Cooperative surveys, banding, and depredations control have produced excellent results. Waterfowl banding in the winter of 1967-68 will attest the advantage of combined agency efforts. Cooperatively, in excess of 11,000 ducks and geese were trapped and banded Maryland furnished the traps, Game Management Agents furnished the corn, and labor was provided by both agencies. A 40' x 20' duck trap has just been completed on Eastern Neck National Wildlife Refuge. The State furnished part of the wire, Agents and Refuge personnel furnished posts and supports, and again, labor was a mutual contribution.

In summary and final analysis, we point to an interesting observation from the past 2 years of experience. Five U. S. Game Management Agents cannot possibly become familiar with this vast and complex area in its entirety. U. S. Game Management Agents depend on the intimate knowledge the Maryland Wildlife Officer has of his assigned area and of hunters' habits. Maryland Wildlife Officers depend on the specialized equipment of the Agents and the tremendous deterrent of a very interested Federal court.

The logical question now might be: "Is one agency being 'used' by the other?" The answer is, "Yes." Each agency uses the other; however, we believe neither agency is abused. We know cooperation is a two-way street that must be walked by all who participate.

In closing, we believe there is a wonderful opportunity in this State to make a significant contribution to North American conservation by jointly affording maximum protection, commensurate with wise use, to the valuable resources entrusted to our care.

Thank you.

RECOVERY OF BODIES OF DROWNED PERSONS

By Lt. Cdr. Howard Shenton
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Rapid recovery of drowned persons is of vital importance to the estate and heirs of the deceased and to the local law authorities. Insurance settlements, pensions, business details, contracts and estate problems may be delayed indefinately pending the recovery of the body and the identification of same. Long periods of submersion make identification extremely difficult and add greatly to the problems of establishing the cause of death.

Following is an outline of recommended procedures and practices for use when conducting dragging operations:

A. *General*

1. Location —— determine exact location of accident (submersion) by questioning witnessess.

2. Buoy —— buoy or otherwise mark the location of the accident, utilizing best information, and extend search as necessary from that location.

3. Craft —— drag from row boats, slow speed outboards or runabouts in preference to larger, heavier and less maneuverable craft.

4. Speed of drag —— speeds of 1½ to 3 knots are recommended. The drag must drag the bottom, not skip and plane due to excessive ratio of speed to weight of drag. Speed and weight of drag must be such that the drag line tender can "feel". Hand tend the drag line at all times. Too heavy a drag or excessive speed reduces "feel" and body can be snagged without tender knowing it. When drag snags, the tender should pay out line and stop the drag boat; then gently haul in drag for investigation. In average depths of water the drag line should be at least 4 times the depth of water.

5. Body recovered —— when body is recovered it is best to tow it to shore, pier or landing and turn it over to the authorities. When weather conditions or distance makes towing impracticable the body may be removed from the water and taken on

board for the trip to shore. Do not touch, search or otherwise handle the body any more than is absolutely necessary until the authorities are present.

6. Resuscitation — the provisions of the above paragraph may be disregarded when there is a reasonable chance of revival by means of resuscitation.

B. *Search Area*

1. Remember that once the body submerges it sinks directly to the bottom unless caused to drift slightly during descent by a current. Considering current direction and speed and the reliability of the location of the accident, conduct the first and most exhaustive search in that immediate vicinity. If the body is not recovered two things can account for it. First, the location of the accident (submersion) and inaccurate. Second, areas were skipped and the body missed.

When satisfied that an area, sufficiently large to compensate for maximum errors in location, has been thoroughly dragged, the only recourse is to extend the area of search.

C. *Drag Gear*

1. Varied equipment has been utilized successfully in recovering bodies. Poking and feeling with poles and oyster tongs have been successful. Casting and reeling in with fishing tackle has proved adequate as have grapnels (3-5 pounds) when used on irregular, stumpy or rocky bottoms. When fishing tackle is used it should be well weighted. Five or six feet of boat anchor chain attached between grapnel and the tow line give added weight and tends to keep the grapnel in the correct angle for snagging the body. For relatively clean and even bottoms large type drags are used successfully and are recommended. Haul seines are also effective in shallow water where the exact location of submersion is unknown.

2. *Most Common Equipment Used*

a. 4' Piece of pipe — with treble hooks trailing on chain, approximately 8" apart — flat iron skids welded to each end with tow line attached.

b. Cartwheel drags 8' to 10' long — fastened in center, circular pipe welded to bar approximately 16" in diameter, on end of pipe. Hooks hanging to skim bottom approximately 1 ft. apart.

c. Drag Line 1. ¼" Nylon line — 150 ft. long — swivel hooks each end. 2. Treble hooks attached 30" apart 3. Weights attached to each end. 4. Buoys and tow line attached to weights 5. Linepulled between 2 boats or worked in circle from 1 boat.

WHAT HAPPENS WHEN PEOPLE DROWN

The modern medical view of drowning death was derived from studies ordered by the United States Army in World War II to try to save the lives of fliers who parachuted into water or ditched their airplanes.

