Some Views of Antarctica
ANTARCTICA
LAND OF SUPERLATIVES & CHALLENGES

77+ Degrees

![Antarctica Map]
TUFTS UNIVERSITY NATIONAL SCIENCE FOUNDATION ANTARCTIC EXPEDITION

1969-1970

Robert L. Nichols - Leader
Geology Student Field assistants:

Robert M. Goodspeed – class of 1960
Roger A. Hart – class of 1962
William G. Meserve – class of 1962

RESEARCH GOALS Include investigating:

PHASE 1 the nature, height and ages of elevated beach ridges along deglaciated coastlines to determine the rise of the continental margin and sea level changes as the ice melted and over what period of time, and

PHASE 2 the glacial geology and volcanic history of the Wright Dry Valley region.
Field Assistants’ Friendly Assistants
To Antarctica: From Quonset, Rhode Island to ( #s 1-6)

#s are stops along air route:
Quonset Navy Base, RI; San Francisco, CA; Oahu, HW; Nadi, Fiji; Islands; Christchurch, New Zealand; McMurdo, Antarctica; Sidney, Australia; Darwin, Australia; Bahrain Island; Cairo, Egypt; Athens, Greece; Naples & Rome, Italy; Paris, France; London, England; Glasgow, Scotland; Boston, MA

Stage #s - 1 to 5 via MATs; 5 to 6 via US Navy; 7 to 8 via Ice Breaker "Glacier"; 8 to 18 via Commercial Air Lines

To Boston, Massachusetts (#s 7-18)
1. coldest, windiest, driest, cleanest, healthiest and largest desert (averages 2” water equivalent per year) in the world with most rapid & extreme climate change, eg. Temperature can drop 65 F in 12 minutes

2. no permanent human residents, has no government and is shared by all countries

3. ice sheet is over 3 miles thick (15,700 feet), averages 1.6 miles thick, and holds 70% of the earth’s “fresh water”, it contains 7,250,000 cubic miles of ice (90% of world’s total ice)

4. if all ice melted, world ocean levels would rise by 200 to 250 feet

5. the rock surface is pushed by the weight of the ice some 1,625 feet and would very slowly “spring back” over ~ 10,000 years

6. no rain has fallen in the “Dry Valleys” for at least 2 million years (similar to that of the planet Mars)

7. icebergs with surface area 4,250 square miles (size of Connecticut) (subsurface size up to 10 X greater)

8. ocean sea life around Antarctica is the richest in the world

9. lowest ever temperature recorded on earth occurred in Antarctica at minus 129 F

10. sea ice doubles the size of the continent during the winter months, increasing by 40,000 square miles each day

11. ice cap has 29,000,000 cubic kilometers of ice (which is 90% of all the fresh water ice on the planet) with only ~ 0.4 % of Antarctica ice-free

12. earth’s largest Ozone Hole reaches a maximum area of ~ 27,000,000 square kilometers during winter

13. ice cap is home to the least number of species and smallest number of native wildlife individuals of any continent

14. six months daylight & six months darkness

15. Kadabatic winds at the continental edges blow up to ~ 190 mph

16. dry valleys have had no rain in thousands of years and the longest river in Antarctica is the Onyx River In Wright Dry Valley which = 12 miles long
One Of Our Earliest Views Of The Antarctic Ice Cap
Close-Up Of Ice Cap Surface “Sastrugy” Caused By Extreme Winds
Size Comparison Of USA And Antarctica *Without* It’s Surrounding Sea Ice

Sea Ice Is Shown In The Next Slide
Continent Doubles In Size During The Winter Months
All 7 Continents Have Changed Location Through Time.

How Do We Know This?

Watch The White Area Migrate Over Earth’s Surface Through Time
McMurdo Station With Western Antarctica Across The Sea Ice

- Continent
- Sea Ice
- Ross Island
Williams Air Field At McMurdo, Antarctica (on sea ice) With Active Volcano In The Background

Mt. Erebus
Where The Hell Are We Anyway?

It’s Not Exactly The Center Of Civilization
Maybe This Will Help A Little, Well Maybe Not
Now That We Know Where We Are, What Is It Like Here?

Temperatures

Thu Sep 09 17:58:55 2010

Air 1m
Sub-surface 1m
Sub-surface 0.1m
Sub-surface 10m
Sub-surface 3m
Operation “Deep Freeze”

Earth’s Lowest Ever Recorded Temperature

Vostok, Antarctica In 1983 = Minus 129 Degrees F

★ = Our Location
McMurdo Station From The Air
Our Temporary Home When Not In The Field
Ross Island’s Smoking Gun

Mt. Erebus

Summit = 13,350 feet

Antarctica’s Largest “City” = McMurdo is Located In Volcano’s Back Yard
Quonset Hut: Our Quarters While In McMurdo Station On Ross Island

Few miles from the active volcano

Early Summer Conditions
What The Well-Dressed Antarctic Explorer Wears - Most All Of It At Any Given Time
Outline Of Our Expedition Study Area

★ = Goodspeed Glacier
Cross-Section Of West And East Antarctic Ice Sheets

Much of the rock crust lies well below sea level as the result of the weight of miles of overlying Ice.
Most of The Bed Rock - Ice Interface Lies Far Below S.L.

