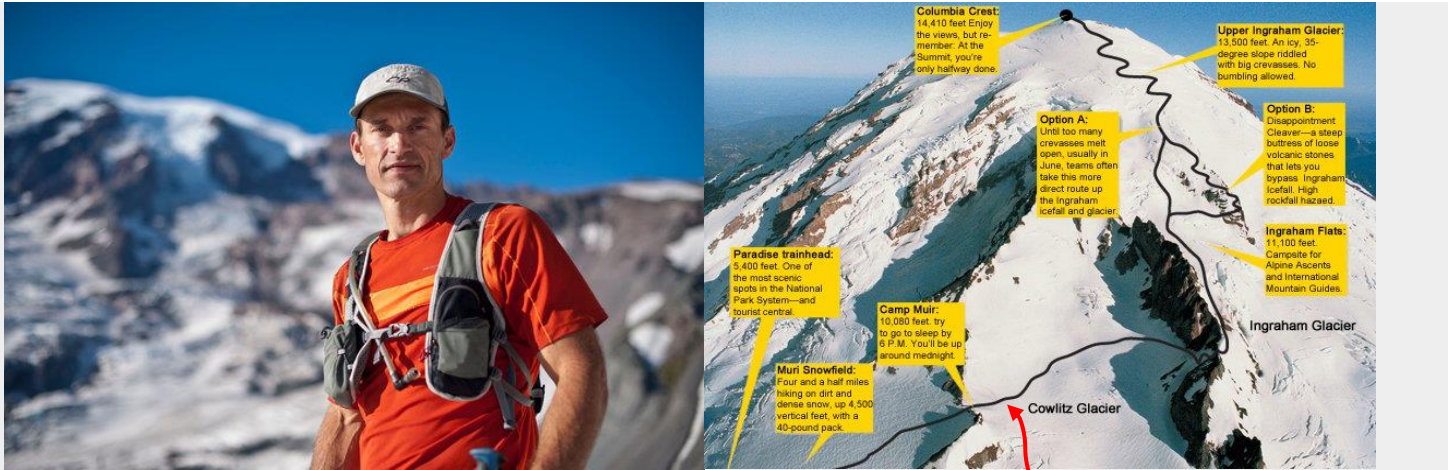


WORK, $\frac{1}{2}mv^2=K$, $mgh = U$, Power= W/t , Units 10 & 11

Dr. John P. Cise, Professor of Physics, Austin Com. College, Austin Tx., jpcise@austincc.edu, & NYTimes, 2/18/2014 by S P Farrell

Chad Kellogg, a Speed Climbing Pioneer, Dies in Rock Fall at 42



Chad Kellogg while training on Mount Rainier in 2011. NOTE: Editor Dr.Cise in 1967 climbed this route up Rainier in 1.5 day...slow!

Chad Kellogg, an elite climber known for his speed ascents of large mountains, died on Friday after being struck on the head by a falling rock while descending the Patagonian peak Fitz Roy. He was 42. **Kellogg was one of a small but growing number of climbers who had begun to make speed as much a priority as establishing a first ascent or a new route up a familiar peak.** He had attempted a speed record on Mount Everest three times. "It's not that I'm a great climber," he said in 2011, as he prepared to make his second attempt on **Mount Everest without the supplemental oxygen** used by many climbers to ascend the nearly 30,000-foot mountain. (Climbing without oxygen was, he thought, a greater challenge.) Kellogg, who did his climbing all over the world, won the Khan Tengri mountaineering race in Kazakhstan in 2003 and held a variety of **unofficial records for speed ascents of Mount Rainier, the ((14,410-foot mountain(from Paradise Lodge at 5,400 ft.)))** that looms over the national park of the same name in Washington State. **One of those records, now broken, included the ((first sub-five-hour ascent(3.5 hrs. going up.1.5 hrs. descending))** and descent, a trip that can take some climbers two days. "He was competitive," said Mike Gauthier, the chief of staff at Yosemite National Park, who hired **Kellogg as a climbing ranger on Mount Rainier in 1997**, "but Chad really never spoke about it; **he just did it.**" Behind Kellogg's prowess on rock and ice lay a crevasse of loss. His wife, Lara-Karena Kellogg, died while descending an Alaskan climb in 2007. Shortly after, he learned he had colon cancer. (It later went into remission His partner on the Fitz Roy climb, Jens Holsten, survived the rock fall.

Normal human metabolism produces heat at a basal metabolic rate of around 80 watts. A trained cyclist can produce about good average fitness 400 watts of mechanical power for an hour or more, but adults of average between 50 and **150 watts for an hour of vigorous exercise.** Wikipedia

INTRODUCTION:NOTE: Chad(160 lb.) was killed by gravitational potential energy(U) lost by a rock converted into kinetic energy. The KE was dissipated by doing work on Chad, killing him. Goal is to find Chad's human power in Mt. Rainier record climb.

QUESTIONS: (a)Find work Chad did (went into U) climbing from 5,400 ft. to summit? (b) Chad ascended Mt. Rainier in 3.5 hrs. convert to seconds?, (c) Find Chad's power (P) output(in ft.lb./s.) during this record climb?,(d) Convert P to horse power HP? (e)Convert Power in horse power to Watts ?, (f) Compare (e) to left box statement?

HINTS: $U = m g h$, $P = \text{Work}/\text{time} = W/t$, 550 ft.lb./s. = 1 HP, 746 Watts = 1 HP

ANSWERS: (a) $W = U = 1,441,600 \text{ ft. lb.}$, (b) $t = 12,600 \text{ s.}$,(c) $P = 114.4 \text{ ft. lb./s.}$ (d) $P = 0.208 \text{ HP}$, (e) $P = \sim 155 \text{ Watts}$, (f) Amazing confirming comparison to box note