

IN MEMORY OF JON C. BOOTHROYD

4 August 1938 – 15 October 2015



JCB's photograph of the Yahtse River/Icy Bay field camp in the summer of 1975.

IN MEMORY OF JON C. BOOTHROYD

“My best guess is that Jon is now working on some far-flung outwash in a distant corner of Heaven, where the weather is not quite perfect and a large population of grizzlies is always nearby.” **Chris Ruby**

Miles O. Hayes

I arrived at the UMass campus in Amherst in the fall of 1964 and found a lot of interest on the part of the graduate students there in the subject of **coastal geomorphology**, so we soon started a program in the Geology Department that we called the Coastal Research Group (CRG). One of the earlier students to sign up for the program was a New Hampshire native called Jon C. Boothroyd, otherwise known as **JCB**. Unlike me, Jon was an expert surveyor, having surveyed a few roads in his native state. One of the first things we did under his supervision was to set up a quick-and-accurate method of measuring beach profiles that is still in use even to this day. Throughout the mid 1960s, we members of CRG made biweekly measurements of a large number of beach-profile sites scattered along the New England Coast, as well as started up several research projects on the beaches and estuaries of that coast.

On May 9-11 1969, CRG organized and ran a three-day field trip in our study area (coasts of Mass. and New Hampshire) for the Eastern Section of SEPM. This trip included visits to 29 field locations at which members of our group, including me, JCB and others, gave erudite explanations of the sediments, morphology, and coastal processes at those sites. The “guidebook” for that well-attended trip was a 462-page tome we called the “White Elephant.” This document included several original papers, the second one of which (by JCB and me) was titled **STORMS AS MODIFYING AGENTS IN THE COASTAL ENVIRONMENT** that summarized the results of our beach profiling projects, discussed details of the beach morphology, etc. This paper, the first to give such details on the New England Coast, is still frequently cited in the literature. Also, Jon had a paper in the “guidebook” titled **HYDRAULIC CONDITIONS CONTROLLING THE FORMATION OF ESTUARINE BEDFORMS**, a totally original look at the evolution of the sand waves, megaripples, etc. in

the New England estuaries that eventually led to several important papers by him and associates on that topic. See Dennis Hubbard's story below for a discussion of that work.

In the summers of 1969 and 1970, CRG, with funding from the US Navy, surveyed the southern coast of Alaska. During these visits, JCB investigated the Scott Glacier outwash fan in detail, which led to another classic paper. We also studied about 200 miles of the outer beaches, that resulted in the creation of a slide show/tone poem/movie called *SUZANNE'S LAMENT*. The members of the field team that surveyed the outer shore and created *SUZANNE'S LAMENT* included MOH, Paul Hague, Woody Hobbs, Frank J. Raffaldi, Jr, and Bob Henry. Jon Boothroyd was an outstanding photographer, so, naturally, some of the 300 or so slides that went into the creation of *SUZANNE* had JCB labeled on their sides.

In the fall of 1972, about 14 members of the CRG, including JCB and me, headed to the Geology Department of the University of South Carolina where we formed the Coastal Research Division (CRD). Soon, Jon was on the field team that ventured to the southern coast of Iceland where they studied the outwash streams as well as the skinny barrier islands. Some of this led to investigating the braided streams on Mars, but that's a detail I will not elaborate upon here (see the discussion by Dag Nummedal given below).

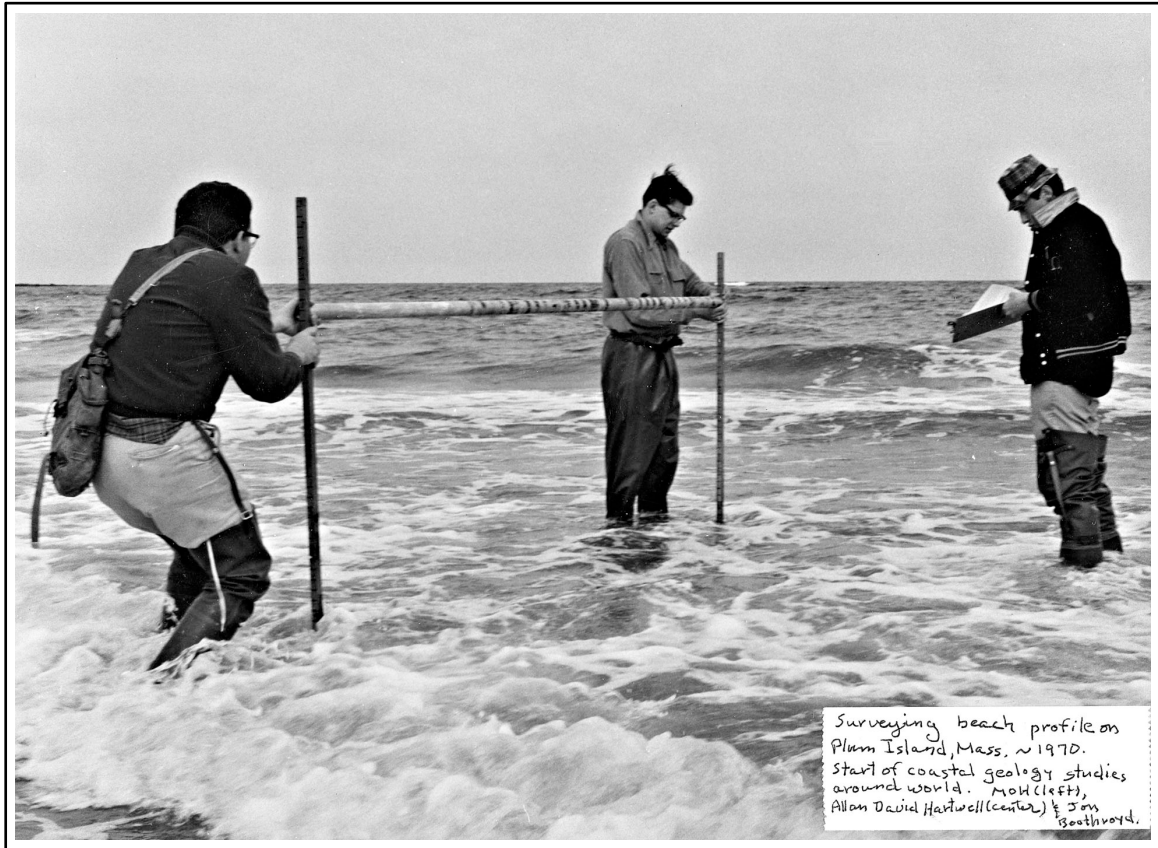
And then in the summer of 1975, we were back on the Southern Alaska Coast where Jon led a team working on the outwash plain of the Malaspina Glacier. This work, together with his earlier studies of the Scott Glacier outwash plain and in Iceland led to several more original and breakthrough papers on those glaciers and their associated outwash plains (e.g., Boothroyd and Ashley, 1975; and Gustavson and Boothroyd, 1987).

Meanwhile, back at CRD, Jon was finishing off his Ph.D. dissertation on *OUTWASH FAN SEDIMENTATION, NORTHEAST GULF OF ALASKA*.

