate, lying upon a grayish or yellowish green calcareous sand-rock. The sand-rock is exposed for ~~a long~~ ten feet above sea level, is free from the large masses of coral which characterize the upper bed and has been much blackened by the action of the seawater. There is no apparent discordancy between the sand rock and the overlying agglomerate. The strike of the beds is about ~~N 60°~~ N. 30° E. and the dip 10° or 12° toward the W.N.W. Near the sea the surface of the rocks, when nearly horizontal, is roughly corroded, as at Le Monde and the Porte d'Enfer. The

cape behind the Pointe des Chateaux is low and ~~much~~ largely covered with thickets of the sea-grape. Rainfall is scanty. Near the northeastern shore there are several "salt pans" where formerly salt was prepared commercially from the sea water. Wild goats and sheep abound.

The elephant tooth from Guadeloupe which was described by ~~him~~ and on which much speculation has been based regarding ~~the~~ a former connection of the Lesser Antilles with continental America is stated by La Ronciere and ~~him~~ to be untrustworthy. They say that the tooth was brought to the island by some travelers. ~~It~~ Alone and with

its doubtful history it seems 20
weak evidence for an old land
connection with South America,
as compared with the strong
contrary evidence presented by
the ~~Islands~~ Lesser Antilles themselves in
their nature and in the certainty
of their comparatively recent eleva-
tion through some hundreds of feet.
This recent elevation of the chain
of islands is indicated by the
elevated sea beaches, sea
grottoes and beach lines that
occur in a constantly
rising series from Grenada
to ~~Saba~~ St Eustatius (100? ft
on Grenada, 1500? ft on St Eu-
statius). Guadeloupe has risen
some 900? feet in this recent
emergence. There is no evidence

(over)

The second and principal object in stopping in Guadeloupe was to visit again the Grande Soufrière and its fumaroles, to compare the condition of the latter with the observations made in 1903 and 1908. Hence, M. de La Roncière and I left Pointe à Pitre at 6 o'clock of the morning of 19 February by the autobus which carries the mail daily to ~~the town of~~ Basse Terre, ~~forty miles distant by road~~ which is on the Caribbean side of the high island of the same name. The colonial highway crosses the Rivière Salée on a pontoon/drawbridge [See p. 4] Basse Terre island as far as known is entirely volcanic in origin (Dimensions

and area?) It consists (22
of a series of great volcanos
the principal of which
from south to north are
Vieux Fort, Grande Citerne,
L'Echelle, Grande Soufrière,
Nez Cassé, ---, ---
Deux Mammelles (make
list complete + include
altitudes.) Warm springs
are reported ~~from several~~
as ~~exist~~ issuing at several
localities, but the geography
of the high mountainous
district is but little known
The present distinctly volcanic
activity of the island is confined
to the Grande Soufrière and
its neighboring mountain
L'Echelle

The colonial highway, after crossing the Rivière Salée and its bordering lowlands, turns abruptly southward and skirts the coast as far as Trois Rivières. [Then it begins to ascend the high ridge connecting the Vieux Fort mountains with the main back bone of the island] It crosses many flood ash deposits or slopes of débris which have been brought down from the mountains by stream and flood action. The eastern slopes of the high mountains face the trade winds and receive much more moisture and rain than the western. Streams therefore are more numerous, copious and permanent, the slopes more graded and

the flats more extensive. Deposits of red clay are abundant. The mountain axis of Basse Terre lies west of the middle of the island. The western slopes of the mountains receive much less moisture and rain than the eastern. They are much steeper than the eastern, the valleys are more profound, the lowlands are narrower or lacking entirely.

West of Trois Rivières the road rises rapidly to gain the top of the high ridge or col connecting the mountains of Vieux Fort with the main mountain range of the island. On this ridge there is an area of ~~lava~~ lava blocks and other débris which apparently issued from the Soufrière (Grande) and which

is supposed by some to be the ash flow of the eruption seen by Columbus when he discovered Guadeloupe in 1493. [N.B. La Roncière says that this is described or mentioned in the son's life of the Admiral.] The bed looks as if it might be assigned to an outbreak as recent as that would be. It is reported that there are extinct fumaroles surrounded by sulphur deposits in the top of the massif of Vieux Fort. De La Roncière stated to me that he had visited them.

X The old fort south of the city of Basse Terre rests upon a ridge of ash agglomerate which betokens an ancient

eruption of the Grande Soufrière. Many similar records of old eruptions are to be found along the coast as well as in the interior of the island. Although there are many ~~solid~~ beds of solid lava exposed, and domes of lava appear in the mountains - as in the cone of the Grande Soufrière - it seems probable that the major portion of the land mass is composed of fragmental ejecta. If the Grande Soufrière can be taken as a fair sample of the volcanoes of the island, andesite (what kind?) predominates among the lavas and explosive eruptions have been the more common type of outburst from the vents.

Arriving at the town of Basse Terre at the usual hour of 10 o'clock, M. de la Ronciere and I were met at the autobus garage by M. Hubert Anceline and taken to his home for an elaborate breakfast. After this, we drove out northward from town to the place where there is still in operation (21-38 A) a rum distillery established by the famous missionary of the seventeenth (17th?) century, Père Labat. This Jesuit father made a profound study of the Caribs and as well as of the negro and French population of the French West Indies and instituted many projects for the betterment of the condition of the laboring classes. Here (where?)

he had a large monastery the ruins of which still stand near the old rummery. In its garden were carried on experiments in agriculture and gardening as well as horticulture. One of the products was a delicious white, slip-skin grape similar to the Niagara grape of western New York state. Pirates infested the Caribbean Sea in Père Labat's time, hence the good missionary had to erect a tower of defense near his monastery and distillery for their protection. The old D monastery's ~~fields~~ estate lay upon an low angled slope of volcanic ash coming down

from the Grande Soufrière. [29]

M. de La Roncière and I were planning to spend at least two nights on the summit of the Grande Soufrière, hence we secured hammocks and supplies from Anselin and set out by carriage late in the afternoon for Saint Claude where we were to spend the night on our way to the mountain. Saint Claude is healthfully situated about 1500 feet above the sea and is the home of many men doing business in Hot Basse Terre. Contiguous to it is the former military establishment of Camp Jacob in which are the governor's residence and an excellent

hospital. Hotel accommo- (30
dations in St. Claude are lim-
ited to the excellent little inn
which has been kept for years
by three Sisters of St. ~~Joseph~~ Paul
who took up this means of mak-
ing a livlihood, when their
nunnery was secularized
by the national government.
Kinder or more thoughtful hosts
could not be found than these
ladies prove themselves to the
travelers who seek shelter be-
neath their roof.

Early in the morning of
20 February I left the hostelry
and called for de La Roncière
at the home of the friend with
whom he had spent the night
in a former officers house

in Camp Jacob. Our two negro porters were on hand for their service (21-45-13) and at ten o'clock we reached Bains Jaunes. This is a favorite place of resort 1500 feet above St Claude or 3000 feet above the sea, where a warm spring gushes from the mountain side in the midst of the dense tropical forest. A pool some fifty by fifteen feet in area and about five feet deep at the maximum has been walled formed by building a wall. The water is only tepid now and de La Roncière says that its temperature has decreased noticeably within the last ten years. Without having actual figures at hand, his

statement seemed to me to be correct, as I recalled the bath as it was in 1903 and 1908. The Club des Montagnards of Guadeloupe maintains a rest and bath house beside the pool for the convenience of its members and guests.

My friend and I rested for a few minutes near the pool enjoying the view over the southwestern portion of the island and the Caribbean Sea which is to be obtained from a clearing in the woods which was once occupied by a dwelling house and its garden. Then we pressed on through the diminishing forest and at its upper limit stepped

aside at an angle of the
~~fo~~ trail to get the magnificent
view ~~from~~ commanded by an
outlook shelter overlooking the
gorge of the Matylis, the bowl-
shaped crater of La Grande Citerne
and in the distance the maze
of peaks comprising Vieux Fort.
From this point the trail ascends
rapidly through low bushes
to the open slope at 500 feet
above Barre James which
is thickly covered with wild
pineapple and luxuriant
moss. Flowers are abundant
here, among which we no-
ticed with particular pleasure
a pretty little white orchid
of terrestrial habit. ~~The Trail~~

The trail reaches the base

of the cone at about 3800 feet above the sea, where begins the thousand foot ~~steep~~ climb to the summit plateau of the volcano. The side of the cone is steep, averaging from 40° to 45°, and the ascent is a veritable climb, which it is advisable to take early in the morning to avoid the fierce rays of the tropical sun. The whole cone is thickly covered with long moss, the masses of which are beautiful at this season of the year with their shades of light yellowish green, greenish yellow and flesh pink.

At about noon M. de La Roncière and I reached the hut ~~built by~~ of the Club des Montag-

wards, which was erected with much labor in 1904 (?) and stands in a sheltered spot near the pinnacles of rock which form the Porte d'Enfer. (21.46.A) Hut

The hut is a simple affair of one room, containing a table in the middle and a bench around three sides, but it is a welcome shelter from the rain which often falls on the mountain and from the keen wind which sweeps over the summit and chills one to the bone in the pervading dampness. We spent two nights here on this occasion in comparative comfort, sleeping in hammocks swung from the roof timbers. Our negroes slept on the benches, but one of

them ~~sel~~ was much dis-
turbed by noises which he at-
tributed to "Zombi" (or spirits),
but which
really were the whistling of the
wind and the hissing of one
of the strong fumaroles. The
man had never before been on
the summit of the Soufrière
and every strange sound ap-
pealed strongly to his vivid
imagination. He felt better when
he had hung his blanket over the
only window in the hut to pre-
vent the zombi from coming
in, though he had to sleep cold
to pay for his precaution. For-
~~tunately~~ tunately for us the doorway,
which could not be closed, pro-
vided ventilation while we slept
during the
night. The ~~temperature~~ mercury dropped to

perhaps 10°C (50° F) during the night, though Le Boucher (reference) states that temperatures as low as 0° C (32° F) have been recorded on the top of this mountain.

The summit of the Soufrière is characterized by pinnacles and ridges rising from 50 to 150 feet above the general level of what is called the summit plateau. The most prominent of these as viewed from the west are called the Piton du Nord and the Piton du Sud. (21, 45, A + 21, 44, A). The western trail skirts the base of the latter and within 150 yards passes through the Porte d'Enfer (21, 46 A or B), which is the name given

to the great cleft between a 50 foot pinnacle and a ridge. The topography of the summit is so much like that of Mt. Pelé of Martinique that the similarity in origin of the two cones, as brought out in my ~~[illegible]~~ articles on the Caribbees in 1903 and 1904 (Ref.) seems to be fully established and was emphasized in my own mind by the present condition of the summit of Pelé as observed later in this year's expedition. (Add descriptions of other pinnacles and the great clefts, particularly the Grande Fente, from previous notes and de Bonchar's map)

As soon as M. de La Roncière and I had dispatched our luncheon after arrival at the Club's shelter we proceeded to the great fumaroles to take their temperatures, going first to the one called Cratère Napoléon Here are ~~four important~~ five vents in the cone of the Grande Soufrière from which steam issues now or has issued ~~in~~ within the past thirteen years. Four of these are associated with the Grande Fente - Lac de Soufre, Cratère du Nord, ~~which has three openings,~~ Cratère du Sud and Cratère Lacroix - and one, the Cratère Napoléon, in the most important secondary fissure traversing the cone. The Lac de

Soufre is the largest and (40
most important of the whole
series but its vent or is inaccessible.
(Illust. from 1903 photos)
It lies within the Grande Fente
where that fissure cleaves the
solid lava from top to bottom
of the north side of the cone.
One can stand beside the fissure
and look down into the cham-
ber some eight or ten feet in
diameter which seems to con-
tain the principal vent, if
there be more than one outlet
for the steam. This chamber
is beautiful, with its complete
lining of sulphur in crys-
tals. Below this chamber is
another smaller room in which
one can see pendent "stalactites"

of sulphur, but they are made by ascending vapors instead of descending solutions as in limestone grottoes - Le Boucher (reference) gives the following account of the old sulphur cave (translation from Le Boucher):

The opening leading into these chambers is said to have been closed by a landslide which took place in 1843 at the time of the great earthquake destroyed the city of Pointe à Pitre and shook the whole of Guadeloupe. Apparently this landslide closed the lower end of the Grande Fente, below the Lac de Soufre, but it seemed to me as I stood above the "lake" that

the old sulphur chambers were still existent and that entrance to them could be gained by means of a rope or a rope ladder. The rumbling within the chambers is strong and a large volume of steam issues from them, but no temperature observations could be made or gases collected. To the senses there seemed to be somewhat less strength of discharge than at the times of my visits in 1903 and 1908.

The Cratère du Nord lies in the Grande Fente, ? yards south of the Lac de Soufre. It now has three principal openings, which are arranged along a line running N 5° W – S 5° E

The northernmost of these is the most active, the steam issuing with force enough to throw out pebbles an inch in diameter when cast into the vent. Two temperature observations here one at six inches and the other at nine inches below the orifice gave the same results, viz 99.5°C. (correction ok?) collected gas for analysis. The second vent, some ~~ten or twelve~~ 12 or 15 feet south of the preceding, gave forth a gentle column of vapor and its temperature 18 inches below the bottom of its little crater was 95°C (21,52 B) The third vent, about ten feet still further south, discharged so

little steam and this was so endurable by the bare hand that its temperature was not taken.

Proceeding southward there are no other fumaroles in the Grande Fente until the south side of the cone is reached. Here about 50 yards below the top of the cone one finds the Cratère du Sud. The actual orifice of this fumarole is in the bottom of the narrow open fissure which the Fente here present. It is wholly inaccessible and is not very active. Warm vapor rises gently from the fissure and no hissing noise could be heard. We undertook to ~~sound~~ measure the depth of the cleft with a stone tied

to a cord. The stone ceased descending when × feet of cord had been let out (Vid. Quad-Nt. Bk No 1 p. 24) Stones thrown into the open fissure where the vapor came out returned the noise of falling for seven seconds. Thrown in three yards distant on the same fissure they could be heard for ten seconds. These experiments may indicate a depth of approximately × feet.

Cratère Lacroix, 300 feet below the top of the cone on the Grande Terre, is the most southern of the Grande Soufrière fumaroles. It was first observed in 1902 (?) and received its name in honor of the famous

French ~~geologist~~ mineralo-
gist whose masterly reports on
the 1902-1903 eruptions of Mt.
Pelé are well known to the
scientific ~~world~~ world.
This vent has now ceased
its activity. A small deposit
of sulphur marks its location
but no warm vapor now issues
from ~~it~~ it.

Next to the Lac de Soufre
the Cratère Napoléon is the
most important and interesting
fumarole of ~~Guade~~ the Grande
Soufrière of Guadeloupe.
This vent is in the southeast-
ern quarter of the summit
plateau of the cone and is
associated with the long se-
condary fissure, which

traverses the cone from SSE to NNW. (Cf. LeBoucher's map) making a gigantic letter X with the Grande Fente. The Cratère Napoléon (21,54 A or B) fumarole rises through a small cone about three feet high and twelve feet in diameter situated in the northwestern quarter of a shallow oval saucer-like depression or crater about 100 feet across. Apparently an explosion took place here at some time (look up eruption of 1857) and the present fumarole is the residue of the activity which caused that explosion. Considerable sulphur has been deposited in and on the little cone. Steam issues from

the vent with so much force that it supports a stone four inches in diameter thrown into the orifice and with ~~so much~~ noise brought to be heard distinctly at the Club's shelter a half-mile (verify from map) distant, when there is no wind. It was necessary to tie my thermometers to a stick to get the temperature here, which proved to be 99.5° C at a depth of 15 inches below the surface of the ground. This fumarole seems to be unchanged in condition from ~~that~~ of 1903 and 1908. (what it presented in)

On the northern edge of the outer cone of the volcano, in line with Grande Fente, the

Fumeroles Colardeau first came into notice in 1902, after the eruptions on Martinique and St. Vincent began. These ~~vents~~ fumaroles never were vigorous enough to destroy much vegetation around their vents. Now a gentle column of steam indicates their position and their activity certainly has not increased since 1908.

