



RESEARCH ON EVEREST

Y 2016

Y 2017

Y 2018

Y 2019



1963 AMERICANS ON EVEREST

First Americans to climb Mount Everest

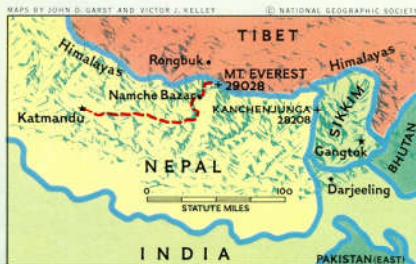
New route on the West Ridge; first traverse of the summit

Research: effects of altitude on humans, glaciology, and more



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Deputy leader, William E. Siri coordinated the expedition's scientific program, which embraced glaciology, solar radiation, meteorology, and man's reaction to extreme stress at high altitudes. Here he magnifies a blood sample.

Nine hundred porters converge on a log bridge that must be crossed single file. When a man rests, he stands and supports his load on a T-bar staff.

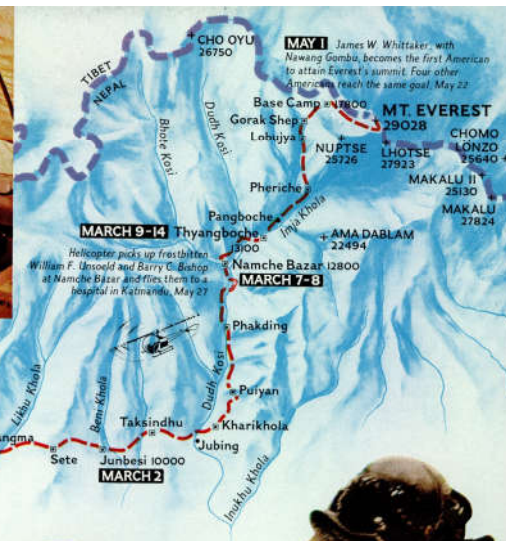


FEBRUARY 20 Katmandu, 4423

"A little war against a big mountain" begins with the assembly of the American Mount Everest Expedition in Katmandu, Nepal's capital. Thence the expedition journeys by jeep and truck to Banepa

An army of a thousand men, including climbers, Sherpas, porters, and a Nepalese liaison officer, sets out from Banepa on the 185-mile hike to Everest, February 20

STATUTE MILES
Elevations in feet *Camp sites
Khola, Kosi.....river



MAY 1 James W. Whittaker, with Nawang Gombu, becomes the first American to attain Everest's summit. Four other Americans reach the same goal, May 23

MARCH 9-14 Thyangboche

Helicopter picks up frostbitten William F. Usseld and Barry O. Bishop at Namche Bazar and flies them to a hospital in Katmandu, May 27

