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VOICEPIPE

Issue 87 April 2021

The Newsletter of the BIO-Oceans Association

Fig. 1 - Gerry McCormick displaying produce from the BIO Garden - no cabbage worms in this one!

Annual General Meeting BIO OA
Mid June by ZOOM
Check for time and date by email, OA website, or OA Facebook page

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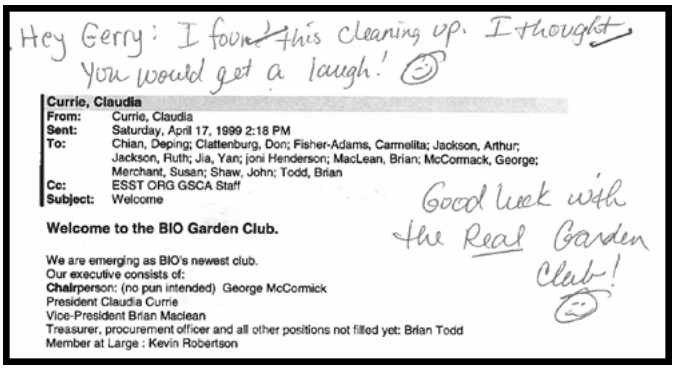
The BIO Garden
Raising Vegetables for Health & Charity (Gerry McCormick)

(Editor's note - Gerry is a new member of the OA executive, chairing the BIO Garden committee. This article provides some of the story behind this great initiative. All photos courtesy of G. McCormick)

The idea to start a new garden club at BIO was proposed during Canadian Environmental Week in 2016 by the Regional Office of Environmental Coordination (ROEC). But, as is with life (and especially in government) we had come full circle from an original idea for a BIO Garden Club back in 1999 (see Fig. 2)! The announcement of a BIO Garden was met with overwhelming interest from employees at BIO. We explained our vision of having a garden to grow vegetables and raise money for charity. And little did I know that this would evolve into my new role as the unofficial BIO gardener. As with many new roles this job came with no extra money and lots of extra work! But I embraced the new position, (straw hat, overhauls and all).



Hey Gerry: I found this cleaning up. I thought you would get a laugh!

Currie, Claudia
From: Currie, Claudia
Sent: Saturday, April 17, 1999 2:18 PM
To: Chian, Deping; Clattenburg, Don; Fisher-Adams, Carmelita; Jackson, Arthur; Jackson, Ruth; Jia, Yan; joni Henderson; MacLean, Brian; McCormack, George; Merchant, Susan; Shaw, John; Todd, Brian
Cc: ESST ORG GSCA Staff
Subject: Welcome

Welcome to the BIO Garden Club.

We are emerging as BIO's newest club.
Our executive consists of:
Chairperson: (no pun intended) George McCormick
President Claudia Currie
Vice-President Brian Maclean
Treasurer, procurement officer and all other positions not filled yet: Brian Todd
Member at Large : Kevin Robertson

Good luck with the Real Garden Club!

Fig. 2: Email welcoming the BIO Garden Club as BIO's newest club. Handwritten note from Claudia to me. Note that there was even a G. McCormack in the original club.

With support from Real Property and BIO senior management, we 'broke ground' in the lower courtyard in the summer of 2016. We selected the courtyard location as it had not been used in many years and was well protected from the BIO deer. Many of us, including myself, had little experience with gardening, but we had enthusiasm. We planted everything we could and watched as it actual grew. We celebrated every plant and I remember parading a particularly large zucchini around BIO as if it was the Stanley Cup. We were more than excited. We came up with lots of ideas, some successes and some failures, but had fun doing it.

Fig. 3: Acting silly at the official ribbon cutting.

As anyone who has tried to organize anything, you know how good it feels to see people excited to show up and willing to get their hands dirty, literally. Some of you avid gardeners may have heard of Niki Jabbour, an award winning author and local gardening legend? We brought her to BIO for a presentation and packed the auditorium, standing room only.

Our club was growing and finding its place at BIO when we found out that the lower courtyard was to be renovated and we would lose access to our garden. With news of the renovations we started to look for a temporary location to continue gardening. We settled on an unused location near the Sea Pavilion. We had lots of momentum and were beginning to be associated with many other committees at BIO, including wellness and mental health, so we expanded in the new location. Soon we went from 3 raised beds to 10! Our club now had over 100 members, with representatives from all the departments at BIO (i.e. NRCan, DFO, CCG, ECCC, SSC, DND, and PSPC).

Fig. 4: Everyone busy at work in the new Sea Pavilion location of the garden, complete with deer fence courtesy of Real Property.

In the meantime, the lower courtyard plans took into consideration the existing raised beds and included new engineered beds and a food theme. By the time the new lower courtyard was complete, we were established in the second location and decided to keep both locations.

Fig. 5: New engineered gardens in the new and improved lower courtyard.

We would use the garden at the Sea Pavilion to "farm" and the lower courtyard location to provide gardening plots for employees to garden on their own if they choose. We asked for a small donation for each plot and donated the money to the Workplace Charity Campaign. As well, we upped our garlic planting as it was very popular and easy to sell. Garlic probably raised over $500 alone, all donated to Feed NS.

Fig. 6: Beds of garlic, our main cash crop.