South of the Grande Soufrière and separated from it by a comparatively shallow valley, whose floor is 550 feet above the western base of the Soufrière, rises the older volcano known as L'Echelle. On the L'Echelle side of the saddle between the two mountains, in line with the Grande Fente, active fumaroles broke out in the late spring of 1902, or at any rate were first no-

ticed then. The vents rapidly (50
increased in number until there
were scores of them over an area
several acres in extent at the
base of the irregular cone or upper
slope of L'Echelle and the steam
rising from them was distinctly
visible from Pointe à Pitre. The
vegetation of the area was killed by
the escaping gases and their heat
and much anxiety was felt by
the inhabitants of the island
lest the Grande Soufriere join
in the devastating activity of
Mt. Pelé and the Soufrière of
St. Vincent. The area which was
so active in 1902 still ~~shows~~ has many
active small vents scattered over
it. These are from one to three inches
or more in diameter. Most of these

are lined with a coating of crys- (51
tallized sulphur and discharge
~~hot~~ moist hot air. Three were
tested with the thermometer and
gave a temperature of 95° C.
One having almost no sulphur
in it had a temperature of 96° C.
During the last few years the burnt
area has not increased perceptibly toward the east, but it has
spread up the slope of L'Echelle
where new vents have opened and
boiling springs have developed.
These seem to owe their origin mainly to
the damming of surface drainage
from the mountain. The lowest
of the springs is now five to six
meters in diameter, almost circular in outline and is ~~and is~~ and
more than one and one-half meters

deep. The principal boiling (52
is in the eastern third of the spring
and the temperature of the water
there is 94° C. In 1908 there was
a much smaller boiling spring
at this spot, but it was less ac-
tive crater contained no water
in the dry season and its activity
seemed less than it is now.
About six meters up the slope
there is another similar spring
about six meters long and three
meters wide which was not in
existence in 1908 and which
is new even to M. de La Ron-
ciere's ~~experience~~ observation,
and he is a frequent visitor
to the locality.

I should say on the whole
that there had been no decided

change in the Grande Soufrière fumaroles since my first visit in ~~February~~ April (?), 1903. The noticeably lessened activity of the Fumeroles Colandeau, Cratère du Sud and Cratère Lacroix ~~is~~ is counterbalanced by the increased ~~activity~~ area occupied by the vents on the slope of L'Echelle. The slight diminution in the discharge at Lac de Soufre and Cratère du Nord may be more apparent than real, while the Cratère Napoléon is certainly as strong now as it was then, ~~if not stronger.~~

Returning with difficulty through the upper reaches of the gorge of the Matylis, ~~N. de L.~~ we reached the pools of sulphur-

ated water at the southwest base of the cone of the Grande Soufrière and found them to be distinctly lower in temperature (to the hand) than they were in 1903 and 1908. There are warm springs in other parts of the island, but nothing is known about their actual temperatures (but look up Le Boucher's descriptions) or any changes that may have taken place within recent years.

(N.B. From my note book 9dlpe 1. pp. 35 to 47 and the literature prefare a sketch of the rest of the island.)

Guadeloupe.

Grande Terre

The low Grande Terre portion of Guadeloupe is larger than the mountainous Basse Terre part, from which it is separated by broad mangrove swamps. Through these flows ~~back and forth with the tide~~ the brackish arm of the sea called the Rivière Salée, freshened by the rivers flowing constantly ~~from the~~ from the mountains of Basse Terre and during the rainy season from the flat surface of Grande Terre as well. A slight northward current sets through the river ~~from~~

~~times northward and sometimes southward~~ under the influence of the easterly trade winds [N.B. Find out whether this current is variable in direction and how variable in strength]

The mangrove ~~swamps~~ look to be impassable, but shallow, tortuous natural canals give boat access to most parts of them. They are a great resort for ducks and other migratory water birds during the winter months and hunters' huts are perched on piles in some of the lagoons in their northern part. The highway from Pointe à Pitre the commercial center to Basse Terre the political capital of the Colony crosses the Rivière

Salée by means of a pontoon drawbridge. Cultivation comes out a short distance onto the flats bordering the swamps, but not far, since the land is too wet to support it.

Grande Terre ~~is of an almost equal sided triangle~~ comprising 000 square miles in area. It is roughly speaking an isosceles triangle lying upon one of its longer sides. Its southern side extends ~~nearly~~ from Cape — nearly due east to Pointe des Chateaux twenty? miles. Its windward side stretches another twenty miles from Pointe des Chateaux northwestward to the Grande Vigie. Its western

side, fifteen miles long, runs irregularly S.S.W. from Grande Vigie to our starting point - Pointe à Pitre, with a population of about 20000 people, lies at the northern end of the southern one third of the western side. The surface of this portion of the double island of Guadeloupe is undulating, but no hill rises more than 200 feet above the sea. The southwestern part of the triangle might even be described as hilly, while the northern angle shows a fault scarp bluff 80 to 100 feet high trending southward for about 6 miles from Grande Vigie toward the middle of the island. No permanent stream of water is

found in any of the shallow valleys.

Grande Terre is an elevated coral reef and shoal, and the numerous fossils in some parts of its rock indicate the abundance of Molluscan and other invertebrate life in the region during late Tertiary time. The road-metal quarry on the southern edge of Pointe à Pitre at the end of Rue Alexandre Isaac are highly fossiliferous in many parts. As far as I saw, the fossils were all molds ("casts") of the interior and exterior of the shells, the shell substance having been entirely leached out. The rocks exposed in the numerous road cuttings examined

were of lime sand and gravel, often breccia-like in appearance, the hard lumps of which contained many small fossils, gastropods, lamellibranchs, etc., but there were apparently no corals in the western half of the island. Corals (particularly Meandrinas) are abundant, however, in the upper beds at Porte d'Enfer, Le Monde and Pointe des Chateaux along the north-eastern coast; and the rock of Porte d'Enfer seems to be continuous to the Grande Vigie. At and above the sea level along this windward coast there is a beach band fifteen or twenty feet wide. This has been made by the action of sea beating against the cliffs. It differs some-

what from the overlying beds, in that distinct macroscopic fossils seem to be lacking. The rock is a calcareous meal like the cement binding together the corals and other fossils of the upper beds. The meal is perhaps algous in origin. Often it is like hardened mud in texture

St. Vincent.

Leaving the hospitable shores of Martinique with regret at ten o' clock in the morning of Friday, 26 March, I boarded my old friend the Quebec S.S. Co's liner "Guiana" and about half after one the ship was under weigh for St. Lucia. The day was beautiful and the three and one-half hour run across the channel between the islands was very enjoyable, giving delightful relief from the hot days spent in ruined St. Pierre, on the arid ~~west~~ south-western slopes of Mont Pelé and amid the sugar plantations and torrid hills of Lamentin, Vauclin and Ducos in southeastern Martinique

Arrived in Castries, St. Lucia, I found that I could get passage to St. Vincent the following night on the little sloop "Glen Nevis", bound for Grenada with coal. Since this would expedite my arrival at my destination more than a week over going to Barbados and taking the Royal Mail steamer thence to Kingstown, St. Vincent, I speedily got my needful baggage and outfit off the "Guiana" and bade farewell to the newly formed acquaintances of the trip from Fort de France. The evening in Castries passed quickly in the company of old friends, made on previous visits en route to and from St. Vincent, and the following day was fully occupied with correspondence, walking about town and completing arrange-

ments for the trip on the sloop. Late in the afternoon my effects were put on board the little boat and before half after eight we were standing out of the harbor. The wind was favorable, the sky was almost cloudless, the moon lacked but three days of fullness, prospects were good for a satisfactory voyage to Kingstown. Persons who have traveled on these small coasting vessels ~~sleep~~ avoid their cabins and sleep on deck unless it rains heavily. Hence my Castries landlord had loaned me a canvas ~~chair~~ deck-chair and I soon made myself comfortable for a night in the open. The wind held so good that we crossed the channel between St. Lucia

and St. Vincent under a reefed mainsail. The sloop's master said that we should ~~be~~ be at Kingstown in twelve hours from Castries, but we were only off the northern end of St. Vincent at sunrise. The wind died down and later became contrary and it took us till four o'clock Sunday afternoon to beat down the leeward side of the island and reach our destination. The heat, glare and inaction of the day overwhelmed the beauties of the moonlight sail across the channel.

A friend had ~~his boat awaiting me and it~~ arranged with the port authorities and the custom house to admit our sloop without delay in spite of the day's being Sunday and had his boat awaiting

ing me. Hence it did not 15
take me long to get ashore, satisfy the customs authorities, with the aid of my letter of introduction from the British ambassador at Washington, and reach the hospitable home of my helpful friend, J. MacGregor MacDonald, Esq.. Mr. MacDonald was a near-by eyewitness of the great eruption of the Soufrière of 7 May, 1902, and kept notes which have been published [Century Magazine. See also my accts. in Mus. Bull. & Nat. Geogr. Mag.] forming the best, and a most useful, account of what happened on that eventful day.

On the day after my arrival, the Hon. C. Gideon Murray, ad-

ministrator of the colony, gave me an interview in the course of which he cordially pledged the co-operation of the insular government with the American Museum in the preparation of a large-scale topographic map of the region surrounding the crater of the Soufrière. The plan was for Mr. J. Landreth Smith, the Crown surveyor of the colony, to go into camp with me on the mountain, and Tuesday afternoon I took my outfit with me to Chateaubelair by canoe, a heavy ~~load~~ bulky load for the little conveyance, leaving Mr. Smith to follow me by the regular mail canoe on the next day. He came according

~~to Richmond~~ I went directly to Richmond Vale, the manor house of the Fitzhughes Estate belonging to the Mac Donald brothers, which I made my base during the fifteen days that I spent on and about the leeward (western) side of the Soufrière. The house commands an unobstructed view of the summit of the volcano four (?) miles distant, and it was from here that Mr. Mac Donald made the valuable observations on 7 May, 1902, to which reference has already been made.

The following day, Wednesday, 31 March, was ~~beautiful~~ fine and about sunrise I left Richmond Vale for the top of the Soufrière, taking Forest Ranger Jimmy James with me as guide and porter. Arriving at the rim

of the great crater at eleven o'clock, a beautiful panorama was spread out before my eyes. The surface of the ~~emerald green~~ lake stands many feet above the level which it held in 1908, ✕ James says ~~in fact~~ that the water ~~is now~~ seems to high to be higher than it was before the eruption of 1902, judging by his recollection of the old marks within the crater, but such an opinion cannot have much value on account of the changes in the appearance of the crater caused by the eruption, now occupies fully the bottom of the crater, the water covering the talus slopes, and ridges and flats that were visible in 1903 and 1908 except for the uppermost parts of the débris cones at the base of the vertical northeastern walls.

The emerald green water pre-19
sented a ~~striking contrast in~~ wonderful combination of color
~~when contrasted~~ with the grays, purples
and ~~grass~~ vegetation greens of the walls of the
crater. [Incorporate here pp. 19a-c
of this book]

After selecting a camp site in the head of a gully thirty feet below the rim, where it seemed as if our tents would be protected from the easterly trade winds, we left the summit at 10 o'clock and went down to Chateaubelair to meet the mail canoe and complete arrangements for making camp on the mountain the next day. Mr. Smith arrived according to schedule, but on the way to Richmond Vale to spend the night he fell from his horse and injured his shoulder. ~~so that he was finally~~

~~obliged to give up the plan of going into the field on the map work.~~
While awaiting ~~the~~ knowledge as to the extent of Mr Smith's injuries, I spent a day visiting the Lankai Valley and the coast as far as Balein Point and another day on the Richmond Estate and in the gorge of the Wallibon River. Mr Smith's shoulder getting worse he returned to Kingstown on 2 April for medical attention. ~~And~~ I followed the next day, not deeming it advisable to spend Easter Sunday and Monday alone on the Soufrière on account of the numerous and sometimes boisterous young men and women who make an annual pilgrimage to the summit on the latter days.

On Monday, Mr. MacGregor MacDonald and his brother Duncan and I went by automobile northward along the windward coast as far as the road was passable and then walked a mile further. This journey took us across the area seriously affected by the 1902 eruption, from Georgetown to the south bank of the dry river on the north bank of which stands the revived village of Overland. Then, returning in the car to the Orange Hill Estate, now the property of Mr. Charles Barnard, I went on horseback with Mr. Childs manager of the estate across its fertile fields, which have been restored to more than their pre-eruption production of sugar-cane, and across the still

unrestored acres of the Lot 1K 1/2 Estate to a point on the brink of the gorge of the Rabaska River whence a good view was obtained of the changes which have taken place therein since my last previous visit, in 1908.

It being evident that Mr. Lambeth Smith's accident was too serious to permit his going into camp with me, ~~Mr.~~ B. A. Spence one of his assistants was detailed to go in his place and we went to Chateaubelair in the old mail canoe "Mizpah" on Tuesday, 6 April. Telling Jimmie James to have our negro porters ready for an early start the next morning, I went to Richmond Vale for the night. At sunrise I was again at the

colonial Rest House in Chaubelair, where my camp outfit was stored. Spence was on hand promptly, but it was nearly eight o'clock before we could get our impedimenta loaded into the small row boat that was to convey us to the mouth of Trefle Valley, an old course of the Wallibou River, whence the trail starts up the leeward side of the Soufriere. Here we were met by those of our porters who had walked over from Chaubelair and there began at once the interesting and amusing process of distributing the packages so that no man should have more than 75 pounds of weight to carry up the mountain. Soon after nine o'clock the

long line of 17? men, including Spence, Jansen and myself, were wending our way along the gently rising floor of the Trespi Valley which forms the prelude to the steep trail leading to the crater rim, 2900 feet above the sea. About Two hours of steady work brought us to the rim and my men soon leveled off the spot which had been selected for a camp site, the tents were erected and everything put into order for the work of the expedition. But the nearest source of drinking water was about a mile away and 1000 feet ~~lower~~ down the trail. The trail too was so steep for part of the distance that the "heading" of a five-gallon demijohn of water every day was no light task and rendered us careful in the use of the

indispensable material.

The day after our arrival at the summit gave us good weather, though the wind was strong, and we circled the crater, establishing four poles and flags on the rim for the main stations of our triangulation. This however was the beginning of a week of bad weather with almost continuous high wind and much rain. It was impossible to do any theodolite or plane table work, and Sunday morning the gale was so severe that the negroes' tent was "done bust down", to use their expression, about five o'clock. At sunrise they crawled out from under the canvas, patched up the hole and erected the tent again. Again it ripped and again was sewed up, but the repairs lasted for

storm rain

only a short time before a gust of wind tore the cloth beyond present repair and the wreckage could be used only for covering the camp boxes. Meanwhile my tent, which was a new one, was being slatted about so in the wind that Spence and I were kept busy renewing its anchorage in the soft ash and lapilli, and there was constant danger of its being swept away down the mountain. That afternoon we struck the good tent, cached most of our effects under ~~the can~~ a ~~good~~ tarp ~~hung from the wreckage~~ and started down the trail in search of a more protected camp site. This we found in the lee of some pigeon-berry trees not far from our water hole 1000 feet below the rim. Leaving what packages we had brought down,

we proceeded to Richmond Vale and Chateaubelain for the night. The next morning we returned with ten men who ~~fa~~ leveled off our new camp site and brought our luggage down from the old site, so that we were established in our new home by ~~ab~~ noon. The wrecked tent was repaired so that it could be used in the lee of the prigonberry trees. Spence and I with two men spent the afternoon on the rim of the crater, but could do no instrumental work on account of ~~the~~ high wind. ~~that was blowing~~.

The bad weather continuing on Tuesday, Spence went down to Chateaubelain in the afternoon and reported to headquarters. He came up ~~again~~ early the next morning

but went down again before noon, since rain, wind and cloud portended no opportunity for field work on the mountain. There being less mist in the air on the 15th, James and I started for the rim in the rain at 9:30 in the morning. Perseverance was rewarded, the weather began to clear by noon and in the latter part of the afternoon conditions for theodolite work were almost ideal. The fine weather continued through the next three days and enabled me to do all the important work for which I had planned, except the making of the topographic sheet. The surface of the lake was determined as being 779 feet below the rim of the crater where the leeward trail arrives, and 1386 feet below the highest point of the rim, which is on the northern side.