MARCH 7-8

MARCH 2







1980s MAP OF MOUNT EVEREST

Mapping led by Dr. Bradford Washburn, Boston Museum of Science

Traditional photogrammetry and cartographic methods

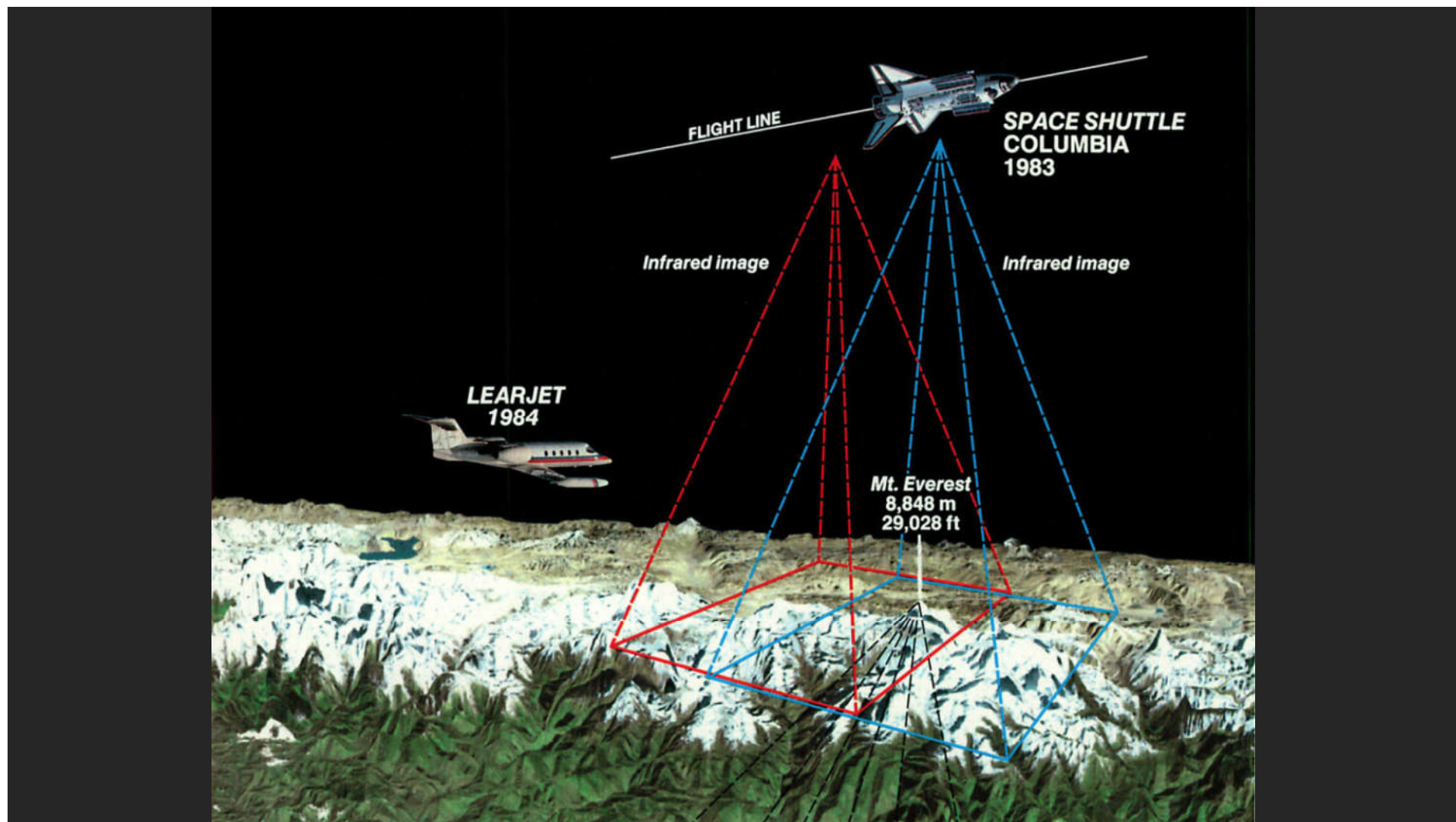
