

NDA NAUI

"Safety Through
Continuing Education"

NAUI NEWS

JUNE 1975

NEWSLETTER OF THE NATIONAL ASSOCIATION OF UNDERWATER INSTRUCTORS
AND THE NAUI DIVING ASSOCIATION

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IN THIS ISSUE

Instructor Articles:

Back-to-Back
by W. J. Miles, NAUI 3883
and James D. Blood Pages 2-3

A Professional Approach
to Scuba Instruction
by Jay P. Merkley, NAUI 1784 Pages 4-5

Push Regional Orientations
by Bob Weisman, NAUI 3825 Pages 5-6

"Go and Tow?"
by Frank Quinn, NAUI 3840 Page 6

The Concepts of Physics
by John Wozny, NAUI 1442 Page 7

IN-HOUSE NEWS Pages 10-12

1. By-Laws Ballot Change
2. Board of Directors
Nominations Now Open
3. Skin Diving Leader vs. Assistant
Instructor—What's the Difference?
4. Report From the Far, Far West
5. July 4th at the Channel Islands

SPECIAL FEATURE

Great New Diving Film
—Sharks' Treasure Page 13

CURRENT TRENDS

1. Evaluating Your Diving Instructor
by Richard R. Spencer,
NAUI 1025 Page 14
2. Doppler Ultra Sound
for Detection of Bends
by Robert L.
Meckelberg, M.D. Pages 15-16
3. Flying After Diving
by Milt Golan Page 15-17
4. Weighting for Freshwater
by C. L. Smith, NAUI 2290 Page 18

ACTIVITIES

1. IQ7 Page 8
2. Port Townsend ITC Page 9
3. Underwater Freshwater
Photo Contest Page 17
4. Calendar of Events Page 22

ALSO

1. Just A Drop & Dribble Page 17
2. The Medical Editor's Column Page 19
3. Diving Travel Pages 20-21
4. How You Can Enjoy A Safe and Happy Dive
by Richard R. Spencer, NAUI 1025 Page 23
5. Accident Investigations Page 21
6. Accident Treatment Chamber
at Columbia Page 21
7. Electronic Resuscitation Page 21
8. Calif. Photos Page 23
9. New Publication—SCUBA Regulations Page 24

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BACK-TO-BACK

by Wendell J. Miles, NAUI 3883
and James D. Blood

"Hey, how long can we stay down on this dive? Mmm, maybe 15 or 20 minutes, I guess. We probably should figure how much air we have left too. How do those formulas work again." Makes me shudder to think how much students forget a year after their class. And it's not the instructor's fault. After all, most of us crammed for college exams to "get through," too. What makes it easy for us to remember is that we live this business of diving every day. Obviously, anything that would help us to remember dive table procedure or save time is a valuable aid.



J. D. Blood and W. J. Miles

Recently while team teaching an advanced diver class, we brought together two forms each of us had been personally using and jokingly called it our "Back-To-Back" handout. This laminated worksheet became a timesaver and has aroused increased interest in our area. They do have an open copyright on them, so if they are used in any manner, please give us

credit by keeping our names on the sheet. If there's any good here, we want to share it with you.

Side one:

Repetitive Dive Worksheet by James D. Blood

This worksheet was designed and drawn up in 1972 as a result of a personal study into the repetitive dive tables and the existing U.S. Navy worksheet. In the belief that a more comprehensible, less space consuming, and a more thorough progressive worksheet could be drawn up for the sport diver, I inked out the following form. It is to be used with Navy tables 1-11, 1-12, 1-13, or its modification, the "Nu-Way" tables.

As you can see, the form (plastic laminated for reuse with grease pencils) can accommodate up to 6 dives a day for three divers or one diver for three days. I do not feel that this number of dives per day is uncommon as many instructors meet or exceed six no-decompression repetitive dives on open water training sessions.

Spaces for "time in" and "time out" provide a more accurate record of surface intervals. The progressive linear method of filling in the blanks, adding residual times where shown, referring back to the indicated Navy tables to arrive at an equivalent dive time (E.D.T.) and finalizing with a repetitive group is easy when using this method. There is no forgetting what to do next when planning a group of dives.

CONT. NEXT PAGE

REPETITIVE DIVE WORKSHEET - By J.D. Blood

For Repetitive
"No-Decompression"
Air Dives

Date: _____

Name: _____

Dive No.	Time In	Sur. Int.	Rep. Group	Max. Depth	R.N. ₂ T BOT Time	E.D.T.	Rep. Group	Time Out
1st	:	X	NONE		0	+	=	:
2nd	:				+	=		:
3rd	:				+	=		:
4th	:				+	=		:
5th	:				+	=		:
6th	:				+	=		:
Date: _____			Name: _____					
1st	:	X	NONE		0	+	=	:
2nd	:				+	=		:
3rd	:				+	=		:
4th	:				+	=		:
5th	:				+	=		:
6th	:				+	=		:
Date: _____			Name: _____					
1st	:	X	NONE		0	+	=	:
2nd	:				+	=		:
3rd	:				+	=		:
4th	:				+	=		:
5th	:				+	=		:
6th	:				+	=		:

BACK-TO-BACK (Cont.)

Isn't keeping an accurate worksheet worth not getting bent? Look this method over, criticize it, and give it a try.

The back side:

Pressure-Volume Conversion Chart by Wendell J. Miles

Being the type of person that never remembers the half dozen constants (for calculating tank volumes) for the more popular scuba tanks on the market, and hating to pull out pencil and paper in a dripping wet suit, I compiled the data for this chart in early 1972 as a personal reference guide. I was always diving with someone who had a different set-up than mine and the cubic foot difference in our cylinders (often also at varied pressures) made an additional factor in dive planning. For example, my buddy's double 52.8s filled to

1600 PSIG had more volume than my single 82.6 filled to 2800 PSIG. How much more? The chart, of course, shows the answer and its use is self-explanatory.

The use of PSIG itself can be erroneous when filling in the "air used" portion of dive logs, when calculating surface air consumption rates or figuring how much air to use in buoyancy situations when the use of different sized tanks are being employed. Other standard sizes and pony bottles can also be added to a similar chart.

Pressures shown over the rated capacity are for comparative purposes only as the author realizes the dangers involved in over-pressurizing any high pressure vessel.

Used as a reference guide, I feel anything that can simplify and safely save a little time on the dive site can't be all bad.

PRESSURE-VOLUME CONVERSION CHART

BY W. J. MILES

FOR SCUBA TANKS - P.S.I.G. TO CU. FT.

TANK SIZE	50.8 STEEL		52.8 STEEL		71.2 STEEL		50 ALUM		80 ALUM		82.6 ALUM	
TANK PRESS IN PSIG	FILL=2250 RATED=2475 CONSTANT=.0205		FILL=1900 RATED=1980 CONSTANT=.0257		FILL=2250 RATED=2475 CONSTANT=.0205		FILL=3000 RATED=3000 CONSTANT=.0167		FILL=3000 RATED=3000 CONSTANT=.0267		FILL=3000 RATED=3000 CONSTANT=.0275	
	SINGLE	DOUBLE	SINGLE	DOUBLE	SINGLE	DOUBLE	SINGLE	DOUBLE	SINGLE	DOUBLE	SINGLE	DOUBLE
3500							58.33	116.67	93.33	186.67	96.37	192.73
3400							56.67	113.34	90.67	181.34	93.61	187.22
3300							55.00	110.00	88.00	176.00	90.86	181.72
3200							53.33	106.67	85.33	170.67	88.11	176.21
3100							51.67	103.34	82.67	165.34	85.35	170.70
3000	61.58	123.15			85.30	172.61	50.00	100.00	80.00	160.00	82.60	165.20
2900	59.52	119.05			83.43	166.85	48.33	96.67	77.33	154.67	79.85	159.69
2800	57.47	114.94			80.55	161.10	46.67	93.34	74.67	149.34	77.09	154.18
2700	55.42	110.84			77.67	155.35	45.00	90.00	72.00	144.00	74.34	148.68
2600	53.37	106.73			74.80	149.59	43.33	86.67	69.33	138.67	71.59	143.17
2500	51.31	102.63	66.67	133.34	71.92	143.84	41.67	83.34	66.67	133.34	68.83	137.67
2400	49.26	98.52	64.00	128.00	69.04	138.09	40.00	80.00	64.00	128.00	66.08	132.16
2300	47.21	94.42	61.33	122.67	66.17	132.33	38.33	76.67	61.33	122.67	63.33	126.65
2200	45.16	90.31	58.67	117.33	63.29	126.58	36.67	73.33	58.67	117.33	60.57	121.15
2100	43.10	86.21	56.00	112.00	60.41	120.83	35.00	70.00	56.00	112.00	57.82	115.64
2000	41.05	82.10	53.33	106.67	57.54	115.07	33.33	66.67	53.33	106.67	55.07	110.13
1900	38.99	77.99	50.67	101.33	54.66	109.32	31.67	63.33	50.67	101.33	52.31	104.63
1800	36.95	73.89	48.00	96.00	51.78	103.56	30.00	60.00	48.00	96.00	49.56	99.12
1700	34.89	69.79	45.33	90.67	48.91	97.81	28.33	56.67	45.33	90.67	46.81	93.61
1600	32.84	65.68	42.67	85.33	46.03	92.06	26.67	53.33	42.67	85.33	44.05	88.11
1500	30.79	61.58	40.00	80.00	43.15	86.30	25.00	50.00	40.00	80.00	41.30	82.60
1400	28.74	57.47	37.33	74.67	40.28	80.55	23.33	46.67	37.33	74.67	38.55	77.09
1300	26.68	53.37	34.67	69.33	37.40	74.80	21.67	43.33	34.67	69.33	35.79	71.59
1200	24.63	49.26	32.00	64.00	34.52	69.04	20.00	40.00	32.00	64.00	33.04	66.08
1100	22.58	45.16	29.33	58.67	31.64	63.29	18.33	36.67	29.33	58.67	30.29	60.57
1000	20.53	41.05	26.67	53.33	28.77	57.54	16.67	33.33	26.67	53.33	27.53	55.07
900	18.47	36.95	24.00	48.00	25.89	51.78	15.00	30.00	24.00	48.00	24.78	49.56
800	16.42	32.84	21.33	42.67	23.01	46.03	13.33	26.67	21.33	42.67	22.03	44.05
700	14.37	28.74	18.67	37.33	20.14	40.28	11.67	23.33	18.67	37.33	19.27	38.55
600	12.32	24.63	16.00	32.00	17.26	34.52	10.00	20.00	16.00	32.00	16.52	33.04
500	10.26	20.53	13.33	26.67	14.38	28.77	8.33	16.67	13.33	26.67	13.77	27.53
400	8.21	16.42	10.67	21.33	11.51	23.01	6.67	13.33	10.67	21.33	11.01	22.03
300	6.16	12.32	8.00	16.00	8.63	17.26	5.00	10.00	8.00	16.00	8.26	16.52
200	4.11	8.21	5.33	10.67	5.75	11.51	3.33	6.67	5.33	10.67	5.51	11.01
100	2.05	4.11	2.67	5.33	2.88	5.75	1.67	3.33	2.67	5.33	2.75	5.51

