Underwater PHOTOGRAPHY

Discover a whole new world of subjects for your camera

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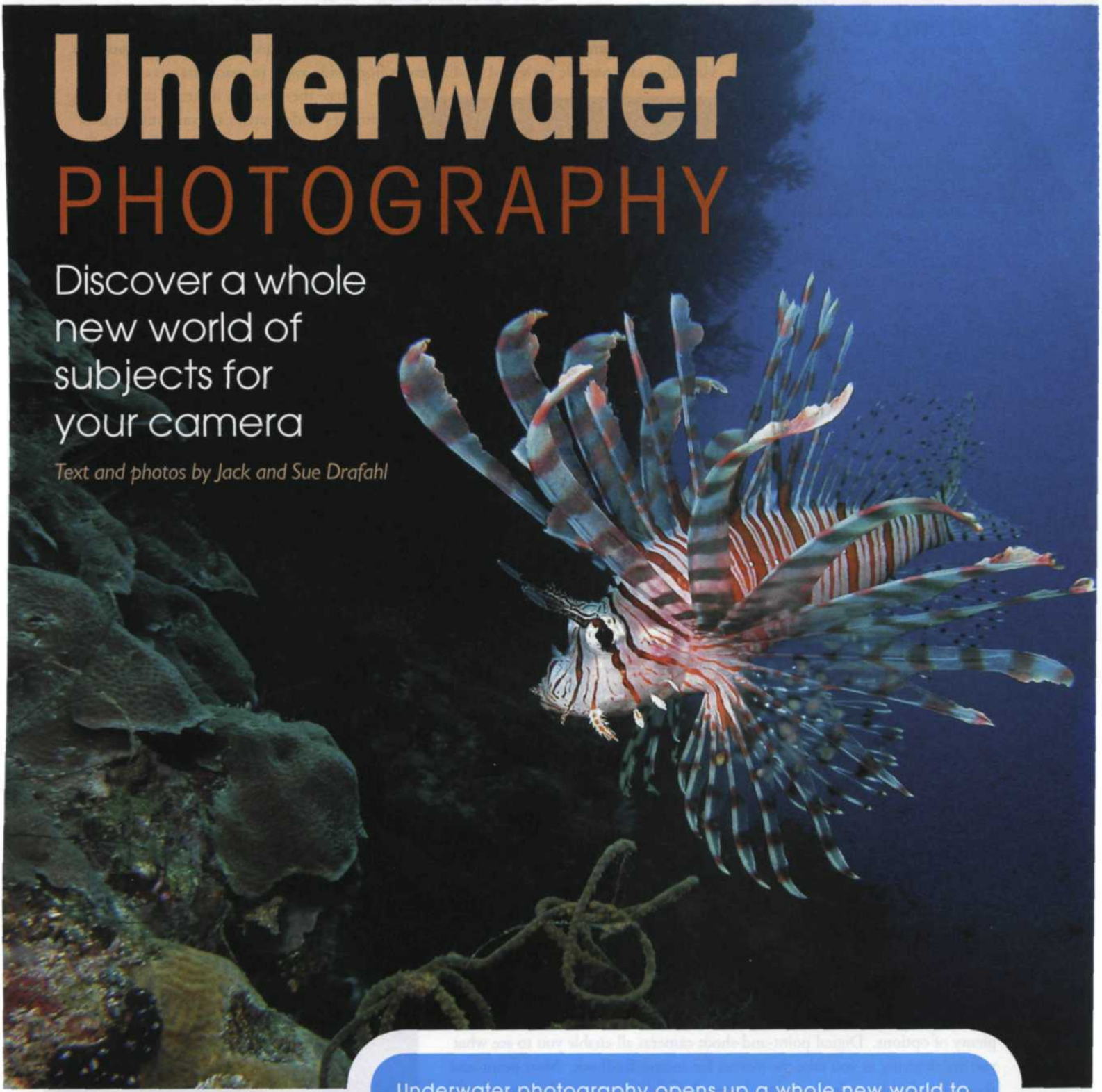


Underwater photography opens up a whole new world to the photographer. It provides mystique, excitement and challenges like no other place on Earth. Come with us as we take the plunge beneath the depths of the oceans to share this new-found world through photography.

Setting Up an Underwater Photography System

Now that you are considering trying your hand at underwater photography, where do you start? Who do you ask for advice, and what equipment should you buy? Which films are best for underwater photography? Does digital really work when you have to view the LCD screen through a facemask? How much is it all going to cost? There are so many variables that it may seem a bit overwhelming, but not to worry. We will help lend a guiding hand as you take the plunge into underwater photography.

The first decision to be made when recording the underwater world is which camera to choose. Well, you have three main categories to choose from and then a few other options to consider. You can select from amphibious, point-and-shoot or single-lens reflex cameras and then decide if you want to use film or digital. Let's take a look at each category.

Amphibious Cameras

The number-one film amphibious camera for years was the Nikonos camera. It is no longer being made by Nikon but there are still plenty of used models available. It features a virtually indestructible body and quality lenses from wide-angle to macro framers.