The chief changes in the volcano as compared with 1908 and 1903 consist of the rise of the waters of the crater lake, the removal of loose ash and lapilli from parts of the mountain slopes and from the valleys of the Wallibou, Rabaska and other radial rivers, the advance of vegetation over the area devastated by the eruption, and the restoration of cultivation on several of the old plantations. The surface of the lake determined by theodolite observation to be 779 feet below the point on the rim where the leeward trail arrives, or 2121 feet above the sea, taking the elevation of the rim at 2900 feet above the sea as the average of aneroid readings taken on three traverses of the trail on different days. The highest point of the rim, which is on the northern side of the crater rises 1386 feet above the present surface of the lake (Cf. elevations on Admiralty chart). Over-

James, who is a colonial forest ranger of long experience on the Southfield, says that in his opinion the crater lake now stands at a higher level than it did before the eruption, judging from landmarks beneath Lavigal Peak with which he was familiar in the old days and which he now recognises. It seems to me, however, that not much reliance can be placed upon this opinion, on account of the changes which have been produced by the eruption. Before that took place there was much more vegetation on the southern, southwestern and western walls of the pit than there is now, and the denudation has made changes in the appearances of things. There does not seem to have been much if any enlargement of the crater in these quarters or on the north, above

the level of the lake's surface, but toward the northeast, east and southeast there has been an undeterminable increase, caused by landslides into the crater from the undermined walls. This has been greatest toward the northeast where the old walls are vertical, and the slides have continued to the present. (Cf former note books and photos) Prior to May, 1902 a ~~_____~~ rest house ~~which~~ stood on the brink of the crater where the trail from the windward side arrived at the top of the mountain. James showed me that the ground on which this structure stood had disappeared. Without doubt it had slid down into the pit. The greatest activity of 1902-1903 was probably centered in the south-

Aside from the increase of vegetation the exterior of the ~~old~~ cone, the slopes of the mountain itself, does not present much change in appearance from that of 1908. The coarser, loosely compacted ash has been largely washed off, leaving behind an increased exposure of lapilli composed of countless little bombs or ~~rounded~~ bits of lava that became rounded and more or less nearly spherical in shape as they cooled from fusion before falling to the ground. The fine, dust-like ash retains more of the rain that falls upon it than does the coarse ash and its particles adhere to form a firm and resistent mass. It is gray in color and my helpers spoke of it as "cement". ~~At~~ In preparing my second

camp site for the tents we dug through eight
alternations of thin beds (quarter inch
to one inch thick) of the hard mud and
loose coarse black sand into a bed
of "cement" which we cut into for
six inches without reaching its bottom.
This thick layer recalled to mind
the ~~sea~~ morass of soft mud which my com-
panions, Messrs. J. A. Jaggar Jr., G. C.
Curtis and J. MacG. MacDonald, and
I waded through near this spot
on 31 May, 1902,
when we made the first ascent of
the volcano after the great eruption be-
gan. The tenacity with which
this material holds its place and
resists erosion is strikingly il-
lustrated by the caps which rest on
many rocks along the sea coast
near Morne Ronde. Some of these
hard mud-caps are still two to three

feet in thickness and look as (32
if they would last for many years to
come. [Ill. Bk 22, p. 773 or p.
78 A] No vegetation has secured
a foothold on them.

Great quantities of the fine mud were
deposited on the upper slopes of the moun-
tain and on the rim of the crater.
Estimates of the amount would
be mere guesses but it is evident that
at and near the point where the leeward
trail reaches the rim there still remains
a bed from three to
eight feet thick which is composed
principally of this material and coarse fresh sand.
Toward the northwest the increase of elevation of
the rim is maintained in varying
degree partly with the mud and partly
with coarse sand, the latter predomina-
ing. Toward the southeast
as far as the southern limit of the crater
the mud is the chief deposit on

the rim, but thence toward the north-
east ~~east~~ ~~west~~ and around the eastern and northern part
of the rim coarse sand, gravel and
larger lapilli predominate or are the
whole deposit. At three places, at
least, Larikai Peak & head of Larikai Valley on
the northwest side of the crater and
~~at the~~ head of one of the branches of the
Wallibu the new deposits have been
eroded away, leaving the old ma-
terial of the rim exposed. At the last named place the new ash
~~Hence~~ still measures six feet in thickness.
The deposits exposed now bear out
the observation made at the time
of the eruption that the discharges
of fine dust and mud were prac-
tically confined to the southwest-
ern quadrant of the volcano,
though comparatively small
quantities were drifted to the W.
and W.N.W. by the trade winds.

The surface of the mud or dust beds is coated with and protected by a continuous growth of moss (or lichen?). ~~Grass~~ Bunch grass is abundant likewise over much of it, especially in shallow water courses which have been carved into it. This bunch grass is particularly noticeable on the steep slopes of mud within the crater in its southwestern quarter. The grass grows even on the coarser ash where circumstances have favored the accumulation of any moisture. The eastern, northern and northwestern sides of the outer rim, being covered with course ash and lapilli, are largely barren of vegetation, but here and there ~~there~~ is a tuft of bunch grass

and some of the rocks are sparsely coated with lichens and a dry, gray moss.

The ~~so-called~~ "New" crater (so-called because it is supposed to have been the locus of the 1812 eruption of the Soufrière) contained no pool of water at the time of my visit, but the area of dried mud in the bottom of the bowl indicated the position and extent of the water standing there during the preceding rainy season. The lowest part of this crater is 3330 feet by aneroid measurement above the sea at the point where the leeward trail arrives or 3230 feet above the sea. It is 1109 feet above the level of the lake in the big crater. There is no practicable way of determining or even of estimating

the amount of ash which has been deposited by the 1902-1903 eruption in the New crater, because there seem to be no reliable data regarding the depth of the crater before [Look up Humboldt's Cosmos for the evidence on which this is called the "New" crater. He may give data on its original depth. Perhaps Hutchins's pamphlet gives the depth in recent years. Also cf. Flett & Anderson's report.] the recent eruption took place. The eastern boundary of this small crater is formed by a wall of ~~old~~ solid lava the top of which is 140 feet above the bottom of the bowl. This old rock wall is covered more thickly with vegetation than is the new ash

anywhere on the top of the moun- 27
tain. Mosses, tree ferns, other ferns, bunch grass, and begonias abound. At the base of this wall within the crater strong pseudo-fumaroles were active in 1903, and some warmth (cf. 1908, note bk) was rising from their vents in 1908 (?) Now all trace of the fumaroles has disappeared, except for some reddening of the rocks beside the passages where the vapors rose. Moss on the rock wall assists in gathering moisture here and vegetation is rank. I noted a pigeon-berry tree four feet high near one of the old ~~vents~~ loci of steam discharge. Moss, grass and ferns predominate. The highest point of the rim of the New Crater is on the southern side and is 260 feet above the present bottom. ~~and~~ It is part of the rim of the old crater.

The Rabaika Dry River bed near sea-level remains a barren waste of fine and coarse lapilli a half-mile across. Its lowest portions, as cut down by the shifting channels of the stream in flood time, are 15 to 20 feet below the general level of the sloping plains which marks the maximum of débris transportation and deposition in 1903. The material is too porous to retain moisture and therefore bears no vegetation. A vast amount of new sand and gravel and boulders has been carried out to sea from the windward side of the mountain, principally or almost wholly through the gorge of the Rabaka. This has been distributed along the coast from the Orange Hill Estate to Comaire, 60 miles to the southward, building out

a flat beach which was roughly (29
estimated as being from 100 to 300
yards in width. The village of George-
town has been built upon a plain
of similar origin, which is the site
likewise of several sugar plantations.
The old plain is now ten to fifteen
feet above sea level and stretches
back to the bases of truncated sea
cliffs terminating ridges which
come down from the interior moun-
tains. [Look up Humboldt
and old charts to determine
if practicable whether the Georg-
town plain was formed by
or prior to the eruption of
1812. When was G-town found-
ed on its present site?] [Ill.
543] along the middle reaches
of the Rabaka the river bed is bordered

by high walls and terraces of the new ash indicating the extent to which the gorge was filled by lapilli from the late eruption. A lava bed exposed in the bottom of the channel near where the river emerges from the foot hills and where ~~the~~ was fixed ~~to~~ an anchorage for the chain which in ~~the~~ pre-eruption days supported the pipe carrying mill water to the Orange Hill Estate shows that the stream is now flowing in places at its old level but the coating of new material covering most of the bottom of the gorge shows that the Rabaica has not yet completed the task of carrying to the sea all the fresh ash that is likely soon to go. The heavier floods still undermine the bordering banks

and carry out great quantities (31
of the recently ejected débris. The up-
per branches of the river draining the
immediate slopes of the cone are free
~~from than less~~ from great banks of new
ash than are the middle reaches,
probably on account of greater and more frequent rain
fall on the higher land and less con-
centrated erosive activity. The
banks of new material in the gorge
bear only a scanty growth of grass
and vines, with few bushes, on ac-
count of the porosity of the deposit,
which permits rapid drainage with
consequent slow decomposition.

In April (?) 1908 a pipeline
for the water for the Orange Hill Es-
tate was being laid on concrete
piers across the gorge of the Rabaka
near where the pre-emption suspend-

ed pipe crossed the stream, but (52
the builders ignored the fact that
the foundations of the piers were
in new ash in the bed of a
corroding river. The floods of
the ensuing rainy season washed
away the piers. Without learning
all that they should have learned
from that experience, the estate owners
then buried the pipe in the river
bed at the same place to serve as
an inverted siphon for the transfer
of the needed water. This too was car-
ried out by the next floods (1909). Later a
new owner buried the pipe in
older material farther down stream
and accomplished the task with
satisfaction.

The Waterloo and Orange Hill
Estates north of the Rabaska River are

now raising sugar cane more heavily per acre than they did before the eruptions covered them with ash. On the Lot Fourteen Estate, which lies higher on the mountain than the preceding and which received a thicker deposit of ash, vegetation is pushing its way freely through the new deposit, and the manager of the plantations told me that the ground would bear richly. Cane is, in fact, cultivated as far over the old fields as the present means of transportation of products will warrant.

The eastern or windward side of the Soufrière receives more rainfall than the western, and vegetation therefore is much more luxuriant here. The upper limit

bushes (the pigeonberry) and large tree ferns is now between 2400 and 2450 feet above the sea by aneroid determination.

On the leeward side of the volcano the devastation caused by the eruption was more thorough (verify) and recovery from it has on the whole been slower than on the windward, except as favored by the greater retention of moisture due to the depositing of several layers of fine dust to the southwest of the crater. On this side conditions are better perhaps than on the other for observation and description of the return of the vegetation. Beginning at the south, the Richmond Estate was on the southern border of the zone of annihilation or devastation and the valley of the Richmond River was the limit of that zone,

receiving only enough of the great eruption cloud to destroy its vegetation and a moderate deposit of new ash. In this valley vegetation has regained its former luxuriance, the new gru-gru palm trees being as large and as numerous as those that were killed. [Ill. 22. 60 B] The angle of the plateau on which the manor house stands was covered with a bed from two to more than ten feet thick. This became well compacted and hard but its surface is thinly covered with grass and occasional "cure-for-all" bushes, while the numerous drainage courses in it are thick with the bushes, "silver" ferns and other coarse plants. [Ill. 22, 61 A, B + 62 A] Cattle are now pastured here. 37 The ash-drift covering the site of Richmond village, which occupied the shore near the manor house, is fifteen from three to twenty feet thick

(Look up 1902 notes & 1903 photos)

and is now deeply carved by drainage from the plateau. It is too porous and well drained to support much vegetation and I noted only scanty grass and few bushes. The sea has carried away a considerable slice of the shore since 1902 & 1903. [Cf. 1902 & 1903 photos] Advancing up the Bunker's Hill ridge, which is a part of this estate, one notes that the fine mud which held its place so well in 1902 and 1903, through cementing together, was never washed away but is now recognizable and is covered with grass and other vegetation [Ill. 22, 62 B. & cf. 1902 & 1903 photos. Also look at 1908 photos. Same ridge.] [Cf. Sands's article on the plants.] Also Flett & Anderson

[Insert on p. 35]

Going northward from the house on the plateau the deposit of new ash becomes thicker and coarser. A gully ten feet deep near the border of the Wallibou gorge does not cut through to the bottom of it. Vegetation is nearly absent from this part of the flat, the grass being very thin and there being almost none of the bushes here. The ash contains many bombs from 6 to 12 inches in diameter and some that are even 15 inches across. [Ill. 22, 62 A] The illustration shows the northern, more barren part of the little plateau and brings out the new drainage features

On this ridge a ficus tree is very prominent. It is about 2 feet in diameter and James is positive that it has grown up since the erup-

tion. The gru-gru palm is a tree of much more rapid growth than the ficus, and the ridge bears many that are 20 to 24 inches in diameter. These certainly have grown up since the eruption, for the photographs of the same region taken in 1902 and 1903 show no living trees, while here and there stands the charred trunk of a pre-eruption palm as a mute witness of the destruction wrought by the clouds of incandescent ash.

The Walibon River has carried out to sea an enormous quantity of the volcanic débris which was deposited on its watershed and in its gorge by the eruption of 1902-1903 but it is still running considerably above its old grade. This is

is particularly noticeable in the flood plain at its mouth. This plain extends about one-fourth mile inland from the sea and is about ~~the~~ one-fourth (one-half?) (verify fr. chart) mile wide at the sea. The head of the deltal plain, which is assumed to be at the line where the river leaves the shore hills on its north side (Wallibou Estate), is fifty feet above sea level, by aneroid readings, and is one hundred yards wide.

The deltal plain has increased in area since 1908 through cutting away by floods of the low shore plateau on which I pitched my tents in 1908 at the base of the bluffs of the Wallibou Estate on the north side of the river. This low plateau, the top of which was 20 to 25 feet above the sea, was composed of a heavy

deposit of ash from the 1812 eruption capped with a bed five (2) to eight feet thick of débris from the 1902-1903 outburst. The washing away of this small plateau exposed the ruins of the Wallibou sugar mill, which was destroyed and buried by the eruption of 1812. Material increase of the deltal plain has also been effected ~~by~~ at the expense of the sea. Accurate surveys ~~as back~~ which would establish the amount of gain are lacking, but appearances indicate that 100 yards would be a low estimate to put on the gain at the point. [Ill. 22, 67A; 82A; ~~66B~~]

The thickness of the new material in the deltal plain can only be guessed, but judging from the position of the ruins of the old Wallibou Estate mill as compared with the elevation of the

head of the plain above the sea it (41
may be roughly estimated at from
20 to 25 feet. This thickness is sub-
ject to constant change until grade
level has become established. That
the plain has recently stood at a higher level
than now is shown by a terrace
on its south side [Ill. 22, 66 B]
That its level is being lowered is
shown by the trenches cut by
the present stream.

Lowering of level in the bed of the
Wallibou is most noticeable in the
37 two three mile stretch between the face
of the Wallibou Estate bluff fronting
the sea and a rock wall, an old lava
flow from the Soufriere, where the constant drainage
from the wooded northern slopes of Richmond
Peak and the intermittent flow from
the bare southern slopes of the Soufriere

comes through it flowing in its in a narrow torrent (42
old channel. Here the river fills its
rock bed and is so deep and swift,
even in the middle of the dry season,
as to be impassable. The same
conditions prevailed at this lava wall
in 1903 and 1908. In the angles
and side ravines of the gorge there
still stand lofty banks of new ash
which, except for loss of height due to
settling, give a measure of the deposit
made by the recent eruption and show
that it was from 100 to 150 feet deep.
(Cf. former notebooks on this depth)

About a mile from the sea is
the old bend in the gorge which re-
ceived an immense amount of
ash in May, 1902, and was the locus
of the ash fountain action produced
by the access of water to the interior

and which was so well developed here that it then received the name of "Wallibon action". [Hovey. Mus Bull and Nat. Geogr. Mag. Russell.] [Ill. XXII, 63 A. Cf. photos same area in 1902, 1903 & 1908.] The concave side of the gorge now shows nine terraces one above another. The uppermost and possibly the two next below it are the original deposits from outbursts of the volcano and are now covered with sparse vegetation. The remainder are flood-plain terraces. In 1903, hot water was seeping out from the bottom layers of some of these banks and there were places in them where steam or hot vapor issued [Cf. 1903 note book]. In 1908, the out-flowing water still was warm (?), but now the drainage level is be-low the old outlets and there is

no apparent evidence of elevated temperatures remaining in the beds. A half-mile farther up stream begins the section of the northern bank which was characterized in 1903 by countless flows of hot dust [Hovey. Bull. U.S.A. &c. Also 1903 photos] and secondary eruptions of that material. Here the bed of the stream is at least 30 feet below the level occupied by it in 1903. [How about 1908?] The rivers operations now being in pieces to be cutting down into deposits which antedate 1902. The massive beds of dry new ash, desiccated by reason of their southward exposure, discharge much dry sand and gravel. This collects in cones at their bases during the dry seasons and furnishes a not unimportant contribution to the débris carried out by the river when it is in flood. [XXII, 63A & 64B.

The latter shows the site of a dust crater and flow which were photo'd in 1903. Note the little pinnacle then left and still standing in 1915.]