-NN-

A PROFESSIONAL APPROACH TO SCUBA DIVING

by Jay Peter Merkley, NAUI 1784

The time has come when we who are engaged in teaching skin and scuba courses must take a hard look at the way we are conducting our classes. Although most scuba instructors can produce an instructor certification card, we are experiencing a decline in the number of courses which really meet our national association's standards.



Jay Merkley

Paul Tzimoulis, in expressing concern over this problem in the October, 1974, "Skin Diver" magazine, commented that rising costs are probably the reason for the deterioration in diving instruction. I feel, however, that the problem really goes deeper than just the rising costs involved in offering certified scuba instruction. For several years, I have been concerned with the philosophy of some instructors that one really doesn't need to know how to swim extremely well in order to scuba dive. I have even met instructors who claim that as long as a diver has a buoyancy compensator, he or she doesn't really need to know how to swim at all. Quite frankly, philosophies such as these really scare me. I feel that the instructors who have such philosophies are usually more interested in receiving the course registration fee and selling the student equipment than they are in advising the student to get some additional swimming instruction before taking a scuba course.

I also believe that most instructors have had to deal with the student who knows how to swim but hasn't been swimming in several years or is in very poor physical condition. We usually tell these people that they swim well enough that we can probably bring their swimming skill up to the national standard by the middle or the end of the course. If these people are able to pass the minimum standards during the course, then we feel we are correct in our assessment; but, if they still fail to meet these standards, we sometimes feel that it was our fault they continued.

One very important implication of this situation is that we are facing these problems at a time when the federal government is looking into the advisability of placing federal

controls on sport diving instruction. If we aren't willing to accept our responsibility of providing the best and most professional instruction possible to the public, the federal government will eventually decide to solve all our problems for us.

Legislators are well aware that we as scuba instructors oppose federal controls, but they are concerned because of the publicity diving accidents have received. Some of the legislators are starting to ask how we can account for these accidents if our instructional programs are being conducted properly. We not only have to convince our elected officials that federal control of sport diving is not the answer, but, we have to convince them that we are the experts in the field and are willing and able to accept our responsibility.

I feel that NAUI is to be commended for its diligence in upgrading and improving the qualification standards of scuba instructors in this country. NAUI's constant vigilance in tracking down and suspending instructors who won't abide by the professional standards has also been a positive force in maintaining quality scuba instruction. Without this kind of professional control, scuba instruction in this country would be a chaotic nightmare.

However, NAUI can't solve all the problems we are experiencing by itself. We as instructors must commit ourselves to being part of the solution instead of contributing to the cause of the problem. I would like to suggest two ways that we as instructors can upgrade the quality of skin and scuba diving instruction in this country and give our sport the respect I feel it deserves.

First, we as instructors must develop a teaching-learning process for our scuba classes. The system I have been trying to use is "The Good Teaching Process" introduced by Dr. Charles Corbin in the December, 1966, issue of "The Physical Educator." There are four areas of concern in implementing "The Good Teaching Process;" foundations, objectives, programs, and evaluation.

The instructor must have a professional foundation or philosophy. This means the instructor must know what he wants to accomplish in terms of outcome each time he teaches a scuba course. In order to have a professional foundation, instructors also need to know and follow the guidelines and principles of the profession. The area of professional foundations also includes understanding the needs and interests of the students to be taught.

The second aspect of "The Good Teaching Process" is establishing objectives that the course must meet. The objectives of a scuba

CONT. NEXT PAGE

A PROFESSIONAL APPROACH . . . (Cont.)

course are the blueprints that show us what our end product will be like. Without objectives, our instruction will have no direction and we, therefore, will not arrive anywhere.

After we have established our objectives, we then need to develop programs that will help each student to meet the objectives or goals of the course. Programs are the activities we choose to use in order to achieve our goals. If we find we are doing things that don't help to meet the goals of the course, we must discard those things and replace them with more suitable programs.

The last step in this process is evaluation. We must finally look back over each course we teach and see if we have accomplished what we set out to do. If we find that our final products don't meet our blueprint specifications, then we need to find out why and correct our shortcomings.

After we have developed a teaching-learning process, the second thing we need to do is require and enforce watermanship prerequisites for scuba classes. I am sure no one would ask someone who hadn't learned the alphabet to read a book or write a letter; yet, we still see scuba instructors teaching students how to swim well enough to scuba dive. I would like to suggest that a scuba course isn't the place to teach students how to swim. Students should already possess a high level of swimming skill before they enroll in a scuba course. During the course, the instructor can then worry about teaching them how to scuba dive in safety. I am not suggesting that we shouldn't spend some time having students swim to increase their endurance and skill, but I am suggesting that they be able to meet the national association's minimum swimming requirements before they enroll in a scuba class. A student should first work his way up from a beginning level swimmer to an advanced level swimmer before taking a course in scuba diving.

I believe that by applying "The Good Teaching Process" and requiring prerequisites of students before they take a scuba class we can prove that we as scuba instructors are the most qualified people to regulate the profession as well as give our sport and profession the respect they deserve.

Let's all strive to be professional in our approach to teaching scuba diving and I am sure we will experience a higher degree of prestige than we have ever witnessed before.

-NN-



PUSH REGIONAL ORIENTATIONS

by Bob Weisman, NAUI 3825

In the past two years I've been teaching and diving in areas such as California, Hawaii, Pennsylvania, Cape Cod, and now Ponce De Leon Springs, Florida. Like every new dive spot, each area had it's own special environmental conditions, beauties and hazards. At each new diving location, special equipment and precautions have to be observed, used, and practiced. I think where we, as diving instructors, may be in error is in not stressing the importance of these different areas, and the meaning of; **PLANNING YOUR DIVE AND DIVING YOUR PLAN.**

In California, the "sport diver" or the "experienced diver" needs to know the art of boat diving. He or she also has to have some knowledge of kelp and various types of marine life.

In Hawaii, the diver needs to have knowledge about currents, tides, winds*, and the kinds of marine life of the islands.

When venturing to a much colder region, such as Pennsylvania and Cape Cod, the diver has to adjust to the cold waters and the worries of thermoclines. Then in these regions there are diving localities involved such as quarries. Most quarry dives are relatively safe except for limited visibility of about 1-2 feet, jagged pieces of metal from wrecked cars and wire or rope that an unexpecting diver could easily be entangled in.

Moving to the South into Florida, we encounter the caves, sinkholes and springs which require specialized training, equipment and a large measure of common sense. Panic, silt, equipment problems, getting lost, penetrating too far—all are nightmares when the caves can be a dream world when dived in properly.

