

# The 10th Mountain Division Ski Technique of WWII

A skier bearing a heavy pack needs a quiet upper body for stability. In teaching ski troopers how to do it, instructors anticipated fundamental post-war technique changes. **BY CHARLES C. ROBERTS, JR. AND SETH MASIA**



A World War II ski trooper descends a practice slope while wearing a rifle and heavy backpack, weighing a minimum of 90 pounds. The Arlberg ski technique, popular at the time, featured an exaggerated shoulder rotation that turned the load into a top-heavy pendulum.



Demonstration of a Stem Christiania turn from the 1936 book *Downhill Skiing* by Otto Lang. Because the Army at first had no field manual for on-snow operations, instructors agreed to use the book as a reference to resolve disputes over finer points of technique.

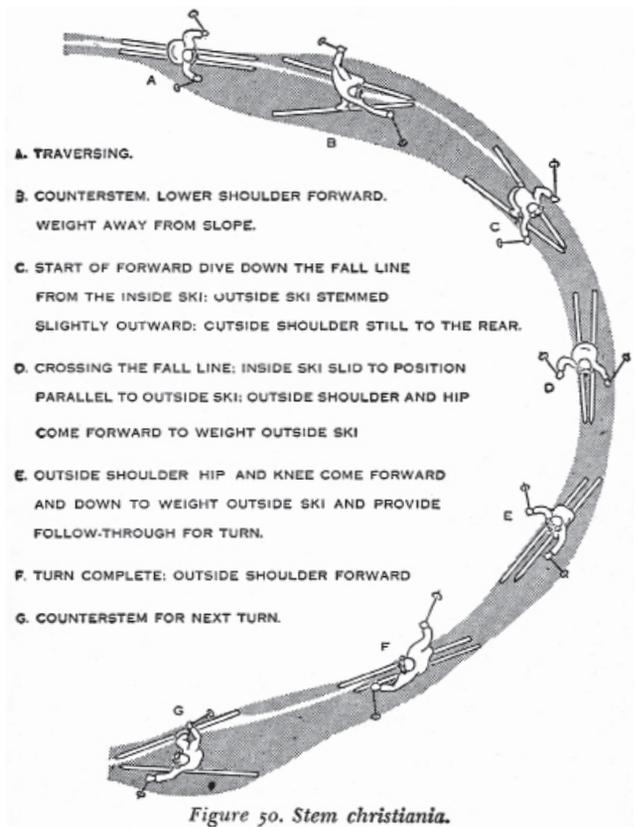
While racing for the University of Washington, John Woodward was a slalom ace. Unofficial champion of Pacific Northwest alpine racing, he finished fifth in tryouts for the 1936 Olympics. He also joined the ROTC program and went into the U.S. Army in December of 1940 as a second lieutenant. That winter he led 15<sup>th</sup> Infantry ski patrol training trips, and in March was transferred to the 41<sup>st</sup> Division's ski patrol. By late spring he had led about 10 weeklong patrols on and around Mt. Rainier. When the Army folded his unit into the new 10<sup>th</sup> Light Division in 1943, later to become the 10<sup>th</sup> Mountain Division, Woodward was named its head ski instructor. His duty was to train ski instructors and develop a teaching progression for U.S. Army ski troops.

The instructor team quickly found that the Arlberg teaching progression then in vogue in U.S. ski schools was unsuitable for military skiing. The problem was that ski troops carried a heavy pack containing gear and grub for a two-week slog through the mountains. Platoon Sergeant Hugh Evans calculated that if the pack was filled with all the required gear, the weight would be 112.25 pounds. Without the tent, the weight would be 99 pounds. Radiomen and other specialists might have heavier packs. Troopers usually cite 90 pounds, as in Ralph Bromaghin's lyrics for the WWII-era song

*Ninety Pounds of Rucksack* ("Ninety pounds of rucksack, a pound of grub or two; he'll schuss the mountain like his daddy used to do..."). On top of that, a 10-pound M1 Garand rifle was clipped to the pack. The Arlberg technique featured an exaggerated shoulder rotation that turned the load into a top-heavy pendulum, with the rifle swinging wide on every oscillation.

As a racer, Woodward was strongly influenced by Emile Allais' 1937 book *Ski Français*, which advocated a pure parallel teaching method. That was clearly impractical for recruits who had never even seen snow, let alone slogged through fresh wet "powder" under a heavy load. In a July 2001 interview with Lowell Skoog, Woodward said that Swiss ski technique made more sense for military skiing because it relied on stemming, unweighting and weight transfer to make turns instead of shoulder rotation.

When world champion Walter Prager and mountaineer Peter Gabriel, both Swiss, joined the instructor corps, they were the only two who knew the Swiss technique. They couldn't get the Austrians to go along with it, Woodward said, so the team settled on a "modified Arlberg" technique, using Arlberg leg movements but throwing out the shoulder swings, at least when wearing a pack. Because the Army at first had no field manual for snow-bound operations, instructors agreed to



In 1944, the Army developed a manual that provided guidance for troopers on how to perform the Stem Christiania (above) and other turns. Soldiers wearing heavy rucksacks modified the technique (below) by quieting the upper body and steering actively with the feet and lower body—not an easy task in flexible, ankle-high leather ski boots.



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The new 10<sup>th</sup> Light instruction progression, aimed at nonskiing recruits, included walking on skis, the side step, the herringbone, climbing with seal skins, the snowplow turn, the stem turn, the lifted stem turn and the parallel turn. In the end, the emphasis on a quiet, stable upper body presaged the evolution of American ski teaching. By the early 1970s the emerging American Teaching Method blended Arlberg's stem-based lower-body maneuvers for beginners and intermediates with Swiss and French-based parallel skiing at the expert level—all with a stable upper body "anticipating" each turn by keeping the chest facing more or less down the fall line.

