Coastal Infiltration and Withdrawal

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Complications in using the buoyant ascent technique

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Lieutenant John A. Hurley's article, "A Technique for Coastal Infiltration," in the summer 1962 issue of this journal, suggested the application of the buoyant ascent escape technique to the debarking of agent personnel from a submarine submerged off the coast. He was apparently unaware that such an application has been made in practice, that in fact Marine Corps reconnaissance teams have been using the technique successfully in training exercises since 1958. These exercises were made public in the excellent CBS television presentation "The New Marine," shown on "Twentieth Century" in February 1961.

Lieutenant Hurley's brief exposition, however, glossed over some of the difficult aspects of the infiltration and withdrawal operation, leaving perhaps the impression that such operations could be carried out with only perfunctory effort. I should like to point out here some of the complexities that must be fully understood and provided against in order to assure any reasonable degree of success. It is not the buoyant ascent in itself that is difficult. This requires, as was said, only half a day of training; and training to a depth of 50 feet is quite adequate, for this is deeper than the escape trunk when the submarine is operating at periscope depth. But the real problems commence after debarkation.

Landing on Target

There are many questions which must be answered correctly before you can expect to step ashore at a predetermined spot. Consideration must be given to local tides and currents and the effect they will have on the swimmer's course, so that the proper point for debarkation can be calculated. A decision must be made whether or not to employ scuba. Personally, I do not like scuba for infiltration or withdrawal missions, and I believe that the majority of those who advocate its use do so for exotic rather than practical reasons. Be the latter as it may, here are the reasons for my preference.

First, underwater navigation is more difficult than surface navigation. A submerged swimmer not only is denied the use of visible reference points on the coast but is also at the mercy of changing currents. While extrapolation can usually provide a fair estimate of the effects of these, changes in the contour of the sea bottom caused by storm action or other unpredictables can result in variations that might well move the underwater swimmer appreciably off course.

Next, the value of open-circuit scuba is severely restricted by the limited underwater time it provides, the phosphorescence at night of the bubbles it emits, and the requirement to cache the equipment once ashore. Realistically, from a detection viewpoint the most critical time in amphibious infiltration is in crossing the beach from waterline to hinterland. Picture, if you will, an agent waddling across a beach with a double or triple tank block weighing some 60-80 pounds on his back in addition to the equipment he needs for his tasks ashore. If he cached his scuba under water at some distance from the shore, how useful would it have been? He would still have to swim on the surface to the waterline. Moreover, he would have the additional problem of locating it again for withdrawal.

The use of closed or semi-closed circuit scuba would overcome only the disadvantage of emitting visible bubbles. The navigation and caching problems would still exist. Another difficulty, though not a decisive one, is that the use of this equipment requires rather extensive training.

For those not convinced by these arguments, I recommend an experimental analysis of both techniques under proper environmental conditions. Remember, you are not going to attempt infiltration in a densely populated or heavily defended area. Normally it will be done at night over a fairly remote beach.

Maneuvering the Submarine

Restrictions on submerged operations for modern submarines affect both the launching and recovery of personnel. First, a submarine is highly vulnerable in shallow water. If detected, it needs deep water for evasive maneuvers. How deep is deep? I honestly don't know, but would guess that most submarine captains would like a minimum depth of 100 feet: since the submarine itself is over 50 feet from periscope to keel, this would give only 50 feet more to the bottom. How many coasts in the world have a steep enough profile to allow a submerged submarine to come safely within swimming distance of the shore?

Second, although the possibility of radar detection seems always to be mentioned exclusively as the primary reason for submerged operations, is it not reasonable to presume that an enemy having a sophisticated surface radar system on his coast line will also have effective underwater sound detectors? One sensitive hydrophone in the water can detect a submarine at a considerable distance.

Third, the presence of essential and expensive electronic equipment on the hulls of present and programmed fleet submarines precludes bottoming. Therefore a submerged submarine must either hover or maintain some speed in the water during launch and recovery. Hovering, however, requires a skilled crew and a thoroughly experienced diving officer to maintain proper trim, so one cannot count on it. In almost all ordinary operations the submarine must maintain a speed of 1 to 2 knots. When you realize that the average swimmer with fins can attain only a speed of about 1 knot, you begin to understand some of the problems of recovery.

Effecting Withdrawal

In withdrawing the infiltrators, location is the first step. Here we must decide whether it is easier for the swimmer to find the submarine or the submarine to find the swimmer. Both methods have been tried, and I believe that the latter is not only easier but requires less equipment. Here is how it works. At a prearranged place and time the submarine searches with its organic hydrophone for a signal which the swimmer can transmit by a simple mechanical or electronic device. Since the hydrophone is highly directional, the signal when detected yields a precise bearing to the source. The submarine then moves along this bearing to effect rendezvous.

Because of the submarine's inability to bottom or hover, rendezvous can be the most difficult task to carry out. It is particularly so when you introduce the added problems of darkness and wave action. How can a swimmer locate and reach a submarine periscope that is moving faster than he can swim? There is, of course, an answer. There may be other techniques which are better, but here is one that is simple and effective. While it suggests a minimum of two swimmers, with a little ingenuity it could probably be employed by one.

After the swimmers reach the preplanned rendezvous area off shore, they stretch a 100-foot line between them perpendicular to the prearranged direction from which the submarine will approach. When the submarine, constantly checking course to home on the signal, reaches the swimmers, its periscope, extended above the surface of the water, snags the line and rendezvous is made.

Re-entry, or "lock-in," as it is most often called, is the final step. For this there are three methods which the Marines have tested and found feasible.

First, without breathing apparatus. Since the escape trunk is only 32 feet down when the submarine is at periscope depth, the free swimmer can reach it after very little training. To obviate the effect of the submarine's speed during the swimmer's descent, a guide line should be pre-rigged from the periscope to the escape trunk. The swimmer uses this for a hand-over-hand descent into the submarine.

Next, the use of scuba. Attached to a trolley, a single tank block is floated to the surface along a line pre-rigged from the escape trunk to the periscope. The swimmer, using the scuba, goes hand over hand down the line into the submarine. The tank is then sent back up the line to the next swimmer, if required.

The third method is essentially the same as the second except that instead of a scuba a high-pressure line with a full face mask is rigged inside the escape trunk and sent to the surface via the "cable car" system described above. This provides a continuous flow of air for the swimmer during his descent.

There are, needless to say, many more problem aspects to such operations; I have purposely cited only these salient points in order to simplify the discussion. Underwater sound, for example, is a science in itself, and in many situations it is difficult or impossible for a submarine to hear a swimmer's signal. I have merely attempted to illustrate that while coastal infiltration and withdrawal by this technique are possible, thorough planning and careful execution are required if the operation is to be successful.

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