The BIO Garden Club prepared for spring 2020 by getting better organized and defining our roles to expand yet again, but we met with the biggest challenge yet, COVID. Since March 2020 many of us have not been working at BIO so there has been little activity in the gardens. However, with employees slowly returning to the office we could attempt some limited gardening in the spring of 2021. I'm hopeful to start gardening again at BIO soon, as I think it's more important than ever to stay physically and mentally healthy. If anyone has interest in the BIO Garden Club or would like to help out, please let me know. We are always looking for new members.

Fig. 7: Current state of the BIO Garden.

Fig. 8: Familiar faces from the OA executive - Jennifer Hackett and Jazmine Hayden working in the garden.

An Epiphany (Don Gordon)

I majored in geology while attending Hamilton College in upper New York State. One day in 1960 in a structural geology course, the professor spent a few minutes discussing the theory of continental drift as proposed by Alfred Wegener. While there was some supporting stratigraphic and fossil evidence, this theory had received little support from earth scientists at the time. As there was no known mechanism for moving the continents, we quickly moved on to other topics.

Shortly after, our class had the opportunity to visit the Lamont Geological Observatory of Columbia University at Palisades, NY. As chance would have it, we were taken into the lab of geologist Bruce Heezen. Off to one side was a woman recording bathymetric data from echo sounder records. Together, they showed us a very detailed bathymetric map which they were preparing of the North Atlantic Ocean. It was mind-blowing! For the first time I saw the Mid-Atlantic Ridge and its rift valley, all in great detail. I never knew before that this major earth feature even existed. The woman of course was Marie Tharp, the noted oceanographic cartographer. She and Bruce Heezen went on to create similar detailed bathymetric maps for the entire world ocean, and her career is well documented in the book entitled *Soundings* by Hali Felt (2012).

Two years later, I moved to the Graduate School of Oceanography at the University of Rhode Island to

do my master's degree. Near the end of my stay, in early 1965 I had the opportunity to work for geophysicist Dale Krause on a cruise of the R.V. *Trident* to the Mid-Atlantic Ridge. My job was to run the echo sounder and magnetometer during surveys over the Ridge and plot the collected data. All went well at first but then I became concerned when reversals in the earth's magnetic field were observed that did not make sense to me. I suspected that maybe the problem was a faulty tow fish but the same patterns continued when I deployed a new one so I continued with the surveys as directed. At the end of the cruise, I gave the data to Dale Krause and subsequently never thought anymore about the curious magnetic data because I then moved on to Dalhousie to do my doctoral degree at the Institute of Oceanography.

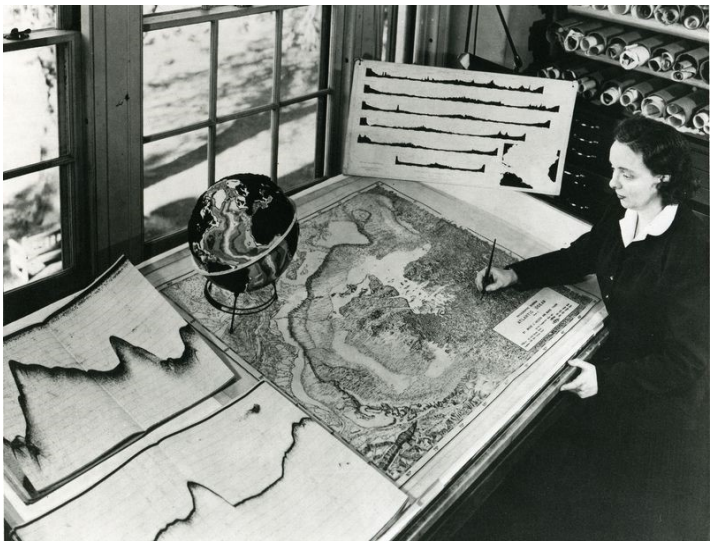
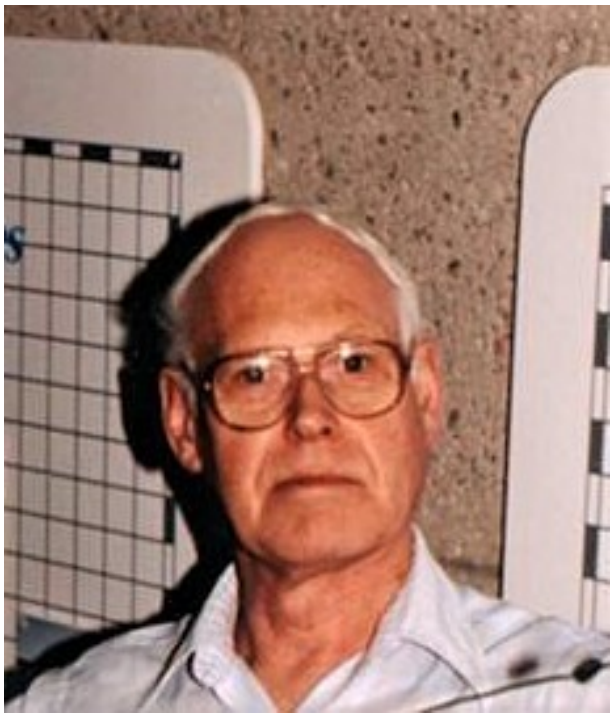


Fig. 1: Marie Tharp with one of her maps. Image: Lamont-Doherty Earth Observatory and the estate of Marie Tharp

However, in the fall of 1966, I had the good fortune to attend an oceanography lecture given by Frederick Vine from Princeton University in which he presented recent magnetic evidence in support of the new concept of seafloor spreading at the Mid-Ocean Ridge. It was another mind-blowing experience, a true epiphany for all the events which I had experienced over the past six years now fit perfectly together. Here at last was a mechanism for moving continents, and the theory of continental drift soon evolved into the science of plate tectonics. It was a privilege to view first hand during my student years one of the greatest scientific revolutions of the twentieth century.