These indicated that the main cause of death from drowning in fresh water probably was explosive dilution of the blood with water from the lungs. This dilution results in rapid failure of the heart, which cannot continue contracting for lack of both oxygen and normal blood concentration, especially with an overloaded circulation.

The studies showed dilution was so quick that after three minutes of submersion the blood of experimental animals was diluted with an equal volume of water.

In salt water submersion, an opposite effect occurs, together with asphyxiation. The brine in the lungs act through osmotic pressure to suck large amounts of water from the blood. In three minutes, animals lost 40% of the normal water volume of the blood.

The overconcentration of blood can cause the heart to fail, but not as quickly as in fresh water drowning. In addition, sea water chemicals pass quickly into the blood stream through the lungs, upsetting body fluid balance.

In any case, death from submersion may occur rapidly, often in two minutes or less, depending upon the physcial status of the victim and other factors, such as how long spasm of the larynx continues. Sometimes persons still alive when removed from the water die from the delayed effects of water entering or leaving their blood. Asphyxia also plays a major role.

The usual sequence is this: The victim holds his breath until forced to inhale, then gulps water. But the water induces spasm of the larnyx, which closes off the windpipe (trachea) to protect the lungs. Little water enters the air passages.

With the trachea blocked by laryngospasm, no fresh air enters the lungs, and the supply of oxygen in the blood begins to fail. Lack of oxygen (anoxia) affects the brain first. After 20 or 30 seconds, the spasm weakens because the brain begins to fail.

The victim then inhales again, this time gulping in a little more water before a fresh spasm closes the trachea for a shorter time. With successive inhalations of water and with increasing anoxia, spasm is finally abolished and much water enters the lungs and blood stream.

If drowning reaches this point, the chance of resuscitation is believed to be poor. While spasm still protects the air passages, resuscitation efforts are more likely to succeed. Recovery after rescue in such cases may occur spontaneously.

Manual artificial respiration methods, both back pressure and arm lift types, have been found to be largely ineffective in ventilating the lungs, particularly when performed by amateurs.

The "new" mouth to mouth resusitation technique has been proved effective. It may date back to biblical times. A book about resuscitation, published in 1796 in Copenhagen, describes it in detail.

For the person confronted with an unconscious person freshly removed from the water, the following has been recommended by anesthesiologists as a guide:

If the victim is breathing he will recover spontaneously and resuscitation is not needed. If he is not breathing, the pulse should be checked quickly to determine whether the heart is beating. If it is, mouth to mouth resuscitation should be started at once. Clear mouth and troat of victim, hold head back in sword-swallowers position, pull jaw forward, compress nostrils, blow into victim's mouth 12 times a minute, breathing twice as deep as normal.

The Sinking and Rising of Drowned Bodies

The human body is slightly heavier than fresh water. Consequently, when unconsciousness takes place, the body sinks. Fat bodies are slightly more buoyant than are thin bodies, but still all bodies will sink in fresh water. If there is considerable clothing on the body along with shoes, articles in the pockets and other paraphernalia, it renders the body considerably less buoyant. The question is often asked, "When a body sinks how far down will it go?" There is some dispute on this point, but the very best evidence indicates that a body will go to the bottom regardless of how deep the water may be, unless it meets with some obstruction or upward current which tends to prevent it. As a body sinks into deep water, the pressure of the water tends to compress gases in the abdominal and chest cavities with the result that the body displaces less water as it sinks deeper and consequently becomes less and less buoyant and further down it goes.

Almost without exception, a dead body lying on the bottom of a river or lake will come to the surface again. This is due to the gas formed in the body tissues because of decay and putrefaction. When enough gas is formed to inflate the tissues and distend the skin, the body then becomes lighter than water and rises to the surface. This process is due to the action of bacteria within the body. Consequently, the length of time which elapses before the body rises to the surface depends not only upon the amount of fat contained in the body but even more upon the temperature of the water. If the water is quite warm as it may be in the middle of the summer, the formation of gas within the body takes place rapidly and the body may rise to the surface in a day or two. However, if the water is very deep and cold as, for instance, in the Great Lakes during the winter, bacterial action takes place very slowly, and it may be a matter of Several weeks before the body appears on the surface. When the body becomes greatly distended with gas, the tendency to float becomes very great and it is no easy matter to sink a dead body and make it stay down. In my own experience, I know of a case where two bodies reappeared on the surface, although window weights had been wired to the arms and legs in an effort to keep the bodies submerged.

A question frequently asked is, "When a body drowns, where may you expect to find it and if it later comes to the surface where is it apt to appear?" When a drowning takes place in a river, the most common mistake is to start searching for the body too far downstream. Sinking takes place quite rapidly with the result that the victim reaches the bottom close the the place he was last seen on the surface. When the body starts to rise, it will appear on the surface not very far from where it disappeared. If drownings take place when the river is swollen, as it may be in the spring of the year, the current is very rapid and the supposition is that the body will be carried a long way before it strikes the bottom or encounters some other obstruction. The fact that the current on the surface of a river is entirely different from the current on the bottom is seldom considered. While the speed of the current on the surface may be eight or ten miles an hour, the speed on the bottom will vary accordingly. Consequently, the deeper a body sinks, the slower is the motion of the current. However, the body soon reaches the bottom where there is practically no current and there it stays. It is rare, indeed, that the victim is found downstream more than a few hundred yards, at most, from where it disappeared, and more often than not, the body is recovered surprisingly close to where it was last seen. It is true that when the body rises to the surface after several days, it may then drift a considerable distance from the site of death, and in large lakes, it may be found miles away.

