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Reproduced below is an article which first appeared in the News just a scant 24 months ago: reading this recently, for the first time, posed for me a two sided question---was this article written to channel enthusiasm searching for an outlet, or in an endeavour to inject enthusiasm into a club in the doldrums - as the U.R.G. is NOW!

This is not the grumbling of a disgruntled member-the lack of interest by group members is graphically illustrated in the attendance figures at group orgainsed dives- a total of 21 for FIVE dives which includes a 5 at the September Group Dive. Dive locations have included Boat Harbour, Bare Island and Oak Park, so that lack of variety should not be used as a reason for not diving.

Bare Island would appear to be best given a miss for a while because of the dredging operations being carried on at the present, but Boat Harbour normally offers good water clarity and the Oak Park area is a veritable treasure house of both plant and animal species. In the last 'dip' there six varities of nudibranch were sighted and more than 25 'Rose Petal' bubble shells were observed browsing on a meadow of sea grasses. Bass Point of course, although some distance away offers, usually, a water clarity seldom seen around Sydney, deep (60') water easily accessible from the shoreline and for the shell collector group members have found 'Magnificant Volutes', a Beer Barrel Tun' and Abalone shells, up to 53/4" in length.

The views expressed here are those of the editor alone and no complaints or criticism should be directed at the committee in general, the editor guaranteed to print any or all articles to criticize or refute these views.

APPROACH TO RESEARCH

The U.R.G. is primarily a group of diving enthusiasts who wish to participate in the field of marine research, compensating any lack of technical knowledge with practical diving experience. The main factor which makes the Group valuable to established marine research institutions is its ability, as a group, to dive, thus allowing 'on the spot' observations to be made and recorded. The recorded observations being of no value unless the diver observes and records accurately what he has seen.

The initial approach to a research project is most important as this is the means of achieving a successfulend. Listed below are some suggestions which may be of assistance to members who intend taking an active part in research projects.

1. SELECT A SUBJECT; Little is known about the marine life that abounds our coastline, therefore this should present no problem. Just select a book on marine life, any book, open it at any page there you will probably find something worth investigating.

2. FAMILIARISE YOURSELF WITH THE SUBJECT MATTER; Read any written material you may find which is relavent to the subject. The N.S.W. Library has an excellent research department which you will find most helpful. Talk to people who may have done some preliminary work in your particular field, remembering always to endeavour to verify the information already received as well as bringing forward new facts.

3 PRE-DIVE PREPARPATION; Before attempting a dive make sure you have the equipment necessary for your work in good operating condition, many a good specimin has been lost due to lack of preparation. As this is a relatively new field,

manufactures equipment is hard to come by, so use a bit of ingenuity. Your fish trap may look like a mobile fowl house, but aslong as it traps fish-who cares?

4. DIVE LOCATION; Select an area in which you are likely to meet up with the particular beast you are searching for. Your fellow divers may be able to help you here, just ask around, it's amazing the answers you will receive-yes, you will receive many of that type of answer, but disregarg them for practical information.

5 ACCURACY OF OBSERVATION; Record the things you see during a dive, now what you thought you may have seen. (I thought I spotted a mermaid off Broughton Island last Easter, but who wouldn't with a tummy full of Harry Traceys O.P. Rum)

6 RECORDS; Record observations as soon as possible after leaving the water-a time lapes can mean a lapse of memory. In your record be sure to enter all relevant information such as date-time-weather-location-type of bottom-depth-etc., as these factors may be important during the final analysis.

7. ASSISTANCE; If you feel you require assistance do not be afraid to contact established research institutions requesting information or help, as these people will only be too glad to lend assistance in genuine cases.

In conclusion I would like to point out that it is nice being able to dive and just look, but so much nicer when you have something to look for.

D. MURDOCH.

ABALONE (HALIOTIS RUBER0 YAGGING

A Brief Summary of results

Between June, 1962 and August, 1964 approximately 90 Haliotis ruber have been tagged in Condwong Bay. A little more than half of these being transplanted from another locality, namely South Maroubra. All have been tagged with various coloured fine plastic wire, knotted or twisted through the outermost hole in the shell. Most shells tagged have been adult or near adult size. In over two years there has been no observable growth in the two adult shells tagged in June, 1962. Six very small specimens were tagged in late June, 1962, eight months later the only one to be found had grown from 11/2" to 17/8" in diameter (an increase of 3/8"). One half-grown specimen in seven months (March, 1963 to October, 1963) added 11/4" to its circumference and three exhalation apertures had been built up past the tagged aperture.