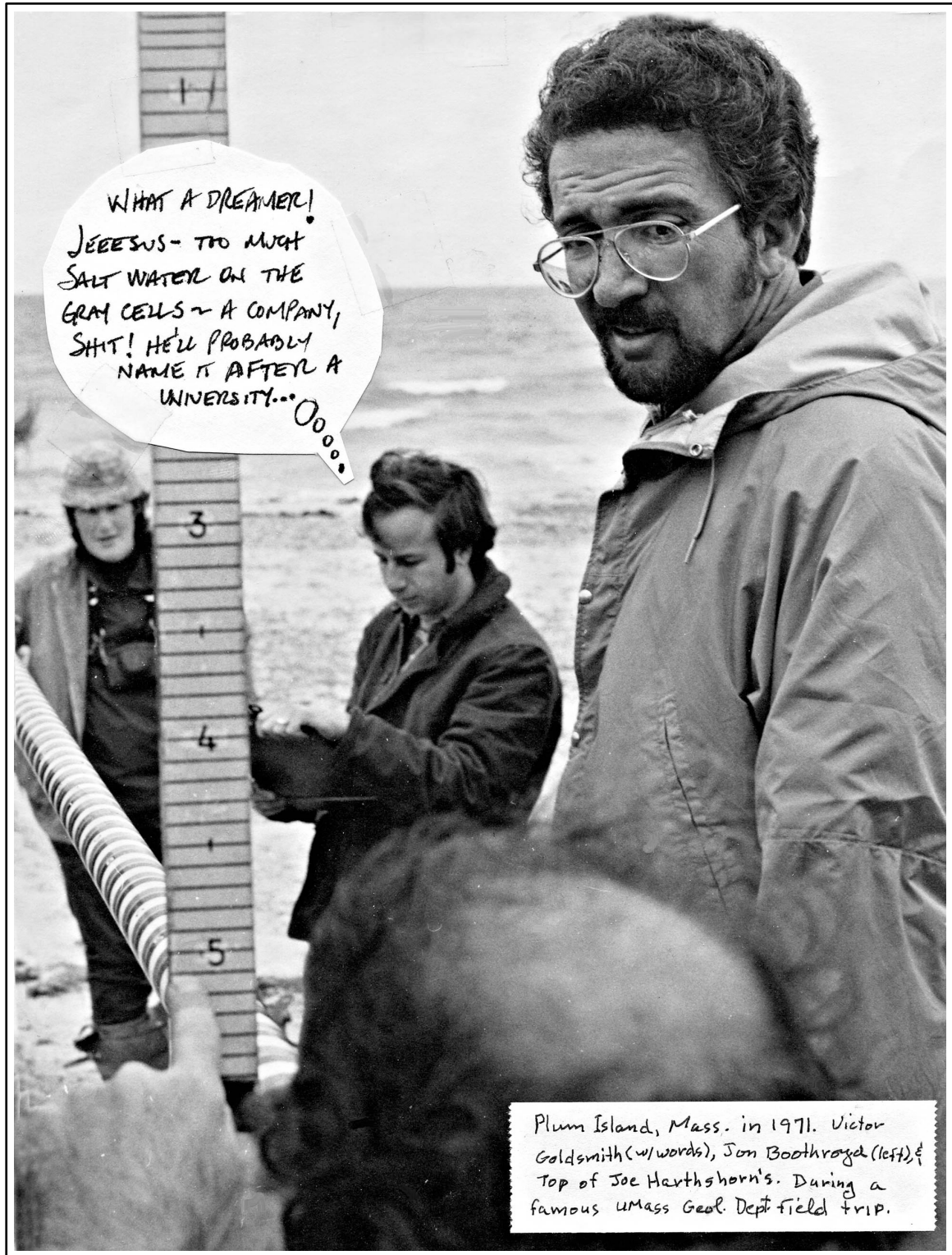
CRD was a bustling place while JCB was there with usually up to 10 or so graduate students working on their degrees at the same time. Jon filled in the role of **mentor** for the newer incoming graduate students to perfection. It would have been very tough to keep up with that many students without his help.

So, in conclusion, throughout all this, Jon, an ingenious, tenacious, hard worker left an indelible imprint on the research groups at both universities, as well as on the sciences of coastal geomorphology and sedimentation. He did this by developing several new research concepts on beach cycles, estuarine bedforms, barrier island development, and, of course, outwash and braided stream sedimentation.

THUS ENDS MY BRIEF INTRODUCTION TO THE ONE AND ONLY JCB



Caption: Plum Island, 1970. On left is MOH, in the middle is Allen David Hartwell, and on the right is JCB.

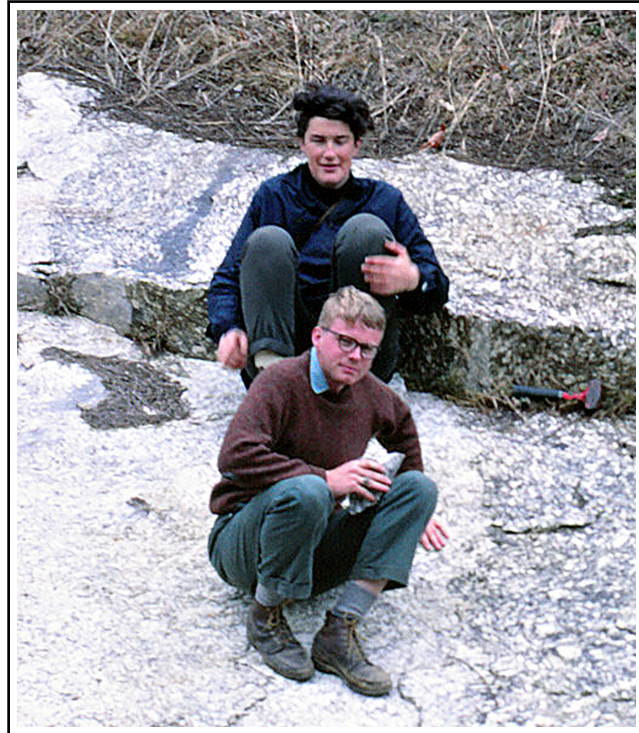


Caption: Running a beach profile (believe it or not) on Plum Island in 1971. JCB on the left, Victor Goldsmith in the middle, MOH on the right, and top of Joe Hartshorn's head is in the foreground.

Albert C. Hine

Fellow Colleagues,

Jon and I knew each other for 49 years. He was a wonderful friend and mentor. He and I first met when we were both hired by Dr. Peter Robinson as his field assistants for the summer of 1966.



Caption: Top photo is the two of us that summer. The other photo was at the NEGSA at Bretton Wood in March 2015.

I will really miss him.

Peter Robinson (a virtuoso scholar of igneous/metamorphic rocks and structural geology who was professor at UMass when JCB, MOH, Al, Matz, Skip, Dennis, Victor, Paul, Ray, Woody, Farrell, et al., were there)

Dear Al et al.,

The picture you show was on a Petrography field trip in 1968, or at least the year you took the class, not 1966. It is on an outcrop near Laconia, N.H. of Winnepesaukee Quartz Diorite. Jon took the same course the very first time it ever ran and it was he who led me to run part of my trip that year near Laconia to show off the new road cuts. They were so good that I kept going back for many years. Jon also liked to go along which is why he is in the picture. I have another picture of him in another group when we climbed to the summit of Red Hill in April 1970, in the foreground is Bruce Yare, another coastal process student (I believe). Will fire that off soon.

A few days ago, in working through field notes, I came to an entry for "Aug. 8, 1966 Gridded W. slope of Quabbin Hill. Jon smashed foot." Very likely this is when we almost got caught swimming by MDC police! Next day, August 9, we were back in hot sun at Parker Island making structural measurements like fury. The three pages of notes are in a hand writing that is either you or Jon. We were warming up for the record run on August 17.

Pete

Later, Pete added the following discussion to these notes (including the cartoon and the two photographs given below):

The cartoon features, among others, Jon Boothroyd 1967 (with side comment about Folk terminology). At some point I remember the team Boothroyd, Gale Ashley and Tom Gustavson as the team with great knowledge of proglacial sediments. Jon was in my very first Petrography Course, which continued to thrive into the late 1990's. Jon was also in the very first Field and Structure 1 and 2 sequence when George McGill and I first taught it in academic year 1965-66 and Jon was the top student (then an undergrad I believe) and that is why I hired him in summer 1966.