The heavy rucksack affected the unit's ski technique in a number of ways, beyond the problem of turning. Simply traversing on skis was a chore with this load. A wide track was necessary to stabilize the weight. When a trooper loaded one ski, as in a stem turn or lifted stem, that ski sank into soft snow, producing a weight shift that was unrecoverable. Climbing with skins in deep snow was more than exhausting. 10<sup>th</sup> Mountain veteran Earl Clark frequently explained that the combined mass of skis, rifle and pack more than doubled his body weight. Fellow soldier Gordon (Tiny) McQuade recalls that he weighed slightly less than 100 pounds when he arrived for training in 1943. When he fell while lugging a rucksack, he could not get up, and two fellow troopers had to lift him. His dislike of the pack was so intense that on an occasional day training outing, he would stuff his pack with pillows so it looked loaded. This worked for a while until his sergeant discovered the ploy. He was immediately sent to KP (kitchen patrol) duty.

The lifted stem turn is performed by transferring all the skier's weight to the stemmed outside ski, then lifting the inside ski and stepping it over to the parallel position and then weighting it. The late Bob Parker, 10<sup>th</sup> Mountain vet and Vail pioneer, recalled that under a heavy load the move required great care: You had to keep the knees and ankles flexed to keep the center of mass as low as possible, and do the lift-and-step quickly to reduce the time the stemming leg had to bear the whole load. Moreover, the final parallel had to be wide track to form a stable base for the heavy combined weight of skier and pack. A polished-looking narrow-track, feet-together stance did not work out well as it encouraged the top-heavy skier to topple sideways.

Even very experienced skiers, like Hugh Evans, found it difficult to ski with the loaded pack. The secret, he said, was to ski slowly. Troopers often froze sealskins to the bases of the skis for the braking effect. Most turns were snowplow and stem turns. Skis were used for transportation, to travel to the



Platoon of 10th Mountain Division skiers at Cooper Hill. The instructors out front have narrowed the stem to a parallel stance, while the student recruits used a wide fully-stemmed technique.

next objective with all of the equipment. It was dangerous and unnecessary to travel at speed while loaded, so very few photos of such an endeavor exist.

In 1944, an Army manual was developed (apparently with no input from Woodward's team) giving guidance on how to perform the Stem Christiania and other turns. The technique was identical to that described in Lang's book—that is, pure Arlberg. The stem christie entailed a counter rotation of the upper body at turn initiation, followed by rotation of the upper body through the turn. This worked, of course, only for the skier without a loaded rucksack.

The Swiss-French-Arlberg mashup didn't entirely solve the problem of turning, even on the relatively easy training run at Cooper Hill. It required more active twisting (steering) of the feet and legs to compensate for the loss of upper body movement. The ankle-high leather boots of the era, even the relatively heavy Army-issue ski boots, didn't help much with foot-steering.

The 10<sup>th</sup> troops shown in the photo are skiing with heavy packs but without rifles. The lead skiers appear to be skilled, executing parallel turns in expert fashion. The knee and ankle flexion is needed to keep the center of mass low to aid in balancing the heavy backpack. The 1943 vintage ski boots lacked the fore/aft and lateral stiffness of today's modern ski boot, making it difficult to maintain balance when negotiating steep slopes with a heavy load.

The Army never did formally address skiing with the heavy rucksack and rifle, nor do modern ski schools have a teaching module for pack-burdened skiing. Like the soldiers of the 10<sup>th</sup>, modern skiers have to figure out adaptations to technique on their own. Many modern skiers carry packs, though few would ever saddle up 90 pounds. Ski patrollers, backcountry skiers, mountaineers and camera people often carry up to about 40 pounds of high-tech lightweight gear. We use modern boots with all their advantages in support and leverage, not to mention warm and waterproof comfort. We have

## CARRY THE WEIGHT

To fine-tune your balance and perfect your technique, try skiing with a 90-pound pack.

BY RON LEMASTER

Learning to ski with 90-pound packs on their backs made sense for the soldiers of the 10<sup>th</sup> Mountain Division. After all, that's how they were going to have to ski when they were deployed, and it provided great strength training while the troops were learning the skills of the sport. There was also another benefit, possibly unintended, but equally important.

Skiing is a sport of balance: balancing on a platform that is moving on a slippery surface. Technically speaking, that means managing the alignment of forces of interaction between you and the snow. To develop that skill, your body must become attuned to the pressures and forces that develop between your body and the snow, and their alignment. Forces are proportional to mass, so a good way to develop that awareness is to amplify the forces by increasing your mass with a heavy pack. The increased force on your body and pressure under your feet make it obvious where your point of balance is. Moreover, small movements, be they fore and aft or toward the inside or outside of the turn, not only become glaringly obvious, but their effects on the behavior of the skis are magnified.

Economy of motion and efficiency of stance are the result, without the need of an instructor to tutor you on the finer points of technique. Skiing with a pack loaded with just 20 or 30 pounds will tune up a skier's technique in short order. Skiing with a 90-pound rucksack will turn an apprentice into a journeyman: just what the doctor ordered for the 10<sup>th</sup> Mountain Division.

**Ron LeMaster  
fine-tunes his  
balance while  
skiing with a  
30-pound  
pack loaded with  
camera gear.**



flexible wide skis that do most of the work in difficult snow. It's still no fun to fall under a heavy pack, which can swing forward and pound your head into the snow like a hammer. When carrying a big load, today's skiers resort to the same adaptations figured out by troopers of the 10<sup>th</sup>—a wide, stable, evenly-weighted stance, quiet upper body to keep the pack in control, and strong but smooth leg technique. ❄️

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