Of the first large batch of Haliotis transplanted, less than 25% were found after two weeks. Of the second large, transplanted batch, 50% were found after two weeks and 33% after a month. But very few dead tagged shells have been found the number being three at this stage, and one of these had been broken into pieces (by a predator?) the tag still in position on the broken piece.

Our main purpose in tagging have been to see if we can:-

(a) establish that these shells can be transplanted
(b) restock a depleted area
(c) start a new colony in an apparently suitable area

(d) determine growth rates and life span

Propositions (a) and (b) have been proven, only time and more tagging of small specimens can give additional information on (c) and (d).

C.J. LAWLER

THE 'ALUMINAUT'

Time was when the idea of an aluminum submarine would have been dismissed as ridiculous. For one thing, most experts would have agreed that aluminum couldn't take deep sea pressure. For another, they would have tagged the fabrication problems impossible.

But like the bumblebee, which by all the laws of aerodynamics shouldn't fly at all, you never konw whether something will work until you try it.

So...we now have an aluminum submarine. And it's not just a submarine, it is the world's deepest diving sub, designed to descend to depths ranging anywhere from 15,000 to 17,000 feet.

Now being built in part at Portland, Me. by E.W. Bliss' Bliss-Portland Division under contract to General dynamics' Electric Boat Division, the 'Aluminaut' is a project of Reynolds Internationsl, Inc. The craft is a true submarine in that ot operates under its own power. It is designed for salvage jobs and to probe the ocean floor.

Bliss-Portland is building the 'exo-structure', which consists of the superstructure, two ballast tanks, the keel, and the stern structure. All components are made of non-heat-treatable Alclad 5083, which has high strength and corrosion resistance, and which work-hardens rapidly.The superstructure is fabricated in sections of 1/8 to 3/16 inch thick material, and has expansion joints to protect against contraction of up to 1/4 inch.

Light Metal, Tricky Contours

Putting the superstructure together proved tricky because of the lightness of the material and the compound curves of the design. On top of that, a tolerance of 1/8" had to be held from one end to the other of the 40' long structure. Here, as with the other components of the exo-structure, Tig welding was used.

The ballast tanks mounted on both sides of the pressure hull are made from 3/16" material. Welding here had to be pressure-tight because the tanks must sustain pressure when they are blown for surfacing. The tanks have compartments that magnetically hold pre-measured amounts of metal shot. This shot helps the sub to descend and when the shot is released the vessel rises to the surface. The ballast tanks are air-tested at 5psi.

At the ocean's bottom, the submarine rests on a 20' high keel that contains piping, wiring, compressed air cylinders, and also a permanent and drop ballast. the keel was fabricated on a special fixture.

Compound curves and tough forming problems also complicated fabrication of the submarine's stern section. The stern consists of a 'flag' or topside structure (where the crew enters) and a conical part.

The top section is formed on a specially built fixture built out of 3/4" plate, and the cone consists of three pieces welded together and then cut in half before being

attached to the hull.
Two nacelle planes, each housing a 5hp dc motor, complete the stern section. As with the vertical propellor housing for the vessel's third and last motor, the cone was spun to produce the necessary compound curve.

Hull Construction

The exo-structure will eventually wind up at Electric Boat in Groton, Conn, where it will be attached to the pressure hull with drive pins. Eleven 7800lb forged aluminum seamless cylinders, each 40" long and 61/2" thigh,make up the hull. The material: 7079-T6
No welding is done on the 40' long pressure hull. Instead, each cylinder is flanged and joined by bolts. The flanges are machined to such precise tolerances that there is no need for seals, even though the hull is designed to withstand pressure up to 7500psi. Under pressure, the hull compresses from a 481/2" radius to 483/8". All the living and working facilities for the three man crew are in this part of the submarine.
The bow of the vessel was formed from pre-shaped pieces welded together to form the required compound curve Here (as elsewhere on the sub) all welds were 100% die checked. When thin plate (1/8 or 3/16") was welded to heavier plate (1/2") the thicker material was heated to 200F, and semi-automatic guns were used, with 5356 alloy, and 3/64 wire.
As has been said, Tig welding was used throughout - with one exception, the rudder post. This 5" diameter, 5' long unit has two fins made from 1/4" material welded to it. Here, electron - beam welding did the job, because no distortion could be tolerated. Both the fin and rudder post are made of 6061-T6.

Undergoes tests this summer

The Aluminaut is expected to hit the water sometime this summer for tests. It will eventually go into service for the Woods Hole Oceanographic Institute at Woods Hole, Mass. under sponsorship of the United States Navy.
here are some of its specifications: overall length, 50', range 80 miles, displacement 150,000 lb. Cruising speed os 3.8 knots, and the sub can move either horizontally or vertically. It can stay down 72 hours or more.

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