

BOTTOMTIME

The newsletter of the Nova Scotia Underwater Council

August 1993

Press Release

The summer diving season is almost over. There have been lots of changes in the diving community this past summer. After many year's serving divers, Northern Shore Diving has closed its doors. **Good Luck** to "Chipper" Budreski in his future endeavours in the aquaculture industry.

Nautilus School of Diving has four newly certified instructors. Congratulations to Carolyn, Chuck, Don and Gary.

Discover Diving presented a Treasure Hunt at Hubbard's beach, that was well attended, well run and from what I hear well appreciated by not only those that attended, but by the **Children's Wish Foundation** who received a generous donation from the proceeds.

Don't miss the 14th Annual NSUC Seahunt this year at Crystal Crescent Beach on September 19th. This has traditionally been the largest dive event and has a history of really great prizes. Besides the prizes, it is also a chance to talk to divers that perhaps you don't see as often as you would like. It is a great social event; bring the family and spend the day. All the information required can be found later in this issue.

Even though fall is fast approaching, it is the best diving weather. The water is at its warmest, and the days are cooling off. This makes carrying your gear to a shore dive more comfortable. As long as the hurricanes co-operate, boat diving is superb (as usual) this time of year as well.

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What's in this Issue ??

1. Press Release - News from the Editor
2. Instructor List
Advertising Rates
3. The Seahunt Co-ordinator explains Eastern Canada's largest dive event.
6. President's Report
Aggett Award Winners
7. Volunteers Needed
At What Depth Will an Air Bubble Sink ?

Press Release (continued)

There have been a variety of fish seen during both day and night dives summer by various groups of divers. Several torpedo rays have been seen at the Letitia and at Bear Cove. There seem to be fewer dogfish around this summer. Shark have been seen from boats as far in the Halifax Harbour as Rock Head Shoal, although I have heard of no one positively seeing one while in the water.

I am interested in hearing of tropical fish or non native fish being seen while diving. Feel free to drop a line relating the time, depth, water temperature, etc. of these encounters.

I hope to see you at the Seahunt, and Good Luck!

..... The Editor

Instructor List

1. Dave Allen	464-4091
2. Austin Baird	492-2653
3. Noel Battcock	876-0555
4. Mike Chambers	454-4296
5. Sheilagh Condry	423-5783
6. Darin Connors	479-1631
7. Gary Edwards	883-9392
8. Aaron Flynn	461-2855
9. Tim Gay	835-6565
10. Ken Jardine	562-6061
11. Trevor Kenchington	889-3555
12. Roland Lewis	562-2457
13. George O'Neil	564-5671
14. Lorne Piercey	
15. Donnie Rogerson	835-8833
16. James Semple	876-0555
17. Joanne Shadbolt	634-9190
18. Bob Smith	462-0738
19. Chess Chaulk	765-8527



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Full Page	11x8	\$ 50	\$ 75	\$ 250	\$ 400
Half Page	5.5"x4"	30	40	150	300
Third Page	3.5"x2.5"	20	35	100	190
Quarter Page	2"x2"	15	25	80	170
Eighth Page	1.5"x1"	10	15	50	80

From Roland Lewis,
Seahunt Co-ordinator

The 1993 version of the NSUC Sea Hunt - the 14th such annual event - will be held this year on Saturday September 19th at Crystal Crescent Beach, near Sambro. If Mother Nature co-operates - and surely it must be time we had some good weather - then it is expected to better last year's record attendance of 190 divers. For the information of new divers: the SEA HUNT consists of an underwater search for tokens placed such that each entrant has a good chance to find one. This token is then used to enter a draw. All the metro dive shops and some from out of town, will be providing prizes and helping to make the day enjoyable for all. Although the prize list has not been finalized, one interesting treasure will be a crystal figurine of a diver. This year the major prizes will be drawn for first, with the consolation prizes being given out last. Dive Master and MC will be Ken Jardine from Sydney. All safety rules will be observed and each diver must present a C-Card. Even though the clean water, sandy bottom and shallow depth make this an easy dive for any diver, rescue divers and an ambulance will be in attendance. Refreshments will be available as well as toilet facilities. So why not get the gang together for that last beach picnic of the summer, enter the Sea Hunt and perhaps win some fabulous dive gear? As usual commemorative T-shirts will be provided to the first 150 divers - so come early. Registration begins at 0900h with divers expected to enter the water at 1100h. Fees are \$15.00 for NSUC members and \$20.00 for non members. For more information call Rolly at 562-2457 or Colin at 864-2802. See you on the beach !



