

10:13 a.m. and run continuously until 11:09 a.m. for a total of 56 minutes.

Pete and Bill took lots of pictures and carefully read the Kollsman altimeter, which was graciously loaned to us by Lou Bissoni. They also collected two tiny samples of ancient limestone from a small ledge just south of the top, stone that none of them had ever seen before. The same furious west-southwest winter gales that had revealed George Mallory's body on the other side of the peak had swept this lofty ledge clear, too, revealing very, very old limestone from the Ordovician period. This "new" ledge is certainly the highest bedrock anywhere in the world!

During their descent, Pete Athans replaced the GPS station bolt at Bishop Ledge (just below the summit) with a new, permanent one. Otherwise, the descent back to Base Camp was routine, and they carried with them the two precious GPS receivers.

I take pleasure in reporting the final results of our GPS data, now thoroughly coordinated with China, Nepal, India and the United States' NIMA. The newly-established altitude for Mount Everest is 29,035 feet (8850m).

BRADFORD WASHBURN

*Medical Research at High Altitude.* The E-3 expedition (Dr. Kenneth Kamler, expedition physician, and Dr. Christian Macedonia, director of medical research) was in the field from April 21-May 30. There were 15 expedition members, including five medical doctors. We used the standard approach to the south (Nepal) side of Everest, flying from Kathmandu to Lukla and then trekking to the standard expedition Base Camp area on the Khumbu Glacier. We returned via the same route. We were a medical research expedition and did not attempt to climb any peak.

The 1999 E-3 project's goals included high-altitude research, real-time biomonitoring, telemedicine and an education program involving "live transmission" from Mt. Everest to a number of schools. Research took place en route to, and at, Everest Base Camp (17,500'). Five members climbed through and above the Khumbu Icefall (19,000'+) in order to gather additional altitude data and to test the function of real-time biomonitoring equipment. We obtained permit space for Nuptse to do this, as the first two camps above Everest BC are the same as for Everest. The team treated numerous climbers and Sherpas at Everest Base Camp and also conducted free village medical clinics.

At various times en route, as well as during a climb through the Khumbu Icefall, team members wore compact, ca. four-pound biomonitoring devices. These instruments both recorded locally, and transmitted in real-time, vital signs including heart rate, core body temperature, skin temperature, activity level and GPS location. This data was displayed on computer screens showing the position of each climber "live" on a topographic map along with corresponding physiological information. Researchers at Base Camp and at Yale, 10,000 miles away, were able to monitor both the physical condition and precise location of the climbers. These devices functioned well and may serve as a useful adjunct to certain types of climbs in the future.

Newly available compact imaging duplex Doppler ultrasound equipment was used to gather data on how the blood flow rates in the carotid (neck) and brachial (arm) arteries change as a response to a hypoxic (low oxygen) environment. Comparing differences in circulatory flow rates, we were able to document significant change in blood flow patterns. The data appeared to show a significant shunting of the blood flow from one area of the body to another as an adaptation to a hypoxic environment. In some cases, the blood flow to the head

more than doubled, while the blood flow to the arms and legs dropped to 25 percent of typical flow rates. The pounding headaches, poor appetite, muscle cramps, etc., that climbers experience may be explained, at least in part, by the significant redistribution of blood away from less vital organs and areas, such as the stomach, to the brain in an attempt to survive a low-oxygen environment. The project collected a large data set of imaging duplex Doppler ultrasound of blood flow at high altitude.

Drs. Kamler and Macedonia suggest that climbers going to high altitude consider the pneumococcus vaccination called Pneumovax. It is a one-time vaccination that is considered safe and effective at preventing the major subtypes of pneumonia caused by pneumococcus bacterium. Pneumovax is usually only given to the elderly and people with impaired immune systems. High altitude appears to produce similar risks in impairment of healing and in damage to the system that removes contaminants from our airways. Pneumovax has minimal risks to high-altitude climbers with potential life-saving properties.

SCOTT HAMILTON

*Erkimkang, North Face, and Khatung Kang, Ascents.* In mid-August I went to the Langtang region, north of Kathmandu, where I retraced the steps of Bill Tilman, who visited the area in the late 1940s. Like Tilman, I made a base at the yersa (temporary settlement) of Langshisa, exploring and making acclimatization hikes in the area. I made an ascent of "Buddha Peak" (Tilman's name, locally known as Erkimkang, ca. 6100m), in three days round-trip from base camp, via the north face. The climb involved some moderate mixed climbing but was mostly snow and ice. I descended to the west, down a glacier. Tilman approached this by crossing the river downstream of Langshisa near the Yersa of Numathang, but now there is a small bridge at Langshisa itself. This may or may not have been the peak's first ascent.

In September I went to Pokhara by bus, then flew to Jomsom. From there I trekked over the Thorung La, and to acclimate climbed Khatung Kang (6400m) from the east by a moderate snow/ice route.

CHARLIE FOWLER

*Cho Polu, First Official Ascent.* Our team was composed of Dieter Ruelker, Guenter Jung, Dr. Olaf Rieck and myself as leader. On October 13, we started from Kathmandu, reaching Lukla by airplane and continuing on via the normal trekking route to Namche Bazar in a few days of reasonably good weather. On October 18, just as we reached Dingboche, it started to snow heavily, forcing us to stop for two days before continuing via Chukhung to Island Peak (Imja Tse) Base Camp. On the last ten kilometers we broke trail through one meter of snow and dug out a path for the yaks with shovels (while lots of trekking groups waited behind us to enjoy the fruits of our work when it was done). On October 23 and 24, the yaks reached the porter shelter near Island BC, but were not able to continue further to Island Peak or even Cho Polu BC. We lost three more days carrying the loads by ourselves before establishing our BC on the moraine east of Island Peak on October 26 at about 5200 meters.

Two days later we started our first reconnaissance, but due to the vast amount of snow on the Lhotse Shar Glacier it took us until November 1 to reach the base of the mountain. We approached from the west and put in a line on the west face of the col ("Hardie's Col," 6183m) on November 1 after two days of climbing under continuous avalanche danger. Due