MOUTH TO MOUTH RESUSCITATION

Mouth to mouth resuscitation should be used on people who have stopped breathing due to *drowning*, also in cases of smothering, electric shock, smoke suffocation, gas poisoning, head injuries, heart attack, stroke, foreign object in throat, poisoning, chest injuries and shock.

A person may not be dead just because he stops breathing. He might live if someone would start mouth to mouth resuscitation for him. His lips, tongue and nails may have turned blue by the time someone reaches him, but this means he needs air. mouth to mouth resuscitation should be started right away.

Immediately place victim on his back. If foreign matter is present, turn his head to one side and wipe throat and mouth clean. Tilt the head back so the chin is pointing upward. Pull or push the jaw into a jutting-out position. These maneuvers should relieve obstruction of the airway by moving the base of the tongue away from the back of the throat.

Open your mouth wide and place it tightly over the victim's mouth. At the same time pinch the victim's nostrils shut or close the nostrils with your cheek. (Air may be blown through the victim's teeth, even though they may be clenched.) The first blowing efforts should determine whether or not an obstruction exists.

Remove your mouth, turn your head to the side, and listen for the return rush of air that indicates air exchange. Repeat the blowing effort. **For an adult, blow vigorously at the rate of about 12 breaths per minute. For a child, take relatively shallow breaths appropriate for the child's size, at the rate of about 20 per minute.**

If you are not getting air exchange, recheck the head and jaw position. If you still do not get air exchange, qucikly turn the victim on his side and administer several sharp blows between the shoulder blades in the hope of dislodging foreign matter. Again sweep your fingers through the victim's mouth to remove foreign matter.

For those who do not wish to come in contact with the person, they may hold a cloth over the victim's mouth or nose and breathe through it. The cloth does not greatly affect the exchange of air.

POINTS TO REMEMBER

1. Always keep the head tilted backward.
2. Determine whether or not there is actual movement of air in and out of the mouth and nose by listening closely or feeling for breath with your fingers.
3. Air in stomach — If blowing is too forceful, inflation of the stomach may occur. If the stomach is seen to bulge, stop blowing momentarily and press your hand between the victim's navel and breastbone. This causes air to be burped.

MOUTH TO AIRWAY RESUSCITATION

The airway is designed to make mouth to mouth resuscitation easier and more effective. It provides a mouthpiece for the rescuer and a breathing tube for the victim that helps keep his air passageway open. (The airway) (overcomes the greatest objection to mouth to mouth resuscitation — reluctance to come into direct oral contact with the victim.)

With this method, take these steps: Remove foreign matter from victim's mouth and nose as previously described. Take position facing top of victim's head and tilt his head back as far as you can. Force his mouth open. Hold the airway so that the mouthpiece curves toward you. Insert other end of airway over the victim's tongue and along roof of mouth until flange is cupped over victim's mouth. **Be careful not to push victim's tongue back into throat. Insert long end or airway for adults, short end for children.**

Pull the victim's jaw up. Pinch his nostrils together with your thumbs, and with the forefingers press down on the airway flange. **Never let the chin sag.** Blow into the tube. Stop when chest rises. Wait for exhalation and blow again. Repeat about every 5 seconds. Continue until victim revives or until a physician pronounces him dead.

MOUTH TO MOUTH TECHNIQUE FOR INFANTS AND SMALL CHILDREN

If foreign matter is visible in the mouth, clean it out quickly as described previously.

1. Place the child on his back and use the fingers of both hands to lift the lower jaw from beneath and behind, so that it juts out.

2. Place your mouth over the child's mouth **and** nose, making a relatively leak-proof seal, and breathe into the child, **using shallow puffs of air. The breathing rate should be about 20 per minute.**

If you meet resistance in your blowing efforts, recheck the position of the jaw. If the air passages are still blocked, the child should be suspended momentarily by the ankles or inverted over one arm and given two or three sharp pats between the shoulder blades, in the hope of dislodging obstructing matter.

AFTER-CARE OF REVIVED VICTIMS

When using resusitube, to prevent vomiting, remove airway when consciousness begins to return, or when the victim tries to expel it, or reacts by gagging, retching or caughing. Keep the head tilted backward so that air passageway remains open. Watch victim carefully and apply artificial respiration again if he stops breathing.

Do not allow a revived person to sit or stand up. Place him on his back and keep him quiet, comfortable and warm but do not overheat. Loosen tight clothing. Put blankets or suitable substitutes under as well as over the victim.

A doctor's care is necessary during the recovery period as respiratory and other disturbances may develop as an aftermath.