With proper training, planning and equipment all the ill-fated hazards of each of these areas can be avoided. Encourage your students to get an orientation to the region before he or she straps on a tank and is the first one in the water . . . maybe the first one never to come out.

More emphasis should be made during the basic course on safety of diving in different areas. Not to say the Hawaiian instructor should spend a whole class period on Florida

CONT. NEXT PAGE



Bob Weisman

PUSH REGIONAL ORIENTATIONS (Cont.)

caves, or that the Florida instructor should spend a class period on the dangers of Hawaii's giant surf conditions, but it should be emphasized that if they do venture into new areas to ask questions about the hazards, and dive with a local diver who knows the area before he or she goes with their fellow novice-to-the-area on their own dive.

Fellow Instructors, let's stop accidents from happening, there are too many places on this earth too beautiful to remain unseen, to be kept in the depths of our imagination. Each and everyone of us, as certified divers, should be able to see God's Creation and enjoy the splendor of it, with the feeling of safety.

Let's prevent the accident and educate our students before they become a statistic on one of our Accident Report Forms.

**Winds—A diver's plans are restricted very much by the Trade and Kona Winds in Hawaii. When the Trade Winds come in from the north beautiful diving can be expected most of the time. When the Kona Winds arrive, low visibility, high waves, and the infamous Portuguese Man-O-War become your dive buddies.*

—NN—

"GO AND TOW?"

by Frank Quinn, NAUI 3840

What should be the proper sequence of rescue options for the potential scuba rescuer? Do we need a sequence at all? In swimmer lifesaving, the proper sequence is given as "Reach, Throw, Row, Go." In other words, the "GO" or actual swimming, physical contact rescue is the *last* option open to the rescuer;

he should have considered, if not actually tried, other, less hazardous types of rescue first. Can he reach the victim without even entering the water? Is there a ring buoy or inner tube nearby which can be thrown to the victim? Is there a boat available? These factors should be quickly considered before entering the water for a swimming rescue.

Now, how about scuba rescue? Should some sequence of options be developed here or should we elect a "GO and TOW" technique of having the rescuer "wade" right into the midst



Frank Quinn

of the situation? I personally would opt for a scuba lifesaving sequence similar to that mentioned above for swimmer lifesaving. Perhaps something along the line of "SHOW, THROW, GO, TOW." In other words, the victim may first be able to be talked into rescuing himself. The rescuer, in the water beyond reach of the victim, can shout explicit instructions for self-rescue (e.g., "Reach down with your right hand and drop your weight belt!" or "Inflate your vest, inflate your vest!") However, the victim, perhaps in panic, does not respond to this first attempt. We now try "THROW." An available surface float—inner tube, air mattress, surf board, inflatable buoy—could be pushed to the victim. He will scramble onto this object, forcing it underwater, rather than climbing onto the rescuer, who is still at a distance. Well, suppose we have nothing to "THROW" and we've tried "SHOW"ing. Now, our remaining option would be a physical contact rescue, preferably with an underwater approach. Once the victim has been put under control by any of the above methods, we begin our "TOW" to safety, administering artificial respiration if indicated.



Of course a "THROW" might be tried before a "SHOW" if the rescuer had, for example, an inner tube immediately available. It makes little difference. The point is, something should be tried before actual rescuer-victim contact. Granted, some seconds could be lost in unsuccessful "SHOW" and "THROW" attempts, but if the victim remains on the surface, struggling, the rescuer will probably have these few seconds. If the victim goes beneath the surface during or prior to any rescue attempt, the rescuer must, of course, "GO" with all prudent haste. The victim is then probably unconscious and the rescuer has no other options open to him.

So, is the basic "SHOW, THROW, GO, TOW" sequence something most divers could apply in most surface scuba rescue situations? Are there times when a "GO and TOW" rescue option might be superior? Hope to get some comments.

P.S.—What is the feeling on having students practice direct A.R. in class?

—NN—

THE CONCEPTS OF PHYSICS
Part of a "How to Teach" Series
by John Wozny, NAUI 1442

Why should ideas and concepts dealing with pressure concern a beginning basic student? The answer is simple. We instructors are training a wonderful bunch of kids to enter a completely alien environment. We expect to train them well enough so we can turn them loose in the near future to survive and even learn to enjoy this

completely alien environment. I think we can agree that in most cases in life, people tend to fear the unknown. Therefore, the more our students understand about the underwater world and the effects this world is having on their bodies, the more they can relax and accept these effects. They must learn WHY as well as WHAT. It is



John Wozny

easy to tell them what will happen to them if they hold their breath while making an ascent with scuba gear, but they really should understand why, and this understanding should be part of their personalities so that all their behavior is subconscious. Correct practice leads to correct habits which leads to correct behavior which leads to enjoyment. This can best be accomplished if we can instill in our students a respect for the underwater world and all that is in it. You can only gain respect by understanding, and that should be the goal of all instruction.

Every instructor is aware that the laws of Physics completely dominate diving, both skin and scuba. Judging by the enrollment in secondary schools, Physics is the number one most unpopular course. The main reason for this is the mathematics requirements. But Physics is a study of nature's laws, and these laws existed before mathematics had been invented. Our students are not going to carry slide rules or calculators with them when they dive. It should not be necessary for them to work Physics problems as they dive for enjoyment. Rather they should just understand what effects the various natural laws are having on their bodies as the pressure changes with

depth, or they try to float on the surface with too much weight, or try to stay down without enough weight.

Diving Physics doesn't have to be dull. Teaching aids can be interesting and exciting and involve students in many different levels of participation and learning. A picture is worth a thousand words, a demonstration is worth a thousand pictures, and a student actually taking part in the demonstration is the peak of involvement.

I would like to suggest in a series of articles simple, logical, orderly and very exciting methods of teaching Diving Physics to involve students in the learning process, and make your Skin and Scuba Diving course the most talked about activity around. Turn those students on! Get them involved and let nature take its course. But start simple and gradually build up and up and up! Let them sell your course for you. Make the best use of some excellent teaching aids, get the students deeply involved, and you will know the sweet taste of success.



By using a combination of teaching aids in a logical and orderly presentation it is possible to have one-hundred percent student involvement which can lead to complete respect and understanding of the effects of changing pressures of the oceans. In subsequent articles we will describe various teaching aids which have proved very successful in helping develop the respect and understanding of the physical laws of nature. These aids stress student participation, student involvement, motivation, and finally learning. Our students deserve the best we can give them, and with some imagination and effort we can give them the most exciting experience of their lives that can change them forever.

-NN-

DETECTION OF "BENDS" . . . (Cont.)

with this modified technique, it is quite important to be able to detect those individuals who do manifest a significant amount of bubbling in their blood vascular system, and who, therefore, should be kept under surveillance for the possible onset of bends symptomatology. Also, those individuals wishing to perform a repeat dive excursion can be warned away from this endeavor if their Doppler ultrasound examination shows a significant number of bubbles in their blood vascular system from their first exposure.

Concomitantly, the ultrasound detector can also be utilized as a monitoring system for individuals undergoing therapeutic recompression and staged decompression for the treatment of their bends. The elimination of the venous gas emboli can be used as a predictor of effectiveness of treatment, and delineate how much treatment must be administered to the individual to produce therapeutic recompression. Also, it has been shown that in many instances of simple bends, a shortened procedure both in time and depth of recompression can be utilized as effectively as more prolonged methods. Typical Doppler ultrasound equipment can be made quite compact and portable, and easily utilized in the field. This makes the application on shipboard quite feasible, and limits it only by personnel and time.



FLYING AFTER DIVING

by Milt Golart

With the recent availability of low cost diving trips to the neighbor islands, there has been a great deal of interest in the question of how safe it is to fly after diving. There is no ready reference that establishes the relationship between permissible unpressurized flight altitudes and the time and depth of preceding dives. However, there is a way to determine this by means of the procedures used for high altitude diving. If you can safely make a dive in a lake at 6000 ft, it is obvious you can take the same dive at sea level then climb to 6000 ft in an airplane without any additional risk of decompression sickness.

There are several techniques used for high altitude diving, most of which use a factor to determine an "apparent depth" for the high

altitude dive. This "apparent depth" is then used to enter standard dive tables to determine the no decompression limits and the proper decompression, when required. One such method developed by Hannes Keller is described by M. G. Peredo in *UnderSea Technology*, 33-36, February 1966. Tabulated below are factors from Peredo's paper to be used to multiply the actual dive depth to obtain an "apparent depth" for that dive:

Altitude of Dive Factor

10,000 ft	1.454
9,000 ft	1.399
8,000 ft	1.347
7,000 ft	1.296
6,000 ft	1.248
5,000 ft	1.202
4,000 ft	1.158
3,000 ft	1.116
2,000 ft	1.076
1,000 ft	1.037

Thus at an altitude of 6,000 ft, a dive to 50 ft for 100 minutes (actual dive time plus residual nitrogen time from previous dives) would be the equivalent of a dive to a depth of 62.4 at sea level ($50 \text{ ft} \times 1.248 = 62.4 \text{ ft}$). From the U.S. Navy dive tables we find that a dive to 62.4 ft for 100 minutes (70 ft—100 minutes) requires 33 minutes of decompression at 10 ft. Thus at 6,000 ft we require 33 minutes of decompression for a dive that would be a no-decompression dive at sea level. We can use this information to permit a safe flight at 6,000 ft following a sea level dive by taking the necessary decompression prior to take off as follows:

(a) Make the dive to 50 ft for 100 minutes (bottom time plus residual nitrogen time).