The deposits of 1902-1903, like those of 1812 and before, made natural charcoal from some of the trees which they buried. Much of this has been collected by the negro natives of the island (and used as fuel). About ~~one~~ two ~~and one half~~ miles from the sea the stumps and roots of a silk cotton tree, changed to such charcoal stand beside the stream in their original positions. This does not necessarily indicate that the stream is now flowing on its old bed, for the water may well have flowed elsewhere when the tree was alive.

In some places the river is cutting down into its old bed, removing ash which antedates the eruption of 1902. One of these places is about two miles from the sea, where the filling of new ash was so deep that the revived stream cut off a sharp angle of the old wall, thus straightening its course. A sharp pinnacle has been left in the middle of the gorge ~~which is~~ about 50 feet high. The upper 15 feet of this pinnacle consists of new material, but the lower 35 feet has been cut through older deposits. Its base is about 250 feet above sea level. The pinnacle is backed by the remains of one of the higher flood plain terraces. Upstream from the pinnacle the large bowlders in the bottom of the

gorge are arranged in confused terraces, above which six terraces are distinct [Ill. ~~XXII~~, 66A] in the southern side of the gorge.

Northward of the Waitbon River the only gorge of importance with reference to the recent eruption is that of the Larikai River. This drains the valley between the crater and its somma ring on the north as far as a line drawn about midway of the longer diameter of the great crater and near the northwestern side of the New crater. With the present barrenness of the drainage basin, no water flows in the Larikai, except after a downfall of rain. Much ash has been carried out of the gorge and off from its slopes since 1908. In that year the slope

of the river bed was gradual for two-thirds of a mile from the sea. The lowest of the old lava flows, exposed in 1903 & 1908 as a ridge in the bed of the river about 450 yards from the strand line, is now the capping of a vertical precipice 25 feet high forming a waterfall in the stream. Its exposed edge is about 15 feet thick and the flow rests upon an old bed of ash. As has been noted in previous descriptions of the Soufrière there were many extravasations of lava (augite andesite) in the earlier history of the volcano. In 1907 I described

* Bull. G.S.A.

973
328
[illegible]

the V-shaped rock gorges of the Laikai and illustrated them. The best example extends from 650 to 725 yards from the sea and is in the

fourth lava flow from the bottom of the section exposed by the valley. It seems to be deeper and even longer than it was in 1903 [Pl. XXII, 69A] at any rate. It is evident that scouring of the rockbed is active during the passing of the floods, which still are heavily laden with sand, gravel and boulders from the sides and head of the valley.

Three-fourths of a mile from the sea [Cf. distances publ. in article] and 470 feet by aneroid measurement above it is the 30-foot precipice, formed by the edge of a lava flow crossing the gorge, which stopped my advance up the valley on my previous visits. Now a ladder brought with us from Chateaubelair enabled me and my men to scale the ledge and

go further up the gorge; but we could not go far, for 225 yards advance brought us to the foot of a precipice estimated to be 300 feet high, forming part of the walls of a basin in the stream bed which was 80 yards long by 50 yards wide. The floor of this basin is 620 feet above the sea. The upper part of the precipice is composed of a heavy lava flow which is inclined at a low angle down the gorge. The lower part of the flow is platey, the upper part roughly columnar in structure. The major portion of the section given by the precipice is unsorted tuff, showing slight indications of aerial bedding. Lines of sand on the walls of the basin show some of the stages passed through in the filling and excavation of the gorge.

[Ill. XXII, 71 B]

The remainder of the valley is accessible from the rim of the crater, and its whole length can be examined from the ridge leading westward (W.N.W.) from Lankai Peak. From the brink of the big precipice up to the base of the peak marking the beginning of the Somma ring the bed of the stream is a trough cut into the upper surfaces of two or three lava flows, which are separated by low precipices, the flows being comparatively thin on their lower edges and not separated by heavy beds of ash. The cirque-like forms which characterize the drainage in the new ash on the leeward (western) side of the Soufrière are well developed on the slopes of the upper portion of the Lan-

kai Valley, as is shown in the illus-
tration Plate 00 [Ill. XXII, 75 B + A]
That this form of drainage character-
ized the removal of the ash deposit-
ed by previous eruptions is well
shown on the north side of the Tresfé
Valley. (Plate 00) [Ill. XXII, 82 B]

Northward from Laikai Valley
the devastation which was wrought
by the outbursts of 1902 + 1903 was
caused by showers of ash drifted
over the northwestern section of
the island by the trade winds.
Vegetation was destroyed as far
as Balein Point [Cf. 1902 Note b],
but the old soil was not injured,
hence the restoration of plant
life to its former luxuriance
has been complete. The caps
of fine dust on boulders along the shore
north of Morne Ronde has been described.

A trip up the leeward trail to the summit of the volcano gives one a good idea of the advance which vegetation is making and of other changes which have taken place since the eruption devastated this section of the mountain. The trail now ascends the bottom of the Trespé, or Dry Walliton, Valley for a ? mile to a point 410 feet by aneroid above the sea. Here begins a steep zigzag path up a ravine in the bordering wall of the gorge, ~~which is 300 feet high~~, through one of the new "peasant proprietor" plantations recently established in the island under the encouragement of the Colonial Government. Attaining the edge of the gorge wall 300 feet above the bottom of the valley at the foot of the trail the trail attains

the crest of one of the radial ridges characterizing the mountain, which it follows to a junction with the old trail about 1000 feet above the sea. Below this point the old trail has become difficult to traverse and has been abandoned. Thus far the old soil on the slopes was not destroyed by the eruption blasts or buried deeply in the new deposits of ash and mud. Hence the old fertility of the soil was not diminished and the restoration of the plant life has been rapid. The slopes and crests of the ridges are covered with a luxuriant growth of vegetation. Near the junction of the new with the old trail there is a Spanish ash [look up Sands article for scientific name] tree about 25 feet high and with a trunk 12 inches in diameter which has grown up

since the eruption. From the junction the trail follows the crest of the left bank of the canyon of the Rozeau River all the way to the rim of the crater. At three or ×7 more places the divide between the Rozeau and the branches of the Trespé (Dry Walibou) River is reduced to knife-edge breadth or but little wider. As on Brunker's Hill and elsewhere on similar locations the fine dust has kept its place on the crests of the ridges through the cementation which has already been described. This has given good foothold for a heavy growth of grass (name?) and morning glory (Ipomoea) and other vines. Along the slopes up to 1100 feet above the sea and perhaps higher there are many of the Spanish-hash trees 8" in diameter,

[Photos from 1902 eruption could well be utilized in illustrating the leeward trail.] while along and near the crests the heavy grass is shoulder-high and the vines form dangerous traps for the feet.

At 1600 feet above tide one comes upon the location of the old "half-way tree", which was a great ficus that was overturned by the eruption blast [Mt. 1902] and all trace of which has now disappeared. About 30 feet distant down the southern slope of the ridge a young ficus has sprung up and now is about 25 feet high which will soon take the place of the old landmark in the minds of the users of this trail across the island. Two hundred feet

higher what is now the uppermost (57
clump of pigeon berry trees is
traversed at the beginning of the
steep mud covered slope of 1902
[Ill. from 1902 photos] The trees
are now 10 to 20 feet high and they
formed the second camp site of
1915, an excellent situation.
Here too tree ferns, club mosses
and begonias abound and flourish.
Within 100 feet
above this little grove vines
and grass disappear from the trail
and the mountainside becomes
much less covered with vegetation.

Then for 500 or 600 feet of rise
one toils up a steep slope which
was coated with gravel-like little
bombs by the outburst of September
1902. The stones now bear
sparsely the short stalks of a hard,

dry gray moss and some
patches of lichens. For the last half
mile of the trail, the ridge rises at
a gentler angle, mounting but
300 or 400 feet to the rim of the
crater. This part again is covered
with the compacted fine dust of the
May 1902 outbursts of the volcano. This
material retaining moisture well,
its surface is thoroughly covered
and well protected by a thick coating
of a flat-leaved moss [Moss?
Consult Mrs Britton and
show her the specimen, No
540, collected at the site of
my first camp.) which retards
erosion. Here and there there grows a
tuft of grass or a little bush.

End of St. Vincent section.
"Cluett" voyage follows.

The Arctic Voyage of the Schooner "George B. Cluett"

Omit to be Typed - rewritten

In July, 1913, the American Museum of Natural History and with the co-operation of the American Geographical Society, the University of Illinois and the assistance of departments of the United States Government, several sister educational institutions and scores of corporations, business firms and private individuals, despatched into the Arctic regions by way of Northwest Greenland an exploratory and scientific expedition, known as the Crocker Land Expedition. Preparation for the work of the expedition was begun under the leadership of George

Bonup and Donald B. Mac (2
Millan, who were two of Peary's
trusted assistants in the admiral's
famous dash to the North Pole,
but were brought to a sudden
halt by the sad drowning on
28 April, 1912, of Mr. Bonup, a sad
accident which deprived the
world of a most enthusiastic
and promising young explorer
in the very beginning of his ca-
reer. The enterprise was then re-
organized under Mr. MacMillan.
and constituted a memorial to George Bonup.
Its scope enlarged and an ex-
cellent scientific staff engaged
was
comprising Ensign (now Lieutenant)
Fitzhugh Green, U.S.N., engineer and
physicist, W. Elmer Ekblaw, geolo-
gist and botanist, Maurice C.
Tanghay, Ph.D., zoölogist, and

Harrison J. Hunt, M.D., surgeon and bacteriologist. To the staff were added Jerome Lee Allen, an expert wireless operator in the United States Navy, as electrician, and Jonathan C. Small as mechanic and cook. Mr. MacMillan took charge of anthropology and ornithology. Thus splendidly equipped for scientific work and with an exceptionally complete outfit of instruments and supplies, the Expedition established itself at Etah in latitude 78° 20' N. on the coast of Northwest Greenland in August, 1913, and entered upon the carrying out of its broad and comprehensive programme.

Leaving to others the narration of the experiences of the Expedition staff and the description of the work accomplished by them,

I propose to give an account of the voyage of the auxiliary schooner "George B. Cluett", the vessel which was sent northward under charter to the American Museum in the summer of 1915 for the purpose of bringing back from Etah the members of the staff and the collections and other property of the Expedition. The "Cluett" is well known to the American public through belonging to the Wilfred T. Grenfell Association and being engaged in promoting Dr. Grenfell's medical missionary work among the fishermen of northern Newfoundland and Labrador. The master of the vessel is Captain Harris C. Pickels, a deep sea master mariner of many years experience in all the seven oceans.

She is a three-masted schooner (3
of graceful lines, one hundred thirty
five long over all and one hundred
fifty five tons register. Her equip-
ment includes a seventy-five horse
power Wolverine gasoline-kerosene
engine as auxiliary. [H.C.P.fr. p. 4.]
The Museum sent the writer on
the vessel as its representative for
the voyage and provided as pilot Captain
George Comer whose long experience
as master of whaling ships has in-
cluded twelve winters in the ice
of the northern part of Hudson Bay

Delayed by adverse winds and
other circumstances, the "George B. Cluett" did not reach Sydney, N.S.,
until Friday, 16 July. There some
supplies forwarded by the Museum
and procured at Sydney
to be landed at Etah in order to en-

able Mr. MacMillan to spend
an additional year in the Arctic
according to his expressed desire,
sundry boxes sent to the various
members of the staff by their friends
in America, Captain Comer and
I and our baggage were gotten
on board, some repairs were
effected to the vessel, a new crew
was installed and, at six o'clock
in the beautiful afternoon of Monday the
Nineteenth, lines were cast
off from the Ingraham wharf,
the motor was started up and
we got under weigh for the
Far North, full of anticipations
of an agreeable and interesting
voyage to a rarely visited portion
of the globe and a safe return to
civilization and home in the early

autumn. Like many deep water ship masters, Captain Pickels and Captain Comer are great story tellers and the first evening of our long voyage was made memorable to me by the narration of some of their varied experiences.

Our run for the first twenty four hours, at first under engine power and then under sail, was 135 sea miles. If we could maintain even that record as an average the success of our undertaking would be assured, but internal-combustion engines are uncertain agents and the wind is famed for its unreliability. During the following night the engine was put out of commission by a crack which developed in the hub of the fly wheel caused by

the constantly recurring necessity of diving in the steel Bay arising from the looseness of the flywheel, which was a new one, on the crankshaft, which was old and worn. It took us six days to reach Battle Harbor, a Labador harbor for fishing vessels made famous by the many Arctic expeditions which have touched at and reported from it, whereas under proper conditions we should have made the journey in three days at most. ¶ [Note on B.H. & the Grenfell mission.] An incident of our sail through the Strait of Belle Isle was a distant view of Barge Rock, near Red Bay, where, miles off her course, the steamship "Diana", the first vessel chartered for the Crocker Land Expedition, went ashore in July, 1913, and would have wrecked the whole enterprise had not exceptionally calm

weather prevailed for several days at the time. Crude repairs, but the best that could be effected under the circumstances, were made to the flywheel by Captain Pickels and the engineer at the little village blacksmith shop, and we sailed away from Battle Harbor at four o'clock on the 26th with revived hope. Begin copying here -

We had no more than settled down to fine sailing with the favorable breeze when great excitement arose over Chum, the captain's splendid full-blooded Newfoundland dog. The report came aft that Chum was dying and the captain went forward at once to investigate. I followed a moment afterward but had gotten no farther than

the main hatch, when I saw the captain jumping for the starboard foreriggings, the crew scattering in every direction and Chum coming around the side of the forward deck house, wild eyed and frothing at the mouth. One glance was enough for me, and I started for my room. I could not go down the forward companion way to the cabin, because the two mates were already there with Charlie, our cabin boy, on top of them. I rushed around to the after companion way and down to my room, where I met Charlie who had somehow managed to get past the mates, who now were in the dining room braced against the door to keep out the dog, which occupied the forward companion way

to the exclusion of all others. Chum (11
being where he could do no harm,
the captain and some of the crew
came aft and lassooed the dog and
dragged him up onto the deck,
where a pail or two of sea water
dashed over him cooled him off
and brought him out of his fit.
Poor fellow! he had had too much salt
meat to eat and was suffering from
too much warm weather and too
little exercise. He did not attack
anyone, he had the headache and
merely wished to get into some place
where he could be quiet and alone.

Late in the afternoon of Monday,
2 August, we sighted the Greenland
coast through the mist. The land
was Camels Hump, a mountain
0 000 feet high in latitude. We

were being driven by a favorable gale and made 210 miles that day. Even the captains admitted that there was "quite a breeze of wind blowing" and we went flying through Davis Strait, crossing the Arctic Circle about midnight of 3 August.

The Greenland coast is bold and picturesque, and the grandeur of its scenery is to be compared with that of Norway. Numerous deep narrow fjords indent the shore line. Granitic mountains 3000 to 5000 feet in height rise precipitously from the water. Countless glaciers, most of them nameless as well, descend the cliffs from high neve fields or the heavy ice cap in bands of brilliant dazzling white, the ice cap itself being visible beyond the heads of the fjords.

of this region as far north as Upernivik, or even as far as the Devil's Thumb at the southern limit of Melville Bay, were as well known to the traveling public as the coast of Norway, it would be visited every summer by tourists from America and they would be delighted with their experiences.

The wind died out and flat calm settled upon us half-way across the broad entrance ~~to~~ of Disko Bay sound and at half after ten in the evening of 4 August I went to my room thinking that we should not reach the harbor of Godhavn, Disko, that night, where we were to make our first stop in Greenland. Soon, however, the engineer called me saying that the captain wanted me to

come on deck to see a peculair black cloud ahead of us. Directly across our bows I saw the long line of lofty cliffs forming the southern coast of Disko Island ~~rose~~, half exposed above a heavy bank of fog which rose as an opayue gray plane, and it looked as if our course lay directly up the slope. Here and there an iceberg could be made out indistinctly through the mist about us, while an occasional one could be seen the pinnacles of which rose above the thin outer edge of the fog bank. The dull cough of blowing whales added a touch of weirdness to the scene, which was further varied once in a while by the boom of ice falling from the bergs. For several minutes our

attention was held by a great sulphur bottom whale swimming leisurely past us near the surface of the water without heeding the vessel. When the monster finally sounded, his flukes were seen to be sixteen or eighteen feet across. Screaming gulls circled about above the whale and settled eagerly to the water each time it approached the surface, evidently getting food in the shoals made by the animal's rising back.