I did not realize until recently that this epiphany was due to Bosko Loncarevic. He and Frederick Vine had worked together at Cambridge in the early 1960s and it was he who invited Fred to come speak at Dalhousie.

Brian MacLean Passes Away



We were saddened to hear the news that Brian MacLean, a founding member of the OA, passed away suddenly on April 30 at the age of 91. While Brian retired in 1997, he continued working as an Emeritus Scientist until his passing. In the words of Gordon Fader, Brian will be remembered as "a true BIO pioneer, one of the best." Gordon continues with some thoughts about working with Brian: "In the late 1960s I joined the team of Lew King and Brian Maclean who were studying the bedrock and surficial geology of the southeast Canadian Continental Shelf, an ambitious project ahead of its time for marine geology. Brian was my mentor over the following decade, the most patient teacher and a very kind and special person. Despite his grey flannels and blue shirt and tie, he was a very progressive scientist forging new ideas and interpretations of seismic and sidescan sonar data. After all he hired Bob Miller who at that time had the long flowing hair to his waist!"

"He worked with a full team spirit and his paper with Lew on pockmarks was a benchmark that led to an understanding of an important seabed process to global warming and the discovery of hydrocarbon basins. We sailed on many cruises together focused on the production of an offshore bedrock map from the Gulf of Maine to the Laurentian Channel. This was a most impressive piece of work and was the first offshore bedrock map and report for any area in the world – true pioneering. It involved the collection of cores and samples and thousands of line km of seismic reflection data that all had to be carefully interpreted and integrated."

"Brian could always be counted on to listen to personal issues of the staff and was always the last one off the watch at sea. That was Brian, others came first, the survey must continue, and the big picture was always in mind."

"In the 1980s he moved his research to the Canadian Arctic where he took the techniques learned and honed down south to new heights, and made significant strides in unraveling the marine geology of the north. He always kept in touch with his colleagues working in the south and continued to have many discussions on some of the new and exciting features that were found."

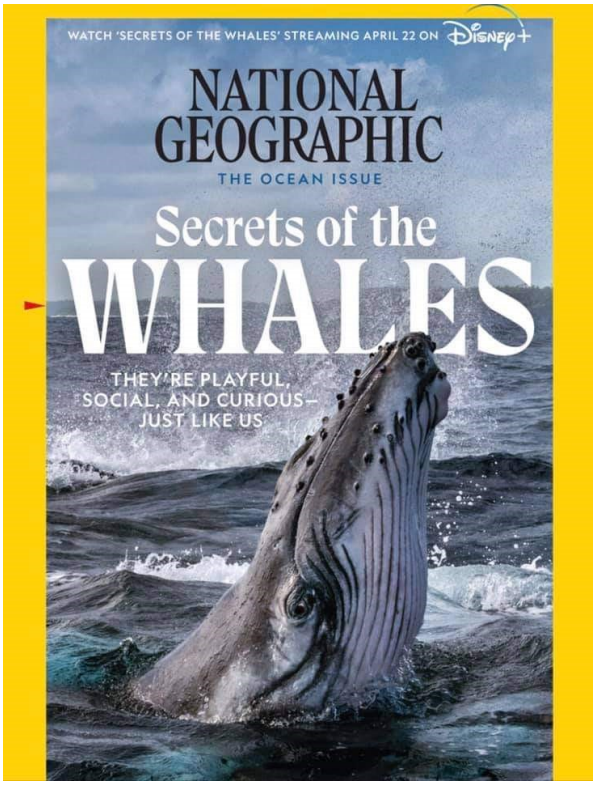
Claudia Currie shared her thoughts on Brian saying "Last week, I among many, said goodbye to a good friend, mentor and former boss Brian MacLean. He was an extraordinary person, a professional, kind and caring friend to us all. I had the good fortune to have worked in person with Brian Maclean for over 39 years. And that was both a privilege and honor. When I met Brian in 1979, I had no idea just how great a person he was, but as the years unfolded and our work together took us around Baffin Island, Cumberland Sound, the High Arctic and Hudson Strait, I realized that Brian truly believed in and supported those around him. He appointed me second senior scientist on several of those Arctic cruises, everyone worked hard to never let him down. That is just who Brian was, quietly professional, an extraordinary example of grace under pressure, and a great person who I am blessed to have called my co-worker, teacher, mentor and most of all, my friend! I will miss you a lot my friend."

Graham Williams reflected on Brian's impact on him, especially as a mentor that helped him integrate with the BIO "oldtimers". He wrote "I will miss Brian's scientific expertise, insights, advice and guidance. He was meticulous in everything he did and would gladly give of his time and guidance to help others. Brian was one of those rare scientists who was an astute observer with an acute mind and a gifted compiler. He was truly a gentle man, incredibly polite and unbelievably tolerant, especially of me. Steve Blasco and I shall really miss Brian and our long entertaining coffee breaks. It will seem really lonely not crossing the hall to talk to him, to discuss possible drilling sites and to tap into his vast knowledge. Brian's loss has hit me hard but one blessing is that I had his friendship for so many years. I shall always be grateful for that."