(b) Surface without decompression (not needed as this is a no-decompression dive at sea level).

(c) Remain at sea level for 33 minutes. This will result in a nitrogen loss of *at least* that which would have taken place at the 33 minute decompression stop in the 6,000 ft lake.

(d) Fly at an altitude of 6,000 ft (which is equivalent to surfacing in the 6,000 ft lake). Thus all altitudes 6,000 ft and below are within the safe limits of the decompression tables.

If one calculates the required interval at sea level for several dives to no decompression limits we find:

CONT. NEXT PAGE

PORT TOWNSEND—ITC HOT SPOT

by Bill High, N. Pacific Branch Manager

Port Townsend, site of the 1975 North Pacific NAUI ITC will prove to be one of the finest instructor training areas in North America. This former military coastal defense facility with its victorian age officer's quarters, parade ground, and aging lookout posts, remains as a quiet reminder of two great wars, when such defense positions were necessary against possible great fleets of enemy battle-ships.

Now a Washington State Park and Conference Center, Fort Warden serves a wide variety of diver needs. Individual rental homes with numerous single and multiple bedrooms, kitchens and even fireplaces are lined neatly adjacent to the parade ground. Larger dormitories and a dining room are also part of the complex. These homes can be rented by groups of six or more persons by the day or week.

photos by Bill High



Victorian age officer's homes overlook the protected beach at Ft. Warden. These residences are available for rent to diving groups such as the Jan. North Pacific NAUI Instructor's Retreat.

Diving begins a short 5 minute walk from the housing. A no surf sand beach stretches for hundreds of yards along the lee shore of Pt. Wilson. The park provides a small boat launching ramp carefully protected by a large dock and bulkhead. The "L" shaped dock and bulkhead create a totally protected lagoon for a controlled teaching and training area.

Wind and weather has little chance to hamper water activities. Prevailing summer westerly wind limits chop and light swell to the west side of the point where divers can choose more challenging conditions. Divers with surface floats or small boats can quickly reach Pt. Wilson reef from the Park staging area.



Strong tidal currents on the reef dictate special procedures and, therefore, is an ideal training area for instructor candidates. Kelp beds flourish and lingcod to 60 lbs are not uncommon. Sailing ship anchors and wrecked vessel remains are still found among the reef ledges. Port Townsend in the late 1880's was one of the maritime centers of the North Pacific. Sailing fleets from around the world traded their goods for lumber. Today, the quaint town with crumbling brick buildings hanging over the water, offers much diving pleasure. Divers searching for antique hand made bottles are still highly successful when probing the sand and mud harbor. Old gold coins and jewelry also reward dedicated underwater hunters.



Parking along the water's edge at Ft. Warden takes the work out of diving.

About 2 miles across the bay from Port Townsend, the freezer ship ALASKA REEFER burned and sank in 30 to 60 ft of water. It too offers instructor candidates an opportunity to experience the proper techniques for safe wreck dives.

NAUI instructors are urged to prepare their teaching assistants for the 1975 Port Townsend ITC by encouraging them to participate in a nearby IQC or through the instructor's own Assistant Instructor Program.

-NN-

IN-HOUSE NEWS

BULLETIN

NOTE THIS CHANGE



BY-LAWS BALLOT CHANGE

by Arthur Ullrich, NAUI 601

As reported in the January and February, 1975 issues of NAUI NEWS, a ballot was to be put forward to the membership which would expand the Board of Directors, change the length of the Director's term, establish local elections and change the fiscal year of the Association.

Comments from the membership in response to the NAUI NEWS articles pointed out the need to reconsider some characteristics of the overall reorganization. We were asked if the proposed reorganization would go far enough to meet all the needs it was designed to fulfill.

While many of the questions and suggestions are being put together in a new plan, the regularly scheduled election of Directors will have to go on as specified by the By-Laws.

A ballot will soon be on the way to all members regarding the change in the membership year and fiscal year. This ballot seeks approval to change the current membership and fiscal year of September 1 through August 31 to a new schedule to run from January 1 through December 31 each year.

This ballot will deal only with Article III, Section 3, Annual Dues; Article VII, Section 1, Fiscal Year; and Article VIII, Section 2, Audits.

When this ballot arrives, please consider the issues and vote. In the meantime if you wish to express your ideas and suggestions on the reorganization, please address your letter to Larry Cushman, NAUI President, C/O NAUI Headquarters.

Remember, it is your organization. Please take an active part in making it grow.

BOARD OF DIRECTORS NOMINATIONS NOW OPEN

BOD vacancies in 1975:

Lee Somers, Ph.D., Ann Arbor, MI
Paul Tzimoulis, Los Angeles, CA

The Nominating Committee:

John Reseck, Chairman, Santa Ana, CA
Roy Damron, Honolulu, HI
Jon Hardy, Colton, CA

Place your nomination for a member of the Board of Directors of NAUI to:

John Reseck
Santa Ana College
Santa Ana, CA 92706

OR

Roy Damron
Box 15516
Honolulu, HI 96815

OR

Jon Hardy
NAUI Headquarters
22809 Barton Road
Grand Terrace, CA 92324

NAUI is unique among the Instructor agencies . . . you elect the people who control the organization . . . Do your part — nominate qualified candidates for the Board.

Absolute deadline for nominations is July 1, 1975.

IQ7 The Greatest Show on earth



. (for divers) Be there!

Miami Beach, Florida — Sept. 26-28

Skin Diving Leader versus Assistant Instructor ... What's The Difference?

Due to confusion of the ratings and questions from the field, the following comparison is presented between NAUI Skin Diving Leaders and Assistant Instructors:



Both Skin Diving Leaders and Assistant Instructors receive the same services, may purchase liability insurance through NAUI, and renew on the same date. If certified as both, dues need to be paid for only one rating.

The differences in the two ratings are clear; each fills a different need. The Skin Diving Leader program is designed to create qualified people to teach NAUI Skin Diving Courses, and the Assistant Instructor Program is designed to prepare qualified assistants for NAUI Instructors and candidates for the Instructor Training Courses.

DIFFERENCES

Skin Diving Leader

1. Prerequisites to certification: (a) DOES NOT REQUIRE SCUBA CERTIFICATION. (b) Open water experience of 8 or more hours SKIN or scuba diving. (c) Current training in lifesaving.

2. Curriculum in courses: (a) Applied Sciences, Diving Equipment, Diving Safety, Diving Environment, Diving Activities, Course Operation and Procedures, Teaching Theory and Techniques—ALL ON SKIN DIVING. (b) Swimming, Skin Diving and Lifesaving Skills. (c) No specific written exam.

3. Not qualified to attend ITC.

4. May teach NAUI SKIN DIVING courses and certify SKIN DIVERS independently.

5. May assist a NAUI Instructor in teaching scuba if certified as a scuba diver.

Assistant Instructor

1. Prerequisites to certification: (a) Certified Scuba Diver for a year or more. (b) Open water experience of 20 dives with 10 hours of bottom time. (c) Current lifesaving training not required.

2. Curriculum in courses: (a) Diving Safety, Boat Diving, Teaching Techniques, Legal Aspects, Instructor Course Preparation, NAUI Orientation—EMPHASIS ON PREPARING TO BECOME A SCUBA INSTRUCTOR. (b) Swimming, Skin Diving, Lifesaving and SCUBA skills. (c) Standard exam on general diving knowledge, INCLUDING SCUBA.

3. Qualified to attend ITC.

4. May not teach independently or issue ANY certification.

5. May assist a NAUI Instructor in teaching scuba diving.

NAUI • NDA • NAUI • NDA • NAUI • NDA • NAUI • NDA • NAUI • NDA • NAUI • NDA • NAUI • NDA

RON BANGASSER, NAUI COMMENDED

Dear Mr. Graver:

We are most grateful for the \$75.00 contribution made to the Heart Association of West Cook County by the National Association of Underwater Instructors. This gift will be used to further our cardiopulmonary resuscitation training/certification program.

We enjoyed working with the NAUI members who participated in the February 22-23 ADP Instructor Seminar. Their enthusiasm and interest was truly refreshing. Ron Bangasser,

who organized and conducted the CPR part of the program is an excellent Instructor-Trainer—precise and accurate in his administration of the performance tests.

We look forward to future opportunities to work with NAUI.

