



The Newsletter of The North Texas Skeptics

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In this month's issue:

- [Heavy Boots](#)
- [Is Raw Meat Conscious?](#)

Heavy Boots

by John Blanton

The North Texas Skeptics is an organization devoted to the promotion of science and rational thinking in the study and understanding of the world around us. So we occasionally need to talk about science and the public's perceptions of science. John Sigler has forwarded this to me from the Internet because he considers it a remarkable indication of the state of science education in this country, and I have to agree. If all of this is strictly true (I'm a skeptic to the end), then things are much worse than we thought. As John said in his note: "[It's] kinda long and depressing, but the point is made quickly ..."

We don't have the original author's permission to reprint this entirely. In fact I have not been able to discover the name of the original author. How's that for a friend-of-friend story. So I will just relate what was said and quote where necessary. If you want to follow up, here is some information from the mail header:

From: BDEMPSEY.ENG-MAIL@SMTP.INTECOM.COM (Dempsey, Bill)

Date: Thu, 15 Dec 1994 14:53 CDT

"About 6-7 years ago, I was in a philosophy class at the University of Wisconsin, Madison (good science/engineering school) and the teaching assistant was explaining Descartes. He was trying to show how things don't always happen the way we think they will and explained that, while a pen always falls when you drop it on Earth, it would just float away if you let go of it on the Moon.

"My jaw dropped a little. I blurted 'What?!' Looking around the room, I saw that only my friend Mark and one other student looked confused by the TA's statement. The other 17 people just looked at me like 'What's your problem?'

"'But a pen would fall if you dropped it on the Moon, just more slowly.' I protested. 'No it wouldn't,' the TA explained calmly, 'because you're too far away from the Earth's gravity.'

"Think. Think. Aha! 'You saw the APOLLO astronauts walking round on the Moon, didn't you?' I countered, 'Why didn't they float away?' 'Because they were wearing heavy boots,' he responded, as if this made perfect sense (remember, this is a Philosophy TA who's had plenty of logic classes).

By now the two heroes of our story were really charged up. Remarking on the stupidity of philosophy majors they went

back to their dorm and conducted an unscientific, nearly random phone survey. They selected 30 respondents and asked this question:

1. "If you're standing on the Moon holding a pen, and you let go, will it a) float away, b) float where it is, or c) fall to the ground?"

Encouragingly, they report that 47 percent answered correctly (answers at the end of this article). Next they asked the remaining 53 percent (16 people):

2. "You've seen films of the APOLLO astronauts walking around on the Moon, why didn't they fall off?"

"About 20 percent of the people changed their answer to the first question when they heard this one!" The others? You guessed it! "Heavy boots."

Undaunted, our heroes plugged on. One of them (Wally) was teaching a physical science class, and he gave his class the heavy boots quiz, asking what would happen to the pen and the astronauts. Here are the results:

- 8 people thought the pen would float away
- 5 thought it would float where it is
- 5 said it would drop to the ground

"Of those in the first two categories [sic], several said that the gravitational pull of the moon kept the astronauts from floating away. And some said they were wearing heavy suits. And one said they were wearing lead-weighted boots."

The Internet note listed several of the actual responses to the class quiz, but I'm only going to give you a couple of the more interesting ones:

1. Float where it is 2. They don't fall off the moon because they were anchored to their hip with a rope. The rope was tied to the astronaut (sic) on one end and the ship on the other.

1. Fall to the ground 2. The reason that the astronauts fall to the ground is because the moon has a certain amount of atmosphere. This atmosphere is not half as powerful as the earth's but is (sic) still produces a minute gravitational effect.

The saga goes on: "So a bunch of us TAs got together and gave our physics classes quizzes asking this question. Out of 168 people taking the quiz, 48 missed the question." Again, here are two interesting responses:

From a class in Physics 324 — Modern Physics for Engineers:

The gravity of the moon can be said to be negligible, and also the moon's a vacuum, there is no external force on the pen. Therefore it will float where it is.

From a class in Physics 221 — First Semester Calculus-based Introductory Physics:

External forces that are present on the moon will attract the pen. There isn't gravity on the moon as there is on earth so the pen won't drop.

The original mailer included pages of responses from the students, all indicating a lack of understanding of some fairly basic science concepts. It's no good saying, "Wait! These were *undergraduates*. What do you expect?" This is the kind of material that should be picked up in grades four through six. By *all* students. My guess is that this was presented, and maybe the students did learn it then. However, we live in a society that so relies on received knowledge from entertainment and from authority figures that at a young age we quit thinking for ourselves. What should be simple problems of logic such as these are not attacked rigorously unless circumstances absolutely require it. The usual approach is to pick the most convenient answer and go with that.