As we slowly advanced by use of our engine the great fog bank gradually dissipated and by half after twelve it disappeared altogether and the features of the hills could be dimly discerned. The sun was below the horizon at midnight but the twilight was strong

Captain Pickels held straight to his 16
course until he seemed almost
ashore, having passed the beacon
and the outer peninsula, ~~and~~
Then he swung through a right
angle to the east and went through
the narrow entrance to the little
harbor, which is completely land-
locked, and cast anchor in ten
fathoms of water at 1:30 in the
morning of 5 August. There are
no lighthouses along the Green-
land coast, and the moderate
illumination from the northern
sky cast the town and its low,
hilly peninsula into the heavy
shadow of the great shore cliffs,
which here rise almost vertically from
the strand to a height of 1200 ~~1300~~
feet above the sea. Neither are

there adequate charts or sufficiently explicit sailing directions. Hence, to make this little harbor in the middle of the night without a pilot was a remarkable performance and we took off our hats in acknowledgment of the captain's skill. (17)

As we came to anchor we saw a little procession setting out toward us from the landing place on the rocks in front of the most pretentious house in the ~~little~~ diminutive village. The line consisted of the white rowboat of the Royal Danish Inspector followed by several kayaks, or native sealskin boats, with one Eskimo in each. The inspector, ~~whose name is H. Lindow,~~ is a tall, fine-looking young Dane, named H. Lindow. He

is the chief government official for the whole of North Greenland, a district which stretches from Nord Strömns Fjord (lat. 67°30') to Devils Thumb (74°35') at the southern border of Melville Bay, which is the northern limit of Danish authority. ~~The inspector was duly impressed with~~ The letter of introduction from the Royal Danish minister at Washington to the officials of Greenland which the American Museum had procured for me secured cordial permission for the vessel's officers and myself to land. The crew, however, could not be allowed on shore nor could any Eskimos be permitted to come on board, because we had no bill of health from our last-

port, visited by the Danish con-
sul there. Our "last port" had
been Battle Harbor, where no
bill of health could be obtained
and where no consuls are stationed.
Nevertheless, permission was given for
our crew to fill the vessel's water tanks from
a designated brook on the opposite
side of the harbor from the village.

Godhavn (Good Harbor) is a
straggling settlement comprised of
five Danish and twenty five or
thirty Eskimo families. Many
of the ~~latter show the~~ evidences of
admixture of white blood.
It is the capital of Danish North
Greenland and the most prominent
~~build~~ structure in it, aside from
the church, is the Building which
Contains the rooms devoted to

the meetings of the native par-
liament. ~~For the past four years~~ Since 1912
the Danish government has been
trying the experiment of partial
local self-government and the new
parliament is drawn from thirteen
~~consists of about a~~
districts, which are subdivided into 37 communes.
~~dozen Esthsaaws.~~ The ~~effort~~
effort is not a great success yet,
but the natives are gradually learn-
described as being
ing. They are too individualistic
in ~~their bonds~~ temperament to adhere to or abide
by general agreement, which seem
for the moment to be contrary
to their separate interests. The
recently
royal government has established
here
a scientific station ~~here~~ for
the purpose of studying the ethnolo-
gy, botany, geology and zoölogy of
North Greenland. Dr. Morton
P. Porsild, a scientist of inter-

national repute, is in charge of (21
the work and he has made and pub-
lished the results of important studies on the
material culture of the Eskimos
and on the flora of the Disko
Sound region. [Look up the
scope and work of this station]
Mr. Porsild is a Danish Dane in
the fifties, much interested in Green-
land and in Arctic life aside from
his professional work. He has
gotten together at his home an interest-
ing and important collection of
Greenland objects which he is always
delighted to show to visitors. Like
all the Danes whom I met, he is
the soul of hospitality. God-
haven is an important station
of the Royal Danish Trading Co
and is in charge of (Mr.) Bistrup,
(at the time of my visit was

who is Greenland born, like (22
his father and grandfather before
him, his great grandfather having
come from Denmark. The agents
of this company have certain
administrative or ministerial duties to perform
in connection with the government
which are important in the ab-
sence of the inspector, and
they are locally called "governor".

The Danes' houses are sub-
stantially built of lumber, mostly
of course from Denmark, and have
double windows, which are provided
with solid board shutters. The
stone foundations are reinforced
with turf outside, and further
protection from the intense cold
of winter is secured by banking
the houses with snow up to the

[Ill. - photos. - church, stone houses to]

lower windows at the beginning of the winter. The inspector's home is large and comfortable. It is one story high in front, facing the north, and two stories high in the rear. The office is in front, while the pleasanter rear facing the sun is devoted to living and bed rooms in which the windows are kept bright and attractive with flowering plants. The inspector and the governor are proud of their vegetable gardens behind their homes where they raise small quantities of lettuce, cabbages, radishes, turnips and potatoes under glass. Coal of Tertiary geological age is obtained at several places on the island of Disko

6 20 - 72 48 = 3°32' = 212 mi

and is much used for fuel at God- (24
haven and elsewhere along
the coast. It is rather friable
and leaves much ash when
burned, but it is an impor-
tant factor in the lifes of the
Danes and many of the Eski-
mos in Danish Greenland

The first building in Godhavn
to attract the attention of the
traveler approaching from the
west, south or east is the Lu-
theran church, which is
situated on high land on the
eastern border of the settlement.
Churches and missionaries
are maintained throughout
Greenland by a Danish mission-
ary society with the sanction
and help of the Royal Government

The pastors of these churches are stated to be doing good work among the Eskimos as well as among the Danes. At some, if not all, settlements where there are churches the pastors are the teachers in the schools as well. I was told that most of the Eskimos can read and some of can write.

The hulk of the steamship "Fox", the famous vessel in which Captain F. L. McClintock, R.N., made his successful hunt for proofs of the fate of the Sir John Franklin expedition lies beached at Godhavn and is an object to interest all arctic travelers. After completing her work in the Far North, she was sold to the Danes and was used for thirty years in the transportation of cargo.

lite to market from the mines at Ivigtut, South Greenland. She was then refitted and was used as a mail and trading ship along the Greenland coast until the season of 1917, when she struck on a rock and received injuries that were too severe for local repair or to permit taking her to a European shipyard and she was abandoned. Her mizzenmast is gone and she is otherwise much dismantled. [Ill. Photo of ss "Fox"] Captain Pickels secured the end of an oak bit for the Museum and several pieces of teak from her original timbers. The latter proved very useful during the long months of our detention in the ice through furnishing many hours of employment

to some of the crew in making canes and carving chains ~~with~~ terminating in ball and anchor.

My chief objective in stopping at Disko was to visit and collect specimens for the American Museum Ovifak the locality where Baron Nordenskiold got his masses of terrestrial native iron in basalt. The captain ~~therefore~~ put the gasoline launch into the water and, soon after noon on the fifth of august, took the inspector, the governor and me, together with an Eskimo pilot, on board and started westward along the coast toward Ovifak, the spot ~~some thirty miles distant~~ where Baron Nordenskjold, the famous Swedish scientist and explorer, got his masses of terrestrial

native iron in basalt, my chief 128
object in stopping at Disko being
to visit this locality and collect spec-
imens for the American Museum.
The day was perfectly calm and
the sea glassy, so that the run of
some twenty miles along the coast
was most enjoyable. We landed
beside a rocky point formed by
an ancient lava flow, where the
motor boat would be safe, and
walked a mile or two along the
coast before reaching the exact
place where Nordenskjold collected.
When I learned, to my great dis-
appointment, that the masses of
iron were found in the water
and were ~~to be~~ exposed or visible
only at very low tide, and that none
had been found for lack of demand

for two or three years. We might better have brought the "Chett" along and thus not have been obliged to go back to Godhavn! But we could not have sailed her, for lack of wind, hence we really lost no time on our main journey. Ovifak (or Uifak, as it is also called) is at the base of the lofty cliffs forming the face of Nayat Mountain, which is about 2200 feet high and receives its name, meaning Nest Mountain, from the myriads of sea birds that breed in frequent its crevices every summer.

Returning to our landing place we partook of an excellent luncheon provided by the inspector and consisting of rye bread, Danish butter, anchovies, Roquefort cheese, bottled Danish beer and cordial - quite a

spread to procure in latitude 69° 20' N. on the apparently inhospitable coast of Greenland. Then we boarded our launch and started back to the vessel. On the way we put in at a shallow bay to get some fresh fish from a family of Eskimos having their summer tupic (skintent) there. Our tender was a stubby little boat about seven feet long belonging to the inspector and not intended to hold more than two or three people. As the inspector, the governor and I pushed off from the launch, the captain stepped into the bow and loaded the little craft down so that we had only about two inches of freeboard left and we had to ~~still~~ sit as still as the proverbial

church mouse to avoid swamping. The shore was bordered with a heap of kelp and other seaweed two feet high and ten feet wide which made a bad place for landing. When our tender is bow stuck in this pile, the following gentle surf wave curled over the stern and wet us in good shape and our condition was not improved by wading through the seaweed. We found the natives drying, salting and smoking sea trout, which are abundant in the bay. We bought some fine fresh ones for the equivalent of a few cents in american money and then the Eskimo threw in two large trout for a bit of tobacco, the natives being extravagantly

fond of the weed. The trout as used are from twenty to thirty inches long. Their color of their flesh is somewhat lighter pink than that of the salmon, and they are finer in texture and more delicate in flavor. The smoking is done by means of a fire of dried savin in a little structure built of stones and turf. (Figure)

Regaining the launch without trouble, but ~~with only~~ in two trips instead of one, we continued our homeward journey in the waning sunlight of the ~~warning~~ late evening. There was scarcely a ripple on the surface of the ocean, but the gentle swell reflected in marvelous beauty the colors of the night clouds, intensifying them indeed to gold, purple and green.

I felt that Bradford, Stokes (33
and other artists were justified
in the color schemes that they
have used in depicting Arctic
sunsets. When we reached the
"Cluett" the sun was well down
behind the mountains, but the
waning moon was hanging mid-
way over a deep valley cutting the
cliffs near the village. I thought
that it was the new moon, until
I realized that the crescent shape
faced the wrong way and was
on the wrong side of the sun for
that phase of the orb.

The weather continuing to be
perfectly calm, so that it was
useless to try to sail, I took the
launch the following day and, with
the inspector, the governor and

Captain Comer, ~~for~~ set out on a twelve- [34
mile run eastward along the coast to see the nearest of the coal beds of the island. The coal is of Tertiary geological age and was formed in embayments in the older lava beds, when the land ~~stood~~ at a lower level than it does now. ~~It~~ The plant remains found prove that the climate of Greenland was much milder then than it is now, in fact that it was probably warm temperate ~~or perhaps sub tropical~~ in character [Verify this.], ~~for~~ The coal bands contain ~~in~~ large fragments of carbonized wood which is more like charcoal than it is like true coal in texture, besides abundant impressions of leaves, ~~wood~~ other plant remains.

Climbing to the top of the shore cliffs, which here are only about one hundred feet high, we came upon a narrow plateau sloping upward to the base of the lofty parapets composed of thin reddened beds of lava and volcanic ash. The plateau is covered with a thick carpet of vegetation, consisting of the Arctic willow, a savin, several flowering plants among which a yellow poppy is conspicuous, grass, mosses and lichens. But the largest of the willow "trees" have trunks only six or seven feet long and they are prone upon the ground or nearly so. The "forest" rises scarcely to a man's waist. The flora of the southern coast of Disko is of particular interest to botanists, because the region forms a border or transition zone between the sub-arctic and Arctic regions. The view from

from the top of the cliff was beautiful [36
in the extreme — Disko Sound lay under a summer sky, with the glassy, blue water dotted with scores or perhaps hundreds of ice bergs of all sizes, and the surrounding mountains, green clad half-way up their abrupt southern slopes but bare red and brown above, with great patches of snow here and there and the vast permanent ice cap covering and crowning all.

We were much interested in the kayaks or native boats of the Eskimos who clustered about the "Cluett" offering models of boats and sledges and carvings of walrus and narwhal ivory for sale or barter. The kayak is a remarkable little boat about fourteen feet long and twenty to twenty-two inches wide at the waist, when

built for one person's use as it usually is. The frame is of light wood which is covered completely with seal hide, except in the middle, where the user sits. Five hides, denuded of the hair, are needed for the cover. They are stretched over the frame (while wet) and sewed together with sinew. The covering must be accomplished at one sitting and is done by several women working together, like New England women at an old-fashioned quilting bee. Kayaks are cranky affairs, but the men paddle about in them fearlessly, going miles out from shore when hunting or fishing, protecting themselves from dashing water with a seal-skin apron fastened securely around the cockpit and tied about the body under the arms. A double-ended paddle

tipped with bone or ivory is the motive power and it is used most skilfully in driving the ~~Kayak~~ sail craft at a great speed through quiet water or in contending with waves. On the kayak's deck are carried harpoon, duck spear, rifle, fishingline, knife and ice knife and the boat is used not alone for catching sea trout and birds, but also halibut, seal, narwhal and walrus. [How for south do they catch narwhal and walrus?] The bow of the kayak is edged with bone or ivory as a protection against ice and the ice knife is used to prevent young ice from cutting the sides of the boat.

The inspector and the governor came off to take supper on board our vessel, the former doing honor to the occasion by donning his full

official uniform. Yankee Na- than had prepared an extra menu, according to his standard and our guests seemed to enjoy the meal. At any rate, it was a change from shore diet, and landsmen seem to like ship food as much as sailors like to eat on land. After supper I started up the victrola. ~~which I was taking northward for Admiral Peary as a gift from him to Cotah, who was one of his companions at the North Pole.~~ It developed that the inspector was a violinist hence he greatly enjoyed the Kreisler, Elman and Zimbalist records that I had with me for the Crocker Land Expedition staff, while the opera records brought to mind old days in Europe. About ten

o'clock Mr. Porsild, having returned earlier in the evening from an eastward cruise in his power boat, came on board. He told us much about Greenland and said that we were quite early enough for the attempt on Melville Bay, because the preceding winter had been exceptionally severe and the bay would be choked with ice till late in the summer.

Our guests all left us by midnight and at 4:30 the next morning, the seventh, Captain Pickels began heaving the anchor, since it seemed best to all of us to put out to sea in spite of the continuing calm. The engine propelled us out clear of the coast and then was stopped, the broken fly wheel making the captain, being already chary of run-

ining under power. The day was clear, bright and beautiful, but we made little progress. Sunday was the same, and the captain's observations showed an advance of only 35 miles for the two days. I began to get anxious about our journey on account of the long continued calm. From Battle Harbor to Godhavn our daily runs averaged 114 miles, a rate that made me think that perhaps, after all, we had not made a bad mistake in chartering a sailing vessel for the trip to Etah. But four days of flat calm, with the engine in poor shape, was another and very different story and made me at any rate begin to feel very anxious regarding the ultimate success of our voyage.

Sunday afternoon we took the

launch for a run over the glassy sea to Disko Fjord, a deep, picturesque indentation in the west side of the island. We landing in a little cove behind a low point formed by the basaltic columns of an old lava flow, where we found a simple canvas "A" tent and a skin tupic, forming a settlement called Maligiak. About fifteen Eskimo men, women and children were grouped on the beach, some of whom were visitors from the opposite side of the fjord, their oomiak, or large skin family boat, being drawn up on the shore. Most of the natives that we have seen thus far show an admixture of more or less white blood, in fact scarcely a half dozen of the adults seemed full blooded or nearly so. At this

Photo

little settlement on Disko Fjord one of the young men was blue eyed, red haired and rather fair skinned, while another had wavy black hair and the features and skin of an Italian. One of the young women was rather good looking and none was repulsive in appearance. [Ill. tupics and grump.] Our engineer had his photograph taken in the act of rubbing noses with (the Eskimo substitute for kissing) the pretty one. She blushed deeply and was at first reluctant to be immortalized in this fashion, but the gift of an old, brightly colored necktie overcame her hesitancy.

The northern portion of Disko Island is high, and its scenery is grand. The shore cliffs are sheer, rising 3,000

feet and more from the water shore, while (44
three mountains, the summits of
which are only eight to twelve miles
from the coast tower close together to
heights of 4,186, 4587 and 5110 respectively feet above
the sea and dominate the whole re-
gion. Around the end of the island
we got an attractive glimpse of
the entrance to the Vaigat, the nar-
row strait with lofty, precipitous
sides, which separates Disko Island
from the Nugsuaks Peninsula of
the mainland. Between Nug-
suaks and Svartenhuks penin-
(13 37 Go on to third page beyond ↓.)

oulas lies the important Umanak Fjord, which is one of the chief sources of the icebergs drifting down the Greenland coast. Seven active glaciers descend in icefalls from the inland ice cap into the branches of this body of water which are of sufficient importance to receive names on the Danish chart, while a half-dozen others are considered too insignificant for special designation. More bergs come out of Umanak Fjord than from Disko Bay, though the latter receives the discharge of the great Jakobshavn glacier, ~~and icefall~~ which is the most active ice stream in Greenland and perhaps in the world, its summer rate of motion being stated to be 150 feet (?) per day. [Ill. Northern end Disko I. and iceberg off Godhavn.)

