of a missile site raid, the commander instructs the LO to plan for a front-loaded infantry company in the initial air assault serials. Simultaneously, the CH-47s sling load towed 155mm howitzers within range of the raid area to neutralize enemy advances from the flank. In short, the LO analyzes the ground tactical plan and translates it to aviation elements.

Once the LO completes the insertion plan, he begins planning for the extraction. The nature of cross-FLOT air assaults makes it imperative that all members of the task force, down to the last private, know their parts of the extraction plan. The S-3 Air and the LO develop a series of code words and aircraft readiness statuses for use when it comes time to extract the ground force.

When an extraction call comes, or with the passing of a "no later than" extraction time, a coordinated series of artillery and attack helicopter fires is started to cover the retrograde air assault forces. The LO uses the same detailed planning for the extraction planning sequence that he used for the insertion phase. By establishing coordinated extraction fires, and a sequence of readiness levels between the task force commander and the AMC, the LO ensures that the aircraft are on short final approaches as the ground elements move into a pick-up zone posture.

After the planning process, the LO takes an active part in the air mission briefing that follows the issuance of the task force's operations order. With the task force S-3 repeating the concept of the operation and the task force S-3 Air briefing PZ/LZ operations, the LO briefs the task force on the enroute air assault plan, emphasizing downed aircraft procedures, air control points, cross-FLOT considerations, and the mission abort criteria.

Also the LO ensures that the overall air mission commander and a representative from the aviation slice elements (assault support, cavalry, and attack) attend the air mission briefing. The LO tries to give these elements enough time to execute their planning sequences, including a consideration of crew endurance, when planning for the briefing time. If time permits, both the LO and the task force S-3 Air attend the overall AMC's air mission briefing to individual flight crews. This ensures the continuity of information and answers any specific questions about the mission that may have come out of the earlier task force air mission briefing.

After all the briefings are concluded, the LO gives the task force commander any additional assistance he can, including PZ preparation and helping establish an overall PZ command post that can assist the ground commanders who may have questions as they move their units into a PZ configuration. Furthermore, the LO furnishes assistance to the task force staff concerning any situations that arise before, during, or after PZ operations.

The LO establishes communications relay sites at forward laager sites to assist the ground and air elements. The communication sites supply invaluable assistance to all task force elements, particularly during the extraction phase of the operation.

The aviation liaison officer plays a key role within an air assault task force. By careful, well-thought-out route and airflow design, timely coordination with fire support elements, and with the LO having a good grip on the ground tactical commander's plan, air assault missions can move quickly and flawlessly. Above all, the strengthening of habitual working relationships between combat aviation and ground task force elements will result in achieving the full potential of the air assault concept.

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The Protractor Compass

MAJOR CHARLES F. COFFIN III

Many years ago, in the July-August 1979 issue of INFANTRY, Lieutenant Colonel William D. Telfair (in the article "Why Johnny Can't Read—A Map!" pages 6-8) proposed a number of "radical" ideas for teaching land navigation to junior officers and NCOs.

He suggested, among other things, that perhaps the lensatic compass was not the best one for military use and that perhaps we should consider replacing it with a Silva-type protractor compass.

At the time, as a lieutenant attending the Infantry Officer Advanced Course, I was struck by the timeliness of the article and agreed with many of Colonel Telfair's comments.

Just two years earlier, I had been introduced to the protractor-type compass while competing for a team that was to participate in a major competition. I was

not an instant convert. I had had almost six years of enlisted time, including Special Forces, Rangers, and a tour in Vietnam, as well as my commissioned time. With the arrogance of youth, I thought I had nothing left to learn about land navigation. But I had forgotten that most basic of all education tenets: "It's what you learn after you know it all that counts!"

After a half hour of classroom instruction, I began to have some doubts. By the end of the following day's practical exercises, I was convinced that the protractor-type compass was the way to go. And I have rarely used anything else since.

When Colonel Telfair's article appeared, I therefore waited breathlessly for the Army to see the widsom of his recommendations and switch over. I'm still waiting.

In case you have never seen one, I will describe it briefly:

The protractor-type compass consists of a baseplate, usually of plastic, four to six inches long. Imprinted on the baseplate is a travel arrow for direction of travel, a scale, luminous dots (depending on the model), and perhaps a magnifying glass.

Mounted on the end of the baseplate (the end held nearest to you) is the compass housing, which contains the liquid, the free-floating north-seeking needle, orienting lines and arrow, and possibly luminous dots. The compass housing itself has degree markings from 0 to 360 in two-degree increments.

It looks simple and it is. But you can do more with it, and do it faster, than you ever can with the lensatic compass.

Colonel Telfair made some claims that he called "extravagant." Among them were the following:

- *With the protractor compass, a modified resection problem can be computed in ten seconds or less by a novice map reader. (An experienced map reader needs a minute or more using our present system.)*
- *Intersection, resection, modified intersection and modified resection can all be computed without the use of a single number. In fact, they can be accurately computed by a person who can neither read nor count.*
- *No understanding of how many degrees or mils are in a circle, what the scale of the map is, or how to compute declination is required of anyone for the functional purpose of using polar coordinates in land navigation, which is to get from here to there.*

He was right on all counts.

For example, to compute a direction of travel with the protractor-type, place the base of the compass on your location on the map, line the edge up with where you want to go, rotate the compass housing until the orienting arrow and the orienting lines are lined up *perfectly* north, and move out! All you have to do is keep the north-seeking compass arrow lined up with the orienting arrow. Do you use numbers? No. Do you need to? No.