We hope to publish a more fulsome tribute in the next edition of our newletter that can highlight some of Brian's contribution to marine geology. Here is the link to Brian's obituary:
https://www.dartmouthfuneralhome.ca/obituary/brian-maclean

Notes From NSIS

The latest issue of the Proceedings of the Nova Scotian Institute of Science is now available for members and will be soon be available for non-members at http://nsis.chebucto.org/publications/ . It features a number of articles by BIO OA members - Don Gordon (Hudson 70), Peter Wells (book review), and Charles Schafer (pulp mill waste charges) - and an article on the risks of tidal power development on the fishes of the Minas Passage by Mike Dadswell and Roger Rufilson.



Peter Wells notes that the May 2021 issue of National Geographic is titled "The Oceans Issue" and would be of interest OA members. It has five main articles – Secrets of the Whales; Planet Ocean; Rescuing Reefs; 28 Days Under the Sea; and, Searcher of the Deep. The maps are especially interesting, as they are a very different projection of the planet and its oceans. The superb photos make the purchase of this issue well worthwhile. It is also available on Apple News.

From the President

As I write this message, my wife and I are living at our country house in Pictou County unable to travel back to Dartmouth because of the public health travel restrictions. While we are now in a region with low COVID exposures, our daughters' families are still in HRM, and our granddaughters are back to virtually learning. A friend tested positive and her husband, also positive, was just released from hospital. Both are at home now recovering. These COVID days are stressful for everyone and have impacted families and friends. I hope most of you have not had the misfortune of being exposed. The public health emergency has of course curtailed many plans your Executive had but we continue to meet virtually through Zoom.

The *Voicepipe* continues to be published thanks to Michael Murphy and his contributors. We are having discussions with DFO Real Property on the design for a new BIO History display at the front entrance. Don Gordon has been a great resource for these discussions. At the last Executive Meeting we decided to sponsor a virtual showing of the *Long Coast*, a film about the coastal resources in Maine and the people that make a living from them. It has also been suggested we implement an ongoing film series. More on these initiatives will be announced in the near future. If you have a suggestion for a film we could screen please let me know.

We will be holding the 2021 AGM soon. The date and time will be announced shortly. We are always looking for volunteers to hold the various officer positions on the Executive. If you would like to step forward, please send me an email.

In this issue of the *Voicepipe* are some wonderful articles. The BIO Garden has been a great community building initiative and contribution to the community at large. The gardeners are to be congratulated. Don's article on his epiphany on sea floor spreading reminds me that one of the Huntsman Award winners was J. Tuzo Wilson who achieved worldwide acclaim for his contributions to the theory of plate tectonics. Our own Sheri Srivastava, GSC Atlantic, also contributed to documenting the magnetic signature of the plate movements. The Executive has been following the fate of the Navy dive ship *Cormorant* and its submersible SDL-1. I wrote the Minister of Fisheries and Oceans to implore her to ensure the SDL-1 was extracted from the *Cormorant* before the ship was dismantled. The SDL-1 has been saved and will eventually be put on public display.

Sadly two stalwart members of the BIO community have passed away. In the *Voicepipe* is a brief article on Brian MacLean, a geologist with GSC Atlantic who contributed to the understanding of surficial marine geology of Eastern Canada. He remained committed to his research after retiring and was frequently seen in the halls of BIO as he worked on his emeritus projects. I learned the day of writing this message of the passing of Betty Anderson. Betty was a founding member of the BIO OA and a long time purchasing officer at BIO. After retiring she was a frequent sales clerk at the BIO Shop. She was always quick with solutions to purchasing problems as long as you came to her. I remember one instance where she saved our bacon. We were conducting a deep sea coring expedition in the Labrador Sea with McGill University. The coring winch on *Hudson* broke down with 2000 feet of cable overboard because the winch control compartment had flooded with seawater. A new control unit was ordered through Betty and the unit was in St. John's only a few days after we tied up. With the winch operational again we returned to the middle of the Labrador Sea to continue coring, often bending 60 foot coring pipes when they struck glacial erratics and now coring around the clock to make up for lost time.

Watch for the announcement of our AGM and please consider taking on a role on your Executive. Keep safe.

The GSCA's Submersible Love Story (C. Schafer, J. Syvitski and S. Blasco)

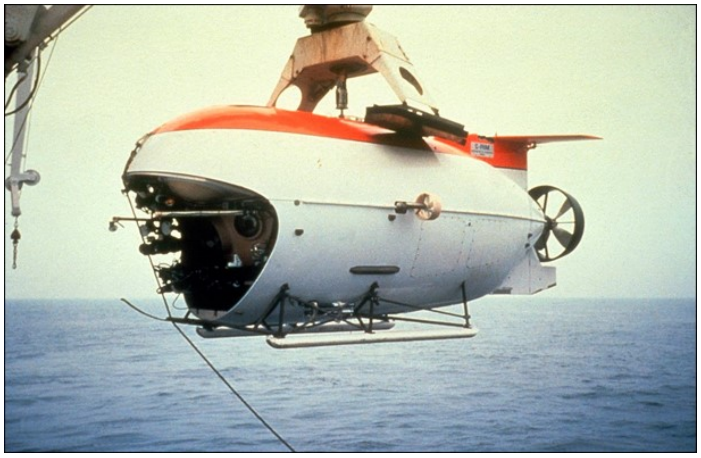


Fig 1: Profile photo of a Russian *Mir* submersible.