What Antarctica Would Look Like If All the Ice Were To Melt
Part Of Phase 1 Work
Environmental Conditions Of Coastlines Where We Were Working During The First Phase Of Our Expedition
Camping on the Sea Ice – 6 to 14 feet thick, We hoped!
What It’s Like To Go Camping On Sea Ice During The Antarctic Summer
This Is How We Traveled During **Phase I**
Sledging – Note **Our** Power Source!
Man-Haul Sledging – Up Close & Personal
Very Smooth Blue Ice Creates Ideal Sledging Conditions
Some Rough Sea Ice Conditions For Sledging & Camping
Example Of Sea Ice Camping Conditions – Phase 1
Another One Of Our Camp Sites On The Sea Ice

You Don't See Any Dogs. Do Ya?
Our Sole Means Of Communicating With Anyone Outside Our Party While In The Field

Operating Frequencies:
Primary = 6835 kcs (voice) Rcv = 3.74;
Secondary = 6708 kcs (voice) Rcv = 2.705, &
Emergency = 9001 kcs (voice & CW) Rcv = 18.17

’59 – ’60 Call Names: “Man-Haul Traverse” = generate – 03 (NGD-03) = Us; NAF McMurdo = McMurdo Radio (NGD); Hallet Station = Alameda (NIC); Marble Point = Marble Point Radio; Victoria Land Traverse = Generate Zero One (NGD – 01)
McMurdo Ham Radio Station = KC4USV = Present Day
“Normal” Field Setup For “ANGRY 9” Radio

The key work here is “normal”
We Had To Sledge & Back Pack This Monster “Radio”

Hows this for our **73+ pound** “hand-held,” **not** counting the tripod-generator, antenna, & accessories?

**HAMTOON**

Next time, how about we put up the antenna before the snow blows?
Elevated Beach Ridges At One Of Our Phase One Work Sites

Mt. Erebus: active volcano 13,350 ft high

Large ice bergs in sea ice

This Ain’t Your Typical Sandy Beach Material

Elevated beach ridges
Our Fresh Water Source During Phase I
Hugh Ice Bergs Frozen In Sea Ice
We didn’t have it even this good!!! We Need A Windbreak. Where is the nearest ice berg or large rock?
Attack Of The Skuas
How High Is The Glacier Barrier?
How Far Is It To The Front Of The Glacier?
Who Is That Strange Person?
What Does This All Mean?
Who Cares?
Inside A Glacier’s Melt Water Cave – Looking Seaward
A Couple Of Our Friendly Natives Kissing On Sea Ice

Waddell Seal Pup is Only Few Days Old
Single Engine Canadian “Otter”
Our Radio “Communications” While Doing Field Work

Modern-Day McMurdo Station QSL Card
Ham Shack & Antennas At McMurdo Long After We Were There

(Not Exactly Up-To-Date By Today’s Standards)
Much Later Photo of McMurdo Ham Shack & Antenna
A Much More Recent Communications Building At McMurdo Station
McMurdo Station Communication Building
Couple of Recent Hams At McMurdo – long after we left
McMurdo Ham Antenna – erected long after we left
It Sure Wasn’t Like This When I Was There!
Environmental Conditions Of Dry Valleys Where We Worked During The Second Phase Of Our Expedition
One Of Our Field Camps In Wright Dry Valley

Our Auspicious Leader = Doc
No More Sledging! It’s Now Hiking & Back Packing
How’s This For A Coffee Break Location?
Petrified Seal In Wright Dry Valley: 4,500 to 5,000 Years Old As Age-Dated Back In The States.  Yum – Yum !!
Adelie Penguin In Wright Dry Valley About 20 Miles Inland From The Sea Ice. This Critter Was Alive!

My shadow
Is It Animal, Vegetable, or Mineral?
Who's That Handsome Fellow?
Digging A Hole For Blasting.
Here’s Where I Learned The True Meaning Of “F.U.B.A.R.”

Roger

Bill

Doc

Note The Patch
Me? I’m Taking the picture, stupid.
Dry Valley & Coastal Area Common **Winter** Wind Conditions

**Summer** Winds Are Commonly 40+ mph

- **Katabatic Wind**
  - Blow up to 190 mph during the winter months
This is one example of what 190 MPH wind-blown sand can do to solid rock. These are common in the dry valleys.
Typical Dry Valley Surface Material Deposited By Glaciers

It’s About The Same Size And Shape As The Materials Composing Elevated Beach Ridges
Field Geologists Hard At Work

Wright Glacier – Landward Edge

Wright Lake (Frozen)

We Ice-Cored This Lake

↔ Ice Cap

Sea Ice ➔

Roger

Doc

Bill

Guess who took this photo
Aerial View Of Glaciers In Wright Dry Valley, Antarctica Named After Dr. Nichol’s ’59 - ’60 Field Assistants (sorry, field assistants’ assistants weren’t included)

“Bob’s 15-Minutes of Fame”
Onyx River = Longest River In Antarctica - 12 miles long

Bob’s Glacier Terminus

Person For Scale
Terminus of Goodspeed Glacier

Person For Scale
Crazy Geologists Doing Field Work In Near-Surface “Whiteout” Conditions

Part Of Depth To Permafrost Study: Phase 2
Our Mode Of Transportation Back To Christchurch, New Zealand
Our Expedition Field Season Ends & It’s Time To Head Home

AGB – 4 USS “Glacier” Ice Breaker - I took this photo from one of the ship’s helicopters just before we landed on it’s helo-deck as it was moving toward New Zealand.
USS “Glacier’s” Helicopter On Helo-Pad: It flew us from our camp at Marble Point onto the ice breaker for our trip back to New Zealand.

Ya, I know. I must have scanned my Kodochrome slide ”basackwards”
USS “Glacier” Breaking Sea Ice In The Ross Sea As It Begins Its Journey To New Zealand
Penguins Waving Goodbye & Taking Pictures Of Us As We Head North
Open Water Ahead – Ross Ice Shelf Margin & Ice Berg
Hey! In case you’re wondering, this isn’t Antarctica!
My Home In The Woods – Winter
Many, Many Years Later.

I Guess I Haven’t Learn Very Much Over The Years!