Further Discussion by Peter Robinson on the Early Days with Jon Boothroyd:

I would like to add a few more words about Jon's early days at U. Mass., in addition to my letter to Al already copied (given above), and contribute two more illustrations for potential use in addition to the cartoon sent earlier (and given below).

As I recall, Jon came to us an undergraduate and had been employed as a surveyor with the New Hampshire Highway Department. I think he had learned about geology from a friend of his father in Laconia, N.H., the U.S.G.S. geologist, Lincoln R. Page, whom I had actually worked for in South Dakota in summer 1953, also an authority on New England pegmatites and radioactivity. In 1965-66, George McGill and I founded a new two semester course sequence, Field and Structural Geology 1 and 2, and Jon Boothroyd was in that first class. Both he and I were New Hampshire boys, so his mannerisms were somewhat familiar. He immediately impressed us with his carefully drawn structure homework problems and was obviously the best student in the class. In the Spring term the mapping projects were on an island in Quabbin Reservoir, called by all "The Island", with perhaps undertones of Alcatraz. This was reached by boat at least in 1966 and 1967. A very early task was to lay out a survey grid on this huge outcrop and mark corners for orienting mapping grids. Jon immediately facilitated the surveying, but also provided an important supply of yellow marking paint, conveniently borrowed from the New Hampshire Highway Department. Each student covered a "quadrangle" about 100 feet by 200 feet with mapping done at 10 feet = 1 inch. Like all geologic mapping there were constant squabbles about correlation and structure near "quadrangle" boundaries. The geology of that island is perhaps unique in the world, and upon my retirement, Jon presented me with two giant black and white prints that he had made. One shows an outcrop within his own "quadrangle" showing the all important Clough Quartzite, barely 1-foot thick, but with three "mappable" members. After two spring seasons of class mapping, the resulting map was published in the 1967 NEIGC Guidebook, on which I see a long list of student co-authors, at the very top Jon Boothroyd and Al Hine.

In summer 1966, I had funding to support my mapping and that of graduate students, including funding for two field assistants. I was very fortunate to get the services of Jon Boothroyd, a known quantity, and also Al Hine, then finishing his third year as a geology major at Dartmouth College and urged to work with me by my old mentor John B. Lyons. Though the

two of them became friends, as assistants they were very different, though both became involved with the geology at hand. My own habits were also different. Summer field work in Massachusetts is taxing both because of heat, but also because of insects, and it became my habit to postpone lunch until reaching a promising spot, such as a windswept hill or exposed point on the shores of Quabbin Reservoir. Jon soon became aware of this problem, so brought along what he called "pseudo-lunch", something that could be easily munched on while walking from outcrop to outcrop. Jon also was a deep thinker, sometimes taken up so much with his own geologic thoughts that he had to be reminded of what we were looking for and measuring. Al Hine, by contrast, was always focused on the task at hand - no reminders needed - and everything went like clockwork. On August 17, 1966 he and I achieved what is still my all-time record, 53 stations in one day. To top it off, we told Jon that 43 of them had been done before lunch! What we did not tell was that we had made a long traverse downhill from Route 202, only reaching the Quabbin shore and lunch at 4:30, then retreating rapidly back uphill before dark.

On September 9, 1966 Jon and I went on a long trip by boat to the eastern arm of the Reservoir. My notes do not indicate specifically that he was along, but a note at one of the stations says I thought the lineation plunged 17° south, but Jon argued, the notes say, that it was really 1° north. (both of us sticklers for the details!). Also early on that day, we came to and landed upon a large outcrop of Monson Gneiss that had just emerged from beneath the falling reservoir waters. We located it by triangulation and took photographs, including one that Jon later printed for me in large format. At the end of that day, we pulled the boat up on the east shore of Little Quabbin Island, and managed with great effort, and using two large planks, to drag a large amphibolite sample into the bow of the boat. We then set off back to the MDC wharf. Unfortunately we learned quickly that the propeller was out of the water, and we could get it in only by both sitting on the back gunnel. Even then, the boat moved very, very slowly even at full throttle. We arrived back at the MDC wharf an hour after closing time, and received hell from the management. The boat was provisionally beached for the night, and retrieved and unloaded next day, during which the two of us took it to the wharf to unload, as in the photograph (that is given below). That rock remained in the rock garden beside Morrill 4 (UMass campus) for many decades and has since been curated for placement in the new rock garden. It is a special amphibolite with both hornblende and cummingtonite.

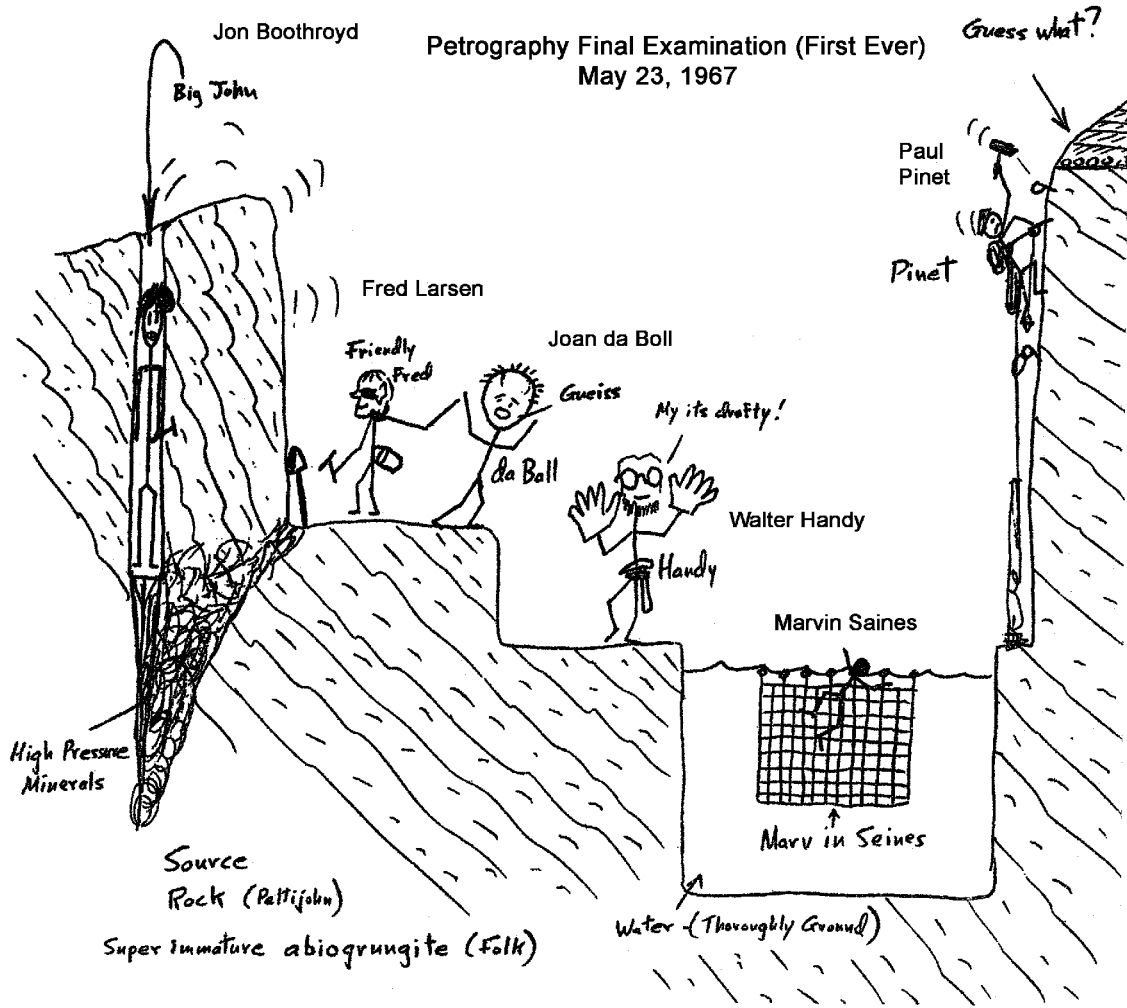
I believe it was after summer 1966 that Jon officially became a graduate student. In spring 1967, he became a student in my very first coarse