To do the same thing with a lensatic compass, first pull out a protractor and plot the azimuth between the two points (assuming you haven't lost the protractor, sat on it, bent it, or torn it, as I always did). Since you don't have a nice smooth desk in the field, you usually end up doing this on your round, unsmooth knee to the accompaniment of much unbecoming language.

Then rotate yourself until you face the proper azimuth. Now you move out, squinting down at the tiny numbers. Or (if you're really good) rotate the movable bezel until the luminous arrow lines up with the north-seeking arrow and move out, keeping the two arrows lined up.

To compare the two compasses in doing a modified resection, assume you are on a highway, for example, and you can see a water tower. You have found both on your map, but you don't know where on the highway you are.

With a protractor-type compass, sight on the tower and determine the azimuth to it. Rotate your compass housing until the north-seeking arrow is aligned with the orienting arrow. (If, for some reason, you need to know the azimuth in degrees, you can read it off the housing but for this problem, you don't need it).

Placing the far end of the compass on the tower on the map, and using the tower as a pivot point for the edge of the compass, rotate the entire compass until the orienting arrow and the orientin lines are pointed perfectly north. Dra a line along the edge of the compass Where the line crosses the road on th map is where you are. Combining th protractor and compass into one un eliminates several steps and thus sever possible errors.

Some may criticize this example, say ing that you can't sight accurately with protractor-type compass. I will gra that sighting is not as accurate with th base-plate protractor compass as wi the lensatic. But I maintain that it accurate enough for field work. If exa precision is required, you can use oth methods of sighting. But what we a talking about here is land navigation f field soldiers. Besides, there is a pr tractor-type compass that does ha sights, which negates this objection.

EASY TO LEARN

The protractor-type compass is als much easier to learn and faster to teac For example, as an ROTC instructor, spent four hours one fall teaching th basic use of the lensatic compass to un versity students, with less than satisfa tory results. The following spring, w ordered protractor-type compasses When they arrived, I gave a class usin practical problems, and in less than a hour, the students had a firm grasp the concepts and were working mode ately difficult problems. Despite son initial reluctance (chiefly from studen with prior military service), all had b come converts by the end of the hour.

The latest protractor-type compass have many features that the lensat doesn't come close to having. For e ample, one of the top models has a bui in compensator for declination. Y plug the declination into the compa and forget it. No more computing. O step and you're done.

You can also buy changeable scal for the compass, and these enable you use it for almost any map you mig encounter. For a few dollars you c also buy a pace counter that clamps the compass.

Obviously, the protractor-type co

pass may not be the best for some purposes, such as artillery or engineering or survey work. But these are areas that require special skill and training anyway. We are interested in the junior officer and NCO and the common soldier who work in the field.

So why don't we convert? Apparently, we have a large emotional and financial investment in the lensatic compass, and there are soldiers in the ranks today whose grandfathers used the lensatic compass. Some would say that we have so much time and money invested in it that we shouldn't change.

But our purpose is to teach our soldiers, as quickly and efficiently as possible, the skills they need to survive in a combat environment. And the time we have available for teaching them is too precious to waste on inefficient methods.

As I have seen from ROTC advanced camp after action reports and from my own experience in combined university field training exercises, many students are seriously deficient in land navigation skills. Conversations with people in a position to know at the Infantry School confirm that one of the greatest causes of failure in Officer Candidate School or in some of the other leader courses is failure to pass the land navigation portion. This is not necessary.

The protractor-type compass is not a cure-all. There is no magic wand that we can wave and make land navigation experts of our people. That comes only with hours of hard on-the-ground practice. But why do we hinder ourselves by using outmoded methods and equipment? Why do we make it difficult for our people to learn a critical infantry task?

The protractor-type compass was originally designed for military use and to give soldiers practice navigating. Eventually, it became popular with civilian sportsmen, particularly in Europe—not because it was difficult, but because it was simple.

The time for the lensatic compass has passed. It is time to move one of the most basic soldier skills into the present day, and to stop wasting time on slow, inefficient methods.

More than ten years ago, Colonel Telfair pointed the way. Let's not wait another ten years to do what needs to be done. Let's dump the lensatic now and move to the protractor compass. What are we waiting for?

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Urban Combat Doctrine
of the Salvadoran FMLN

DAVID E. SPENCER

EDITOR'S NOTE: The views herein are those of the author and not necessarily those of the Department of Defense or any element of it.

The increased urbanization in countries throughout the world has also increased the likelihood of combat in cities, especially in Latin America, as United States forces discovered during Operation JUST CAUSE in Panama.

The November 1989 urban offensive by Salvadoran guerrillas of the FMLN (*Farabundo Marti* National Liberation Front) has presented a unique opportunity for U.S. military personnel to further study the techniques of urban warfare that an opposing force is likely to use in a low intensity conflict in the future.

Fortunately, we do not have to try to discover from the events what the FMLN's urban combat doctrine was. The FMLN, in preparing for this offensive, developed an excellent manual entitled "Instructions for Urban Combat," and several copies of it were captured. The following is a summary of some of the most interesting aspects of it:

- The mission of urban combat is one of stopping and destroying enemy units by firepower, obstacles, and explosives. This is done by defending an urban area. In doing so, small lightly armed guerrilla units can eliminate large enemy units that have air, artillery, and armor support. Too, the longer the guerrilla forces manage to resist, the higher the political and military price the government forces will pay; this theoretically leads to the eventual collapse of the latter and a final guerrilla victory. The guerrillas resist by controlling routes of approach, setting up obstacles, establishing tight security, integrating military and political objectives to annihilate enemy forces, keeping logistics and communication routes open, controlling built-up zones and areas