In 1969, in an "unpublished, unedited manuscript for Internal Circulation" Charles Schafer posed the following question to the BIO research team - *Is there a submersible in your life?* Its short bibliography includes published papers by Bernard Pelletier and Joe MacInnis, marine researchers that would go on to exploit submersibles in a broad range of Canadian marine environments. By this time, N. Ayers had already climbed aboard the

U.S. Navy's bathysphere *Trieste 1* to explore seafloor environments off La Jolla California. In his 1968 publication, Ayers remarked that the cable-deployed *Trieste 1* sphere "has demonstrated the existence of a considerable benthic population, the magnitude of which had not been realized through conventional oceanographic techniques". In the same year, F. Busby was studying the potential of deep diving vehicles for the U.S. Navy's Oceanographic Office. He reported in a 1968 *Ocean Industry* article that "the surface chart showed us that a smooth, gradual slope existed along the six mile track of the survey area. But our observations from [the submersible] *Aluminaut* revealed rugged topography that was entirely missed by the surface ship's surveying equipment".

In those early days, submersible users already included oil companies, the military, trans-ocean cable companies, mineral exploration companies, government oceanographic research institutions, and universities. In 1968, B. Pelletier mentioned continental shelf-depth submersible applications such as quantitative sampling of benthic organisms, core sampling of consolidated sediment outcrops and the inspection and recovery of seafloor-deployed research equipment such as sediment traps as targets for submersibles. He speculated that BIO's needs would eventually require a submersible "with about a 6000-foot depth capability" for deep water missions beyond continental shelf depths.

Fig. 2: The late 1950's Perry *Cubmarine*; a plywood and fibreglass two person submersible that could reach a depth of about 50 metres for observational missions.

By 1968, General Dynamics was offering the *Star III*, a two-person submersible, fitted with a simple mechanical arm, for charter although more sophisticated and versatile manipulator arms were already on the drawing boards. When Schafer visited the General Dynamics plant in Connecticut at about that time, the original small *Star 1* submersible appeared to have already become a piece of display hardware on one of the company's docks, affirming in his mind that the development trend of newer submersibles with deeper-diving capabilities and diver lock out systems was proceeding at a vigorous pace for both military and civilian customers. The first diver lock-out submersible was built by the Florida-based Perry Submersible Builders Company. It was launched in 1966 and featured an aft chamber that allowed two divers to adjust to the outside ambient ocean pressure before exiting to carry out underwater work to a maximum working depth of about 380 metres. It represented a major design departure from earlier models built by that company.

Fig. 3: The Canadian Navy's diving-support team was a critical element for successfully collecting replicate short sediment core samples from undisturbed Gulf seafloor environments using *Shelf Diver's* lock out chamber.

In the summer of 1969, C. Schafer used the Perry *Shelf Diver* lock out submersible to collect undisturbed seafloor sediment samples of living benthic Foraminifera populations. That investigation required lots of help from a team of local Canadian Navy divers and a suitable launching pad for the sub along with deck space for the necessary decompression chamber. The decided choice was the Canadian Coast Guard's supply ship *C.D. Howe*. The stability and heavy lifting capabilities of this supply vessel were perfect for launching and retrieving the 9-ton submersible. The project's sampling transect in the Gulf of St. Lawrence ranged from 16 m to 53 m deep, far less than *Shelf Diver's* certified diving capability. In the following weeks, the Gulf seafloor sampling and observations project went on to yield high quality water depth-related data about living benthic Foraminifera population concentrations and about the spatial variation of their species diversity.

In late 1980, J. Syvitski, fresh from a 10-dive submersible cruise to Knight and Bute Inlet, British Columbia, joined some like-minded researchers at BIO's Atlantic Geoscience Centre. However, before that, west coast inlets investigations were carried out by the Syvitski research team using *Pisces IV*, a submersible that

was built in Canada and operated by BC's Institute of Ocean Sciences. The team included a six-person contingent of pilots, mechanics and communication officers. *Pisces IV* could work at depths of 2000 metres, carry two scientific observers on each dive, and was typically tendered by a large diving barge, the *Pender*, or by the *R/V Pandora II*. The *Pandora II*, an all-weather supply ship redesigned to handle and house the *Pisces IV*, was more suited for open ocean research. Between 1972 and 1980, *Pisces IV* had averaged over 100 dives per year, second only to Woods Hole's *Alvin* submersible.