Sincerely,
G. William Cotts, M.D.
President, Heart Assn. of
West Cook County, Westchester, IL

REPORT FROM THE FAR, FAR WEST

by Roy Damron, NAUI 207

I'm sure you have noticed all of those little dots on the map of the Pacific Ocean and you realize that each one represents a small portion of land. All divers know that some of the best diving in the world is in the water surrounding these islands. For this reason many mainland divers have found an excuse to move West. Other people who were already there took up diving and some of them eventually became Instructors. This procedure has become increasingly popular until there are now more than 200 NAUI Instructors spread across the Pacific. About half of them live on an island known as Oahu. Others have settled on such exotic specks as Okinawa, Maui, Guam, Johnson, Kauai and the Big Island of Hawaii. All of this is well and good, and they would not exchange their Island for the entire Mainland but there has been one glowing handicap, that being lack of communications. Seems our copies of NAUI NEWS are sent via slow boat to China. It has been said that they may have arrived sooner had they been sealed in a bottle and tossed into the ocean off Catalina. But, of course, that would be considered littering. Such articles as announcements, forms, literature, etc., have arrived spasmodically, if at all.

At one time we were included in the West Coast Branch, then the L.A. Branch, and more recently, the San Diego Branch. Nothing has helped. Because there are only a couple hundred of us, Headquarters could not afford to support a Branch for the Pacific Ocean area, but we have finally worked out a "deal." Rather than being a part of any branch we have now organized a "Chapter" for want of a better name. We will be under direct communication with Headquarters and will attend to all of our own local programs and problems. Some of our immediate plans include a monthly newsletter called the NAUI Coconut Wireless, a seminar or workshop each month, and two or three IQCs each year. We will continue to present our annual ITC at the University of Hawaii; Dr. Glen Egstrom has directed the course so often that he has become a tradition, a situation for which we are very grateful because there is no one in our organization more capable.

-NN-

4TH OF JULY

JULY 4th AT THE CHANNEL ISLANDS

Steve Barsky is hosting a 4th of July party on the charter dive boat, Emerald out of Santa Barbara, California. An open invitation is extended to all of my friends in NAUI. Cost of the day is \$25.00 for divers and \$15.00 for non-divers.

We'll leave the Santa Barbara Harbor at 0630 for the rustic Channel Islands. These islands offer some of the most superior diving to be found anywhere. A continental breakfast will be served as we make our way across the channel to our dive site. Diving activity will commence at your own pace whether it be spearfishing, shell collecting or underwater photography. Lunch, and all the air you can use, are also part of the day's package.



In the evening we'll return to the harbor where the Emerald will anchor offshore for a steak barbecue and a magnificent view of the fireworks in the La Playa stadium. Drinking activity will, of course, be B.Y.O.B.

Please join us for this day of diving fun. Jon Hardy, Dennis Graver and John Wozny have already promised to attend. Hope you'll be there, too!

Send your reservations to: Steve Barsky, Underwater Sports, Breakwater, Santa Barbara, CA 93109 — (805) 962-5400.

END OF IN-HOUSE NEWS

GREAT NEW DIVING FILM!

"SHARKS' TREASURE" with Cornel Wilde

Report by Dennis Graver, Editor/Publisher

A group of people from the diving community were invited to a preview showing of the new Cornel Wilde film, "Sharks' Treasure," to be shown at Paramount Studios in Hollywood. Everyone, including myself, eagerly accepted this unique opportunity to view what was felt to be "just another diving film," but everyone was amazed at the dynamic screen presentation for which Cornel Wilde is almost solely responsible.

Cornel spent six years writing, promoting and selling the idea for this film, but that was only the beginning. He then made an unparalleled effort to obtain reality, and certainly obtained it in "Sharks' Treasure." The people, the locations, the artifacts and the sharks are so real you become a part of this intense drama almost immediately.

Until you've seen this great contribution to diving, you won't fully appreciate the work of Cornel Wilde. He is the actor, producer, writer, director and key to the success of "Sharks' Treasure." He gambled his reputation, his salary, even his life to get the effect of this film, but his gamble is going to pay off. Several of the scenes are unbelievable—divers in the midst of a feeding frenzy spearing sharks, a monstrous shark halfway into a shark cage after Cornel and J. Neilson, a chase scene to shore through 15 foot surf. . . it's all something to see on film, but when you realize it is all real, it's a mind-blowing experience.

Al Giddings, Chuck Nicklin and Jack McKenney were involved in the filming, so you know the quality to expect. Bonaire and the Coral Sea in Australia are the settings, so you'll get to see a great deal of these diving paradises. The story, the underwater footage, and the action all combine to make this great film creation by Cornel Wilde a "must see" film for divers everywhere. In fact, Cornel's work is so excellent for diving that NAUI is going to recognize this enhancement of our sport by special recognition. More details on this in upcoming issues as well as stories on behind-the-scenes experiences of Cornel and the rest of the cast and filmmakers.

See "Sharks' Treasure" at the first opportunity. This is not "just another diving film"—it's great! You won't stop talking about this movie . . . I haven't.



Cornel Wilde and J. Neilson with "the real thing."

CURRENT TRENDS

EVALUATING YOUR DIVING INSTRUCTOR

by Richard R. Spencer, NAUI 1025

Some students feel insecure in knowing the instructor they "encounter." To feel secure in knowing the instructor you may "encounter" check the following list, before you get in "deep water." Why not drop in on a few classes unannounced and observe before you take that plunge!



RATING CODE

(The higher the score — the better . . . or the worse!)

1. **NEVER** . . . Does not perform the behavior.
2. **RARELY** . . . Seldom performs the behavior.
3. **SOMETIMES** . . . Occasionally performs the behavior.
4. **OFTEN** . . . Numerous instances of performing the behavior.
5. **USUALLY** . . . A customary behavior, with an occasional departure.
6. **ALWAYS** . . . An invariable, customary behavior.

A DIVER'S "DIVE" INSTRUCTOR

- ☐ Has that just shaven look.
- ☐ Uses Scope (f).
- ☐ Uses language appropriate for a professional instructor.
- ☐ Arrives 1/2 hour early.
- ☐ Has professional looking audio-visual aids.
- ☐ Hair neat, clean and trimmed.
- ☐ Hands out a variety of neat, clean up-to-date materials.
- ☐ Chews gum at appropriate times.

A "HAS BEEN" INSTRUCTOR

- ☐ Needs a shave.
- ☐ Has bad breath.
- ☐ Uses foul language (not just from his bad breath).
- ☐ Always arrives late for class session.
- ☐ Has few audio-visual aids—they look home-made.
- ☐ His hair never combed or trimmed.
- ☐ Has few dog-eared, dusty, out-dated materials to hand out.
- ☐ Is he chewing gum like it's his last meal?

- ☐ Answers each question, all understand its full meaning.
- ☐ Displays a well balanced manner of techniques and demonstrations, (including water skills.)
- ☐ Joins the group/class afterwards at the local pizza place for a large pizza and pitcher of beer—moderate in habits.
- ☐ At times wears his jacket with a smart shirt and tie.
- ☐ Keeps a calm voice giving gentle reminders, always ready to help and correct, if necessary.
- ☐ Teaches students to react instinctively to accident situations.
- ☐ Is always alert to the temperament of each individual student.
- ☐ Obeys all fish and game laws and teaches the same to his classes.
- ☐ Carries a plastic bag on boat to deposit trash—leaves trash at the pier in proper receptacle.
- ☐ His classroom has eye catching bulletin boards.
- ☐ Helps students to respond to related questions.
- ☐ Keeps the attention of his class.
- ☐ His knowledge of subject matter is outstanding.
- ☐ His professional ethics go beyond what is expected.
- ☐ Always attends workshops, seminars, etc., for self-improvement.
- ☐ NAUI considers him an asset to the organization.
- ☐ Never lets class ask questions.
- ☐ Never gets in the pool to demonstrate proper techniques. (Gets in pool only to bathe.)
- ☐ Comes to class tipsy, smells of liquor, goes to extremes. Has his own party before and after class.
- ☐ Wears sloppy jackets, never clean, sometimes ripped.
- ☐ Yells at his students.
- ☐ Teaches his students to think about situations when they happen.
- ☐ Tends to get his class uptight and nervous on their first ocean dive.
- ☐ Takes "game" out of season, always takes game over the limit, calls students for obeying fish and game laws.
- ☐ Throws garbage from the boat into the ocean.
- ☐ Classroom is shabby.
- ☐ Places students in embarrassing situations by asking hard questions.
- ☐ Allows students to wander to unrelated subjects.
- ☐ Doesn't know the material too well—he questions his class to gain knowledge of the subject matter.
- ☐ His professional ethics need always to be questioned.
- ☐ Never attends improvement classes.
- ☐ NAUI considers him a liability. Will review his record at the next ethics committee meeting!

Who is going to teach diving—or more about diving—to you?



Richard "Sparky" Spencer's contributions to NAUI and NDA News are too numerous to mention. With great enthusiasm, Sparky sends material to HQ weekly. That's why he's listed as an Exceptional Contributor. Additionally, he is a member of the Pacific Branch Ethics Committee and teaches the deaf to dive.