Imagery from airplane and Space Shuttle

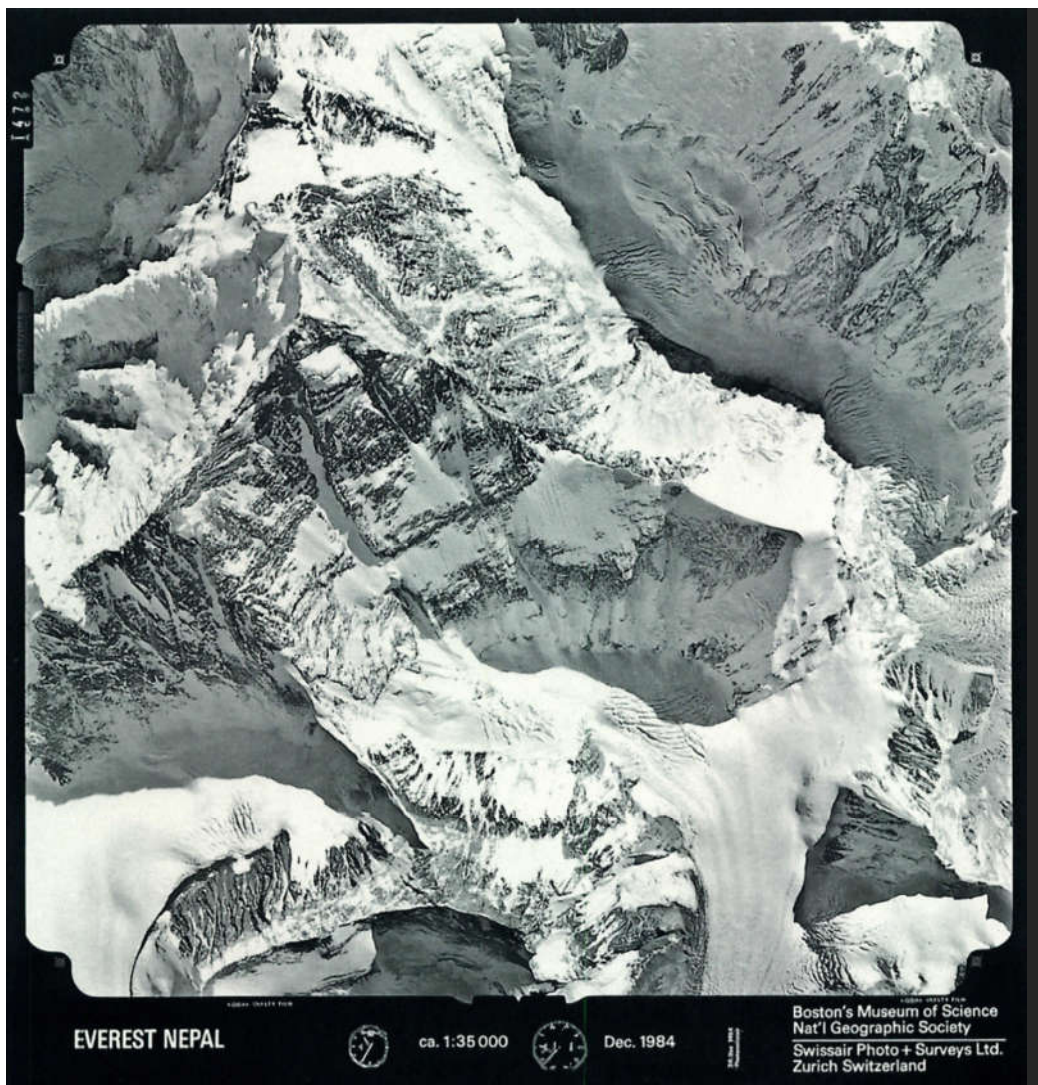
Cartography: Swissair Photo + Survey, Swiss Federal Office of Topography, National Geographic Society

