Astronomical Hazards
by Bob Buchheim (OCA)

The Torrino Scale describes the degree of danger posed by near-Earth asteroids. Perhaps an additional risk-rating scale is needed, to deal with experiences that put the individual astronomer at hazard. This article presents a collated and edited version of a thread from the Minor Planet Mailing List, for the entertainment of OCA members who don't follow MPML. I've attempted to accurately quote, and give proper credit to the original storytellers, but any errors or misunderstandings are my fault.

How Low Can You Go? Last weekend, we (Barbara Toy and I, with a few others) ran the Kuhn telescope down toward the horizon to view Mercury. I don't think I've ever seen it that close to horizontal, and it was a little scary. As it moved lower and lower, a nagging voice in my ear kept whispering "how certain are you that the primary mirror is clipped in properly?"

Once upon a time, I was at the AMOS (ARPA-Maui Optical Station) on top of Mt. Haleakala, and my host pointed out a patch on the concrete floor of the observatory. It seemed that some time previously, the telescope had been pointed downward, with the intent of doing some sort of maintenance, but the technician had failed to secure the 60-inch (?) primary mirror, which tumbled out and fell – thunk – onto the floor. It turns out that huge pieces of glass are pretty tough: it made quite a chip in the concrete, but the mirror was unharmed. Luckily, no one was standing under it!

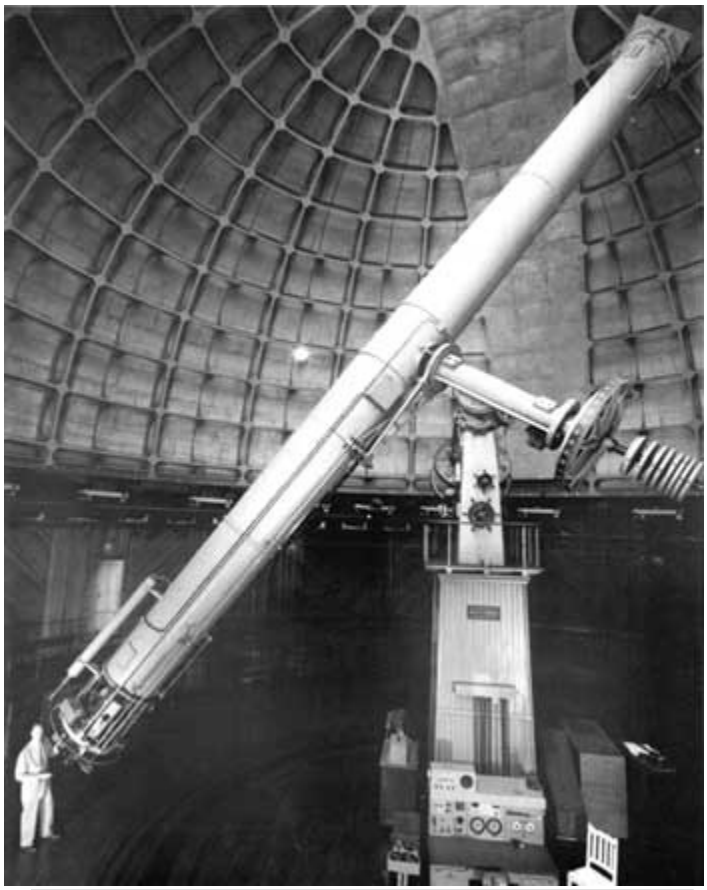
When Men Were Men. *Alan Harris reminisced*, "I once did some observations of an eclipse of Iapetus by the rings of Saturn with the 100" telescope at Mt. Wilson. The event was already in progress as Saturn rose for the night, so we parked the telescope at its horizon limits and waited for it to drift into the field to engage the clock drive and begin the observations. We had the telescope parked at the stops, sitting there for half an hour in preparation for the start. All during that time I was positioning myself on what is affectionately known as "the diving board" that one sits/stands/or otherwise contorts oneself on, in the dark, to reach the Cassegrain focus point on the telescope. This was back in the old days when astronomers were real men and risked life and limb hanging from tall structures in the dark to actually look into the telescope.

"In a previous century, E. E. Barnard went through similar contortions in the dark to visually observe the same event under similar conditions at Lick Observatory. He notes that he chose to use the 12" refractor because he couldn't point "the great equatorial" (the 36" Clark refractor) low enough to start the observations as Saturn rose into the sky. Or maybe he didn't dare climb that high up the ladder to reach the focal point with the telescope on the horizon..."

Michael Richmond noted that "You can read Barnard's own account of this event by going to the Astrophysics Data Service, typing 'Barnard' into the 'Author' box, and 'Saturn Iapetus' into the 'Abstract Words' box. When you press 'Search', you'll receive a list of papers which includes MNRAS 50, 107, (1890), describing Barnard's experiences on November 1, 1889.