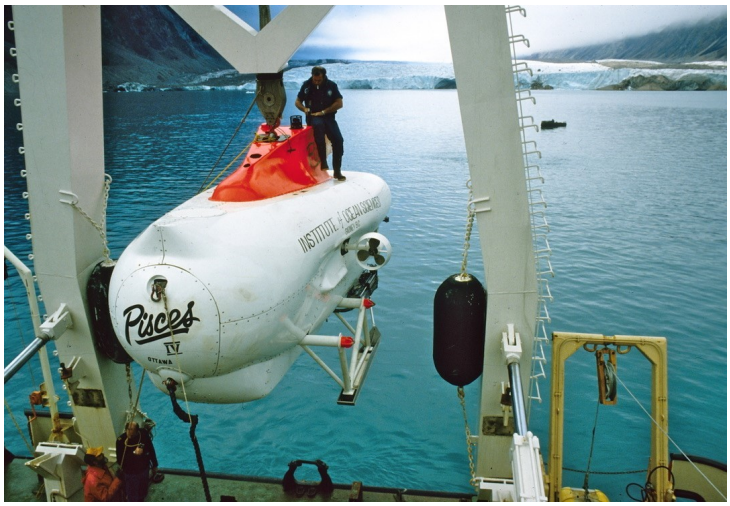


Fig. 4: Final preparations before lowering *Pisces IV* into a fiord basin that is fringed at one end by the termination of a calving alpine glacier.

In 1981, with the circumnavigation around North America of the *Pandora II* and its submersible payload, BIO scientists were given the opportunity to employ the *Pisces IV* at several Atlantic coast research targets. Thirty-five submersible dives were carried out on five separate cruises to the St. Lawrence Estuary, Baie de Chaleur, Scotian Shelf, Grand Banks, Labrador Shelf, and Baffin Shelf. *Pisces IV* employed a mechanical arm/claw with 6 degrees of freedom and a lift capacity of 70 kg. Submersible hull-mounted instruments included STD (salinity and temperature) sensors, current and attenuance meters, and acoustic seafloor profiling systems. The submersible's contingent of scientific observers were usually too occupied to reflect on any discomfort during the crowded, and claustrophobic for some, enclosed working conditions.

There are five sea conditions that can lead to aborting a dive: 1) sea state above a 2 metre wave height, 2) winds above 46 km/hr (~ 25 knots), 3) submersible losing position relative to the mother ship, 4) sea surface visibility of less than 2 km, and 5) sea currents exceeding 1.5 metres/s. Given Canadian east coast conditions, only 50% of planned dives were accomplished. Nevertheless, despite the rougher offshore conditions encountered on Canada's east coast, scientific breakthroughs came fast and furious in 1981. Large-scale seafloor erosion features found in Placentia Bay (called megaflutes) were described for the first time. The local distribution and characteristics of suspended particulate matter observed in the Laurentian Trough water column were detailed. Benthic activity, as related to sediment stability and mobility, were found to be highly variable, as were evidences of iceberg scour processes on the Grand Banks and the Baffin and Labrador shelves. On the upper continental slope, sediment slump features were mapped and instances of hydrocarbon seepage were observed on parts of the Baffin Shelf. On another occasion, Syvitski, along with several interested GSCA colleagues, used *Pisces IV* deployed from the *CNAV Cormorant* to investigate the sedimentary processes associated with several Baffin Island fiord river-mouth deltas that received their annual sediment loads via both spring season runoff and by later ice melt discharges during the warmer summer months.

Fig. 5: J. Syvitski and a second observer contemplate their next dive in close quarters.

In contemplating these experiences with *Pisces IV*, Syvitski notes that "3 people within the sub's habitation sphere get to an eyeball appreciation for the scale and diversity of the world's seafloor that extends over 70% of our Earth's surface. These people, for a moment in time, probe and explore the biological and geological seafloor, while being enveloped by the world's great ocean currents. Whoever enters the ocean, in person with some artificial protection, soon comes to understand the scale and diversity of our world's seafloor environment. However, deep dives, i.e., those that go 100's if not 1000's of metres below the seafloor, are still both spatially and temporally rare. Therefore each dive becomes unique and special. It is not unlike going up into space. In both situations, outside the space vehicle or deep ocean craft is an environment hostile to humans. In

both cases, the experience changes one's normal terrestrial perceptions. Often, the change lasts a lifetime".

By 1991, another member of the GSCA's research team found himself getting into deeper water. Steve Blasco's unique deep diving submersible experience came about as a result of an interest in seafloor sediment geological characteristics on which the wreck of the *Titanic* rested. However, before becoming involved in that very exciting event, his precursor submersible experience included a 1989 collaborative adventure in which he joined D. Cogdon in the DND's submersible *SDL*-1 for an investigation of the wreck of the *Breadalbane* which lies at a depth of 105 m off Beechey Island in Lancaster Sound. This resupply vessel was supporting the search for the *Franklin* and was anchored in 'Iceberg Alley'. It was crushed by sea ice and sank in 15 minutes in 1851. *SDL*-1 observations of that wreck revealed no hull damage during its 138 years on the seabed suggesting that engineering structures placed at this location in the future might be less likely to be impacted by ice keels.

Fig. 6: Profile photo of the *Pandora II* showing *Pisces IV* suspended on the ship's aft heavy lifting frame.