DOPPLER ULTRA SOUND

FOR DETECTION OF "BENDS" *by Robert L. Meckelnburg, M.D.*

Since the Doppler ultrasound was first introduced for bubble detection in cardiovascular work by the Japanese worker, Taratka in 1957, many different applications have been made of this technique. One of the earliest attempts at the use of the Doppler ultrasonic flow meter for the objective detection of circulating bubbles in the blood stream of larger arteries and veins was done by Spencer and Campbell in 1968. Since that time refinements in electronics and instrumentation, coupled with improved clinical application have produced a technique of monitoring the vascular systems for the presence of inert gas bubbles that hold much promise for the study and prevention of dysbarism.



Basically the technique of Doppler ultrasound detection is applied transcutaneously by means of a piezo-electric crystal of five to ten megahertz applied at usually ten milliwatts per square centimeter of the body surface. Utilizing a pair of focused quartz crystals in a contoured probe placed over the pulmonary arteries and veins just to the left of the sternum at the third to fourth interspace, one can monitor the entire return of the vascular system. Hence, bubbles arising in any portion of the body, and gaining entrance into the vasculature will be sooner or later passed in front of the view of the doppler transmitter and result in reflections of the ultrasound beam at the gas-water interface. With the improvement in electronics, the use of larger crystals with reduced background-to-signal distortion have allowed greater flexibility in placement of the ultrasound probe over the chest wall. The radiated area encompassed by the quartz crystals then becomes sufficiently large, so that all of the significant blood flow is examined upon its return to the heart. The presence or absence of venous gas emboli can be determined with a fair degree of accuracy. The arterial system is not monitored, since it has been determined that only under the most unusual circumstances do gas emboli ever appear on the arterial side of the vascular

system. To date, a fairly consistent pattern of detection of venous gas emboli prior to the onset of any symptoms of the bends, has been recognized by most investigators using the Doppler ultrasound technique. Since many venous gas emboli can be detected by the Doppler ultrasound technique and no symptomatology whatsoever developed in the subject, it is quite obvious that the body has an extremely large tolerance of gas emboli before it produces any clinical signs or symptoms.



The application of the Doppler ultrasound, of course, would be most aptly applied directly on a diver during his dive. With surface or self-monitoring, one could detect the immediate development of gas emboli in the blood vascular system, and thus be able to shorten or terminate the dive. Unfortunately, present equipment and technique do not allow monitoring of divers during their dive conveniently, except in the chamber stimulations. Thus in the actual field work, the best that can be accomplished at this point is surveying the diver after he has completed his dive, and returned to the surface vessel. Even

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Photo by Rick Frebsee



Photo by Bruce Nyden



Photo by Bruce Nyden



Don't Forget . .



**Sept. 26—28
Miami Beach, Florida**

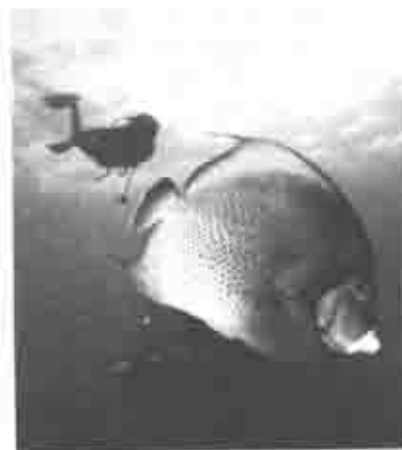


Photo by Rick Frebsee

**Join Us
In
Miami
Beach**



Photo by Rick Frebsee

FLYING AFTER DIVING (Cont.)

Depth/Time of Actual Sea Level Dive	Apparent Depth/ Time If Dive Were At 6000 Ft	Decompression Time from USN Dive Tables	Required Sea Level Interval
100' 25 mins	130' 25 mins	10 min @ 10'	10 mins
90' 30 mins	120' 30 mins	14 mins @ 10'	14 mins
70' 50 mins	90' 50 mins	18 mins @ 10'	18 mins
50' 100 mins	70' 100 mins	33 mins @ 10'	33 mins
40' 200 mins	60' 200 mins	1 min @ 20'	1 hr 10 mins
		69 mins @ 10'	
35' 310 mins	50' 310 mins	Not given*	2 hrs*

*The U.S. Navy dive tables for exceptional exposure do not give decompression for 50'310 mins; however, it would be between 40'360 mins (23 mins @ 10') and 60'360 mins (20 mins @ 20', 119 mins @ 10'). A conservative estimate would be 120 mins.

It is apparent that unless one immediately follows the dive with a flight (such as diving from a seaplane) then the normal delay in getting to the shore and then to the airport and checking in will take care of the needed decompression interval.

Although the foregoing figures are conservative and, therefore, offer a margin of safety, they were computed based upon a "standard atmosphere." The actual atmosphere differs from standard by significant amounts as a result of the air temperature and atmospheric pressure differences over the earth's surface. For this reason one should plan on having more than the computed sea level decompression interval as an added safety factor. I always add about one-third so that for a final dive of 50 ft for 100 min (which requires 33 min) I take 45 mins. In addition, more than ordinary care is required in computing repetitive dive times,



surface intervals, etc., to insure that the bottom time for the final dive is correct. People who have been getting away with exceeding no-decompression limits for sea level dives will be in danger of getting bent when flying after diving unless they carefully calculate their required surface interval between diving and flying.

—from April 1973 AQUALINE

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UNDERWATER FRESHWATER PHOTO CONTEST

The John G. Shedd Aquarium in Chicago is sponsoring an underwater freshwater photography contest for amateur photographers with first prize to be an invitation to accompany the aquarium staff for one week on a marine collecting trip, including air fare to and from Miami. Should the winner decline the trip, an alternate prize will be a Mecablitz Model 402—a rechargeable telecomputer electronic flash. Second prize will be a \$50 gift certificate to Helix Ltd., a camera store in Chicago, and Third prize will be a \$25 gift certificate for diving equipment. All entries must be received by the Shedd Aquarium no later than Sept. 15, 1975. For more information, write to: John G. Shedd Aquarium, 1200 South Lake Shore Drive, Chicago, IL 60605.

JUST A DROP & DRIBBLE

by George Buetow, NAUI 2980

In reflection of diving and law,
We all seem to have committed one flaw;
By giving those men all of the power,
who only get wet when taking a shower;
So to get these laws put on the shelf,
We had better be certain to assure ourself,
That we teach what is right and even get wet,
And the standards we meet are the ones we
have set.

Prevent Legislation—

CONTINUE DIVING EDUCATION . . .

Learn More; Enjoy More . . . Safety

WEIGHTING FOR FRESH WATER by C. L. Smith, NAUI 2299



C. L. Smith

Divers, however experienced in their own local conditions, sometimes have occasion to dive in different kinds of water. Those accustomed to the ocean may try a fresh water lake or quarry, for instance, or a person used to fresh water may decide to dive in the ocean. We all know that weight belts must be adjusted when we do this

and some general rules-of-thumb have been touted for choosing how much weight to add or take off. A very good rule when changing from ocean to fresh water, for example, is to remove 2.5% of your total suited-up weight. The reason for this simple rule, and some formulas for more accurate calculation, are described below.

From the basic principle of Archimedes we know that our gross buoyancy is $\rho_1 V$, where ρ_1 is the density of our customary water and V is our submerged volume. This must be overcome by the weight of ourselves, our gear and by the weight belt. Our submerged volume must thus be

$$V = \frac{w_1 + w_D}{\rho_1}$$

where: w_1 = weight of normal belt, lbs
 w_D = suited weight of diver with tank, etc.

When we dive in water of density ρ_2 instead, our new buoyancy will be $\rho_2 V$ and this must be offset by a new total weight of $w_2 + w_D$. w_2 is the required new belt weight. This leads to the fairly simple expression for belt weight in the new environment:

$$w_2 = \frac{\rho_2}{\rho_1} w_1 + \left\{ \frac{\rho_2}{\rho_1} - 1 \right\} w_D$$

If the diver normally weights himself for the ocean and intends to dive in fresh (sweet) water, ρ_2/ρ_1 is about 62.4/64.0 or .975. If the reverse is true, ρ_2/ρ_1 is about 1.026. The first term can normally be left at just w_1 . In that case the weight that should be added to the normal belt is merely $(\rho_2/\rho_1 - 1) w_D$. When this quantity is negative, it represents the weight to be removed. In going between ocean and fresh water $\rho_2/\rho_1 - 1$ is close to .025, either plus or minus. This is the source of the rule of removing 2.5% of your suited-up body weight when changing dive sites from ocean to lake.

As a numerical example consider an ocean diver whose suited weight (without belt) is 210 lbs and who normally wears a 16 lb weight belt. When he dives in a fresh water lake he should remove 5.3 lbs, according to the simple rule. The more complicated expression would have him remove 5.7 lbs instead.