Nikonos-V camera

Since there was an influx of divers taking pictures underwater, camera manufacturers began providing cameras for different skill levels and pocketbooks. There are amphibious cameras like the MotorMarine, MX-5 and MX-10 from Sea & Sea, Snapper from Bonica and Sea Life from Reef Master to name a few. No longer are cameras designed with just the professional in mind.

These film cameras are difficult to use because they don't offer through-the-lens viewing. This means that framing is not exact, and close focusing is often limited. With some of these systems, you have to decide if you want to shoot small animals with close-up lenses and framers or attach a wide-angle lens before each dive. More often than not, photographers became frustrated when a huge manta ray swam by while they were set up to photograph small critters. Several of the cameras now feature lenses that can be changed underwater. You can take an arsenal of lenses underwater with you to capture any aquatic encounter.

Although all the film cameras will take both slide or color negative film, we recommend that your first underwater attempts be with an ISO 400 color negative film. Its wide exposure latitude will allow you to achieve acceptable images right from the beginning. Immediate gratification goes a long way to build confidence and encouragement.

Speaking of instant results, there is only one digital amphibious camera to date. It is the AquaPix from Sea & Sea and features through-the-lens viewing and a sealed camera to keep the water out.

Point-and-Shoot Cameras

There are several film cameras designed with the snorkeler in mind that have a limited depth capability, from 12–20 feet underwater. These are often one-time-use models with a protective shell. Since divers go a lot deeper than snorkelers, there are cameras with more durable housings to withstand the added depth. Some have a built-in flash and may have controls for focus, f-stop and shutter speed. The advantage to these systems is that you can take pictures underwater, remove the camera from the housing and spend your afternoon beachcombing.

When it comes to point-and-shoot digital cameras underwater, you have plenty of options. Digital point-and-shoot cameras all enable you to see what you are shooting as you take the picture for instant feedback. Most point-and-shoot digital cameras feature zoom lenses that allow you get a close-up of a fish, without being too close to frighten it off. This zoom lens enables you to capture an overall scene and then move in without kicking a swim fin. Some of these cameras have a shutter lag when you depress the shutter button. They can also overheat due to the firing of the internal flash. Even so, these cameras feature close-up controls, are compact, relatively inexpensive, and are quickly becoming a very popular part of the digital world underwater.

UW housing for digicam

Single-Lens Reflex Cameras

In the film world, the SLR camera is very popular because it lets you see what you are shooting via the through-the-lens optical viewfinder. Most of the point-and-shoot and amphibious film cameras use viewfinders or framers to get only approximate image framing. The SLR camera also provides versatility with its ability to accept interchangeable lens: zooms, macro and even wide-angle lenses. The housings are constructed of metal, plastic or Plexiglas to protect expensive SLR land cameras from the outside environment. Although these housings are designed to keep these valuable camera systems safe from the underwater environment, they are often bulky. Even so, their high quality results have made them very popular, especially with the diving professionals.

Ikelite UW housing for SLR

If you have already made an investment in lenses for your film SLR camera, you might consider buying the digital version. The digital SLR camera offers higher image resolution than point-and-shoots, along with versatility of lens choice and through-the-lens viewing. Although the housings are larger than those for the point-and-shoot cameras, they don't have any heat buildup from the internal flash firing because the flash sync is via a cable.

Other Considerations

Film-camera models stay around for years, so there is a long life span for the camera and its housing. Today, when a digital camera is introduced, it's only a few weeks before several housings are announced. This is because the technology for housing manufacturing has progressed over the years and they need to move quickly as digital cameras have a shorter life span. This doesn't mean that they break, but rather that they are replaced by a new version. This is much faster than we ever saw with film cameras. We often see where a digital point-and-shoot camera is only on the market for about a year and the digital SLR cameras tend to cycle to new models two years. Don't worry, as this doesn't mean you have to buy a new system every year or two. Although you might consider if you need to buy two camera bodies, since underwater housings are usually more expensive than the camera and are built to last.

Which One Should I Buy?

There is no simple answer for everyone, since everyone has a different reason for getting into underwater photography. Some people like film, while others swear by digital. Some divers prefer the compactness of a point-and-shoot camera while others demand the versatility of interchangeable SLR lenses.

The only thing we do recommend is that you consider a point-and-shoot camera for when you start using digital even if you do eventually want to go SLR. This way you can get used to the dozens of digital controls and features not always found on film cameras.

Batteries and chargers are another very important consideration when getting into underwater photography. Film shooters have a big advantage in that film cameras do not use nearly as much power as digital. Even so, it is important that you consider using the new rechargeable NiMH (Nickel Metal Hydride) batteries that have longer lasting power. Try and get the highest rating, like batteries 2000+ mAh, or you will find your digital camera running out of power before the dive is over. For those cameras that use proprietary batteries (lithium-ion), you should consider buying extra batteries so you can enjoy your dive while the spare battery is on charge.

Evolution of Underwater Photography

In the beginning, underwater photography was dominated by professionals who used slide film because of its vivid color rendition and because all the book and magazine editors demanded it. As equipment became more affordable, amateurs started making underwater photography part of their vacations. They started taking underwater photography classes from those few working professionals and emulated their instructors by shooting slide film too. In the early days of underwater photography, almost all underwater images were taken on slide film.