in Petrography, very heavy on the microscope, along with a series of other illustrious students as depicted in my cartoon. Jon's lab reports were very good, but he was outdone in neatness by Quaternary geologist Fred Larsen, who typed all his. It was only some forty years later, that I learned with a shock that Larsen was (and remains) older than I. Already, at this time, Jon had become familiar, through Miles Hayes, with the terminology for sedimentary rocks forwarded by Folk (see cartoon given below), and from then on all field trips to sedimentary rocks, we got into great discussions of sedimentary structures and their meaning.

On the inaugural April field trip, we devoted Saturday to igneous exposures on the Massachusetts and Maine coasts, then Sunday were led by Jon to a set of superb new road cuts, that he knew about near the shores of Lake Winnepesaukee and his hometown of Laconia. These included one completely through a classic ring dike, including a contact earlier described by Modell (~1935), with impressive words, as "the zone of dynamo-thermal shock". He also showed a road cut through an intrusion never previously mapped, and in the contact zone we found xenoliths containing tiny grains of dark blue corundum produced by high-temperature desilication. Jon continued his interest in these trips, attending again in 1968, and certainly in 1970, to the classic nepheline syenite pegmatite at Red Hill and the ascent, at Jon's urging, of Red Hill itself (see photograph below). During that trip he and Harold Nielsen nearly came to blows over the roadside scene along the shores of Jon's beloved lake, described by Nielsen as "ticky-tacky".

After the first year of Petrography, Jon was succeeded by other students, in 1968 including Gale Ashley and Al Hine, and in 1970 by Tom Gustavson among others. While Boothroyd, Ashley and Gustavson were all together and working with Joe Hartshorn, they became the local gurus for matters involving proglacial sediments and sedimentation, but all with a great working knowledge of the all important "source rocks". It was my great pleasure to work with all of them then, and to follow many of their careers for many years later.

Pete



(NOTE: Pete Robinson also sent the two photographs that follow.)



Caption: Jon Boothroyd and I in 1966 after collecting large sample of cummingtonite amphibolite of Ammonoosuc Volcanics from Little Quabbin Island, using MDC boat and 10 h.p. outboard motor provided by NSF. When using the motor, we both had to sit on the stern to keep the motor in the water. This sample is now in the rock garden collection to be returned to display after construction.



Caption: 1970 students in spring Petrography class, plus Jon Boothroyd (red jacket), on summit of Red Hill, New Hampshire the granitic core of a nepheline syenite ring complex. Left to right in back: Rich Felkel, Mike Page (an undergraduate from town of Amherst), David J. Hall, Jack Kick. Foreground: Bruce Yare (coastal processes student). The shadow in the background is probably Tom Gustavson.

Dennis K. Hubbard

For whatever reasons, my experiences with Jon always seemed to be different than those of others around him. I transferred into geology at the University of Massachusetts in my junior year when the Biology department and I mutually agreed that pre-med was not for me. Jon needed a summer field assistant who was a diver, so Miles sent me along with him and Barry Timson to Plum Island for a weekend in January... my "job interview". It was one of those winter days when the wind, low temperatures and salt water conspired to create what seemed like pavement. Jon managed to get about a hundred yards away from the parking lot when the Dodge Power Wagon broke through and buried itself to the chassis. No problem... we just

walked off and did the beach profiles.

After the deadman we carried proved ineffective and the Coast Guard announced that they could not "interfere with public commerce" as long as we were above the high-tide line, the only option was a tow truck. Even with their pooled resources, Jon and Barry could not cover the cost... so my first experience with Jon was emptying my wallet.

At the end of the weekend, Jon announced that he wasn't headed back to Amherst and that I would need to drive the Power Wagon back. He explained that this was a good opportunity to learn the joys of a standard transmission, so we went to the closest parking lot for my extensive training. My new confidence waned when he backed the truck up to a trailer holding the "*Sorby*", a vessel I that would become very familiar with over the coming years. I'm not sure whether it was kicking in to get the truck towed or being foolish enough to head off, boat in tow.... but I got the job that would start me down a path I would never leave.

I spent 14 weeks with Jon the following summer..... in a 12-week field season. The nature of our relationship established itself pretty quickly. After our first dive, Jon unceremoniously dumped his wet and salty gear near the hose and waddled off to dinner as I started cleaning up field equipment. When I came down the next morning from the small house where the hired help slept, Jon's dive gear was still in a wet, salty pile. Jon was standing there between my dry gear on the line and his "not dry" gear on the ground... with "the JCB-look" on his face. After some discussion, he apparently recognized the logic of taking responsibility for equipment that your life depended on (dive gear was a lot more "interesting" back then) and my days as chief valet and plate warmer just never happened. I don't know how much this episode had to do with it, but we never had the head-butting episodes for which Jon became so famous. The closest we ever got was when I asked for a Sunday off after working for 98 straight days. He gave me a disappointed look and asked whether I thought I was cut out for this kind of work.

The following semester, I was asked if I might be interested in doing a Senior Honors Thesis that would follow up on the shallow-water work we'd been doing all summer. We came up with a protocol for taking measurements on the large, deeper-water sand waves in the main channel of the Parker River Inlet and I spent pretty much every week-end with a different volunteer diver mimicking Jon's shallow-water setup - the sedimentological equivalent of watching paint dry. But, what mattered to me was that Jon had convinced Miles that I could take care of the *Sorby*, work in a "fluid" environment and bring back some pretty expensive equipment...

and hopefully good data. Jon's study was a novel and ambitious extension of the seminal work John Southard had been doing in laboratory flumes. It provided careful measurements of flow characteristics and bedform-migration patterns at a scale not possible in the lab.... and Jon reckoned that observations and measurements in deeper water were the next logical step. In the end, he graciously included me on a GSA abstract that was my first proud publication... and later on, a paper that summarized our (mostly his) work.

While I received a tremendous amount of support from everyone in the department at UMass and in the Coastal Group, the mentoring that I got from Jon stands out. This was a unique relationship that would not become commonplace in education for at least another two decades, and I know that Jon's willingness to take some of us under his rather expansive wing had a lot to do with Miles' ability to provide opportunities for so many advisees. Perhaps what I will always remember most is how long it took him to settle on a mere 250 words in an abstract... and the first sentence in particular. Some might consider it as "inefficient". I'll choose "careful".

Stewart C. Farrell

My favorite Jon story comes from the initial Alaska safari (in 1969). Jon, two field assistants and I drove a rented station wagon to Seattle WA where we took an Alaska Air flight to Juneau. Our Alaska advisors had insisted that we take guns to defend our camps. I bought a 303 Enfield rifle, while Jon borrowed George Magill's 44 Magnum pistol. We stopped at REI in Seattle where Jon purchased a very smart leather chest holster for the 44.

Upon boarding the plane at the Seattle airport, there was a sign "Please surrender all hand guns to cabin personnel". So Jon rather ceremoniously and carefully pulled the 44 from his holster and handed the artillery piece over to the young stewardess at the plane's door. He expected a "typical female" reaction. The woman took the gun, stuck her finger through the trigger guard and spun the gun around her finger with the finesse of a Butch Cassidy, then stuck it into her service apron ending with the comment "nice gun".