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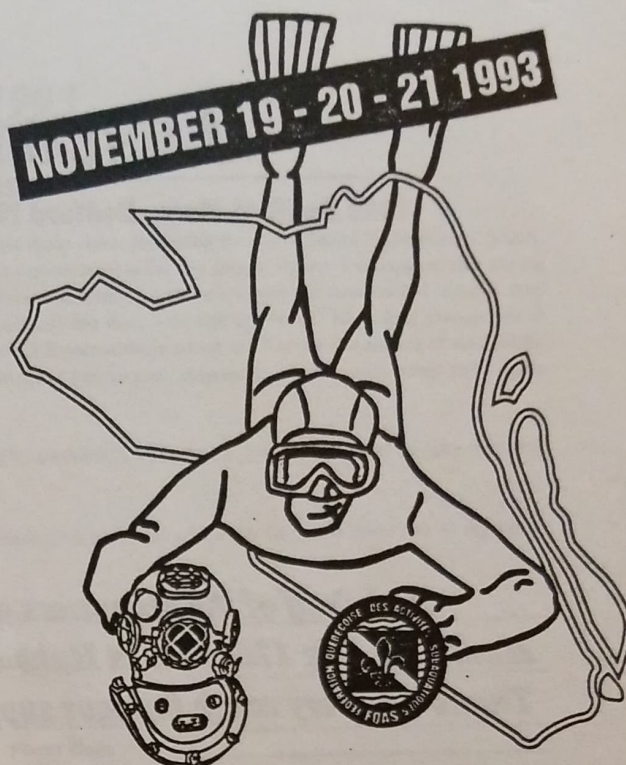
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Informations et fax:

Administration office, c/o Normand Martel,
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(514) 622 - 7407

Discover Diving

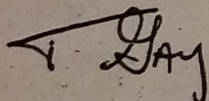
1440 Bedford Hwy., Bedford N.S. B4A-1E4 Phone 835-6565 Fax 835-1666

On behalf of the organizers of the 1st Annual Captain Morgan Treasure Hunt held July 17th 1993 at Hubbards Beach Resort, we would like to say Thank You very much for your support and contribution to this event.

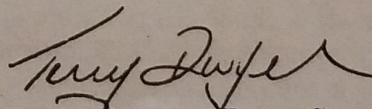
The event raised \$ 2050.00 to benefit the Nova Scotia chapter of the Children's Wish Foundation and saw over 150 divers participating in the event making it one of the largest single diveshop events in Atlantic Canada.

Next year, the expected attendance for this event will be over 200! We look forward to your continued support in the many years to come.

***Sincerely,
Coordinators,***



Tim Gay, Discover Diving



Terry Dwyer, Deep Star Resources

Sea Hunt 1993

Consent, Acknowledgement and Assumption of Risk

I am aware of the inherent risks associated with scuba diving and agree to assume these risks, rendering the Nova Scotia Underwater Council, Divemasters, pick up boats, Rescue Divers and the emergency ambulance service unaccountable for any loss or injury. I understand that during my participation in the 1993 NSUC Seahunt I will be exposed to situations and environmental conditions where the stresses and hazards may be greater or different than those normally encountered (Scuba Diving). I understand too that, although the NSUC has taken precautions to provide proper organization and Divemasters, circumstances may arise which are not foreseeable or which are beyond the control of the NSUC. I acknowledge that the NSUC cannot guarantee absolute safety. I also understand that I am, in part, responsible for my own safety and I agree to comply with the following rules and direction of NSUC staff.

I agree to assume all of the risks arising out of my participation in the 1993 NSUC Seahunt. This includes, but is not limited to, any risks that are unforeseeable.