Eventually, it became obvious that amateur photographers had different objectives in mind when taking pictures underwater. They weren't necessarily interested in publishing their photos, but preferred to share color prints with their friends and family. It is difficult to ensure good exposures when using slide films due to their narrow exposure latitude, and the difficult lighting conditions underwater. Color negative film provides a wide exposure latitude—up to three stops under and four stops over normal. This makes it easier for the amateur, advanced amateur and even professional diving photographer to capture the wonders of the underwater world.

In the past few years, there have been more changes to underwater photography than have appeared in decades thanks to the digital revolution. The digital camera is taking the topside world by storm and is quickly becoming an overwhelming part of the underwater realm as well. The ability to see your results immediately using a digital camera has helped make underwater photography easier and more enjoyable.

The difference is that today's underwater photographer now has a choice of using the chemical capture device called film, or recording an image to an electronic CCD or CMOS chip.

PHOTOgraphic SUPER COURSE

The Underwater Environment

Underwater photography is a tough avocation. Besides having to deal with all the scuba equipment, wet suits, water temperature and visibility, divers also have to contend with photographic physics. When you descend below 15 feet, most of the full color spectrum is reduced to blue and just a hint of warm tone. You also have the problems of light loss due to the water. The particulate density in the water can also reduce the contrast and color of a scene. Underwater photographers compensate for these problems by using an external flash, which can help restore most of the full color in the scene. Even then, the most powerful flash can barely reach eight feet underwater.

Underwater cameras use O-rings to keep water out. Be sure to maintain the O-rings as per the maker's directions.

Point-and-shoot housings underwater are usually fairly small, so they do not add much to slow you down as you swim along underwater. The SLR housings are a different story since they must be large enough to accommodate many mechanical controls, battery packs, a hot-shoe, and focus or zoom controls. When you add on a couple of large underwater flash systems, you have a very bulky system to transport through the water. The good news is that most underwater SLR systems are neutrally balanced underwater, and can be moved around easily with one hand.

Even with all these obstacles, most divers who venture into the underwater world choose to endure it all, just to capture colorful images from one of the last frontiers on the planet.

Water magnifies things, which means your lenses won't be as "wide-angle" underwater as above. You can use this for over/underwater shots.

Practice Makes Perfect

One of the first mistakes potential underwater photographers make is going underwater with a new camera before they use it on land. The best approach is to buy your camera, whether film or digital, and shoot with it topside for quite some time before taking the plunge. Try taking some distant shots, close-ups, available light and with flash. Become so familiar with the camera that you can close your eyes and know what each control does. Once you have the housing for your camera, work with it until you become familiar with its buttons and levers. Take it out and try photographing flowers, pets, insects or any subject similar in size to those you want to capture underwater. Although it may look funny to your neighbors, it will save you a lot of time and heartache later. If you have access to an indoor pool, put some plastic animals on the bottom and practice capturing them on either film or digitally.

Dive Travel

When traveling to distant dive locations, those using film must be aware that the powerful airline-security X-ray machines will damage your film if it is placed in your checked luggage. It is mandatory that you carry your film as carry-on and even have it hand-checked if possible. That being the case, you should plan extra time in the security line. Always take more film than you need, as you will find film in distant locations very expensive or unavailable.

Some travel destinations have facilities where you can get your film processed. We suggest you process a roll or two just to see how you are doing and that no equipment was damaged during transport. We highly recommend that you wait until your return to home base before processing the bulk of your exposed film as some exotic processing facilities are less stringent on their quality control.

Digital camera users do not have to worry about X-ray machines as digital cameras and memory cards are unaffected. Just be sure to pack all your camera equipment in well-padded cases to handle the tender loving care that the airlines provide. Better yet, carry all your cameras as carry-on luggage.

Fish and divers make great subjects.

If you are going to a remote diving location, it is a good idea to become familiar with the animal life you may encounter during your diving escapades. This makes it easier to anticipate the animal's movements underwater when you are trying to take its photo. It is easy to find information via the Web, identification books from your local dive shop, and often information directly from the dive resort. The more you understand animal behavior, the better your images will look.

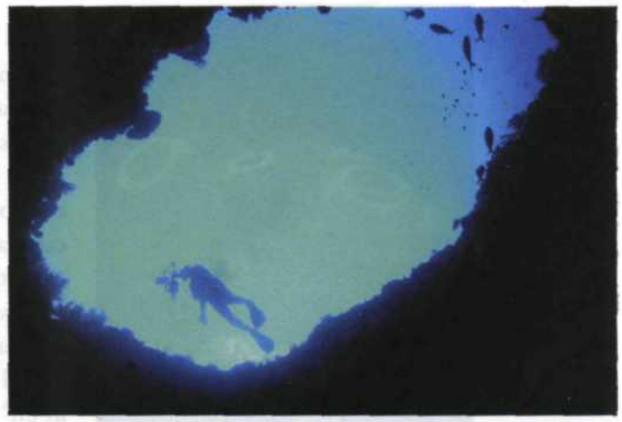
You should also practice your buoyancy control with your camera and housing in a pool if possible, or when you first get to the dive location. Make sure that you have just enough weight on your weight belt to get down, but not too much that would cause you to smash into the reef as you document a particular animal's behavior. You should also check the different environmental requirements for your dive destination. Some do not allow the use of gloves while others do not allow you to touch the reef at all.