For the 1991 *Titanic* survey, Steve joined marine geologist Y. Bogdonev (Shirshov Institute) and a submersible pilot in the Finnish-built Russian *Mir*-1 (one of two *Mir* submersibles used for the investigation) for a 17 hour dive to a depth of 3800 m that brought him onto the foredeck of the wreck. That gave him an opportunity to view the deterioration of the ship's steel structures over decades of submersion in a deep and dark seawater environment. A key scientific question was why the 53,000-ton wreck had not buried itself in the presumably soft seafloor sediment. Remote sensing of the wreck site along with sediment core data revealed that *Titanic* was resting on a dense debris flow that had been deposited by an ancient submarine landslide. In a subsequent dive, the *Mir*-2 submersible recovered samples of the orange-coloured and icicle-shaped 'rusticles' that dangled from everywhere on the wreck. Dale Buckley, another member of the GSCA research team, discovered that the 'rusticles' were composed of iron metabolizing bacteria that were the cause of the wreck's deterioration. A sample of the ship's steel hull was recovered from the seabed using the submersible's mechanical arm. It was subsequently tested by K. KarisAllen, DND Canada, and found to be exceptionally brittle, a characteristic that allowed the iceberg to fracture the ship's hull plating. That finding, along with the discovery of the brittle nature of slag-contaminated hull rivets, is presumed to be among the structural reasons of why the iceberg did enough damage to sink the ship.

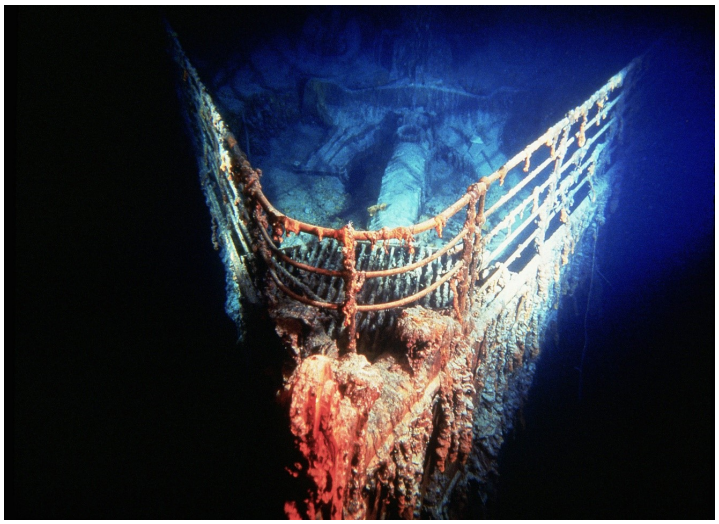


Fig.7: Photograph of the bow section of the *Titanic*'s hull and its "new payload" of various marine species.

In reflecting on the *Titanic* investigation, Blasco says we are still learning and muses about returning to the wreck site sometime in the future to see what other changes have taken place. Some Canadian government reports about the *Titanic* point to its new role as a deep sea reef because the wreck, and its immediate surrounding seafloor, was observed by Russian marine biologist L. Moskalev (Shirshov Institute) to be populated by at least two dozen different species including fish, crabs and corals. Last but not least, during the middle1990's, Canadian medical doctor and marine research enthusiast Joe MacInnis re-emerges as one of two Executive Producers of a 1995 documentary film about the *Titanic* called "*Titanica"*. It features a great deal of imagery captured by submersibles having payloads that often included advanced underwater cameras. In addition to their scientific and marine industry-related missions, *Mir* submersibles have also been found to be useful for occasional political public-relations purposes. For example, in August, 2007, Russia used *Mir 1* and a three-person crew for a dive to the seabed of the Arctic Ocean directly below the Geographic North Pole at a depth of 4261 metres. Before returning to the surface, they planted their nation's flag at the dive site.

Following his *Titanic* research experience, Blasco went on to use the *SDL*-1 in 1996 to study the imposing 1,050 km-long Niagara Escarpment that dips below lake surface in Fathom Five National Marine Park. The larger *SDL*-1 view-port provided him with an expansive look at its 60 m high bedrock cliff that is presently submerged in 30 to 90 m of water. He went back in the field once again in 1997 using the *SDL*-1 to carry out traverses up the seabed of the Bermuda seamount from 500 m to 10 m water depths. Blasco, and his colleague T. Tucker (Bermuda Underwater Exploration Institute), noted that the volcanic rocks of the seamount were draped by a veneer of shallow water-deposited coralline limestone and that wave-cut caves and overhanging shelf-like features were in evidence at a depth of 110 m. Those observations constituted the first Bermuda seamount evidence for a low stand of sea level that existed at about 9000 years BP.

Fig. 8: Photo of recently salvaged *SDL*-1 that will now become the centrepiece of a public display here in Dartmouth

While going about the info gathering for this article along, I pondered a second question concerning the future of the submersible in marine research. My son, a marine surveyor and acoustic signal processor currently working on a continental shelf seafloor survey off Rhode Island mused about the capabilities of the current suite of sophisticated autonomous underwater vehicles (AUV's) and the sizes and applications for the large family of remotely-operated underwater cable-controlled vehicles (ROV's) that can support a large selection of diverse instrumentation and U/W tool payloads. He suggested that, depending on conditions, "the human eye will probably continue to be superior to a camera" and that, "on a submersible, a researcher has both camera and human eye options. You can never really replace some things."

In retrospect, it's hard to guess exactly how the future of submersibles in marine research will unfold. For example, a marine scientist by the name of V. Vescovo piloted the Triton-built submersible *Limiting Factor* to a part of the Challenger Deep seafloor at a depth of 10,925 metres, establishing a new world record for deep diving submersibles. Vescovo's dive lasted 4 hours which was also a new record for the longest period of time ever spent on the ocean bottom. That's not counting the 7 hours needed to reach the floor and return to the surface. Contrast that with a current project by members of our local Canadian Navy Divers Association. They have been hard at work rescuing the *SDL-1* submersible from its mother-ship CNAV *Cormorant,* slated for salvage. The Association hopes to place *SDL-1* on public display, along with descriptions of research projects by other Canadian submersible users for all Nova Scotians and tourists to see.