Jon just stared at her for a few seconds.

I sort of pushed him onward to the seats with the comment "Jon, you have just met your first real woman, Welcome to Alaska".

By the way, unless the rogue bear was about 20 feet away that 44 would have just made him madder than hell because during practice firing JCB could not hit the side of a barn.

But he looked really tough wearing that holster with the pearl-handled 44 tucked into it. Nobody, but nobody messed with him at the Alaska Hotel bar in Cordova. Open carry of side arms was the norm in 1969 coastal Alaska. The guns were never needed because no critter threats occurred and no one saw any urge to kill living things for the hell of it, although a few unlucky salmon served as super welcome replacements for Skip Rhodes's 24-lot cases of "VegAll", a substance I have never come near eating since and have only seen for sale once in a Montana mom & pop store years later. But I do still open cans with the P-38 that came with the C-rations Skip came up with for "emergencies"

We all feel the loss and will grieve the hole in our career lives his passing leaves.

Skip Rhodes

The anecdote that comes to mind is really one of my most vivid memories of Jon. With an unparalleled focus on the details of sedimentologic geoscience, one had to always marvel at the intensity with which Jon could dissect the details of the natural environment. It was during a transect on the Scott outwash plain in Alaska (in summer of 1969) that Jon left us with an illustration of this intensity. For that excursion, Jon had the undergraduate photo lab assistant Denny helping with profiles and descriptions. Denny was often more often engaged in the sheer enormity of the landscape as well as the ever present threat of bears. Consequently, it was with this sort of divergence of effort that Denny absolutely ruined the day. As he was attempting to traverse the braided stream and wade through the close to freezing runoff water, poor Denny waded through one of the small pools adjacent to the main channel, at which time Jon yelled at him to stop!!

The rest of us looked around intently for the approaching bear, at which time Jon explained quite succinctly that Denny "just stepped on the science!" Collapsing around Denny's boots were multiple water laden megaripples and associated waveforms now reduced to a slurry of cold dirty glacial waters. Cursed by the thixotropic behavior of saturated sediment, poor Denny carried with him the egregious burden of "stepping on the

science" for at least the remainder of the day. Of course, the daily surge of melt waters restored new, fresh bedforms the next day, but they just weren't the same!!

As the shale revolution has unfolded over the last several years, and as geoscientists, especially sedimentologists have realized that the "monotonous mudstones" previously dismissed as homogeneous massive layers actually host a plethora of clues about their genesis, I have wondered how Jon would have dissected these sediments if he commenced his career 50 years later. Those individuals with the gift of descriptive science like Jon's are few and getting fewer in the face of "playstation" geoscience. Jon was among that small group of geoscience peers that could turn an outcrop into a credible story of genetic facies and process sedimentology, even when burdened by those of us that "stepped on the science".



Caption: Breaking water-wave forms (standing waves over antidunes) in the major upper fan channel (Scott Outwash Fan). This is a single large train with an estimated flow velocity of 350 cm/sec (12 ft/sec). Flow was from right to left. Geologist (photo lab assistant?) Dennis Wilkins is the observer. Photograph was taken by Jon Boothroyd on 25 July 1969 (From Boothroyd, 1972; Fig. 36B). **OOPS!! HE IS STEPPING ALL OVER THE SCIENCE!!!**



Caption: JCB driving a Coot on the Scott outwash fan in 1969. **OOPS!! IS HE DRIVING ALL OVER THE SCIENCE???**

David B. Matz

When JCB arrived on the grad school scene at UMass., it was obvious he was cut from a different mold. Maybe it was because he worked for a year or two between undergraduate and grad school. He was definitely more mature than many of us. He drove nice sports cars whereas most of us drove junkers. JCB owned ski equipment and often hit the slopes up in New Hampshire and Vermont. Most of us couldn't afford to ski or even mingle in the bar at those places. JCB was big and hulky, so someone (probably Jim Wessel) nicknamed him... "Bear".

What I remember most about JCB at UMass. was the presence he demonstrated in classes, seminars, and discussion groups. It seemed like his mission was to seek the truth and be well prepared. When JCB was around, the BS factor was usually reduced to zero. I learned a lot from JCB. He was almost always right. I'll miss him.

Albert C. Hine

Life Saving Advice From Jon Boothroyd—Iceland 1973

In the summer of 1973, I had the great fortune of spending about 7-8 weeks on a glacial outwash fan delta (Skeidararsandur) along the south coast of Iceland (Figure 1) with members of Miles' Coastal Research Group and an Icelandic field support group. Dag Nummedal was our field chief scientist. Miles had received funds from the Office of Naval Research to generate a sediment budget essentially determining the amount of material introduced by the meltwater from the Skeidararjokull (glacier) forming Skeidarar River, which eventually discharged into the North Atlantic Ocean along the south coast of Iceland. We were also to determine the rate of coastal erosion or progradation of this glacial fan delta coastline over the past 300 years to ultimately determine the position of this 75 km long beach in 1667. A Dutch treasure ship from the Caribbean had been wrecked along this coastline at that time and influential people in Iceland were interested in finding the wreck. Fast forward—Dag was able calculate the position of the 1667 coastline based on the rate of sediment input vs. output due to the rate of longshore transport. But, the Icelanders never located the shipwreck, even with Dag's hindcasted, historical coastline position in hand. That 17th century wooden sailing vessel still most likely lies buried in the outwash. Finding the proverbial "needle in the haystack" would have had higher odds than finding this vessel as it is probably completely rotten and destroyed except for its rocky ballast.

We had two teams: (1) One to study the sediment longshore transport along the coastline, and (2) The other to study the fluvial transport of this huge braided stream system. This was a geologist's dream to examine the counteracting effects of two huge sediment transport systems. The south coast of Iceland experiences arguably the largest floods on earth due the glaciogenic or volcanogenic glacial bursts known as Jokullhaups in the Icelandic language. These short-lived floods due to catastrophic failure of ice-dammed lakes or sub-ice volcanic eruptions would produce water discharges equal to the Amazon River. Then, they would revert to their much smaller, normal discharge when the lakes had been drained or when the sub-glacial volcano had stopped erupting. Historic maps have shown that the fan-delta coastline prograded, at times, as much as 4 km out into the north Atlantic. Meanwhile, during the winter the raging storms of the north Atlantic frequently produced 12 m waves that would reduce this sediment

bulge back to some dynamic equilibrium coastline--talk about two high-energy systems!

Earlier in the spring of 1973, a team that included Dag, Mike Stephen, Denny Hubbard and others from the coastal group had set up field stations. I was asked to head up the coastal team for the summer. Dag, Larry Ward, Mike Stephen and others were the fluvial team. The study of the fluvial outlets to the ocean cut into the barrier spits formed Larry's MS thesis.

We had a team of Icelanders who provided everything from aircraft (fixed wing and helicopter) to operating tracked vehicles, to base camp cooking, securing supplies, and general base-camp upkeep. We bathed in a nearby freezing glacial stream and slept in a survival camp set up by the Icelandic government for fishermen who had become shipwrecked by piloting their trawlers too close to the surf where waves were nearly always 3 m high in the summer and over 12 m high in the winter.

I asked Jon to be my field assistant since we had known each other since the summer of 1966 when we were both field assistants for Dr. Peter Robinson, arguably the top hard rock geologist studying the northern Appalachians. We had worked very well together since then as grad students. I was working on my dissertation with Miles as my major advisor examining sediment movement along the margins of Little Bahama Bank and a large ooid sand body known as Lily Bank, which was covered with spectacular bedforms. But, I could not say "no" to such an amazing experience—so off to Iceland on Lofleidir Icelandic Air we went. Jon and I became the beach team and strengthened our friendship. This was an example when the "field assistant" taught the field team leader. In reality, Jon and I were co-leaders of this component of the project. Together we had the time of our lives in one of the world's most amazing and remote places (Figure. 2).