Basics of Underwater Photography

Underwater photography is different than topside photography in that there are four very distinct types: general, close-up, wide-angle, and fish photography. Each requires a different configuration of camera, flash and lens. Earlier underwater photographers had to plan which type of photography they intended to accomplish before the dive and set up their cameras to match those conditions. Today, photographers still have to plan some of their dives to match their intended photography, but with some of the new equipment on the market, changing your game plan underwater is becoming a lot easier.

General Underwater Photography

Most point-and-shoot underwater cameras are designed for general photography. It is the most compact type of shooting because it often doesn't require more than the camera itself. The subjects covered in general photography include underwater scenics, divers or both. You can shoot fish and some larger animals, but they are usually small in the frame because of the restrictive focus distance of most of the film systems. The digital camera offers the added feature of a zoom lens, which allows you to move in and change your area of viewing.



To add interest to underwater photos, try to find things you can use to frame your subject.

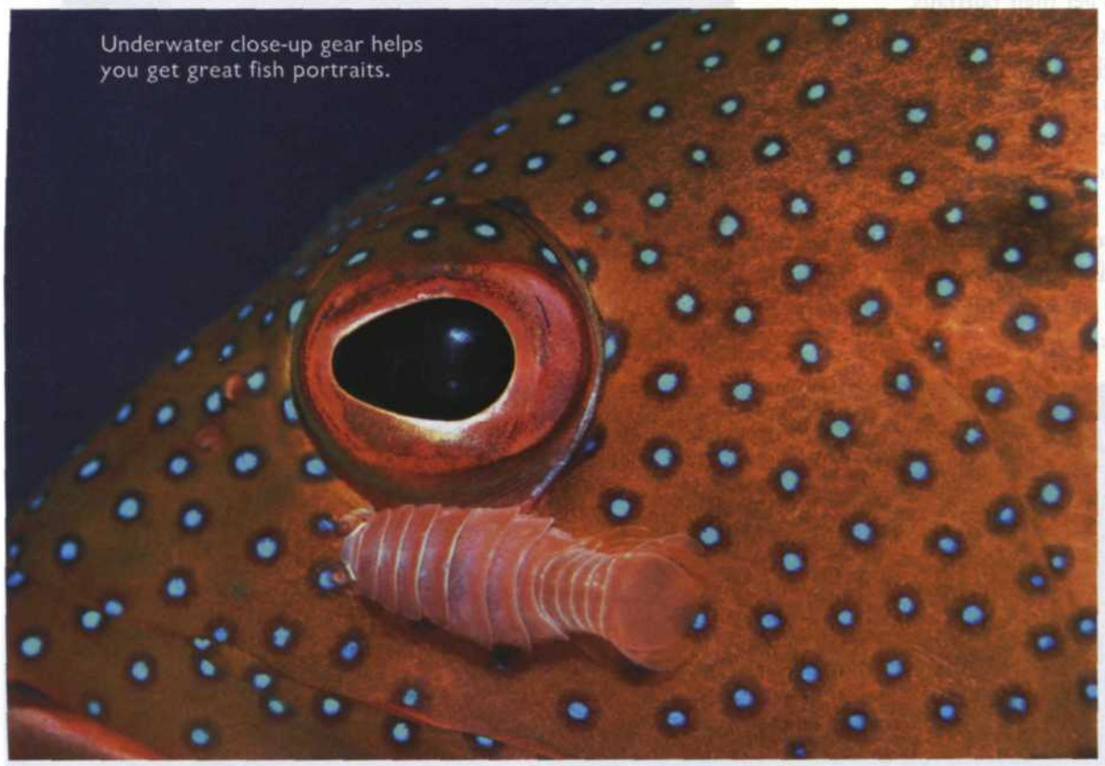
Close-Up Photography

The easiest and most colorful type of underwater photography is close-up shooting. This is where you try and capture all the little critters that are no bigger than your fist. There are several ways to accomplish this, and the method depends on the type of camera system you are using.

Most camera lenses have limited close-focus capability, so you must attach a close-up lens to the camera and place a framer around the subject. The framer is necessary as you do not have through-the-lens viewing for accurate image control. Some amphibious cameras have underwater extension tubes and framers that must be changed topside before going underwater. Depending on the tube you select, you can photograph macro ratios from 1:3 (⅓ life size on the film) down to 2:1 (twice life size).

Some film cameras have a built-in close-up function. When you select this function, a close-up diopter moves in front of the lens to bring your subject closer. The problem here is that your focus is a guessing game and the results are not always favorable.

There are even some film cameras that allow you to add a macro lens and framer while underwater. This is great if you are photographing a tiny hermit crab and a shark swims by. Simply remove the framer and you are ready for action.



Underwater close-up gear helps you get great fish portraits.

With the digital camera, close-up photography is even easier. Almost all of the point-and-shoot cameras have a close-up function that allows you to capture those elusive tiny animals that roam the reef. Since you have through-the-lens viewing (via the LCD monitor), you can see accurate framing and focus. These cameras also feature a zoom lens, which allows you to change the framing and magnification of your images.