I have recently gotten involved in the Science-by-Mail program, which incorporates mentors from science and industry into science projects at local schools. So far, I am finding it an interesting experience, and I believe both the students and the mentors can benefit. I know that one of the benefits I will gain from this is a better understanding of science teaching in the public schools today, and I encourage others to check out the program. Information will generally be available at our meetings.

All right, for you philosophy majors who found this issue of *The Skeptic* on the bus, here are the answers to the quiz:

1. The correct answer is (c) — The pen would fall to the ground (the surface of the Moon, that is).
2. I don't know. If they didn't fall off, how did the astronauts get back to the Earth?

[\[Back to top\]](#)

Is Raw Meat Conscious?

by **Bernard Leikind**

[reprinted with permission from *Skeptic*, the magazine of the Skeptics Society]

Is raw meat conscious? Or is raw meat just dead meat? Maybe this is not the question on the minds of most skeptics, but it was on the mind of Skeptic Board member, Dr. Bernard J. Leikind, when he recently found powerful evidence that top round steak is not only conscious and aware, it is confident enough to prevent burns from a bed of hot coals. Dr. Leikind, infamous for his bizarre adventures as an investigator of firewalkers, visited Tolly Burkan, firewalking guru, to test scientifically the proposition that a firewalker protects himself by establishing the proper mental state. What could be better than strapping a couple of raw steaks to your feet and taking the peripatetic plunge? Dr. Leikind gives us this report of how he spent his summer vacation.

I know it is not the way the average physicist spends his summer vacation, but when a television series featuring explorations of mysterious forces contacted me about firewalking, I thought I would come up with something completely different in the realm of scientific experimentation. The test took place during a week-long program to train firewalking instructors presented by Mr. Burkan at his Firewalking Institute for Research and Education. As emblazoned on participants sweatshirts, "FIRE" is nestled in the forested Sierra Nevada mountains near Twain Harte, California, east of Modesto. The training program was a Summer camp for adults in which arts and crafts were replaced by cheap tricks and self-mutilation. By way of example, do not try this at home: Stand facing a companion. Place one end of a 3/8ths inch diameter, six-foot-long steel rebar on your throat. Your companion does the same. Both of you press together. With surprisingly little force the bar (subjected to buckling forces of a long, thin column) folds and you rush into your companion's arms for a hug to celebrate your amazing power to bend steel. (The camp also doubles as a social gathering place.)

And I will not soon forget how proud everyone was of the puncture wounds inflicted in the flesh between their thumb and forefinger where they had driven a six-inch-long needle. It was not summer camp as I remember it. The climax of the camp, however, was when the trainees practiced one or another form of the ancient rites of firewalking, testing their tootsies and their courage against the glowing embers. One night they tromped the bed of embers to death as done by the Anastaneria of Greece. Another night they marched back and forth 108 times across the coals, following an imagined Hindu practice.

On the night in question, Burkan's charges demonstrated their practices for the television cameras of *Forces Beyond*, a new 26-part series for The Learning Channel (TLC). Circling around of bed of embers--the remains of a massive fire--the firewalkers chanted, beat drums, and danced. One by one they walked, skipped, and danced across the embers. I even managed to stroll across the embers for the camera, though I do not think that the chanting had much to do with my success.

Now it was time for the crucial test. Tolly Burkan claimed that the firewalkers could only succeed by achieving a proper state of mental preparation. Within our attempt to find a mutually agreed upon method of experimental test of the true "force" behind firewalking, Burkan suggested that I be blindfolded and walked across the embers without warning. I politely declined, pointing out that Mr. Burkan could easily do the same experiment himself. He also declined. (Walking blindfolded can be a little tricky as it is; on hot coals one might be burned simply by unsteady steps.) After several more rejected proposals, I finally decided to strap a pair of top round steaks to my feet.* To prevent a "cooling" effect, Mr. Burkan employed two brave firewalking ladies to warm the steaks to body temperature by carrying them under their clothes for an hour. Several experimental questions arose from this paradigm: Would the steaks reach the proper state of mental preparedness to prevent burns from forming? Would the result of the test be "well-done" or "sashimi?" And, most importantly, did anyone have the Worcestershire sauce? Sorry. Everyone at FIRE is a vegan.

Worcestershire sauce or not, the steaks survived uncooked and unmarked by their trek across the fiery embers, demonstrating that they had sufficient consciousness and confidence to protect themselves from the heat.

Despite the success of this remarkable scientific experiment, I think I will leave it off my resume.

** Editors note: Perhaps we should point out here that beef steaks are not the same as human feet.*

[\[Back to top\]](#)