There are one or two other factors which may affect the amount of weight actually added or removed. First, "fresh" water is seldom pure, but often contains dissolved minerals and suspended particles which increase its density. Similarly, ocean water varies considerably in salinity and in suspended matter. These considerations generally tend to reduce the 2.5% figure. Secondly, fresh water diving is frequently done at altitude, as in a mountain lake. In that case the tiny nitrogen bubbles of the typical wet suit expand with the decreasing atmospheric pressure. This effect may give considerable extra buoyancy which must be offset by more weight than anticipated. The change in buoyancy with altitude thus further reduces the 2.5% figure, perhaps nullifying it.

-NN-

THE MEDICAL EDITOR'S COLUMN

by Dr. Charles Brown



DIVING LORE

(Reference this column,
Feb. NAUI News, page 11)

COMMON MISCONCEPTIONS . . . Continued

5. Chest squeeze is a greater hazard than alternobaric vertigo.

It hasn't worked out that way. The old idea was that a breath-hold diver's lungs would compress to residual volume at about 132 ft. (5ata), and below that depth squeeze would occur. Bob Croft's 240 ft. dive blew that theory. The explanation is that blood shifts into the lungs (pulmonary capillaries are quite elastic), relieving the pressure gradient usually with little or no harm. Though serious chest squeeze is rare, there is a well documented case in which a diver apparently experienced shallow water blackout while ascending, whereupon he exhaled passively to a low lung volume, and then fell through the water.

Alternobaric vertigo on the other hand is a common problem. One large survey reported an incidence of about ten percent in divers. It occurs most often in a person whose Eustachian function and therefore middle ear pressure is not the same on each side. The resulting unequal stimulation of a very sensitive vestibular apparatus causes the dizziness. Though not in itself dangerous, it may prompt a beginner or an emotionally unstable diver to a panic ascent and air embolism.

6. Sedatives predispose to nitrogen narcosis.

Sounds reasonable, but drug interactions sometimes defy imagination, and nothing should be taken for granted. Some drugs do potentiate the narcotic effect of nitrogen, while others tend to block it. The latter list amazingly includes some hypnotics and sedatives.

7. Apply heat for shock.

Nope. The Boy Scout Handbook of my youth was wrong there. Shock usually involves reduced blood volume, whether from bleeding, loss of blood water into tissue spaces, or whatever. Part of the body's defense is vasoconstriction, shutting down blood flow in the skin, so that what blood remains is available for the vital organs. Applying heat to the skin causes vasodilation, ruining this defense.

8. Apply heat for hypothermia.

Don't, unless you can maintain the heat. Let's say the victim has an inner body temp of 88°, while the intensely vasoconstricted skin is of course much colder. You have only a thermos of hot coffee, so you pour it on his blanket. The heat is gone far too soon to do any good, but it does produce some vasodilation in the skin. The core blood now flows through this dermal refrigerator, becoming thoroughly chilled, then flows back and lowers the heart's temperature to the critical 86°-87° range where fatal ventricular fibrillation is a real hazard. This is called paradoxical cooling.

The recommended treatment for hypothermia is immersion in water maintained at 105°-110°, or a warm enema, or warm drinks if conscious. Failing these, dry blankets are the best bet. Bad news: alcoholic drinks, since they cause vasodilation, are an absolute no-no.

To be continued . . . -NN-

National
Association
of Underwater
Instructors

NEW EMERGENCY PHONE NUMBER FOR EXPERIMENTAL DIVING UNIT

NAUI has published an emergency phone number which could be called at any time to obtain information on the nearest operational chamber in an emergency. The Navy's Experimental Diving Unit in Washington, D.C. provided this information to the public, but has since moved to Panama City, Florida and the old number — (202) 693-2790 IS NO LONGER IN SERVICE. Bruce Anderson, NAUI 1443 read the request for information on the new emergency number in the March/April issue of the NEWS and contacted Headquarters with the information. The NEW NUMBER to call in an emergency to find the nearest operational chamber in an emergency is (904) 234-4355. Thank you to Bruce Anderson and to the Experimental Diving Unit.

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DIVING TRAVEL



NDA TRAVEL EXCLUSIVE

A suggestion has been made to NDA Headquarters to develop an NDA travel program in conjunction with agencies and individuals promoting diving trips and vacations. Those interested in conducting a travel program would join together, using NDA as a common banner, to advertise and promote their trips. Each agency and NDA would share in the promotional costs. In order to take advantage of the special group rate, individuals or groups interested in the travel program would be required to be members of NDA.

It is felt a joint venture of this type would be beneficial to NDA and to each travel organization. Comments from those interested in this arrangement are welcome as are any suggestions or ideas related to promotion of NDA and diving travel.

ROATAN TRIP LEAVING IN AUGUST

On August 15, Explorer's Unlimited* will be leaving for a two week excursion to Roatan, Honduras. EU is looking for divers to join in the adventure. Those interested in paying their way by conducting instructional programs are also invited.

Approximate cost, including transportation, meals and lodging, diving and extras such as horseback riding is \$670 per person. Those interested in setting up an instructional program and those desiring additional information on this fantastic experience should contact Arthur Sams, NAUI 3153, 680 Stone Canyon Road, Los Angeles, CA 90024.

**Explorer's Unlimited is a non-profit group affiliated with the Explorer division of the Boy Scouts of America. Membership is \$10 and is required to satisfy FAA regulations.*

LISLIND POST IQ7 TRIP TO BONAIRE

Seven days and eight nights at Hotel Bonaire and six days of diving with Captain Don Stewart of the Aquaventure Dive Complex with special features including parties, receptions and barbecues all combine to make this diving vacation offered by LisLind International the memory of a lifetime.



photo by Paul Tzimoulis

Limited to 50, the trip begins in Miami on September 29, and will be popular among members traveling to Miami to attend IQ7. For less than \$500 per person you can dive the Bonaire underwater paradise, enjoy the festivities in a Caribbean dreamland and even spend a day sightseeing with a free rental car provided for each couple. The price includes transportation by KLM Airlines.

This special offer has been extended exclusively for IQ7. Don't miss this opportunity to dive a world you've only seen in photos. For more information, please write or call: LisLind International, Caribbean Division, 5 World Trade Center, New York, NY 10048, Phone (212) 466-1370.

CONT. NEXT PAGE

SOUTH CAICOS POST IQ7 TRIP

Immediately following IQ7 in Miami this September, a group of NAUI instructors and NDA members will fly to South Caicos, B.W.I., for five days of good company, good food and great diving. South Caicos lies 600 miles south east of Miami, Fla., and has some of the finest reefs and marine life in the Caribbean. The island also boasts a vertical drop off from 60 feet to 3,000 feet.



photo by James Nolte

The tour includes round trip air fare from Miami, five days and four nights at the Admirals Arms Hotel, all meals, gratuities, transfers from airport to hotel and tips, rental of tanks and weight belts, exclusive use of dive boats and unlimited free air fills!!! The tour will cost \$329.00. For non-divers, \$279. Tour dates are Sept. 29 to Oct. 3. For more information contact; James Nolte, P.O. Box 2453, Ft. Myers Beach, Fla. 33931.

TAKE YOUR CLASSES TO THE BAHAMAS

Some NAUI Instructors might be interested in providing the open-water experiences for their courses here in the Bahamas. I have put together some scuba-diving packages that include hotel accommodations and diving as well as a sea-plane flight between Miami, Florida, and Paradise Island, Nassau, all at reduced rates. The diving includes almost everything except under-the-ice diving and can be used as open-water training for basic courses or all of a Sport Diving Course or even the NAUI Advanced Course.

If the instructor gets together a group of eleven divers (or more) he will have his accommodation and diving at no cost. For more information, contact: David Andrews, NAUI 1366, P.O. Box ES 5552, Nassau, Bahamas.

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ACCIDENT INVESTIGATIONS

NAUI and the University of Rhode Island are continuing a nation-wide research program regarding skin and scuba diving accidents. The earliest possible notice is requested from all persons with information or accounts of skin and scuba fatal and non-fatal accidents.

Feedback from the NAUI membership in a recent questionnaire showed a high percentage in favor of retaining the NAUI Accident Investigation Program, so in a cooperative effort with the URI, the program is being rejuvenated.

NAUI will supply brochures plus forms for fatalities and near misses, and will copy the URI on any accident information received. Any reports or analyses made from the information collected will be published for the membership.

ACCIDENT TREATMENT CHAMBER AT CATALINA ISLAND

An accident treatment recompression chamber is in operation at Big Fisherman's Cove near the Isthmus at Catalina Island. The facility is operated by the USC School of Medicine, Department of Physiology under the direction of Dr. John P. Meehan. The resident Manager is Dr. Andrew Pilmanis. Also in residence is USAF Major Bruce Bassett with more than nine years of hyperbaric chamber operational experience.

The chamber was obtained primarily for use in hyperbaric research, but is available for the treatment of any diving accident victim requiring compression therapy.