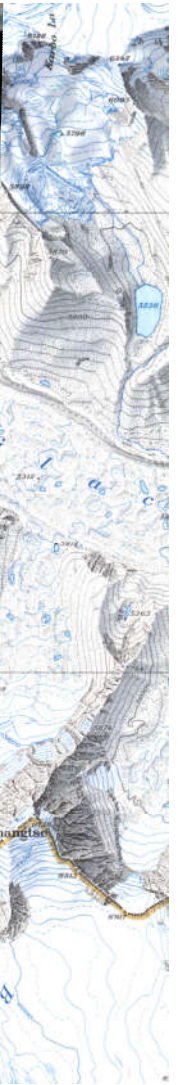


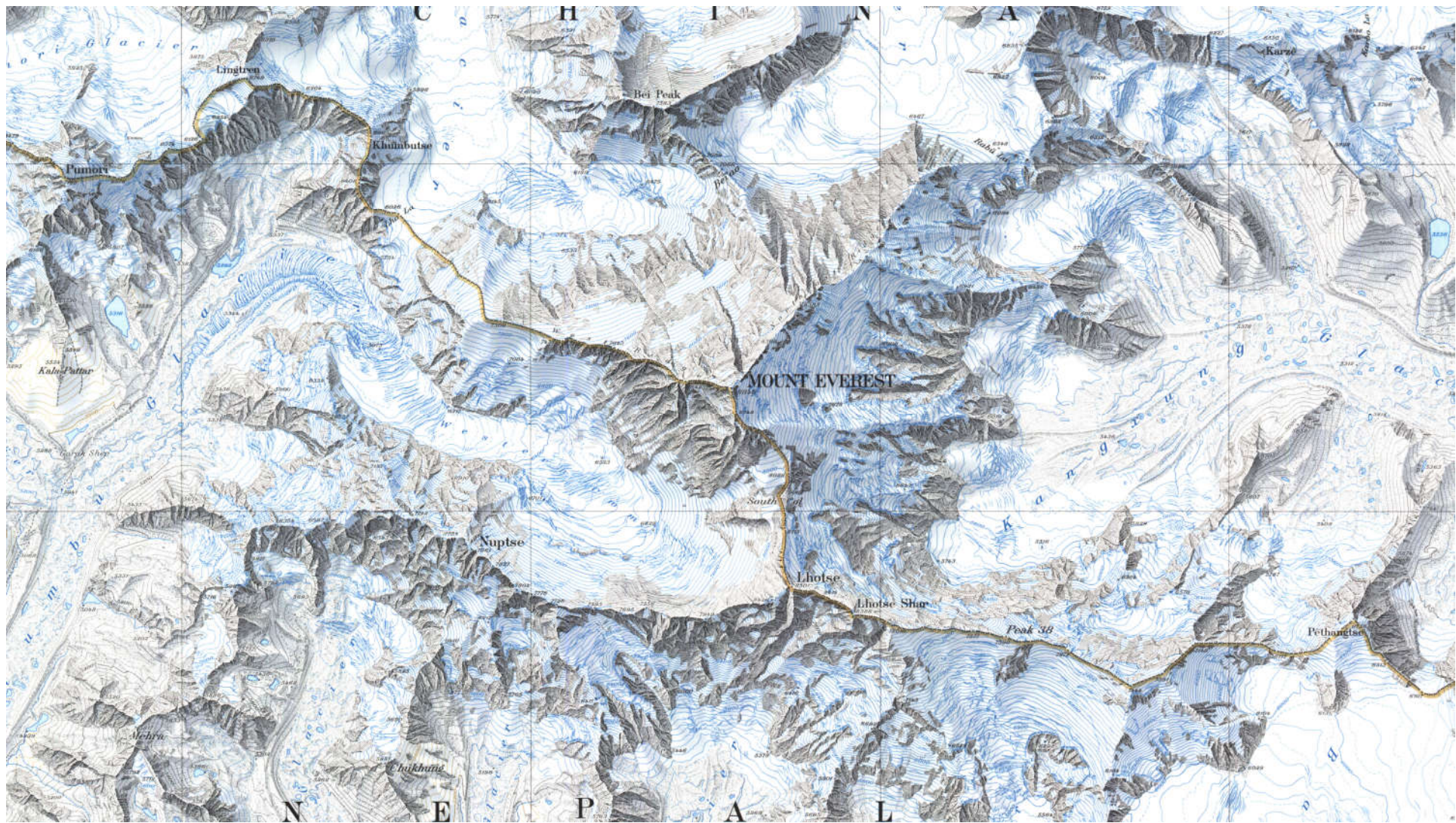