Camera housings use SLR land cameras with macro lenses. This allows you to shoot multiple macro ratios without making any changes to the camera setup.

Wide-Angle Photography

One of the most exciting aspects of underwater photography is capturing the colorful reef and its creatures. Wide-angle photography makes it possible to take images of those big undersea animals and divers in action. Since most wide-angle scenes need more than the sunlight that filters down to light the image, you must use a strobe that matches or exceeds the angle of your lens. Since your distance from the camera to the subject is less than with a normal lens, there is less water for the image to go through, thus increasing the contrast, perspective and image sharpness.

Several of the point-and-shoot cameras feature an auxiliary wide-angle lens that can be added while underwater to broaden the scope of view. Because the digital CCD chip "crops in on" the image, wide-angle images often don't have as wide an angle of view as the film counterparts.

Above: Wide-angle accessories let you move in close to emphasize a nearby subject and add a feeling of depth to the photograph.
Right & below: Fish make challenging but very rewarding subjects.

Fish Photography

If you ask divers what type of underwater pictures they want, invariably they all say fish. Too bad, because this happens to be some of the most difficult underwater photography. Fish rarely sit still or let you get very close, so there are a couple of options to get their portraits.

One manufacturer makes a gunsight viewer while another has light beams that intersect when the image is centered and in focus. It is sort of a hit and miss situation, so most serious fish photographers resort to using the housed SLR cameras. They allow you to use a short telephoto lens to obtain a large image from a great distance.

Since the digital CCD chip crops in on the image, it makes it easier to photograph fish. In addition to this crop factor, digital cameras feature zoom lenses that allow you fill the frame while maintaining your distance from the fish.

Films for Underwater Photography

So, what type of film and brand name do you use in your new camera? We recommend using color negative film for your first tries at underwater photography. Brand name really doesn't matter. All the major film manufacturers have brought their color negative films to such a high level that the quality difference between them is negligible. Color negative film is a great learning tool because the exposure latitude is 5–7 stops, while slide film is usually less than one. When you first start taking pictures underwater, you don't want to lose any images due to incorrect exposure. You need to concentrate your efforts on framing and focus. You get really excited about your new hobby when you get good images right off the bat.

We also recommend the use of ISO 400 film over the slower films. The quality of these films today is excellent and your increased depth of field and flash range give you that extra edge. As you become more proficient taking pictures underwater, you can experiment with slower films, or even try your hand using slide film.

Underwater Photography Techniques

The two most technical aspects of getting any type of images are accurate focus and exposure. It's really no different for underwater photography. Let's take a look.

Focus: Focus is pretty easy since most cameras today have autofocus systems. If your camera has a focus grid that allows you to move the focus point off-center, you should be using it often. If you don't have that focus control, use the focus lock to get the best focus on an off-center subject, and then re-frame the subject as you make your final shot.

Many of the SLR cameras, both film and digital, allow you to choose among three focusing modes: continuous AF, single-shot AF, and manual focus control. Most underwater photographers who use macro lenses find the continuous focus annoying as the lens is constantly moving back and forth. If you want to lock the camera at a specific magnification like 1:1, you can use the single-shot focus to move the lens into that position. Then just move the camera and housing manually to that position to achieve accurate focus.

Exposure: The exposure mode control can be found on almost every camera you see today. It is usually a dial on the top of the camera and is labeled P/A/S/M which stands for Program/Aperture/Shutter/Manual exposure control. You will find many of the old-time pros teaching underwater photography telling you that everything should be in manual. They have a valid point, but if you only use manual, you will be missing a lot of creative and technical control over your underwater camera system.

When you are not sure what mode you should use and a potential subject will be lost if you don't immediately take a picture, then you should select the Program mode. It will provide an accurate exposure and give a good balance between the shutter speed and f-stop.

If you require maximum depth of field, as when taking macro or close-up images, then the Aperture setting should be your choice. You select the desired f-stop and the camera will almost instantly set the corresponding shutter speed to provide a good exposure.

Shooting action in available light may require that you use the Shutter-priority mode to lock in a high shutter speed that is capable of stopping the action of a moving whale, manta ray, or shark. In this case, the camera will then set the corresponding f-stop required for an accurate exposure.

If you want to take images where the flash and available light are correctly balanced, you will probably want to use Manual exposure control. Keep in mind, with most SLRs and advanced point-and-shoot cameras, the TTL flash will still work, even though the camera is using Manual exposure settings. Exposure is then just a matter of thinking f-stops for flash control for the foreground and shutter speed adjustment to modify the background exposure.

Don't limit yourself to individual fish. Schools of fish can make great photo subjects, too.

The LCD viewing technology with the digital camera speeds up your learning curve, so you are taking better pictures faster. With a digital camera just take a picture and view it on the LCD viewer on the back of the camera. If the foreground is too light or dark from the flash exposure, simply adjust it with a corresponding f-stop change. From there you can then adjust the background available light using the shutter speed and it will have no effect on the foreground exposure. After 2–3 test shots on your digital camera, you should have the scene balanced.