The Lick Observatory 36-inch Clark refractor: *This instrument has surprises beyond those posed by tall ladders in the dark, as described by John Oliver:*

"The floor of the 36-inch dome is mounted on an elevator, so that it can be moved up and down to follow the eyepiece of the telescope.



The Lick Observatory 36 inch refractor
see: http://www.cr.nps.gov/history/online_books/butowsky5/images/astro4b2.jpg

"The floor only comes up to a level even with the walkway around the periphery of the dome. In this photo, you can just see the railing in front of the walkway if you look past the middle of the finder scope. This puts the junction of the HA and DEC axes about 20 feet above the floor. There is a spiral staircase on the far side of the pier that allows climbing up on the pier to reach the "captain's wheels" that are the manual motions in HA and DEC.

"With a German equatorial mount, you must "flip" the mount as it passes through zenith. The official procedure for taking the scope to the other side of the pier is to set the clamps and then move the scope with these "captain's wheels". The actual procedure is to unclamp, then swing out, up-and-over, and back down. George Preston, who taught me (John Oliver), was tall enough that his feet never left the ground, although his arms were extended full length. I had to actually leap into the air as I went through the pole.

"As one can imagine, the clamps are not strong enough to hold the scope if a heavy piece of equipment is removed. There are weights hung beneath the floor and they are pulled up and hooked onto the scope during equipment changeovers. There was also a safety cable that protected against mistakes. One night (the story goes) the night watchman (Red ... ???) heard faint cries from the dome and found an astronomer hanging from the ring at the back end of the scope, his toes just touching the floor. He had forgotten the weights and could not quite pull things down to where he could reach down and grab one.

"Somewhat more serious was the afternoon when an assistant did something similar but with the very heavy automatic camera developed by Stan Vasileskis. The scope went up (sans weight or safety cable), and the assistant hung on until the scope was horizontal, carrying him dangling 20 feet above the floor. Fortunately Ollie, the janitor was on the floor at the time. He rolled the camera out of the way so that the assistant would fall on the floor, not the camera (it was all sharp edges and would have been a pretty bad thing to land on).

"The event occurred about 3:45PM Friday afternoon. Most of us were at the Friday afternoon colloquium. Al Whitford (the director) and most of the other astronomers were seated in the front row. His secretary Mrs. Dyer came in quietly and whispered in his ear. He got up and rapidly but calmly left the room. Five minutes later Mrs. Dyer came in again, and whispered to Dr. Stan Vasilevskis who leaped up and nearly ran out of the room. The speaker droned on seemingly oblivious as most of us wished that he would finish up quickly. As 4PM (normal end of the colloquium) passed, the speaker showed no signs of quitting. Time passed ... 4:10 ... 4:15 ... and the sounds of a helicopter became louder and louder. At about 4:20 it was apparent that the helicopter was landing just outside the conference room on the parking lot rimmed by the "parapet" and a several hundred foot drop.

"At this point the speaker said something that could (by perhaps some long stretch of imagination) be interpreted as a conclusion. One of the remaining senior staff stood up rapidly, said "Thank You very much ... are there any questions for our speaker? ... No? ... Well then, again thank you", and the room emptied as we all went out to see just what had transpired.

"We learned later that, to his credit, Dr. Whitford appeared to have hesitated at least 5 seconds over the prostrate form of the assistant (he was, after all, conscious and not moaning very loudly) before going across to the far side of the floor to examine the 36" objective. It is unclear whether Dr. Stan paused at all, but then he was the astronomer responsible for the big Clark.

"After the helicopter ride to a San Jose hospital, the assistant was found to be "OK" but he was kept overnight anyway for monitoring. In the morning they took additional X-rays and found dozens of hairline fractures of the vertebrae. He ended up in a full body cast for many weeks. He made money on the deal though, since his insurance had a payment for every broken bone, and he had a bunch!

"Oh yes ... the wooden frame that held the window shade used as a dust cover absorbed the impact and the objective was unharmed."

Alain Maury remembered another tale about this wonderful telescope: "Was it also at Lick (I am not sure anymore) that an observer used the elevated floor to observe lying horizontally on the floor? He had the control paddle for the floor lying next to him. He was caught observing before the meridian (i.e. telescope end getting closer to the floor), when the control paddle was out of reach and the big refractor was threatening to crash his head. He had to yell, and according to the story I was told, was freed by another observer who heard the yells."

Fallin' From Ladders: *Reiner Stoss commented*, "I think most of us have been there before, falling from a ladder when trying to look through an impractically mounted finder scope or whatever. I know somebody who fell from a pretty big Schmidt and displaced his nose by 1 inch (to quote him). So asteroids not entering the atmosphere can be dangerous too!"

To which Alain Maury responded: "Couldn't have been me... I broke my left femur in 1982 when falling off a pretty big Schmidt (with the ladder). However, when I broke my nose in 1998, I was going out of the dome, walking on ice, with my hands in my pockets. Never do that! And my nose was displaced by only a half inch. Well, OK, a good half inch. I remember seeing my nose taking up much more space than usual from my left eye, and none with the other.