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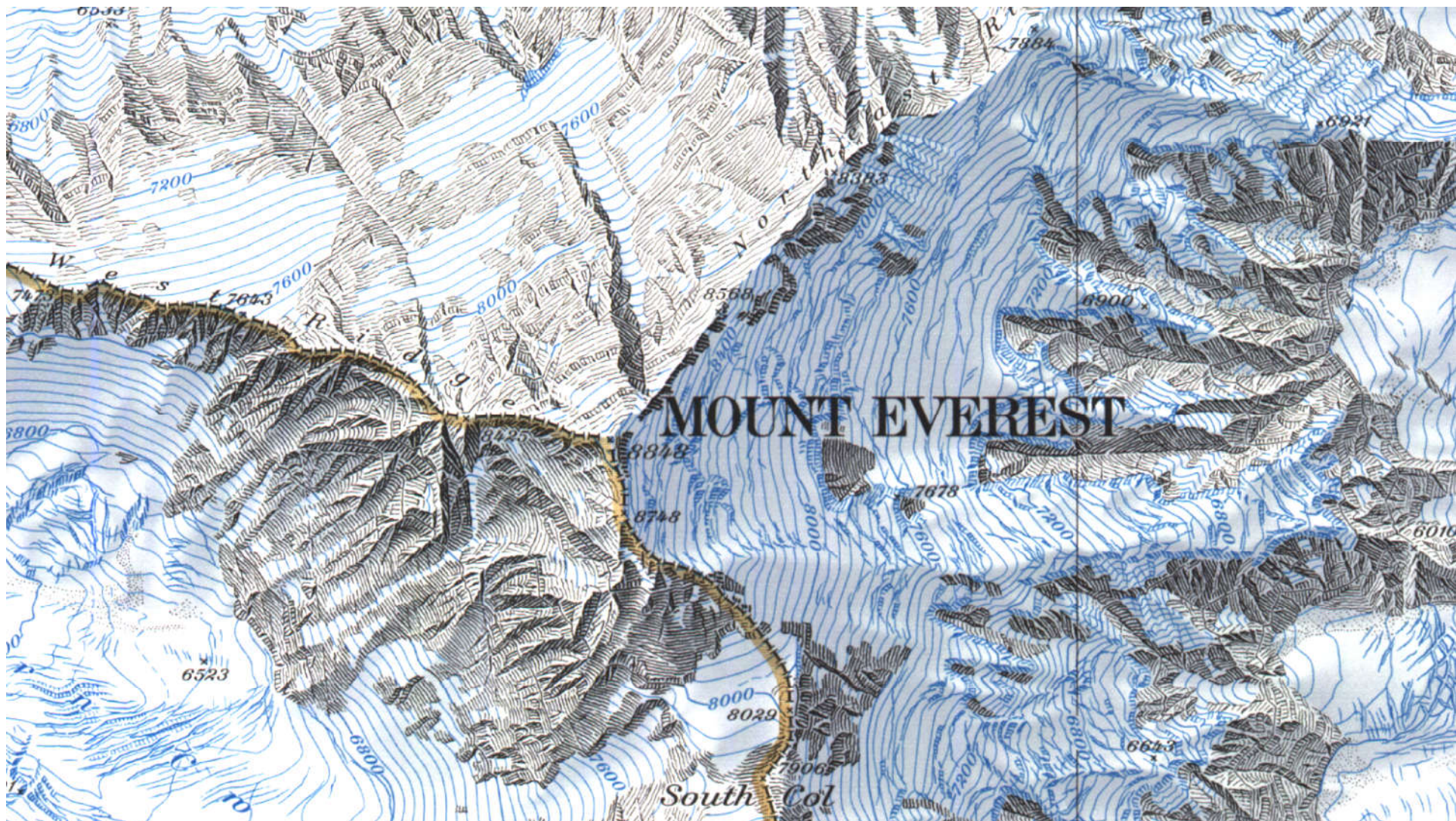