Nevertheless, it is clear that the transition to new more sophisticated ROV and AUV systems for many marine science and industry applications is here to stay, although those technologies will probably never totally replace the need for submersibles. It seems obvious that submersible and AUV/ROV technologies are complementary. As such, we shall all have to wait around just a bit longer to see how the rest of the submersible love story unfolds.

(The authors wish to thank K. Bentham (DFO) who supplied a photo of the Shelf Diver from BIO's photo archive. Other photos courtesy of authors.)

Winter Camping or Why Men Have Shorter Lives (Michael Murphy)

Who knows why we do the things we do. In this case, as in most, it started with a casual conversation. While out on a hike last fall with two of my friends, we started to reminisce about adventures from our youth, and two of us recalled winter camping with the Boy Scouts back in the 1960s. It didn't take long for us to commit to doing something similar in the winter. But as winter dragged on, we still hadn't set a date or made any plans. With spring fast approaching, we set the date for March 10 and decided to go out into the old Bowater lands off Highway 103.

The idea was to replicate the experience we had as kids – that meant no tents, no fancy cook stoves, any of the stuff we have accumulated over the years. We would build a shelter from available material and cook over an open fire. Our group soon went from three down to two participants, me and Brian Smith, my paddling and hiking buddy. We did make some concessions to comfort – we took down sleeping bags and small camp chairs, both necessary items when you are over sixty five. With a roll of baler twine, an axe and a small saw, some water and food we set off on a bright, sunny day.

We drove into the Bowater lands along Hiking Trail Road and parked in a lot close to the Old Annapolis Trail. We got our gear together and headed into the woods. We didn't want to hike too far in as we wanted to spend our time building our shelter and collecting firewood through the afternoon. We followed a little trail until we found a reasonably level and clear spot with some trees we could use to build our shelter.

Fig.1: The shelter with poles for the roof and floor.

We found lots of fallen trees that could be used as poles for the roof and floor of the shelter. We lashed a sturdy one to two trees and just piled the others on top at an angle. Very quickly the shelter took shape. Lots of spruce boughs served to cover the roof and provide a bit of comfort on the floor. It took a couple of hours collecting the material, but in the end we had a sturdy, comfortable shelter.

Fig. 2: Shelter is complete with spruce boughs on the top and on the floor. The camp chairs are a necessity.

The next order of business was to collect firewood and prepare supper. There was lots of dry dead wood in the area, so we gathered it up and got ready to have a well-deserved supper. We had prepared a beef stew ahead of time that just needed to be heated, so we popped it on the fire with a ciabatta baguette for a pretty tasty supper. With some of Brian's home brewed IPAs, we were quite proud of how well we fared.

Fig. 3: Beef stew for supper.

The night was chilly, especially when one needed to leave the nice, warm down sleeping bag to answer the call. Senior bladders and beer are not made for each other. In any case, all went well through the night and we both had a great sleep. Morning came, we had a quick coffee and some oatmeal, packed up and headed home. Everything went as planned without a hitch.

So what's with the title of this little story? Why do men live shorter lives? We did everything right – we planned, we knew what we had to do, we were cautious in our undertaking and stayed within our limits. But it's not the first trip that causes problems, it's the next one. Now we get cocky. We think we know everything and can handle any weather or issue that will come at us. So, of course, we're planning something way more adventuresome for next winter, like a week in the woods when there is a ton of snow and we need snowshoes. Maybe we could build a shelter using nothing but snow - the ideas will continue to flow all through the summer and fall, with ever increasing degrees of hazard. And that, my friends, is why men die before their time.

Fig. 4: Enjoying a beer before heading to bed. (All photos by Brian Smith or Michael Murphy)

Editor's Keyboard:

Well, I did not expect to still be living under lockdown conditions this April. I had hoped that we would be getting back to a more normal life, especially since cases in Nova Scotia were staying quite low through the first part of 2021 and the vaccination process was gathering speed. While I admit a certain weariness with Covid, we know what we have to do: stay at home, get vaccinated as soon as we can, maintain physical distance, wash our hands, wear our mask, listen to the real experts. Oh, did I mention – stay at home!

Just as we were ready to publish this edition, we received the news of the passing of two founding members of the Oceans Association, Betty Anderson and Brian MacLean. Both contributed greatly to the BIO community and will be missed. With the passing of so many, the OA has begun looking at ways to commemorate the extraordinary people that helped build this institute over the years. Any ideas would be welcomed.

Stay safe!

ABOUT THE BIO-OCEANS ASSOCIATION

The Bedford Institute of Oceanography Oceans Association (BIO-OA) was established in 1998 to foster the continued fellowship of its members; to help preserve, in cooperation with the Institute's managers and staff, BIO's history and spirit; and to support efforts to increase public understanding of the oceans and ocean science. Membership is open to all those who share our objectives. Most current members are present or past employees of BIO or of the federal departments of Environment, Fisheries and Oceans, and Natural Resources (or their predecessors) located in the Halifax Regional Municipality. Membership is $10 per year, $40 for five years, $70 for 10 years, or $150 for a lifetime membership.

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