Monday was a better day for us and at 4:30 that afternoon we had an additional 90 miles to our credit, and Tuesday was still more satisfactory, a run of 132 miles with a good stiff breeze bringing us to anchor at Upernivik at seven o'clock in the evening. The wonderful basalt cliffs which we first noticed on the islands in Disko Bay extend beyond Umanak Fjord to Kekertarsuak Island, thus forming more than 200 miles of the coast. The thousands of beds of lava and lapilli which make up the cliffs and mountains are striking evidence of the tremendous volcanic activity that characterized this part of Greenland during the same geological era, the Tertiary, when lavas were build-

3 32 = 212

ing mountains and covering 47
hundreds of thousands of square miles
of the earth's surface with liquid rock in Iceland,
Scotland, India, western North America, the Andes Mountains and the island regions of the Pacific and Atlantic oceans. North of Ketertarsuak Island the rock is again granite or related material and the scenery reverts to the character of that south of Disko Bay. The entrance to Photo Lake Fjord is through a gateway that reminds one strongly of the approach to Yosemite Park, the two thousand foot vertical cliff on the north side closely resembling Sentinel Peak in profile. But a great glacial ice fall is in view thro' the entrance. Kaersorsuak (Sandersons Hope), five miles south of Upernivik is one of the prominent landmarks of the

coast. Its granitic sides form #8
a forbidding shore and rise abrupt-
ly from the sea more than 1200 feet,
culminating in a peak 3467 feet
above the water. Frost action has
formed in the cliff small arches
like the great Washington arch
of the Yosemite Valley

We stopped at Upernivik by
the advice of American Arctic tra-
velers of experience to gather infor-
mation regarding ice conditions in
Melville Bay, but we found
~~was~~ that the people there knew little
or nothing of value on the subject.
They said that the preceding winter
had been one of exceptional se-
verity and that the Bay was pro-
bably full of ice, but they had no
source of definite information.

since
spring, when the Eskimos make [49]
their last trips across by sledge.
The little town is built on the almost
bare rocks at the southwest point
of a small granite island the
highest point of which is 700 feet
above the sea, and there is no beach
~~It might~~ perhaps have been better for us, had we
~~not~~ utilized the good breeze during which
we arrived at Ukiwuk for driving along
up the coast as long as it lasted,
tho' the calm and head winds that su-
pervened would probably have negatived our
progress just the same.
or good landing place forcing the
anchorage. The anchorage, further-
more, is poor being in 23 fathoms
of water on a small ledge or bank.
Hence the two yearly steamers do not
lie here, but moor in Danish Harbor,

a little, almost land-locked cove (50
nestling among the hills a half-
mile north of town, where a wharf and warehouses have been built. The sea was
too rough to permit us to land the
evening of our arrival or to allow
any kayaks to come off to us, but
early the next morning the water
was calm and several of the odd
little craft were clustered about
our gangway and their occupants
were offering for barter ducks, fish,
a few articles of local manufacture
and, of all things most unexpected in
this out of the way corner of the
world, cigars for barter or sale.
The kayaks were not so good as those
which we had seen at Godhavn, and
the skin clothing, carvings and models
of sleds and boats were not so nu-
merous or so well made. The

cigars were of Danish manufacture and were of poor quality, as a matter of course.

Soon after breakfast, I went ashore with Captain Comer ~~who made friends with the Eskimos while~~ and called upon the governor, Mr. A. Winterborg, whom I found to be a serious, interesting man ~~of thirty five or~~ about forty years old, speaking German rather fluently but struggling hard when trying to converse in English. The Danish population of Upernivik consisted of Governor Winterborg, wife and two small children; his newly arrived assistant, the Lutheran pastor, wife and two children, and the former pastor, now a very old man. The governor's wife informed me joyously that she and the pastor's wife

were looking forward with pleasure [52
to the ensuing winter, because a young
physician was coming out from
Denmark and bringing his wife
on the steamer due within a fort-
night or three weeks. [But was there a
steamer due? Is not one of the
two vessels calling at Upernivik a
coasting vessel? Perhaps Rasmussen's
vessel is one and the Royal Trading
Co's the other. Schröder went
home on the "Cap York" in the lat-
ter part of September, 1915.] Uper-
nivik society was to be gay in
the winter of 1915-1916. The Danish
carpenter, A. Schröder by name, who
had been building the residence
provided for the doctor was to go
home after his year of work in
the Arctic. The Eskimo population

of the settlement numbers a-
bout one hundred souls, but most
of the men were away, fishing and
hunting. The Danish women
find the winters terribly long
and lonesome, with nine months
of cold weather and the Arctic night
without sun lasting for 90 days from early No-
vember to the beginning of February.
The men lead a more active life than
the women and do not find it so hard.

The Danes regard Greenland
as missionary ground and are
working hard now to raise the moral
as well as the physical tone of
the Eskimo population. They derive
less revenue from the colony than
is required for
the expenditures which they lay
out upon it, but they discour-
age and in fact prohibit commerce

with other nations. Photo The church (54
at Upernivik is now housed in a
new building and is fully equipped
with altar, high pulpit, reading stand,
baptismal font, melodeon and bell,
and can accommodate an au-
dience of eighty. School is held
in a room occupying the ground-
floor of a house near the church
and has accommodations for
about thirty pupils. ~~The pastor and~~
~~his wife are the teachers~~. Manual
training in the working of bone, ivory
and wood and in sewing forms an
important part of the simple cur-
riculum, which otherwise com-
prises reading, writing, simple
arithmetic, geography and singing.
The pastor and his wife are the teachers
and the school year lasts the usual
nine months. [Photos] The

Danish Greenland education is now slowly extending into Northwest Greenland through women who have recently married into the Smith Sound Eskimo tribe and through the establishment of missionary stations at Cape York and on Inglefield Gulf.

At Godhavn I had looked at only the exterior of the Eskimo houses, but at Upernivik I got glimpses of the interior as well. The house of the church organist is quite pretentious, as befits his high station in the community, but he and his wife both have white blood in their veins and their abode shows the influence of Danish ideas. The building is a wooden box about twelve feet square and eight feet

high inside, walled and roofed outside with turf blocks two or more feet thick. Entrance is gained through a narrow, boarded passage way about eight feet long and five feet high facing the north. The interior fittings consisted of a family bedplatform, which is used as a settee during the waking hours, a cooking stove, a wall cupboard and two small tables. Daylight is admitted through two small windows that can be opened in the west wall of the house. The inside of the house is painted blue, and everything is scrupulously neat and clean. I have described this dwelling at such length for the sake of comparison with a genuine Eskimo (the igloo or house) of a few yards distant. This was built by a-

four
the same size as the other, ~~built of stones covered over with turf~~ but was partly excavated in the sloping bank and the walls completed and the roof built of stones covered over with turf. The entrance passage was so low that I had to crouch nearly double to traverse it, avoiding with but partial success the dog offal covering the ground. The single room contained merely the bed platform as furniture, and was heated by the open cooking-fire in the middle of the ground earthen or stone floor and was lighted by means of an immovable window ~~containing~~ formed of six little panes of glass in the western wall. The smoke from the fire found its way out as best it might through a

a small opening in the roof. 58
A man and his wife, his two brothers and his five children make this hovel their home, while in winter eight dogs ~~sleep~~ occupy the narrow entrance passage. Several native huts in the settlement look and smell worse than this one, but a few look better from the outside, while the surroundings of all leave much to be desired in the way of cleanliness. We are familiar with the Danes as a cleanly people, but it is evident that they have not been able to impress this characteristic generally into the habits of the natives under their jurisdiction.

Even at Upernivik the Danes grow lettuce, radishes and car-

lots under glass outdoors, while/89
in their homes they make roses,
geraniums and other house plants
grow and bloom profusely.
Potatoes do not flourish, even
with the greatest attention. Disko
coal is used as fuel though it is
not nearly so good as that from
England. But it is not nearly
so expensive, costing only 7 kroner
($1.89) per long ton.

An evening of victrola music
on board the "Cluett" closed the day
pleasantly for our new friends
as well as for ourselves, and Cap-
tain Pickels having gathered what
little information was to be gained
regarding ~~the summer's~~ condi-
tions in Melville Bay, we a-
waited only a favorable wind to

continue our journey - al-
though the breeze that sprang up
during the night was from the north
and was light, the schooner was
~~Captain Pickels~~ gotten
under way by gasoline power about
6 o'clock in the morning of 12 August
and, as soon as we were clear of the
small islands off Upernivik, stood
off N.N.W. toward the ice pack. This
we sighted early in the afternoon, only
twenty-eight miles from land, raising
an impenetrable white barrier ~~of~~ before
us ~~which~~ extending in each direction as
far as the eye could see. The pack is
composed of countless large and small
bergs, jammed more or less closely
together, with intervening sheets of
floe and pan ice - a cruel mass, to be
avoided with the greatest care. The
wind coming off from it was piercingly

cold, in fact we did not know another warm day, judged by home standards of temperature, for nearly a full year. We began to encounter low-lying fog and we had lots of it during the next few weeks. Often the sky would be clear and blue overhead while it was so thick near the water that we could not run with safety. For four days, baffled by light head winds and calms, we slowly skirted the edge of the pack, sailing northeastward till the morning of the sixteenth, when we were off Devil's Thumb, where Melville Bay is considered as beginning. Then we changed our course to northward and began our drift across that body of ice-blocked water, which was always the bane of the whalers who used to frequent the North Water of Baffin Bay.

~~An incident of our journey a~~long the edge of the pack, was the securing of ~~our first seal~~. Early one calm afternoon during our journey along the edge of the great pack ~~we~~ Mate Davis came into the cabin and called Captain Pickels to the deck. He came back directly saying that a big hooded seal was sleeping on a near-by cake of ice. He got into his boots while I slipped off my kamiks and followed his example, and within a few minutes we were seated rifles in hand in the small boat, with Captain Comer sitting in the stern and gently paddling us toward the seal. At 150 yards we opened fire and we certainly wasted ammunition in our excitement, for between us we fired thirteen shots at the poor beast. We got him all right and he proved to be an old bull, nine feet long from tip to tip weighing about

five hundred pounds. ~~The skin will make a good rug.~~ High power rifles do awful execution, the two bullets that struck the seal in the head simply pulverizing its skull. The sea was alive with the little purple shell fish known as Pterofods belonging to the class of Pterofods and swimming freely by means of wing-like appendages. These small animals form an important item in the food of the whales of these waters. As we approached land we got our first good view of the front of the Continental ice cap, now at the level of the ocean and stretching along as a straight-edged, lowlying, horizontal white cloud between the blue sea and the blue sky.

We did not quite overtake the midnight sun on our way Northward, but we were in continuous

daylight for weeks. There was so much light, even at midnight, that our old cook, "Yankee Nathan", had difficulty in adapting himself to it. Soon after two one morning Captain Pickels found ~~the cook~~ him busy making coffee in the galley. When the captain asked what was going on, the cook replied "Why, sir, I'm late for breakfast now. Just look at the sun." About midnight one night I heard Nathan in the cabin calling "Charlie, Charlie! -- that boy. Why don't he answer. Charlie!" I called out to know what he wanted at that time of night. "I want Charlie, sir", said he, "because it's time to begin to get breakfast and that boy's sound asleep. Charlie! Get up." But Charlie remained dead to the world, and the cook finally became

convinced that the clock at least did not indicate the near approach of breakfast time yet and left the scene.

To quote from my journal for the 15th of August: 11 p.m. The evening has been clear, and calm, and beautiful beyond adequate treatment with my powers of description. There are a few clouds in the sky, but the sun's disc is free from them. The color effects differ in different quarters of the heavens, but all are beautiful (lovely) and they change rapidly as the sun sweeps along the northern horizon. Icebergs, sea, mountainous islands and coastline, fjords, distant glaciers and ice-cap look weird and mysterious in the soft twilight. The noise made by the gentle wavelets striking into the waterlevel grooves of ice bergs

and floes is musical and plain in the otherwise intense silence. From time to time too there comes to our ears the booming sound made by fragments of ice falling from bergs, or by bergs separating from the great glaciers in the fjords. Nature, for the most part, seems asleep under this midnight sun just as in the darkness of our nights at home, but here and there a seal raises his head above water for a moment or a belated bird flies across my field of vision, while Chum, our big Newfoundland dog, does not know whether to go to sleep or to play with the men whose watch is on deck.

11:25 p.m. The sun has sunk below the horizon, but wonderful purples, reds and yellows still come from

the clouds, while the brilliant orange of the sky itself illumines the whole scene. Midnight. The ~~warm~~ strong sunset colors are central in the northern sky above the sun - royal purple in the horizon clouds, brilliant greenish gold in the band of clear sky above them and bright light yellow on the still higher clouds. To the west, the warm colors are much in evidence, while to the east the sky is gray and cold. It seems strange that there should be this difference in such nearly adjacent quarters on the opposite sides of the sun. 12:30 a.m. The sunset colors have faded and the sunrise colors have appeared, but one wonders that they should be so much weaker and colder than the sunset hues of an hour ago, when the descending

sun was as far below the horizon as the ascending sun now is, and too the disc is barely out of sight. 1 a.m. The sun is above the horizon line and another "day" has begun.

The first two days beyond Devil's Thumb, which is an island presenting the appearance of a tower or pillar more than a half mile high and less than one-third as wide, we sailed seventy miles. This was encouraging enough, considering the reputation borne by Melville Bay, and I had dreams of getting through the dread body of ice in a week's time, but matters changed the next day and six o'clock of that morning found us moored to a Photo cake in the edge of a vast field of ice that stretched away to the east, the north and the west as

far as the eye could see, even from the mast head. It took ~~the~~ our vessel just ~~four weeks~~ eighteen days to drift, sail and motor around the curve of the ~~Bay~~ Coast 140 miles by our course to Cape York, the northern ~~boundary~~ limit of Melville Bay. It was then the 4th of September and perhaps we ought to have turned back at once and headed for home, since our progress continued to be blocked by ice floes and bergs, and young ice was forming every night to a thickness of a half-inch or more. But we were anxious to accomplish the purpose for which we had undertaken the voyage and relieve the minds of the men who had been watching at Etah hour by hour since the first of July for the arrival of a ship to take them home

Turn back ↑ beyond Guadeloupe & St. Vincent

It took us eight days to make our way with and through the ice along the Crimson Cliffs, past Parker Snow Bay and the Great Petowik Glacier between Cape York and Cape Athol, only fifty miles, where the turn is made into North Star Bay.

In spite of our mental distress over the constantly recurring delays, the journey across Melville Bay was not without interest and incident. When we fairly got into the pack and had need of tools with which to contend with the ice it developed that the vessel had on board no ice anchors, no pushing poles, only one long boat hook, no ice-saws, no pickaxes, no ice-axes, no ice chisels, no dynamite, in fact we had nothing

expressly intended for combating the ice which a vessel, and particularly a sailing vessel, should have in order to meet the emergencies that are more than liable to arise in the course of a voyage into the Far North. To add to our difficulties, it was not safe to try to run the engine in its disabled and poorly repaired condition on kerosene and we had on board less than eight barrels of gasoline when we left Sydney. This meagre supply of fuel had been sadly depleted by the inroads made upon it between ~~Bar~~ Sydney and Battle Harbor, at Disko Island and at Upernivik, so that it had to be carefully conserved crossing Melville Bay for

taking advantage of favorable openings through the ice when there was no wind – and it was almost always calm, while we were in the pack! – and for getting out of the way of dangerous icebergs.

During our first few days in the ice Chum made great sport for us. He liked to trot around upon the floes and he soonred learned how to go up and down the ladder leading from the ship's rail to the ice, walking the rungs as well as any of us. But he had conceived a dislike to Captain Comer without any apparent cause, the aversion seeming to date from the day when the Captain donned his khaki overall trousers soon after leaving Battle Harbor. Perhaps

Chum blamed him for the short rations without meat that have been served the dog since he had the fit on the day when we left Battle Harbor. At any rate, in the afternoon of our fourth day in the pack, Chum without warning bit Captain Comer savagely in the hand. Captain Pickels at once decreed the dog's death and delegated the mates to execute the sentence. So poor Chum was taken out onto the ice and made to pay the extreme penalty for his surliness. There was nothing else to be done, but the event made the day sad for us all, because the dog was playful and companionable and was liked by every one on board, including the victim of his spite.