I have Accepted responsibility to verify that I do not have any physical or psychological problems which would create undo risk to myself or others who may depend on me during participation in this event.

Signature : _____

Guardian (if under 16): _____

Name : _____

Phone : _____

Address : _____

NSUC Member Yes: _____ No: _____

Postal Code : _____

Certification Number: _____

Certification Agency : _____

This is my first time at the Seahunt

Yes: _____ No: _____

I need a buddy

Yes: _____ No: _____

Fees: \$15.00 for NSUC members; \$20.00 for Non Members

Registration: Please register at the dive site commencing at 9:30 A.M.

Survey 1- How did you learn of the Seahunt? *BOTTOMTIME* () Poster () Dive Shop () Radio () Newspaper () Friend () Other ()
Please specify _____

2 - Have you any suggestions to make it better? _____

- Rules:**
1. All divers must present a C-Card. No other substitute allowed.
 2. All divers must wear a B.C. if a wetsuit is worn. All equipment must be in good working order.
 3. All divers must enter and exit the water with their buddy.
 4. All diver must sign a form acknowledging they have read and understood the rules of the Seahunt and acknowledging informed consent to the dive.
 5. Scuba equipment must be worn.
 6. Anyone who retrieves more than one token will be disqualified.
 7. When exiting the water all divers must report to the marshalling areas before leaving the beach area.
 8. The decision of the Chief Marshal is final. Non-compliance will result in disqualification or refusal of entry to the Seahunt.

We would like to thank the following people who helped this event occur

1. The Nova Scotia Underwater Council
3. The Sponsors

2. The Nova Scotia Department of Lands and Forests
4. The Dive retailers
5. The many volunteers

Please do not litter ... Remember: it is against the law to consume alcohol in the park.

President's Report

I hope by now that everyone is well into the diving season and to those just finishing courses, your enjoyment is about to come. The water temperature over the past few weeks has risen a great deal, and not before time. Whilst diving in Glen Margaret and French Village this past couple of weeks I have encountered numerous jelly fish, more than I have ever seen in these waters in nine years of diving here. A warning to the unwary, they do sting, although not seriously. Invariably you get stung on the lips as this is the only part of the skin exposed and it feels like a mild visit to the dentist. The tentacles trailing behind are what you tend to miss. They can trail back six or seven feet and some are opaque at the ends. The answer is to give them as wide a berth as possible.

I would like to clear up several points about membership, which seems to be causing confusion to some.

1. Our membership year runs from April 01 to March 31. The reason for this is to have similar fiscal years as the government making it easier to apply for grants, etc.

2. A membership is carried forward for the next year if you join after December 31. e.g. If you join on January 10th, 1982 your membership expires on March 31, 1983.

3. Student membership is available to persons that have taken a course within the last 12 months and is valid only on initial membership. The cost is \$11 and special bulk rates for those shops that have joined the plan.

4. Family memberships may be claimed for two people living at the same address and costs \$30. (Only one newsletter is sent).

I hear congratulations are in order for a well run charity event run by the MAKOS and Discover Diving that was held on the 17th of July.

It is with regret that I see the closing of Northern Shore Diving, a long established shop in metro. They will be sadly missed in the

diving community. On behalf of the Board and Members I would like to wish the best to Chipper, Lorne and staff in any future ventures.

Lets have an accident free year as we do most years. This must be a compliment to the divers of Nova Scotia and the instruction they are given.

Roger Aggett Award Winners

1988	Gordon Murray	Central Area
1989	Bob Semple	Central Area
1990	John Pothier	South Shore
1991	Lynn Gallant	Central Area
1992	Not Awarded	
1993	Colin Frazee-Whitelock	Central Area

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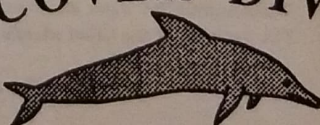
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Volunteers Urgently Needed

Volunteers are urgently needed for the following Council positions.

Secretary

Central Area Representative

Valley Area Representative

If you are interested, please call or write Colin Frazee-Whitlock at 864-2802 or write the Council Address.