One day at the base camp, Dag asked Jon and me to accompany him to the upper part of the fan delta, not far from the source of the meltwater emanating from the snout of the Skeidararjokull (Figure 1) forming an impressive upwelling fountain. We were transported to the edge of the Skeidarar River by a strange, bus-like vehicle sporting huge rubber tires, which, reportedly, had come from a B-52 landing gear apparatus. The vehicle was driven by one of our Icelandic crew, who then dropped us off and was due to return about 6 hours later to pick us up.

The three of us were left alone on this huge outwash plain with our gear. The Skeidarar River was still confined and had not yet become the 25 km wide, braided stream system further down fan (Figures 1 and 2). Dag wanted to obtain a current profile across the river using a rope stretched

from bank to bank along which we could secure our small rubber boat to deploy the current meter. Did I mention that the water was about 1 °C and there were ~1 m high standing waves?

So, how to extend a rope across such a water hazard? Dag and I pushed off into the raging current in our rubber craft armed with our long rope. Dag rowed like mad trying to get to the other side as quickly as possible as I paid out the rope. Obviously, we zipped downstream in the strong current. Jon remained on the bank to secure the rope once we had reached the other side. Suddenly, Dag and I were pitched into the freezing water both wearing hip waders. Why we were wearing hip waders still remains a mystery. Ever since I was a kid growing up in New England, I heard stories of fishermen drowning because of their rubber hip waders prevented them from remaining upright if they fell into the water. So, I really expected to drown. A strange peaceful aura came over me, no panic. With the roar of the water, I could not hear Jon yelling at us providing instructions on how to survive. I have no idea what was going through Dag's mind as we went over one standing wave after another. But, knowing Dag, he was probably calculating why this had happened. I knew I only had moments to live.

Suddenly, I could feel bottom with large cobbles rolling over each other as part of the bedload also making a huge racket. Dag and I made it to a mid-channel bar with Jon looking at us from afar. We walked upstream along the bar until the channel widened and became shallower so we could walk across. But, by this time, I had no feeling in my legs and had to swim fully clothed over to the river bank where Jon was waiting. Dag was in the same situation. I went into uncontrolled shaking, which Jon noticed and yelled at me, "Take off all your clothes right now!" I weakly replied by doing that I would freeze to death. By which he replied even more forcefully, "what do you think is happening to you right now?"

So, we got naked right there on the outwash and amazingly warmed right up. We did have light windbreakers, which helped since air over the huge, nearby glacier was being cooled, thus sinking and blowing hard over the area when our misfortune occurred. Jon, with his Alaskan experience under his belt, knew exactly what to do and how to handle this potentially grim situation. I never forget that exchange between the two of us. There was no arguing with him. We did what he ordered and it might have saved our lives.

Eventually, the strange vehicle with the huge tires returned and off we went to the base camp for a warm meal.

I knew Jon for 49 years. In later years, I invited him to participate on research cruises to the Caribbean. I was damn lucky to have known him, to have learned so much from him, and to have such a great friend. I will always miss him.

Rest in peace, my friend.

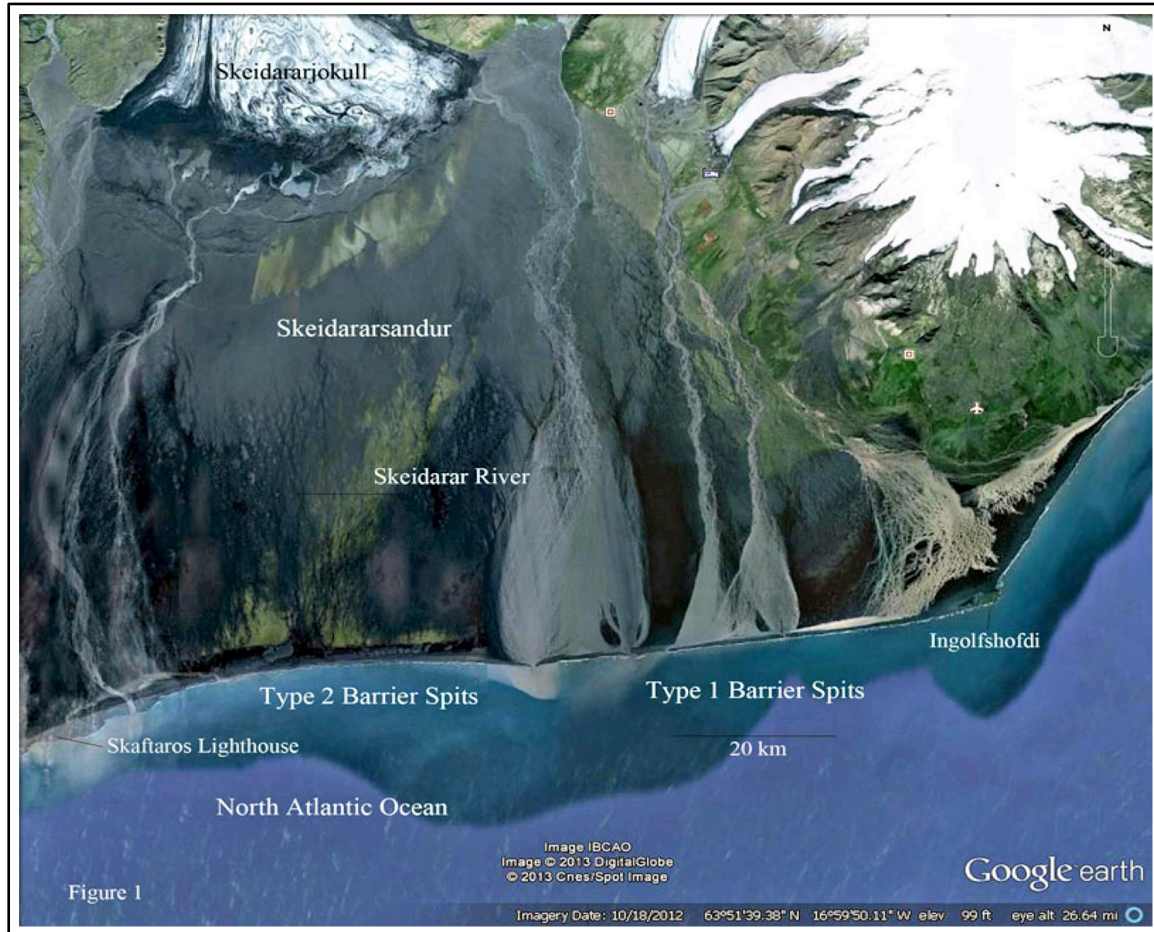


Figure 1. Google Image of our field area with the Skeidararjokull outlet glacier, the Skeidararsandur (glacial outwash fan delta), the Skeidarar River, and the coastline dominated by barrier spits. Note the small, narrow outlets (not inlets as there was no reversing tidal effect) in the barrier spits. Allowing the bedload and suspended sediments to enter the North Atlantic Ocean. Our “adventure” occurred within a few kilometers of the eastern portion of the Skeidararjokull where the Skeidarar River had not yet begun to braid.



Figure 2. Aerial view of lower Skeidarar River fan delta and coastline looking eastward. Note the river outlets.