To contact the chamber facility by mail, write to: USC Marine Science Center, Hyperbaric Research Facility, Box 398, Avalon, CA 90704. The **EMERGENCY ONLY** hyperbaric chamber number is (213) Avalon 1053 (the assistance of the operator will be required to place the call).

ELECTRONIC RESUSCITATION

In Germany, a portable "electric lung" is being used by scuba instructors for reviving other non-breathing victims. Artificial respiration is brought about by electric stimulation of the respiratory muscles. Separate electric circuits act on the inhaling and exhaling muscles, and the device automatically regulates the normal breathing rhythm. After the device has been wired onto the victim, there is no interruption of respiration during the rescue. An oxygen mask can be used along with cardiac massage by the attendant.

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Calendar of Events

Instructor Qualification Courses:

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|------------|---|
| June 6-8 | Seattle, WA, Gary Sundstrom, Director
9632 - 42nd St. NE, Seattle, WA 98115 |
| June 7-8 | San Jose, CA, Ken Loyst, Director
1010 Broadway, San Jose, CA 95125 |
| June 21-22 | Fargo, ND, Mike Wallace, Director
902 - 15th St. N, Fargo, ND 58102 |
| June 27-29 | Minneapolis, MN, Jeanne Sleeper, Director
4409 Arden View Ct., Minneapolis, MN 55112 |
| June 28-29 | Ames, IA, Jerry Symons, Director
904 Kellogg Ave., Ames, IA 50010 |
| June 28-29 | Honolulu, HI, Gary Jung, Director
41-1019 Kakaina St., Waimanalo, HI 96795 |
| Aug. 2-3 | Santa Cruz, CA, Jan Hogle, Director
213 Ocean St., Santa Cruz, CA 95060 |
| Oct. 3-5 | Moncton, NB, Canada, NAUI Canada
10 Monet Ave., Etobicoke, Ont., Canada |

Instructor Qualification and Training Co

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| June 14-21 | San Diego, CA, Mark Elahian, Director
4971 Mt. Gaywas Dr., San Diego, CA 92119 |
| June 12-21 | Long Island, NY, Bob Foote, Director
54 Forbes Ct., Greenfield, MA 01301 |
| June 21-29 | Houston, TX, Jabe Wills, Director
3840 Ruth No. 1, Houston, TX 77001 |
| July 12-21 | Buffalo, NY, Bob Foote, Director
54 Forbes Ct., Greenfield, MA 01301 |
| July 13-19 | Minn., MN, Jeanne Sleeper, Director
4409 Arden View Ct., Minneapolis, MN 55412 |
| July 25-
Aug. 2 | Peterborough, Ont., Can., Nolan Tamm
10 Monet Ave., Etobicoke, Ont. Canada |
| Aug. 9-17 | Norfolk, VA, Ron Johnson, Director
Old Dominion Univ., Norfolk, VA 23503 |
| Aug. 14-24 | Chicago, IL, Jim Foley, Director
7944 W. 163rd Ct., Tinian Park, IL 60477 |
| Aug. 23-31 | Seattle, WA, Tom's Campbell, Director
11522 NE 34th St., Bellevue, WA 98004 |
| Aug. 30-
Sept. 7 | Palm Beach, Fla., Glenn Taylor, Director
Box 1000, West Palm Beach, FL 33406 |
| Sept. 6-13 | Los Angeles, CA, Homer Fletcher, Director
11111 Wilshire Ave., Los Angeles, CA 90029 |

YMCA to Offer Crossover Courses:

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| July 11-13 | Winnipeg, Manitoba, Can., NAUI Canada
10 Monet Ave., Etobicoke, Ont., Can. |
| July 11-13 | Chicago, IL, George Buetow, Director
2100 S. 9th Ave., Maywood, IL 60153 |
| July 19-21 | Buffalo, NY, Dave Michael, Director
27 Concord Rd., Acton, MA 01720 |

Seminars, Symposia and Workshops:

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| June 6-7 | Rough Water Workshop, Honolulu, HI
Mike Benedetti, Director
235 Portlock Rd., Honolulu, HI 96825 |
| June 7-8 | Dive Store Instr. Orientation Seminar
Boston, MA, Fred Calhoun, Director
Box 291, Back Bay Annex, Boston, MA 02117 |
| June 20-22 | Dive Master Seminar, Tobermory, Ont., Can
NAUI Canada
440 West Ave., Etobicoke, Ontario, Canada |
| June 21-22 | High Altitude Diving Workshop, Lake Tahoe, NV
Bob Tolar, Director
1308 La Loma Dr., Carson City, NV 89701 |
| July 4-6 | Instructor Dive Weekend, Manitoulin Is., Ontario Canada, NAUI Canada
11 Monet Ave., Etobicoke, Ontario, Canada |
| July 17-19 | Classroom Teaching Seminar, Honolulu, HI
Bill Owen, Director
101 Kuvala, Kailua, HI 96734 |
| Aug. 1-3 | Advanced Instructor Seminar, New Brunswick, NJ
John Graver, Director, NAUI Headquarters
2160 Barton Rd., Grand Terrace, CA 92324 |
| Aug. 1-3 | ADP Planning Seminar, Honolulu, HI,
Mark Vogt, Director
33 Nawiliwili St., Honolulu, HI 96825 |
| Sept. 20 | Underwater Film Review, Boston, MA,
Fred Calhoun, Director
Box 291, Back Bay Annex, Boston, MA 02117 |
| Sept. 25 | NAUI/NDA General Membership Meetings,
Miami, FL, NAUI
22809 Barton Rd., Grand Terrace, CA 92324 |
| Sept. 26-28 | IQ, Miami, FL, NAUI
22809 Barton Rd., Grand Terrace, CA 92324 |
| Oct. 4-5 | North Atlantic Underwater Symposium, Rock-
Port, MA
Fred Calhoun, Director
Box 291, Back Bay Annex, Boston, MA 02117 |
| November | Equipment Seminar, Chicago, IL
Don Pitts, Director
Box 142 |

SEPTEMBER 1975

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photo by Barry Heller

HOW YOU CAN ENJOY A SAFE AND HAPPY DIVE

by Richard Spencer, NAUI 1025
Member of Ethics Committee,
Pacific Branch, Los Angeles

1. Continue to develop and perfect your diving skills—you are never too old—or young—to learn how to be an even better and safer diver.
2. Practice—practice makes one a better and safer diver.
3. Let other divers (especially your buddy) know your dive plans and emergency safety signals.
4. PACE YOURSELF while diving. Don't over exert yourself! Know your limitations.
5. Judge your distance from the boat. Always have an alternate place or plan to go.
6. Be aware of local open water hazards.
7. Respect night diving and dive accordingly.
8. Control your emotions so that you can exercise good judgment in all diving situations.
9. Know how to dive in all kinds of water conditions whether it might be night or day, calm or marginal water.
10. Equip yourself with a first aid kit and other emergency equipment needed at the beach or boat. Also carry safety equipment on your person for any emergency diving situation.
11. Require your diving buddy to know your dive plans and signals.
12. Safety-check your dive equipment before and after every dive.

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pen and ink drawing by Carla Amparan

CALL FOR PHOTOS

Have you noticed more photos and graphics in the NEWS? Don't these add appeal and make reading more enjoyable? It is difficult to obtain all the photos we would like to put into NAUI/NDA NEWS, so this *Call for Photos* is being made.

Black and white prints of diving and diving related activities are needed. High contrast shots, such as silhouettes are needed for cover photos. Color slides are *not* desirable for our purposes. However, black and white prints can be made from color slides if no option is available.

Photo credit is provided for all pictures published. All photos will be returned if requested. If you have a requirement for the photo, please request a return date. You will be notified when your photos have been received at Headquarters.



photo by John Cramer

So, if you have diving photos, read the NEWS and would like to see your pictures published, please help us help you by sending your black and white prints to: Dennis Graver, Editor/Publisher, NAUI NEWS, NAUI Headquarters, 22809 Barton Road, Grand Terrace, CA 92324.

P.S. If sending an article to the NEWS, you can get it published sooner if you'll enclose a black and white head and shoulders photo of yourself.

Moving?

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NEW PUBLICATION—SCUBA REGULATORS

A new book by Bob Gonsett has just been released by NAUI. SCUBA REGULATORS is a thorough work describing in great detail the inner workings of all types of regulators. The author explains in an easy-to-read fashion, with hundreds of illustrations, how regulators work. It covers such interesting points as tips on buying, plus care and maintenance.

Written in a light, easy-to-follow and understandable format, the author exposes myths and provides many new and interesting facts along with a look at the future. An extremely useful text for all who use, sell, or service scuba regulators. Available for the first time at \$2.95 per copy.

SCUBA REGULATORS is a companion publication to SCUBA TANKS (\$2.95) by the same author. Together they make an

unbeatable combination on the subject of the recreational diver's life support system. Both are available from NAUI Headquarters.



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