At what Depth Will an Air Bubble Sink ?? by Trevor Kenchington

In a recent BOTTOMTIME, the Puzzler asked at what depth an air bubble would have the same density as the surrounding water; in other words, how deep in the ocean would you have to go before bubbles of air sink. The answer given, 2640 feet was wildly wrong. In fact you will never see an air bubble sink under its own negative buoyancy in the ocean!

The density of dry air at 0° C (roughly the temperature of the bottom of the ocean) and a pressure of 1000 millibar (roughly 14.7 psi) is 1.26760 grams per litre. The density of seawater is variable, depending on its salinity, temperature and (to a tiny extent) the pressure. A common average is about 1.025 grams per millilitre. So for a bubble of air to sink it would need to have a density of 800 times its density at the surface. Now as every diver knows, Boyle's Law says that the volume of a bubble is inversely proportional to the pressure, at a constant temperature, while its density will, of course, be inversely proportional to its volume. So an 800 times increase in density would need an equal increase in pressure. Water pressure in the ocean increases about 1000 millibar for every 10 meters of depth (again depending on salinity and temperature) so, if Boyle was right air bubbles should sink at depths below 8000 meters.

Unfortunately, Boyle's (and Charles Law come to that) is an "Ideal Gas Law". It pretends that the molecules of air have no size; that they are just points in space, bouncing off one another and exerting pressure. This is very close to being true at surface pressures but if you squeeze a bubble into a very tiny space, the volume of the molecules themselves starts to become a significant part of the volume in which they are squeezed. There is less room for them to bounce around and so they exert more pressure for their volume than Boyle's Law suggests. At the same time, the molecules attract one another, through very weak "van de Waal forces". Once they are squeezed tightly enough, even those forces can become significant, acting to lower pressure slightly. To find out what the overall effect will be, we need to use the "Real Gas Law".

$$(P + a/V^2) \cdot (V - b) = nRT$$

where P is the pressure, V the volume, T the (absolute) temperature, n a count of the molecules in the bubble (counted in units called "moles"), and R the Universal Gas Constant, while a and b are other constants with values that depend on the type of gas concerned. To increase the density of air 800 times, we need to reduce its volume by the same amount, and that requires a pressure of about 830 bars, or a depth of around 8300 metres.

But that depth is still well within the depth of the Challenger Deep in the Marianas Trench (the deepest point of the world ocean at 10915 meters), so why is there still no chance of an air bubble sinking? For one thing even the "Real Gas Law" begins to diverge from reality at pressures of a few hundred bars and we should use the equations of Berthelot and Kammerlingh-Onnes to find the true depth needed to compress the bubble 800 times. Much more seriously, the gases in air dissolve in water. At the surface seawater is almost always saturated with both nitrogen and oxygen and so the air in a bubble does pass into solution. At great depths, however, the concentrations of dissolved nitrogen and oxygen are roughly equal to their values at the surface. (since surface air is the

At what Depth Will an Air Bubble Sink ??
(continued)

only significant source of those gases in the ocean) but the solubilities are much higher. (Remember Henry's Law?). At 830 times surface pressure, both nitrogen and oxygen would move out of a bubble and into solution until the concentrations of these gases in the water increased by several hundred times. Since the air bubble would inevitably be quite small and the ocean is very large, all of the gas would soon dissolve and the bubble would disappear. In fact a small bubble would probably disappear before you had a chance to see it sink.

But there is one final, and fatal, problem. A nitrogen molecule weighs about 28 units and an oxygen one weighs 32 units, compared to the 18 units of a simple water molecule. The nitrogen and oxygen molecules are each about twice the size of the water molecule. If you were to squeeze air until it would sink in water, you would have to get two big nitrogen and oxygen molecules into about as much space as is taken up by three small water molecules, and at that point the air is going to look pretty much like a liquid itself. If the behaviour of air under these extreme conditions has ever been measured, it is not listed in the standard physical data tables but those do show that nitrogen condenses at about -150° C and 30 bars pressure, so I would guess that at 0° C and 830 bars, it would be just as much a liquid as is the seawater.

Sorry, but you will never see an air bubble sink in water.

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