Jon's contributions to the publications that came from our great Iceland adventure:

- Hine, A.C., and Boothroyd, J.C., 1978, Morphology, processes and recent sedimentary history of a glacial-outwash plain shoreline, southern Iceland: *Journal of Sedimentary Petrology*, v. 48, p. 963-982.
- Nummedal, D, Hine, A.C., Ward, L.G., Hayes, M.O., Boothroyd, J.C., Stephen, M. F., Hubbard, D. K., 1974, Recent migrations of the Skeidararsandur shoreline, Southeast Iceland: Final Report, Contract N60921-730C-258, Naval Ordnance Laboratory, 156 pp.
- Hine, A.C., Boothroyd, J.C., Ward, L.G., Hayes, M.O., and Hubbard, D.K., 1974, Morphology, processes, and recent sedimentary history of a sandur coast, southern Iceland: American Association of Petroleum Geologists Annual Meeting; San Antonio, Texas, April 1-3, 1974.
- Nummedal, D., Hine, A.C., and Boothroyd, J.C., 1987, Holocene evolution of the south-central coast of Iceland, in, Fitzgerald, D.M., and Rosen, P.S., (eds.), *Glaciated Coasts*: New York, Academic Press, p. 115-150.
- Hine, A.C., Boothroyd, J.C., and Nummedal, D., 2013, Glacial outwash plain shoreline, south-central Iceland;

Dag Nummedal

Dear Miles,

Very, very nice tribute to JCB! Everyone in the coastal group will appreciate it! I remember also quite well how JCB took what he learned from the braided streams in Iceland and helped convince the planetary community that those ‘funny scars’ on Mars really were braided streams. Now, 40-years later, we all know that they were; we even know that there is water on Mars – today! I owe a lot of my own education to JCB (and you!).

I will treasure the Iceland memories forever; you were the one who got us that fabulous project!

Re-reading Al Hine’s great account of our adventures at Skeidarasandur in Iceland in 1974 (some of which is embarrassingly almost true - smile), I need to add the remarkable follow-up, which Jon Boothroyd also was instrumental in developing during the subsequent years: our studies of the large outflow channels on Mars. Life is full of coincidences, in fact almost everything of real importance in life happens that way, and the road from Iceland to Mars was one such.

Shortly after our Skeidarasandur experiences, we were visited at the University of South Carolina by one of the leading Mars geologists at the time: Harold Mazursky of the USGS Planetary Science Center at Flagstaff, Arizona. Hal got very intrigued about our tales of giant outburst floods from beneath the glaciers there (so-called “jokulhlaups”, triggered by subglacial volcanic eruptions), because their geomorphological record was remarkably similar to some of the channels that the Mariner mission had discovered on Mars. Similar giant floods had also occurred in the “Scablands” of eastern Washington State during the Missoula flooding at the end of the last glaciation in that part the US/Canadian Rocky Mountains. So, NASA engaged Boothroyd and myself, and USC graduate student J.J. Gonsiewski, to start analyzing these giant flood channels to see what we could infer about (very) ancient channels on Mars. This led to several years of close collaboration with Boothroyd, some of his and my students, and the broad NASA team of planetary scientists at Flagstaff, JPL, and the NASA Houston space center. The field work we conducted at the Channel Scablands was

never as dramatic as Al Hine's depiction of a certain (in-famous) river crossing in Iceland, but, during our many flights across the Scablands, with Boothroyd coaching the pilots to get "just a little lower" for a better picture, I am sure we got close. Jon had great impact on the NASA community because of these projects, and today we know with pretty high certainty that Mars' giant channels were cut by flowing water. We even know that there is liquid water on Mars today, yet the ancient oceans and Icelandic magnitude floods are gone because the solar wind has stripped away the Martian atmosphere.

Jon, I think I speak for many when I thank you for the inspiration you were to us all not to be afraid of asking 'dumb' questions. Those are the ones that lead to real insights.



Caption: JCB in Iceland, 1973.



Caption: The University of South Carolina Iceland team on top of the Skeidararjokul (glacier) in summer 1973. From left to right, Larry Ward, Jon Boothroyd, Mike Stephen, and Dag Nummedal. Photo taken by A.C. Hine.



Caption: Jon on the Skeidararsandur (glacial outwash, fan delta) next to the Skeidarar River in summer of 1973. The gear he is packing was used to make current-meter measurements in the river. The pipes were buried in the outwash and used as anchors from which to tie ropes to in order to secure the rubber Avon water craft (not pictured). We made the current meter measurements from the water craft. Photo taken by A.C. Hine.

Patrick McLaren

I am very grateful for receiving this information and equally sorry to learn of this news. Jon played a significant role in my field camp on Melville Island in 1974 and had great influence on all the members of the group. In particular his knowledge of Canadian politics put us all to shame! Also memorable was his willingness to take part in our under-ice diving observations to examine firsthand the role of ice on arctic coastal morphology – memories that remain fresh to this day.

It was one of life's good fortunes that allowed our paths to cross.

Michael F. Stephen

Thanks Tim for the sad news and thanks to Miles for his kind words. After some reflection, I would like to share a happy and fun memory of Jon. I had the pleasure of Jon's company in our field camp while on the Malaspina outwash (summer 1975; see the picture of this field camp on the cover).

We were working on breakfast in our large cook tent. We were making pancakes. Jon came in and insisted that we could not eat until the plates were heated. We all were hungry, cooking in a very remote area along the edge of Icy Bay with ice bergs and glaciers on one side and 14-foot bears on the other in a damn wet tent with no good bath for weeks, 100 km from civilization, no one wanted to wait.....but we heated the plates! Well I learned something that day, best damn pancakes ever on a nice warm plate with melted butter and warm syrup....thus one of my fondest memories of field work with Jon and the coastal group.

Raymond A. Levey

My story with JCB goes back to Icy Bay, Alaska (1975). That summer field season for me was so amazing and still very vivid to this day.

The memories include not only the hot plates that Michael reminded me of for the pancakes but the long rides on 3-wheelers across the outwash with Jon in the lead. The bears that ripped our tents apart on the 4th of July (because we left camp and went to town to celebrate and shower), and JCB's always cool under pressure with a great love of the work so it never was work but fun and adventure.

Chuckles include the pre-trip arrangements in Seattle going with JCB to the original REI store to buy stuff. Best of all, I remember JCB arranging two critical items for the summer on the glacial outwash. Boxes and boxes of the Mystic Mint Girl Scout Cookies and cases and cases of Olympia beer. JCB even got the Air Force to transport that special stuff to the nearest town (Yakutat, Alaska). Although I don't eat many cookies when the Girl Scout cookies come out every year, I think back to those days and I get a big smile.

Christopher H. Ruby

It has been interesting reliving some of the memories many of us have had about Jon and our days in grad-school. My best guess is that Jon is now working on some far-flung outwash in a distant corner of Heaven, where the weather is not quite perfect and a large population of grizzlies is always nearby.

My story of Jon and the "Yahtse River Base Camp" (pictured on the cover) is somewhat different from Ray's and Mike's. Like Mike's recollection, it revolves around some of the conventions at Jon's camp in the aptly-named Icy Bay.

During the summer of '75, I was also working in the Gulf of Alaska, first as a field assistant to Miles, and later for Mike Stephen. Being the "new guy" I normally had the seaward end of the "beach profile system", but remember the entire experience as one of the best of my life.

Later, toward the end of July, I began work on my own thesis area on the western flank of the Malaspina Foreland, including Riou Spit. Steve Wilson had come up to Alaska to work as my field assistant. Steve, a friend of Miles, was sort of a "satellite" of the CRD and had a distinctly unique way of doing things, preferring as few rules and protocol as possible. Hence, he and I got along famously. He was well prepared for the rigors of our two-man, two-tent moving camp arriving with several semi-automatic pistols, an enthusiastic and unreasonable fear of spiders, a dislike of most birds, and a large stash of weed that he'd grown and hybridized himself (one in a small container marked with 3 X's). He named this particular cultivar "Mr. X" and suggested that I not partake of it since we were so far from a good hospital with an emergency drug unit. He noted, "This is the strongest stuff on the planet and I can attest to that because I've been on at least 300 acid trips. Not for the faint-of-heart." I'd never considered myself among the faint-of-heart, but nonetheless, I took his advice since I'd managed to get to age 26 without dropping any acid...and, despite all outward appearances, I was serious about what I was doing.