With film cameras, you will need to rely upon your previous experiences with the camera system and the film you are using to achieve good results. Sometimes it helps to process a test roll at your dive location to verify that you are achieving good exposures. It's tough to remember what you did or didn't do when you don't see your film for weeks after you exposed it. When you find a really great subject, be sure to bracket the exposures to make sure you got the shot. The extra frames that you shoot will be a lot less expensive than coming back at a later date.

Above: Available light yields a blue cast, but can be very effective, capturing the true feeling of the underwater environment. Here, available light was used to capture flash photographers in action.
Top right: Shipwrecks are too big for one or two flash units to light, so available light is the best source for wrecks.
Below: Shoot up toward the surface and sun for this sort of effect, great for translucent subjects.

Lighting

Lighting your underwater subjects is probably the biggest problem you will encounter in underwater photography. When sunlight hits the surface of the water, some of it reflects back into the sky. The light that does penetrate the surface starts to lose its warm color almost immediately. As the sun gets lower in the sky, even less light penetrates the surface. As you dive deeper, the light decreases and the warm colors are reduced to a gray blue.

So, what do you do? One option is to use faster film or increase the ISO on your digital camera. That helps, but the color is still missing. The best option is to add a flash system to bring back the vivid colors of the underwater realm.

The problem is that if you use the internal camera flash or put an auxiliary flash too close to the camera, it will light up all the dirt particles suspended in the water. Underwater photographers call this pesky critter "backscatter," and it is always a problem. The best solution to reduce backscatter is to move the strobe away from the camera and closer to the subject. This way, fewer of the particles are illuminated.

Another solution to lessen the impact of backscatter is to balance the background exposure with the foreground exposure as we previously discussed. Although this process doesn't physically remove the backscatter, it just blends it into the background so that it is harder to see.

There are some situations where no amount of flash is going to do the job. Shipwrecks, for example, are usually in deep water and in areas with plenty of silt. Using a flash at any distance from the camera would cause backscatter, so your best bet is to use a high-speed film or a high ISO setting on your digital camera. Turn off your flash, use a wide-angle lens and just shoot available light. Some of the best silhouettes can be made with the exposure mode set to P or S so that you capture the light coming down from above and silhouette divers, and other creatures that hover above you.

As with topside photography, multiple flash units provide a lighting ratio. The same is true underwater, except that it sometimes

just doubles your trouble. Now you have two light sources to illuminate the dirt in the water. With two strobes placed in a 45° angles to the subject, you can achieve a nice lighting effect. The rule of thumb is to make sure that the main flash is more powerful than the slave flash to give a better underwater studio lighting ratio. By placing the strobes on flexible arms, they can be moved closer to the subject or out away from the camera for the best effect.

A popular underwater lighting setup is dual flash units on extension arms. This setup allows you to vary the lighting angle and ratio, while delivering sufficient light, restoring colors to nearby subjects, and providing brief exposure durations to minimize blur due to camera or subject motion.

Once you become accomplished in lighting your images underwater, you can then experiment with lighting angles. You may find the creative placement of the flash can result in some dramatic images.

This is one area where the digital camera excels. Since you can see your results immediately, it can be used as a visual tool to help speed up the learning process. You can try one type of lighting, view your results, and if you are not satisfied, try again. Extend the flash arm or move the strobe another direction and try once more. There is no more wondering if you got the shot, because now you know for sure.

We even find it valuable to include the flash in some of the photos, just to see its lighting effect and angle of coverage. To try this, you must use long flash arms that fold up, and can be extended to move to the side, top, or back of the subject. Set your camera to the wide-angle position and aim the flash towards your subject, making sure that the flash head is visible in the camera viewer. It is best to find a stationary subject that has three-dimensional shape to it, like sponges or coral. Vary the foreground and background exposures with your f-stop and shutter speed. Move the flash to different positions so that you have a variety of images with the flash head included. This makes it much easier to visualize the final effect of placing your flash unit in positions other than a 45° angle to the subject.

The process can be taken even further by careful placement of slave flashes, so that they illuminate different parts of the reef when your camera flash is fired. You can also take photos of other photographers using strobe underwater, by having them adjust their flash to a low-power slave setting. Then when you take a picture of them, their flash will fire in sync, and provide the illusion that they are taking a picture with flash.