1990s HEIGHT MEASUREMENTS

1995-1999: Honorary Leader was Dr. Bradford Washburn, Science Manager was Charles Corfield

Geophysics: Roger Bilham, Freddy Blume, Mike Jackson, Kristine Larson, Dave Mencin

Geodesy: Steve Kenyon, Kurt Krueger, Muni Kumar

Climbing: Pete Athans, Wally Berg, Todd Burleson, Eric Simonson, Greg Wilson



Heights of select locations in the Everest vicinity

From Mount Everest Research Expeditions, 1995-1999, quoted relative to WGS84 ellipsoid (EGR1996).

Location	Source	Latitude	Longitude	Ellipsoidal Height
Summit (Snow Top)	5 May 1999 (ITRF96)	27.98808115	86.92520986	8820.6495
Bishop Ledge	20 May 1998 (ITRF96)	27.98695089	86.92532342	8781.0861
South Col	5 May 1999 (ITRF96)	27.97294553	86.9294344	7861.92715
Kala Pattar	5 May 1999 (ITRF96)	27.99386713	86.82790499	5546.63848
Rongbuk	9 Nov 1995 (ITRF94)	28.1937011	86.82739309	4953.09242
Tingri	9 Nov 1995 (ITRF94)	28.62950224	87.15521061	4256.01841
Lhasa	16 Mar 1998 (ITRF96)	29.65733964	91.10398709	3624.65103

[Note that the figures quoted here are to a much higher precision than necessary.]



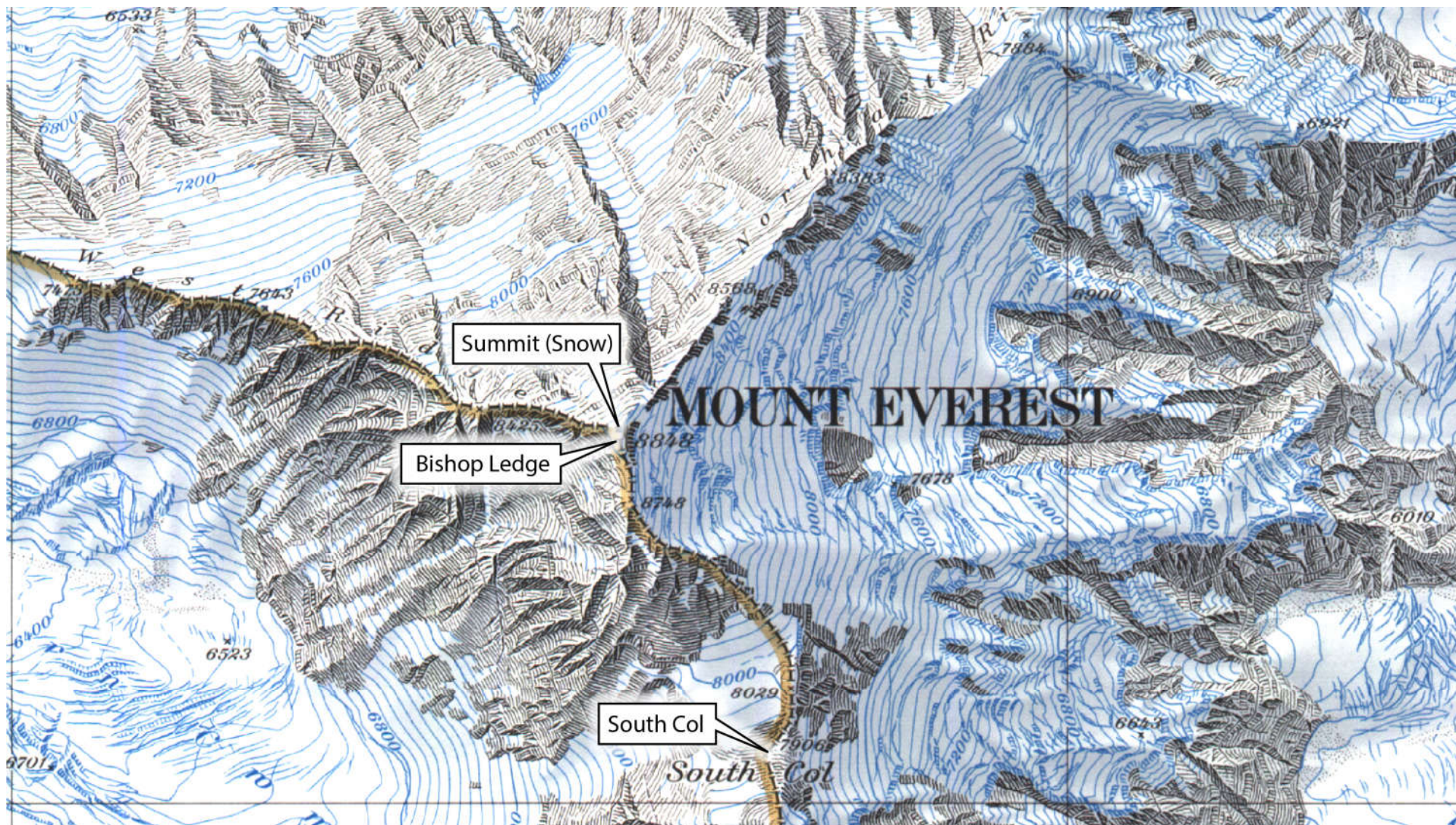
Notes for **Kala Pattar** survey station (5546.638m ellipsoidal height)