Our moving camps were supplied via Jon's camp on the Yahtse River toward the head of Icy Bay. If memory serves, Ray Levey and Mark Cable were acting as Jon's field assistants at that time. Bush planes would resupply Jon's camp when he'd call on his large VHF radio to Yakutat, the nearest "town" some 100 plus miles to the east. This happened about weekly, and following the landing and resupply of Jon's place, the plane would fly along the coast and, having located our camp, drop us some food and supplies, half

of which were destroyed in the air-drop. If we were in an accessible spot, it would land and we'd request anything specific that we needed (we didn't have a radio). One afternoon, the pilot landed along our stretch of the beach, gave us our supplies (intact that time) and asked if we wanted to visit Jon's camp for a day, since he was headed back that way and would be able to drop us back on our beach the following morning.

So, off to the Yahtse River we went. Upon our arrival, and after a few polite greetings, Jon informed Steve that he would be cooking dinner since he was the new guy and "low man on the totem pole". If one was listening closely, one could hear the cogs rotating in Steve's head, as though some sand or small pebbles had been thrown into the gears. However after frowning in my direction, Steve obliged and began cooking the meal with a series of very specific requirements that Jon had given him...resulting in substantially more mental gear-grinding. The rest of us were outside of the cook tent commiserating about our various projects, the dwindling beer supply, the weather, the notable lack of any women, etc.

About an hour later, Steve said that dinner was ready and we should all come into the tent and eat. He'd set the table as requested and cooked what appeared to be the finest meal I'd eaten over the prior 5 or 6 weeks. When he began to serve the plates, Jon reached out and felt them, remarking that they had not been heated. At that point, Steve's gears stopped moving entirely and he looked into Jon's calm eyes, saying simply, "WHAT?". Jon explained that the plates needed to be heated to provide for the full-on culinary experience (I don't recall him actually using those exact words). Steve suggested that after cooking and already serving the meal, he might have a problem heating the plates (knowing Steve quite well by this time, I guessed that it was a very large problem indeed). After an extended period of "discussion" with Jon, Steve collected the plates and began heating each one as he served everyone. He saved Jon, for last, as Jon had requested. At the time, Jon was sitting at the table with his back to Steve and I was sitting across from Jon with a very clear view of Steve as he placed Jon's plate directly over the large burner on the Coleman stove. Steve looked over at me with a devious smile as I was shaking my head back and forth implying "this is not a good idea". A bit later, I assumed that the plate was getting nicely "heated" when I saw that Jon's food was boiling away in its plate on the stove. Steve picked it up with a stove mitt and placed the plate on Jon's lap. It made a rather startling hissing sound before Jon bolted upright flinging the plate, food, table, etc., etc. across the tent. After some extended "debate" about all sorts of things related to family history, various historical dictators, being raised by wolves, anal retentives, deranged drug addicts and so forth, a

sort of "parallel-universe calm" descended on the camp and we finished dinner. (As an interesting aside, I noted that Mark seemed totally at home in the alternate universe, and thought that some Mr. X may have been responsible.) Jon assumed that everyone was finally on the same page about "How things were done at the Yahtse River Basecamp", but I could clearly see that Steve had not quite absorbed the fullness of the lesson and I was thankful that he'd left his ACP-45 Cal pistol back at our camp.

For dessert, Jon had a small bowl of bing cherries...his favorite dessert (in fact he'd arrived in Alaska with an entire case of these little beauties, which he seemed to covet as the rest of us had something else for dessert that seems to have fallen out of my memory). In any event, there were only 5 cans of cherries left from the original case remaining in Jon's stash as we all went to our tents for some sleep. Jon, Ray and Mark were planning to leave first thing in the morning for a long trip on three-wheelers to the glacial front at the head of Icy Bay. The pilot, Steve and I were returning to our camp a bit later.

After eating a quick breakfast and returning from an early morning walk along the beach before we were to fly out, I couldn't find Steve in his tent. I finally located him back in the cook tent, with a spoon in his mouth and an empty can of bing cherries in his left hand. I shook my head and let out a long sigh saying, "Really?", realizing that "The Great Gulf of Alaska Food War of 1975" had just begun. Steve finished his final mouthful of cherries and then, smiling, calmly pointed to the trashcan, wherein a neatly stacked pile of the remaining 4 empty bing cherry cans now resided.

Over the next several weeks, Steve and I were treated to some very interesting air-drops of food supplies from Jon's camp. Sometimes it would simply be an entire case of canned corn (with an empty bing cherry can thrown in). Sometimes a few loaves of bread and some canned peanut butter. Always enough to eat, but never exactly what you'd call a well-rounded selection of foodstuffs. During those food-impooverished days we managed to flag down a passing crab fisherman one day and traded for a few Dungeness crabs. I used the Winchester 300 Mag to shoot a few ducks, however the 2850 foot-per-second velocity of the bear-rifle slugs turned the ducks into an unappetizing mélange of feathers, bones and connective tissue. And so it went for the remainder of the field season. To this day I don't know whether Jon and Steve ever had a burying of the hatchet, but I always get a smile on my face when I recall that summer's interesting interactions of an immovable object meeting an irresistible force out along the Yahtse River, centrally located in the Middle of Nowhere, Alaska.

Like all of us, Jon was a complex person with a full bandwidth of

personality. I can still hear him saying, "Just do it".

Rest in peace, Jon

Kenneth Finklestein

I arrived at USC CRD well after Jon had left. By that time he was not a compatriot but a legend. Someone that I heard of but could only vicariously relive the moments through the story tellers. Concerning Jon, one thing always sticks out to me. Given my residence in the Boston area since 1987 and Jon in Rhode Island, we would occasionally run into one another at a meeting or conference. Certainly less than once per year. Yet Jon was always so kind to me and interested in my career - even though by the late 1980's I had mostly left the Coastal Geology field - despite little past academic or current professional connection. Graduating from the CRD was good enough for Jon. And his warm greeting was a most genuine one. It was always a pleasure to see him and that bond that many of us have with others from CRD was so very real. I will miss him.

Timothy W. Kana

Ken,

Consider yourself lucky you didn't have to take Jon's ball buster 516 final and identify rocks I've never seen again to this day. However, I learned more useful things in that class than just about any course I've taken over the years. He was a master teacher and led an amazing field trip for our glacial geology course. Hayes and Boothroyd, Boothroyd and Hayes wrote some classics and set us all on a great path with our careers, particularly because there were many detours and side trips along the way at CRD.

Tim

John H. Barwis

Jon and I were acquainted only socially. Not having participated in the Great Alaskan Food War or in any other Boothroydian field adventures, I saw him only in unstressed good humor, and as pleasant company.

In the geological discussions we had, Jon was always passionate about what he knew and what he was trying to find out – driven, really – and not shy about sharing his observations in a lively debate. Whether listening to him talk or reading his research papers, it was obvious how much Jon valued direct field observations. Because that ethos pervaded the Coastal Research Group, pollinated by Miles himself, Jon’s passion didn’t stand out as much at the time as it did in the 36 years since leaving Carolina. We may have all brought some level of intensity into the group, but Miles and Jon certainly amped it up. We are fortunate to have shared the experience, and to have enjoyed making a living from what we learned. It was a privilege, guys.