Saturday, 21 August, was typical of much of the time that we spent in Melville Bay. My journal records that the day was Calm, overcast, rainy and foggy, the third day in succession on which it had not been practicable to take an observation for the determination of our position. Fourth day of being gripped fast in the vast field of ice, 300 miles from our destination and no relief in sight. Ice, ice everywhere, dotted here and there with small pools and short lanes of water, no variety to be seen in any direction from the masthead except some islands and headlands rising through the white desert to the east of us. The next afternoon the captain got an observation and determined that we had advanced,

mainly by drifting, nineteen miles in four days. Sometimes the scene changes very rapidly in these Arctic ice fields. One day, for example, it was 26 August, we were closely surrounded by ice pans so thickly pressed together that they formed an impassable barrier for miles and miles. A polar bear was sighted stalking seals a mile or more astern of us, and Captain Pickels, one of the crew and I started for it. I soon turned back on account of getting a bad fall on an upturned ice cake, but the captain and his man kept on after the bear. A narrow lane stopped their advance 300 yards from their quarry and the captain opened fire but without success and they returned to the ship. For an hour after they got back the ice maintained its for-

bidding a fresh and then suddenly 76
began to show signs of movement a-
mong the cakes. Within a few minutes
narrow
black lines were visible between the
winding across the fields of deadly
white and in less than a half-hour
our engine was started. We mo-
tored through widening leads for
several
hours, until we came near a broad
zone of thickly set icebergs, thousands
of them it seemed, stretching seaward
from Cape Melville for miles. The
Captain turned shoreward seeking
to get around this barrier and
about midnight we were in a per-
fect labyrinth of bergs, many of
which overtopped our masts, loom-
ing high above us in most impres-
sive fashion. The great masses
of ice were beautiful under the strong

colors of the sunset clouds, but 67
not finding any favorable leads
along the shore and fearing that
some of the bergs might come together
and crush us, Captain Pickels turn-
ed about and motored out to sea
for two hours, finally mooring
the vessel to a big floe. 9 Another
week of drifting, sailing and motoring
carried us along forty miles nearly
on our course and found us between
the headlands of Cape York Bay.
We were in sight of Meteorite Island
and I had a chance to look through
my binocular at the place where
Admiral Peary secured the great
iron meteorite, the largest in the world, which was Christened
Ahnighito and now is one of the
chief treasures of the American
Museum of Natural History.

Had there been as much ice in Melville Bay in 1897 as there was in 1915 the admiral could not have secured his prize when he did. ~~Nine days more were required to traverse the eighty miles remaining to~~ We reached Cape Athol, where we turned in toward North Star Bay, about 6 o'clock in the morning of 12 September. Then the light breeze that we had been profiting by for half the night died out entirely and we were drifting about in the strait between Cape Athol and Wostenholme Island. At 9 o'clock our eyes were gladdened by the sight of two boats making through the ice floes lying between us and North Star Bay. One of them was a motor boat and we thought at first that it might be ~~the "George Borup"~~ our Crocker Land

Expedition craft coming out to meet us. Soon the two vessels got free from the ice and the power boat forged ahead into the open water and made toward us. Then we perceived that it was not the Expedition boat "George Borup" and as it approached we saw standing on the bow (photo) a very tall white man, with bare head, whose flowing hair, full beard and skin clad figure gave him the appearance of an old time Norse viking of the olden times. This proved to be Peter Freuchen, the Dane who has charge of the Thule, North Star Bay, station of the Cape York Committee, which is the trading and scientific organization whose head is Knud Rasmussen the famous Greenland explorer

and ethnologist. Everybody in Northwest Greenland from Cape York to Anoratok, Eskimos and white men alike, call Mr. Frenchen by his baptismal name, so I soon fell in with the general usage and addressed him as Peter. He is married to an Eskimo woman, Navrana by name, and lives very much as the Eskimo do. He has lived seven years at Umanak. He is 34 years old and is a graduate of the University at Copenhagen.

Peter gave us much news regarding the Crocker Land Expedition staff and offered to take me in his power boat, whose name is "Ingerlis", to Etah and bring back the men who could go home and as much as practicable of their and the Expedition property. besides a supply of gasoline for the "Cluett" The boat which the "Ingerlis" was towing out

through the ice of North Star Bay was the little 35-ton schooner the "Cap York", the vessel which Rasmussen had sent out with supplies for the ~~Hoodaack~~ Thule station. She had left Upernivik on 14 July and arrived in North Star Bay a week ahead of us, having taken seven and one-half weeks for the journey across Melville Bay which ~~it~~ had taken us a full month ~~for us~~ to accomplish. The "Ingerlis" is a stout clinker-built boat about 38 feet long and 9 feet beam. She was built and owned by Captain Koch, who, after he was done using her in connection with his crossing of the Greenland ice-cap, sold her to Mr Rasmussen ~~Peter~~. She has a small hold or locker forward, a four-berth cabin amidships and

an engine room aft, where a one-cylinder kerosene engine is installed which drives her along at a speed of about ~~seven~~ six knots an hour under favorable conditions.

When Peter reached the "Cleft" that Sunday morning he had with him four Eskimos. Procuring provisions from the schooner, leaving two of the Eskimos on board ~~the schooner~~ we started for Etah in the afternoon, taking Sigdlu and Hendrik as our crew and the schooner's jolly boat as our tender. Sigdlu was one of the four Eskimos who accompanied Peary to the North Pole in 1909. In spite of his vigor and his prowess as a hunter, he is quite a dandy, for an Eskimo, and likes to look well and attract favorable attention. Hendrik, who unlike the Smith Sound Eskimos has a surname, which is Ohlsen, be-

longs to one of the South Greenland tribes. He is a high toned Eskimo, quite an aristocrat in fact, having visited Denmark and been received there by the king, who bestowed on him an "Order of Merit" decoration for ~~his~~ services rendered in connection with the ~~Koch~~ Danish East Greenland expedition (verify). Hendrik is very polite and thoughtful and he likes to treat his friends to cigars "like Americans". We left the "George B. Cluett" with the understanding that the schooner was to follow us, if wind made it practicable. That Sunday ~~so was~~, what a landsman would call a superb day. It was clear, cloudless and calm. The North Water of Baffin Bay was free from large masses of pan ice, the conditions were perfect for

for motor boat work and the "Cluett" could easily have made Etah in 24 to 30 hours from Cape Athol, if her engine had been in proper repair, but alas the engine was almost broken down, it would not run on kerosene, would scarcely run on gasoline and the last barrel of gasoline had been poured into the tank while we were off Cape Melville two weeks before. One of the important commissions of the "Ingerlis" was to bring back from Etah a supply of gasoline from the Expedition stock to enable the "Cluett" to get across Melville Bay. In fact, had the schooner's engine been in good condition when we left Sydney, the vessel would, in all probability, have accomplished

her mission satisfactorily and would not have been obliged to winter in the Arctic.

As I have said, the weather was superb and the North Water was free from impeding ice, when the "Ingerlis" left the "Cluett" for the run to Etah. The trip would have been most enjoyable, had I not been so anxious about the success of the whole enterprise. Wostenholme Island, whose outer shore we skirted, is a bold mass, composed most ancient granite and gneisses against which lie the edges of red and white beds of sandstone, geologically more recent, both rocks presenting high steep cliffs to the water. Near the Northern side of Wostenholme Island

Named for Sir John Wostenholme who helped fit out Hendrik Hudson in 1610

rises the rugged, cone-shaped Hal-
ymple Rock, likewise composed
of granitic rock. The second and
larger island lying across the en-
trance to Wostenholme Sound is
Saunders Island. This presents a strik-
ing contrast in appearance to Wos-
tenholme Island, being composed en-
tirely of the red and white bands of
Huronian sandstone, whose hori-
zontal in the lofty southern cliffs
but inclined gently toward the north
in the section exposed by the west-
facing bluffs. It receives its name
from Captain Saunders whose vessel
the "North Star" wintered in the neigh-
boring bay, which is known by
her name.

an almost flat topped block

The next important indenta-
tion of the coast north of Wosten-

holme Sound is Prairville Bay, ~~which presents an attractive vista~~ with the Three Sisters Bees Islands stretching across its entrance. This bay presents an attractive vista and is of great interest to the geologist on account of the variety offered in the glacial phenomena displayed along its shores. Next comes Booth Sound, characterized by Fitz Clarence Rock, a lofty sugar loaf of basalt rising just within its mouth, and then Cape Parry claims attention with its high, bold front of basaltic columns projecting well into the North Water under the 77th parallel of latitude. The tidal currents run so swiftly around this cape that the coldest weather is needful to make ice and hold it together in a surface

safe for kamatik (dog sledge) travel ~~even in the middle of winter~~. (88

But I will not weary my readers with a detailed description of the coast of Northwest Greenland. It is bold, picturesque and interesting, but it has been described more than once.

At half after three o'clock in the morning of Monday, 13 September, we reached Kiatak, the Eskimo settlement on the southeastern shore of Northumberland Island, where Ootah, ~~another of Peary's polar companions,~~ lives. I stopped there to deliver the victrola which had enlivened the northward and ~~records sent up to him by the~~ voyage of the Cleveland. ~~Admiral~~. Peter assured me that we should not be delayed an hour on our journey, because Kiatak lay almost on our direct course and landing was easy, but he reckoned without

his host, in spite of his familiarity with the Eskimo character. While we were on shore delivering the machine and setting it up, the "Ingerlis" grounded on the rocks and we were kept prisoners on the island for several hours, until the tide came in and floated the boat off again. When we left to deliver the machine and set it up, the boat Peter told Hendrik, who serves as engineer, to push her off from shore and cast anchor, but the Eskimo contented himself with letting the mooring lines out somewhat and lay down to sleep, having been up all night running the engine. When Peter [Ill. Ootah & Wichola. Igloos &c] and I came back to the cliffs in the course of a half-hour we were just in time to see the "Ingerlis" keel over on her side, breaking the

mast short off at the level of the deck. My heart went into my boots, for it looked as if the boat were a wreck and I had momentary visions of being marooned there at Kiatak, midway between the "Cluett" and the Crocker Land Expedition men and unable to communicate with either of party before the sea ice should form with sufficient strength to permit sledging. It looked like an awful predicament, but when we reached the boat, we found that the breaking of the mast had occurred at a joint and had not injured ~~her~~ the hull, and that she was lying easily on the rocks. Hendrik and Sigdlo had made the top of the mast to the rocks in order to keep the boat upright, but the stick was too weak for the duty.

There was nothing for us to do but wait as patiently as we could for the tide to ebb and rise again till the boat should float nce more, - a matter of six or seven hours. A South Greenland Eskimo, ~~Iwak~~ Enoock by name, was just establishing himself at Kiatak as a missionary teacher of the Lutheran church and had only recently finished and moved into his winter igloo. ~~or stone and turf house.~~ He was rather ahead of the other natives in going into winter quarters, they being still in their summer tupics. ~~or skin tents.~~ Peter and I went up to call on the missionary and his wife and I had my first experience of the inside of a Northwest Greenland igloo. The woman regaled us with some

excellent coffee, brewed over a ~~native~~ soapstone lamp-stove burning seal oil or narwhal oil by means of a wick formed of dead moss. ¶ The igloo is shaped very much like half an acorn and its cup which have been cut in two lengthwise. It is built of stones, ~~and~~ and the crevices between ~~which~~ are filled in with turf. The ceiling or roof is constructed of boards, whale bones and long flat stones covered over wholly or partly with flat stones and the whole is covered with a thick layer of turf in which a small hole is left for purposes of ventilation. The walls are lined with a tapestry of seal skins sewed together for a wind shield. This is kept in place through being fastened to wooden pegs or walrus

^ upkta + Killilebah (Omit to p. 94)

bones built into the walls for the purpose. Above the inner opening of the tunnel-like entrance passage way a space about thirty by thirty-six inches in dimensions in the wall of the igloo is left for a window. This space is filled in with strips of seal intestine sewed together, the membrane being translucent enough to admit light sufficient for the inmates. A peep hole an inch across is left in the middle of the window. The furniture of the igloo is simplicity itself, consisting of a general or family bed-platform, occupying the inner half of the room and a lamp or stove platforms at a slightly lower level on each side of the entrance. The platforms serve likewise as settees,

and the floor answers for a table during the winter, where the frozen carcass of a seal or section of a narwhal is allowed to stay while the people hack pieces off to eat, each at his own will. A well-built igloo, thoroughly banked up and over with snow, is a comfortable residence even in the coldest weather, one or two large lamp-stoves giving plenty of light and heat.

By eleven o'clock the tide had risen so much that the "Ingerlis" was afloat again. We got her off the rocks, found that her hull was not damaged and we started northward again at full speed, leaving the mast at Kiatak to be gotten by sledge in the coming winter.

Our route lay northward be- 195
tween Northumberland and Herbert
Islands across the entrance to Ingle-
field Gulf. Along the southeastern
coast of Northumberland Island, massive
trap dikes stand out like buttresses
from the cliffs and connect with great
beds of basalt which form the tops of
the bluffs, while six great glaciers
descend the northern slopes of the
island and form a striking and beau-
tiful feature of the scenery. Inglefield
Gulf presented a beautiful vista
toward the east but its attractiveness
had to be resisted. Peter pointed
out the spot near Cape Cleveland where Admiral
and Mrs. Peary spent the winter
when their daughter, the famous Snow
Baby, the only white child of this bleak
region, was born. The weather

continued calm and the sea glassy and practically free from ice, but toward the latter part of the afternoon we encountered a swell in the ocean which was heavy for a boat no larger than the "Ingerlis".

About six o'clock, when we were still four or five hours' run from Etah, the engine suddenly stopped working and all Hendrik's investigation and effort in the diminishing daylight could not discover the seat of the difficulty or start the motor. Peter, Hendrik and Sigdlu got into the tender and began towing the "Ingerlis" to a place of safety for the night, while I manned her tiller. It was slow, hard, heartbreaking work for the rowers. The tide was with us and there was no wind, but the swell

made it difficult to keep the sway- 197
ing motor boat from checking the mo-
mentum of the little row boat. at
first two of the men rowed while
one steered, taking turns at the oars,
but soon Hendrik became so sea-
sick that he was of no further use
and Peter and Sigdlu had to do
all the rowing. We were off Cape
Chalon when the engine went
out of commission, and the men
kept at their grueling work for
six long hours before we came
to anchor in the darkness of mid-
night at Silwahdi Sarfalik near Childs Gla-
cier in Sonntag Bay, the body of
water which caused the death of Dr.
Hayes's astronomer in 1861. 91 The
evening had been beautiful, but
none of us had enjoyed it much

on account of the anxiety due to the additional delay and the precarious condition in which our breakdown placed us. We were only thankful that the calm weather had enabled us to reach a safe anchorage that night, for a strong northeasterly gale broke upon us about 4 o'clock in the morning and raged for more than twenty-four hours. The thrashing of the boat roused us from the deep plumber into which we had fallen after induced by the labors of the long day. Hendrik discovered the seat of trouble with the engine and remedied it, but the wind was too strong to permit our rounding Cape Alexander and proceed to Etah, now only twenty-five miles distant, hence he and

Siggdu took our heavy, four inch line ashore and made it fast to a column of basalt, to supplement the holding powers of our anchor, which had begun to drag. While the Eskimos were attending to this task, Peter and I were having excitement enough on our own account, for the dragging anchor and the as yet ineffective mooring line allowed us to swing around against a small grounded iceberg. This gave us some anxiety for a time lest we be dashed to pieces against the berg or a big loose block on its top fall and crush us, but we finally swung free again and succeeded in hauling ourselves back into a safe position. Within a half-

hour the ice block slipped (100
from its perch on the berg and
rushed into the sea with a
crash. It did not strike the
place where we had been lying against
the ice mass; but we were glad,
just the same, that we were fifty
or more yards distant, when it came
down.