"I also have a large scar on my right elbow from a cut with some pieces of metal (for a telescope fork) which I was loading into my car: 10 stitches. The nail of my left big toe never grew normally again after I received the lift of a truck on the foot, while unloading some H2 bottles at Palomar. Then again, when you spend most of your time doing astronomy, most of the accidents you can have are bound to be related to astronomy. All and all, in 30 years of observing, four accidents are not that much. :-) Even if a real man would have avoided them... :-)"

"There have been a lot of horror stories like this. People are working at night, are tired, and do stupid things. In the 30s, an observer at the Nice Observatory refractor (30inch, 17.89m focal length) was recovered on Monday morning by the janitor. He fell from the ladder during Friday/Saturday night...

Piazzi's Peril: *Edwin Goffin wrote:* "Dear, we all seem to forget the history of our trade! Not only did Giuseppe Piazzi find the first minor planet, he also was the first minor planet observer to break his arm when he fell off of a ladder while observing through one of Herschel's telescopes."

Messier's Mishap: *Gene Lucas recalled,* "There is of course, the ancient story about poor Charlie Messier, who fell into a deep 'cold cellar' while returning from an observing session in the dark. This happened in his old age, and evidently he never fully recovered from his injuries after the fall.

"I was told by a former Senior Observer at Kitt Peak that there was a certain astronomer who was under orders to always wear a construction helmet when working at the 84 inch, after he knocked himself unconscious by bonking his head on the massive fork mount. This episode had evidently been repeated once or twice before the helmet injunction was imposed. (The 84 inch has a rising floor platform, and the huge boxes of the steel fork arms could present quite an 'immovable object' in the dark.) This same Senior Observer told me he once took a spill on the icy floor outside the control room of the 4-meter, and only saved himself from a nasty fall of 1 ½ stories down to the mezzanine by hooking an arm around the railing as he slid over the edge".

Yikes at Yerkes: *John Mahony remembered,* "There was a story in Sky & Telescope a couple of years ago about the building of Yerkes Observatory. Shortly after opening, the entire movable floor collapsed. Fortunately, no one was observing at the time, so they only had to worry about whether the shock of the crash had damaged the scope. Once they repaired the floor, they aimed the scope at a bright star, and were shocked to see bright rays of light scattered from the star at fixed angles. Thinking the objective had cracked, one worker was drafted to climb the dome and take a look from the front end. It turns out that during the downtime, a spider had spun a web behind the objective!"

Walking the Plank: *According to John Oliver:* "In the old days, the 36" Crossley English mounted reflector was used at prime focus. To work near the zenith one "walked the plank" by sliding out seated on a metal reinforced board stretched across the walkways that came up on either side of the tube. You sat in the dark about 16 feet above the polar axis and 20-30 feet above the floor (depending on which floor you hit after bouncing off the axis). Your head was only about 2 feet from being outside the dome and it was bloody cold in winter."

That memory took John Oliver back to Mt Wilson: "George Preston was checking out his equipment at the cassegrain focus of the 100-inch when he released the clamps ... the scope had been left unbalanced (a major no-no) and it nearly squished George. It did do damage to the platform he was working from. (Was that called the diving board? I never worked at the 100-inch cassegrain)".

To which Alan Harris replied, "Yes, the 'diving board'. It's the only way to reach the cassegrain focus. Then there's 'the ride'. That's when you run the horizontal motion of the diving board into the yoke of the mount while also moving the diving board vertically, which results in derailing the chain drive for the vertical motion (another major no-no). The result is that the diving board free-falls to the floor, with the hapless observer on it.

"'The ride' has been taken twice, by the same observer, so it isn't usually fatal, but close to it. I haven't taken 'the ride', although I once ran the chain into the yoke in the same fashion that results in 'the ride', but stopped before the chain derailed."

Richard Kowalski opined that, "Of course the dangers of the telescope are only one part of the night's hazards. I'm sure people could relate a number of encounters with wildlife, human or otherwise, that posed a similar threat as operating the telescope."

And Alan Harris obliged: "Well, there was a tale of one astronomer who was sitting on the diving board guiding a multi-hour exposure in the dark when something warm and furry crawled into his lap. A skunk? A cat? The 'cool hand Luke' astronomer continued his exposure, stroking the animal, whatever it was, to sleep. After completing the exposure and turning on the lights, he discovered a raccoon, apparently a somewhat domesticated one without much fear of people."

Music of the Spheres: *Ron Dyvig shared a romantic memory:* "I'm sure there are more than a few members of this list who have climbed the ladder inside the dome of the Steward Observatory 36" (now known as the Spacewatch telescope), and crawled on top of the dome...at night! It's scary...but also rather enchanting! I recall doing it back in 1970. From atop the dome one could hear Beethoven and Puccini rolling off the mountain from the 84" and other telescopes. This gave us something to do while taking turns on the offset guider. I don't recall hearing of any injuries suffered by ambitious climbers."