Originally measured by Dr. Mike Jackson as an aid to fixing locations observed in the vertical aerial photographs from the 1984 survey for Dr. Washburn's map of Mount Everest.

In 1996, Dr. Roger Bilham engraved a geodetic control point and occupied it for three days; new metal pin nearby occupied in 1997, 1998 and 1999 and tied to 1996 point.

Kala Pattar approximates the latitude and tectonic setting of summit





Notes for **South Col** survey station
(7861.927m ellipsoidal height)

Drilled by Pete Athans in May 1994, maintenance work in 1999

Backup station was drilled in May 1999

The original station has been occupied in the years 1995, 1997, 1998 and 1999; backup has been tied to the original



Notes for **Bishop Ledge** survey station
(8781.086m ellipsoidal height)

Drilled by Wally Berg in May 1998

Further strengthened by Pete Athans in May 1999

The station was occupied for approximately two days in 1998,
concurrent with the South Col and Kala Pattar stations



Notes for **Summit (Snow Top)** measurement
(8820.6495m ellipsoidal height)

Main summit highest point is snow, measurement made by laying GPS receiver on the snow surface

Main summit was occupied for 50 minutes in May 1999,

South Summit, also snow, was occupied for six hours in May 1998



MOUNT EVEREST

We have three slightly different sets of data for this point::

CHINA:	8821.09		
Dr. J. Y. Chen	<u>+ 28.73</u>	(Geoid correction)	
	8849.82	meters	29,034.839 feet
USA:	8820.9830		
"N I M A"	<u>+28.7420</u>	(Geoid correction)	
	8849.7250	meters	29,034.527 feet
1999 MERE:	8820.650		
David Mencin	<u>+ 28.742</u>	(Geoid correction)	
	8849.392	meters	29,033.434 feet

The unweighted mean of these three calculations yields the new altitude of Mount Everest:

8850 meters ($\pm 2\text{m}$) (29,035 feet)

The WGS/84 (1996 Earth Gravity Model) geoid was used in these orthometric height determinations.



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Friday, November 12, 1999 Published at 18:01 GMT

World: South Asia

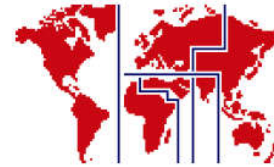
Mount Everest reaches new heights



The west face of Mount Everest,

A team of mountaineers which went to Everest six months ago with sophisticated measuring equipment has revealed that the world's highest mountain has grown even higher.

The revelations of the American Millenium Expedition



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The west face of Mount Everest,

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A team of mountaineers which went to Everest six months ago with sophisticated measuring equipment has revealed that the world's highest mountain has grown even higher.

Nepal has welcomed the revelations. However, it says that it would like to carry out its own measurements.

Bradford Washburn, director of the expedition said: "We now know much more about the configuration of our Earth... than we did 40 years ago."

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OTHER NGS SUPPORTED WORK

Total of over 40 grants to researchers and explorers for work on or around Mount Everest from 1960 to present

2001 Snow depth measurements, grant to Dr. Washburn, climb and work by Paul S. Giorgio, only partly successful

2012 NGS 50th Anniversary of Americans on Everest, Climbing and research grants; GPS work part of grant to David Lageson





2012 NGS ON EVEREST

Attempted new GPS measurement of bedrock summit

Problems with windy and crowded summit; lack of repeated probing of snowpack to find highest bedrock

Unable to collect GPS measurement for snow or rock summit

Successful collection of geological samples and other research goals



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THANK YOU

Y 2015

Y 2016

Y 2017

Y 2018

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