Composition

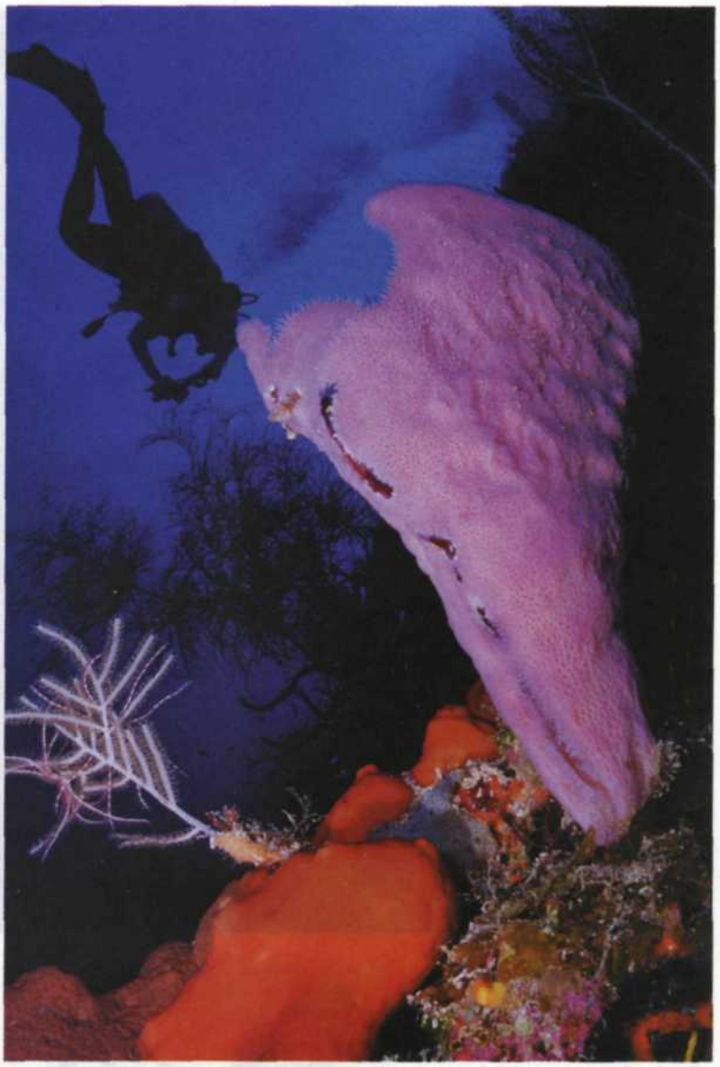
Once you have mastered lighting and basic camera operation, then you can seriously concentrate on making images rather than just taking them. When you first start taking underwater images, you feel lucky just to get them correctly exposed and focused. Once you get past the technical aspect of taking images underwater, the next step is to work on expanding the creative aspects of underwater photography.

Composition underwater is where the real fun begins. There are no set rules to composition topside or underwater because as soon as someone establishes a rule, someone will take a great picture that breaks that rule. The idea is to create an exciting underwater scene using unique camera angle, flash placement, lens focal length choice, and creative cropping.

Some of the best compositions are those with the subject in the one-third position in the image. It might be a tiny crab skittering across a coral head, or a fish hovering above the reef that catches your eye. Since these critters are rarely stationary, you have to think and act quickly, or they're gone. If you have a focus grid that can move the focus position to this one-third position, it makes the process even easier.

Lines that form diagonals, circles, and curves can show very strong composition, especially if a subject is at the end of the line. Placing the camera close to the branches in a fan coral and shooting down the side towards another animal is a great example of a line composition.

Opposites are also a very strong underwater composition. A red soft coral in the lower right third of the image and blue water in the upper left will give a nice balance and great composition. Another opposing factor that works well is in focus and out of focus. When you use extreme macro, you



Moving the subject off-center can add interest to a composition.

Digital Cameras Underwater

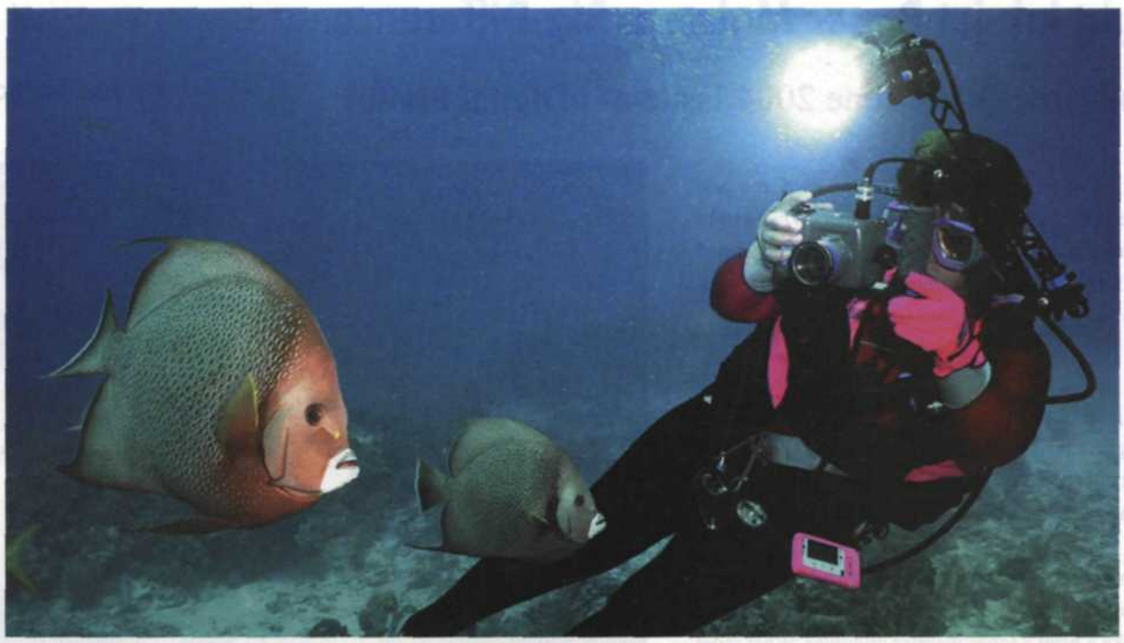
The advent of the digital camera has created a lot of new tools for the underwater photographer, but has also introduced some complex problems of its own. We're talking about all the features in these electronic marvels that require the manufacturers to write a 200-page engineering guide that they call an instruction book! It includes page after page of menus and sub-menus that would scare off even the strong of heart.