When the Eskimos had gone ashore
they had neglected to remove to the
"Inger Lis" three boxes which we had been
towing in the tender, and now when
they tried to come off to us again they
found their little boat too heavy to push
through the surf and they were obliged
to leave their cargo on the rocks.
Hence about 10 o'clock, the wind seeming a bit less heavy, Peter took
Sigdlu and rowed in to get the
boxes, which contained some supplies

for Etah and Peter's harpoon gun (101
for walrus hunting. This was a mistake
that came near costing us the ten-
der, on account of the ice-laden surf
beating heavily on the rocks, the sup-
ply of ice blocks coming copiously
from the front of Childs Glacier, near at
hand. Peter and Sigdlu succeeded
in landing, then the engine was started
and the tender was dragged through
the dangerous surf, her painter
having been made fast to the mooring
line. We managed to bring the
little boat alongside and Hendrik
bailed her out. The ice had stove
a hole in her side, but she was still
usable. There was nothing more
to be done, except wait for high
tide and less wind and surf,
so Peter and Sigdlu stretched them-

selves out on shore in the sun, 102
while Hendrik and I did likewise
on the "Ingerkis".

About 2 o'clock conditions had improved so much that the men were brought off in safety; but it was not practicable to get the boats, and, an hour later, we hove up anchor, cut the mooring line and started again for Etah, although the wind was still high. Soon we began to encounter groups of walrus, and in the course of the afternoon we passed scores, perhaps hundreds, of these strange beasts. They were mostly females, accompanied by their young, ~~but~~ there were a few adult bulls in the herds. The animals are well stocked with curiosity and these seemed

unafraid. They often rose to the surface and swam so near the power boat that they looked ferocious enough with their strong tusks, bristling snouts and glaring eyes.

We passed in safety the wall-like front of the great Cape Alexander Glacier, but the still fierce wind prevented our weathering the cape itself, and we had to put back and anchor and moor the "Ingerlis" to the mainland shore near Sutherland Island, two or three miles from the point. It was a wretched and precarious situation, the bottom being formed of a hard sandstone shelf sloping toward the sea, but we held on and managed to get a few hours of much-needed sleep. ¶ An Eskimo, like an Indian,

can always sleep when he gets a chance, no matter how hard or uncomfortable his quarters may be; but anxiety and the strangeness of the surroundings made my slumber light although my bunk was all right, and about 3 o'clock I crawled out of my caribou skin sleeping bag and went on deck. Daylight was already strong, the sky was clear and the wind had almost died out, so I went below, roused my companions and urged a start. Soon we were under way, but not before Peter had congratulated me upon my birthday, he having recalled a remark that I happened to drop in ~~Enook's~~ Enook's igloo at Keatak.

Cape Alexander is a bold head-
land 700 or 800 feet high of sandstone capped with a heavy
bed of basalt projecting as a sharp
point ten or twelve miles from the
mainland. Among Artic travelers
it is noted for the strong winds and
tidal currents which prevail around
its abrupt face, while the Eskimos
dread it on account of the open
which is usually to be encountered there during the
~~often there all~~ winter,
forcing sledges to traverse the promon-
tory by means of two somewhat dif-
ficult glaciers three or four miles
back from the point. We rounded
the cape without incident and were
relieved to be on the last stretch of
~~On the south side of the Cape Alexander promontory~~
our journey. ~~is the grave of Dr. Sonn-~~
~~tag, Dr. Hayes's beloved assistant and~~
~~astronomer, who lost his life from shock~~
~~caused by falling into the winter sea~~

near where the "Ingelis" was an-
chored at Eskalik in the heavy gale.
About 6 o'clock in the morning ~~The~~
we rounded Stary Island and Peter
Crocker Land Expedition headquarters
at Etah came in sight across Foulke
Fjord, ~~around Riviere Island, and~~
I could not suppress my excite-
ment at being so near my goal.
~~Three-quarters~~ Half an hour later we
came to anchor in front of the house.
~~[Ill. view of house]~~ Dr. Tanquary,
zoölogist of the Expedition, was
coming down the steep pathway
to the landing place. ~~and~~ Peter

called out at the top of his voice (107
"Dr. Hovey is with me", but Jans,
as he was familiarly called in North
Greenland, could not believe him,
not recognizing me in my deer-
skin coat and all the Crocker Land
Expedition having given all hope
of the coming of any relief ship
in 1915, when the first day of Sep-
tember, without the appearance of one.
Passed

with Dr. Sanguinay
At the house were Lieut. Green,
Mr. Ekblaw and Mr. Allen, but
Mr. MacMillan and Jot Small
were down at Nerke about 40
miles south of Etah hunting wal-
rus for dog food and Dr. Hunt
had started up the ice cap only
the day before on a three week trip
after caribou. The four men
at headquarters gave me a hearty
welcome, as soon as they recovered
from seeing me at all so late as
the fifteenth of September, and im-
mediately dispatched Nooca carping-
one of the Eskimos attached to the expedition
wak for Dr. Hunt's first camp
on Brother John's Glacier at the
head of Foulke Fjord, in the hope
that he might have been delayed
for some reason, long enough
to receive Ekblaw's and my letters

announcing my arrival - 109
Four hours later Noscarpingwas returned unsuccessfully from his trip.

Delays are dangerous in the Arctic, hence, as soon as the staff had glanced at their most important home letters, preparations were begun for departure on the next high tide, we having been fortunate enough to arrive at high water. Peter went over to Provision Point, a half mile from headquarters, where the "Erik" had deposited the Expedition supplies in 1913, and got the gasoline desired for the "Cluett" and the kerosene and oil needed for the return journey of the "Ingerfis". After breakfasting on canned baked beans, which

were not a great novelty after (110
two months aboard ship, I
had time for an inspection
of headquarters and a glance
at ~~the~~ its surroundings. The
headquarters house faced the southwest and
seemed well
arranged for living, work and
comfort. The large general room
occupied the middle of the front
and was lighted, during the sunny
months by means of a generous
window on each side of the main
entrance to the house. Its walls
were lined with shelves for books,
apparatus and provisions, while
in the middle of one side of the room was the
dining and work table, behind
which stood the large range for
cooking and heating - Out of
the sides of the room opened the four

sleeping rooms for Mr. MacMillan and his staff, two on either side. The rear of the house was devoted to a large workroom, a storeroom and a photographic dark room, while above was a general attic. The house stood on a ~~west-facing~~ slope, and coal, dog meat and other supplies were stored in a covered gallery on the west and north sides, be-

(Youth Recalls Famous)

Two men on the Expedition, Jordan & Sclater, became ill. Rations do not appear to have been more than adequate, but there was a good deal of sickness. Jordan died on Baffin Land and other deaths occurred among the Eskimos and other natives.

low the level of the windows, while the space under the front half of the main building was used as quarters for some of the Eskimo helpers of the Expedition. Boxes of dog biscuit and pemmican were piled up outside. One of the curiosities of the place was an Eskimo igloo built of boxes of dog biscuit, - no apparent danger of starvation there.

The day was beautiful and exceptionally calm for Etah, where the wind seems always to blow. ~~ready all the time~~. During the afternoon the Expedition records, negatives, ~~exposed photographic plates~~ and herbarium, together with the men's most important personal effects were taken on

board the "Ingerkis" and stowed in the little forepeak and on the cabin floor where they made a pile level with the sides of the bunks. This was flattened out with blankets and fur clothing, making a place where three men could sleep in comparative comfort, provided they did not toss about too much in their dreams. Eight men made a very full complement for the thirty-eight foot boat to accommodate. We got under way at 6:35 o'clock in the evening, skirted ~~Hrobess~~ Starr Island, where we saw the little house in which Green and Allen spent several months of their fruitless effort to get into wireless communication with the distant outside world,

and stood into Hartstene Bay for the purpose of picking up some clothing from the camp where two of the men had been hunting hares, near the location of Dr. Hayes's headquarters in the winter of 1850-51. As we approached the land we saw scores of hares scurrying up the cliff side. Ekblaw counted 67, after a good many had disappeared from view. They looked like a flurry of snow and made one wonder at the starvation of so many parties of whalemen trying to winter in the Arctic.

About 10 o'clock the next morning we arrived off Nerke, which lies near the great Morris K. Jesup Glacier and is a favorite resort for walrus hunting. After much shouting, we roused Mr. MacMillan and Jot, Small and they came out of their tents surprised enough to see the "Je-

gerdis" with us, particularly me, on board. Jot was the first one to reach us, coming out in a kayak which he had constructed after his own plans and which he considered to be a great improvement over the Eskimo boat. He is a boat builder by trade, but his substitute looked ~~rather~~ odd beside the real thing as made by the natives. It being necessary that some one stay by the Expedition property at headquarters, Mr. Mac Millan ~~received~~ said at once that he was the one upon whom the duty devolved, especially since he had sent word to the American Museum in the spring of 1915 saying that he wished to remain a year after the return of the main portion

of the staff in order to carry on his ethnological and archaeological work along the shores of Smith Sound and Kane Basin. At MacMillan's request I left Jot with him as assistant, Jot wishing to remain since he likes the life in this bleak country.

After about two hours of busy conference, we regretfully bade the men good-bye, leaving with Mac his bundle of letters, a box of rifles and ammunition and a half box of oranges. The last ~~to the inboys~~, was a great treat after two years' deprivation of fresh fruit of all kinds. Our journey across Whale Sound was without incident, except that we saw much more ice than on the northward trip,

three days before and that we saw many groups of walrus on the water and on the floes. The big fellows did not pay much attention to us, seeming to know that we were in too much of a hurray to spend time hunting them. It almost broke the heart of Peter, Hendrik and Sigdlu not to be able to stop and get some of the animals or even to kill them. Too much dog and man food was thus being allowed to slip away to suit their ideas of what was proper. In the latter part of the afternoon as we were running along past the entrance to Booth Sound, whose sugar-loaf island Fitzclarence's Rock is a prominent and well-known landmark, the wind suddenly became strong from the

southeast and soon a gale was raging against which we made but little progress. We five Americans were lying in the cabin, keeping dry from the dashing spray, when Peters called down the companionway in a terrified voice, "The boat is sinking". We did not know what boat he meant but we crowded up the little passage two at a time, getting badly in one another's way. When we reached the deck, we found that the waves were swamping the tender which we were towing loaded with gasoline. Under green's directions. the boat was with difficulty hauled up alongside and Allen jumped in with a line around his body. Six or seven cases of gasoline were passed up safely on board

the power boats, but four ~~cases~~ went adrift and soon disappeared behind us - We tried to make Granville Bay, but the gale was too strong for us and we put back to an anchorage near the entrance to Booth Sound, where we lay all night comfortably enough, though drifting growlers (small ice bergs) gave us some anxiety from time to time.

The wind was still very strong the next morning, but we got under way again soon after daybreak and skirted the coast nearly to the entrance to Granville Bay. Then we pushed out directly across Wostenholme Sound, the way being clear, heading for the west end of Saunders Island, to intercept

the "Clarett", in the improbable 120
case that she was taking advantage
of the favorable ~~through~~ strong wind
to follow our course to Etah.
We crossed the sound in safety,
but went no farther than the western
end of the island off a gentle slope
where some old ruined igloos be-
token former occupation of the
land by Eskimos, for there we en-
countered a vast field of tightly
packed ice pans and bergs which
filled the space between Saunders
Island, Wostenholme Island
and the mainland. Turning
back, we skirted the northeastern
shore of Saunders Island making
for Oomanak, at the head of North
Star Bay. The cliffs along this side
of the island are magnificent

in their almost vertical rise of 1000 to 1300 or more feet from the sea and are beautiful in their strong, horizontal banding of red, purple and white quartzite, ~~an ancient metamorphosed sandstone.~~

The cliffs form a great breeding place for birds, during the summer season, principally the akpat or murre, and the island is a favorite resort for the Smith Sound Eskimos during the latter part of May and the month of June. They live in tupics on the lowlying land at the western end of the island while they net the birds for food and clothing and collect eggs for food. A story is current to the effect that some South Greenlanders came to the island

once for the purpose of getting 1122
birds and eggs. They let themselves down by means of a rope to a shelf on the face of the cliff, but while they were at work some Unanak residents who resented this poaching on what they regarded as their own bird preserve took away the rope and left the intruders to escape from their dangerous perch as best they could. After some days of difficult work, the men succeeded in getting down and they left the region never to return or to be followed by others.

Late in the afternoon of the seventeenth, we reached the "Cluett" and were more than glad to get there safely, the wind then being on the increase again. The vessel was

riding ~~with~~ at both anchors
~~out~~ well up in North Star Bay,
about two miles from the little
settlement known as Thule
~~Umanak~~, where the Cape York Committee has
its Arctic station and Peter lives.
We found the deck filled with Eskimo
men, women and children and it
seemed as if the whole population
of Oomanak were on board the schooner
Captain Pickels in fact told me
that nineteen of them had spent
most of the time on the vessel, during
the three days that the "Cluett" had
been lying at anchor there and
that they were a lazy, good for nothing
lot, willing to eat ~~and~~ or accept
everything that was offered them
and to do nothing in return.
There was, however, one woman in

the party who displayed enough to make a pair of kamiks (seal skin boots) for the Captain. We learned later, I am glad to say, from experience as well as from what was told us, that this attitude of the natives was peculiar to North Star Bay, the less efficient people gravitating in Greenland, as elsewhere, to the vicinity of the white man and his trading station. The pickings there are better and it is easy to get a living, by working on the sympathies of the white man and those of the energetic natives who come in on their travels or for purposes of trade. At North Star Bay, matters are somewhat aggravated by Peter's open hearted, generous

nature, for he can never see any apparent distress without relieving it to the best of his ability, even at the cost of personal privation. When taxed with being too easy in his dealings with the Eskimos, he replied "But what is to do? I can not see them hungry." As a tribe the Eskimos of Northwest Greenland, as the region from Melville Bay Northward along the "American route to the Pole" is called, are an independent, self reliant, kind hearted people, possessing some characteristics that are not excelled among the most highly civilized races or nations of the earth.

One of the visiting party on board the "Clutt" was old Merkusak the last survivor of the Eskimo

immigrants who came across ~~Smith Sound~~ from the Baffin Land region some sixty (?) years ago and mingled with the Smith Sound Greenland natives. The old man, who was estimated to be seventy five or eighty years of age, could not resist the temptation offered by the ship's dietary and he overate to such an extent that he had an attack of acute indigestion and died a day or two later. We white men were surprised that the ship's supplies should be so attractive, even to an Eskimo. The chief regret aroused by the man's death seemed to be due to the fact that he had just been provided with a new kooletah (caribou skin coat). and superstition would prevent the

use of the garment by anyone else. (127)
It was too bad to have to waste a brand new Kooletah in that way!

Supper was just over when we arrived at the "Cluett", but a few minutes work sufficed to set an ample meal before the eight hungry men who came in on the "Jugerlis". By this time, the wind had increased again in violence so much that the power boat could not go safely to her anchorage, hence Peter, Hendrik and Sigdlu were obliged to spend the night on the Cluett. Accommodations were arranged for the four men brought down from Etah and by midnight all hands had turned in, glad to be housed in more roomy quarters than

those provided by the little power boat. We were up betimes the next morning, anxiously regarding the weather ~~brought up from the States and to get started for the South, since every hour's delay now added to the danger of our being caught in the ice and forced to spend the long winter in the Arctic.~~ The gale, however, still continued with practically unabated force and it soon became evident that we could not land all the supplies that had been brought up from the States for the use of the Expedition, without dangerously delaying our start for the South. It was already past the middle of September and every hour's detention

increased in geometrical progression the liability that we might get caught by the ice and forced to spend the long winter in the arctic. How I mourned the defects of the "Cluetts" engine! Conditions at Etah, however, did not prove to be so serious as I had expected to find them. ~~Strict conservation of resources had been inaugurated early in 1915 and~~ A careful inventory of supplies had been made in ~~the~~ September ~~fall~~ after the hope of a relief ship had been given up which showed that the supplies which had been furnished on a supposedly liberal scale for three years, with margin enough for even a fourth year emergency, would really be ~~in most respects~~ adequate for the coming year for in all essentials

the seven white men at Head-
quarters. They would be ample
therefore for the three men left at
Etah, especially when the abundance
of game in that region is taken
into account. With the help
~~therefore~~, of the Expedition men the
most desirable articles were selected
from my stores, including 300
pounds of sugar, which was the most
crying need at Etah, and, together
with trading material and per-
sonal boxes addressed to Mac Millan
and Hunt, were made ready
to go ashore with Peter as soon
as the wind might permit his
departure. At 5 o'clock that after-
noon the "Ingerlis" ventured to depart
with all the Eskimos and fully as much
of the cargo as it was safe for her to take.

(Continued in Martinique book.)

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U.S.A.

For Guadeloupe see other
end of this book.
St. Vincent begins on eighth
leaf from this end.
Continuation of "Cluett Voyage" after
p. 58 of St. Vincent.

E. O. Hovey.

Saint Vincent.
1915.

(Guadeloupe.) ("Cluett" Voyage)