Fortunately, after many returned digital cameras, manufacturers came up with the quick-start guide that shows how to load the battery and memory card, turn the camera on, and shoot the picture. Once you have a few good images under your weight belt, you can then venture to explore menus that control ISO speed, white balance, sharpness, contrast, resolution, exposure compensation, bracketing, and more. Take one function at a time and try the different variations in that menu to see how it will affect the image. If you find yourself lost, go to the reset menu, and all the menus will revert to the factory settings.

Make sure you know how to operate the camera with your eyes closed. Keep in mind that if you are having difficulty mastering the digital functions on land, just think about how much harder it is for the brain to function the deeper you dive.

One of the main advantages digital cameras have over their film counterparts is that you can change the ISO from image to image. Don't be afraid to adjust the sensitivity of the chip by adjusting the ISO. The difference between the speeds is not as noticeable as with the higher-ISO films, and it is often difficult to tell if a digital image was shot at ISO 100 or 400. Use the lower ISO speeds for subjects that are close to the camera, and higher ISO speeds for distant subjects.

When you first use a digital camera underwater, you may find that the Auto White Balance will produce some strange color shifts. Try switching to the cloudy setting for scenes with blue water, and the fluorescent setting for green water images. Once you become very adept at adjusting the



Left: Photograph divers and dive photographers at work. Here, the positioning of the fish and diver in the frame provides a pleasant balance. **Below:** Look for the unusual. Here, shallow water provided the opportunity to capture the subject, the bottom, and the reflection of the bottom and diver in the water surface.

can focus on a critical point such as the eye of an animal and let the remaining portion fall out of focus. There are several wide-angle lenses for SLR housed cameras and auxiliary wet lenses that attach to several point-and-shoot housings. With both types of wide-angle lenses, you have the ability to focus very close to small subjects and still keep larger subjects in the background sharp. This extreme perspective can produce some very dynamic images.

Framing is a critical part of the composition process. When you find a good subject, make sure that you shoot it from different distances, various angles, and in both vertical and horizontal format. In many cases a so-so image can be improved dramatically just by the correct cropping of the image in the camera or afterwards using the computer.

white balance, you can take a small white waterproof card down with you and perform a custom white balance.

The sharpness setting should generally be left alone, as the manufacturer's setting seems to be the best with most digital cameras. If your camera has a saturation and contrast control, you might want to experiment with a minus setting to help increase the detail in the exposure range of your camera. This can then later be remedied using Photoshop and your computer.

We generally recommend that you leave the resolution set to the highest setting as you can create smaller images later. In most cases, we find that a 128 MB memory card works well with point-and-shoot cameras on a single dive, while a 256 MB card features more than enough storage space for even 11-megapixel digital SLR cameras.

One of the most heated debates in the digital world is JPEG vs. TIFF vs. RAW. JPEG is an image-file format that compresses images to a file size smaller than was captured by the camera's recording chip. Typically, a 3–6-megapixel camera will save files that are from 1–2 megabytes, while JPEG files from 8–12-megapixel cameras will be in the 3–4-megabyte range.

The TIFF images are uncompressed images from 8–36 megabytes for 3–12-megapixel cameras. Both JPEG and TIFF allow the camera to adjust sharpness, white balance, contrast, and saturation settings. The RAW images take the raw data captured on the chip and make no corrections to the image at all. You have to bring the file in as an unedited image and make corrections for exposure, gamma, color, sharpness, saturation, contrast yourself.

Both TIFF and RAW take considerable time and power to download to the memory on underwater camera systems. The fish is long gone by the time you are ready for the next shot. We are sometimes in a minority on this call, as we recommend and use JPEG. We really don't want to spend all our time correcting images that the camera could have done in less than a second and when we compared all three side-by-side, we had a very hard time seeing any difference. Our suggestion is for you to run your own tests and draw your own conclusions.

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Other Photo Techniques

One of our favorite techniques with both film and digital is what we call the self-portrait. This will require an underwater system that you can shoot with one hand. The idea is to hold the camera and flash at arm's length and point it back towards yourself, positioning a subject between you and the camera. You may have to experiment with your system before you get it right, but the final image will appear as though it were taken by another diver.

When the scene underwater is much wider than your lens can capture, you might consider shooting overlapping images as you pan from one side to the other. Use a manual exposure system so that the images are all the same density. You can then stitch the images together using one of the many panorama programs to create a fabulous wide-angle scene.

Once you start diving and taking pictures underwater, you will be amazed at the marvelous intricacy of the world beneath the waves. It is teeming with life and great photo subjects, and you now possess the photography tools to share this world with others. ■

Tight shots add interest. If you don't have a handy subject, use yourself by holding the camera at arm's length with a subject between you and it.