

EVENTS CALENDAR

(unless otherwise noted, all events are at the Edwin Ritchie Observatory, Battle Point Park)

JUNE

- JUNE 10 10th anniversary Mars exploration "Spirit" launch
- JUNE 11 Gamma Delphinids meteors peak
- JUNE 15 6:00 p.m. BPAA Potluck open to members and friends. Off-site
- JUNE 16
50th anniversary first woman in space (Valentina Tereshkova)
- JUNE 18
30th anniversary first US woman in space (Sally Ride)
- JUNE 20
Summer Solstice (10:04 p.m. PDT)
- JUNE 23 ○
Full Moon (3:32 a.m. PDT)
Largest tidal swing of the year
- JUNE 30
105th anniversary Tunguska meteor explosion

JULY

- JULY 5
Earth at aphelion (1.017 AU)
- JULY 7
10th anniversary Mars rover launch (Opportunity), 25th anniversary Phobos 1 Mars launch
- JULY 8 ● New moon
- JULY 12
25th anniversary Phobos 2 Mars launch
- JULY 13 8:30 p.m.
Planetarium Show and Stargazing
- JULY 21
40th anniversary Mars 4 launch
- JULY 22 ○
Full Moon (11:16 a.m. PDT)
- JULY 25
40th anniversary Mars 5 launch

Calendar *cont* on page 2**Quarterly**

www.bpastro.org Bainbridge Island, WA

Lucky Double Sevens*Iridium Satellite*

CALENDAR NOTES: This summer looks especially promising for August's annual Perseid meteor show. The young moon will set early (as young moons always do) leaving evening's prime viewing hours dark and ideal for meteor watching. Sure, some may skip the predicted peak in the early morning hours of Monday, August 12th; and Puget Sound weather does not always cooperate. But the Perseids will be quite strong for days on either side. In particular our public Star Party,

Saturday August 10th, should offer excellent views. You don't need a telescope or even binoculars. Just bring your eyes, maybe a thermos, and, if you really need technology, perhaps a nice reclining lawn chair would do wonders for your back.

By tracing back the paths of meteors, meteor observers learn that, on any given night, most seem to emanate from a particular spot in the sky. In August that spot tends to be Perseus, the constellation honoring the Greek hero who famously rescued Andromeda, the chained namesake of another celebrated constellation. Both groupings are well placed in August's skies and filled with splendors, whether or not you view by telescope.

The most distant object visible to the unaided Bainbridge Island eye is Andromeda's great galaxy, our neighbor, M31, whose light takes us back 2.5 million years. (From somewhat darker locations the Triangulum Galaxy, M33, at 3 million light years, and, under truly exceptional skies, M81, at 12 million light years, extend unaided eye distance records.) By contrast Perseid meteors burn up in Earth's atmosphere at far more human-comprehensible heights of mere tens of miles. Partly because they're so close, meteors are best seen without a telescope; and partly because it's so far away I feel a delightful thrill every time M31 graces my unaided eye. However, unlike meteors, galaxies reward telescopic observation.

There are so many kinds of telescopes — tilted Schiefspiegler, steerable radio dish receivers, and buried ground current sensors are among the more exotic — but most are fundamentally either reflectors or refractors. Amateur astronomers often engage in friendly banter over the relative merits of each. Summer's mythological skies give a faint nod to the light bouncers; reflector fans can rightfully boast that Perseus would be nothing without his mirror. Perseus slew the snake-haired Gorgon Medusa, a monster so hideous that a single glance at her turned men to stone, by not looking at her at all, instead viewing her reflection upon his polished shield whilst he hacked off her head.

Refractor fanatics often accuse reflector heads of similar trickery, of seeing only a reflection of the universe, while they look straight at her (conveniently

Calendar Notes *cont* on page 2

ignoring their dielectric diagonals). Regardless how one forms their primary image—by mirrors, lenses, catadioptric combinations, or the unaided eye—experienced observers learn that the more subtle details of the universe are often best observed by slightly averted vision.

A similar trick is useful while watching meteors. Novice meteor observers often try looking directly at the radiant, in this case Perseus. Yet it is usually better to look some distance to one side. Staring directly at the radiant one will see meteors; but they tend to be the ones coming straight at us, so we see them as suddenly bright points of light with, at best, a relatively short trail. By simply moving one's gaze a bit away from the radiant's center, the impressive long and persistent trains, for which the Perseids are justly renowned, are likely to be seen.

I thought it was a head-on meteor the first time I saw an Iridium flash. So amazingly bright, brighter than Venus—frankly I didn't know what it was. Meteor was my guess; though I reckoned the chance of seeing that bright a meteor exactly head-on rather remote. A few months later I heard about Iridium.



Iridium flash

The original Iridium phone satellite plan called for a “constellation” of 77 satellites. Presumably they thought themselves clever to name their project after element #77, Iridium. Though double sevens may seem lucky, the company filed for bankruptcy less than a year after its founding, during Perseid season, on Friday the 13th of August, 1999. They had managed to loft a functional fleet of 66 satellites

(which continues operation today, under new owners). It's probably good they'd already named their project. Dysprosium, element #66, has a rather dysfunctional ring.

I've never used—I've never even seen a sat phone; but I have seen the glint of their satellites many times since. They are amazingly bright—at times outshining everything besides the Sun, Moon, and a few very rare bolides. Iridium glints are visible almost every day (depending on the weather, of course), and spectacular flares of mag -7 or brighter happen nearly every week. Although heavens-above.com includes a "prediction accuracy deteriorates" warning (issued whenever venturing much beyond a fortnight) it seems that July's public Star Party will feature a very bright flash. Iridium 72 is predicted to reach mag -6.6 at 23:22:53 PDT on July 13th. For a few seconds it should be bright enough to cast shadows across the entire island!

Purists come in many forms. Some deride the chromatic aberration of achromats, others complain about the coma in reflections. A few even ask whether the observation of man-made objects is a valid astronomical pursuit. After all Astronomy is a term derived from the Greek word for star, so perhaps it should, in the strictest sense, be a practice limited to stars only. My answer is two-fold. First, satellites inspire hope that someday man may reach the stars. Second, satellites shine by reflected starlight (in this case, Sol's). Thus satellites are like planets; heavenly bodies that reflect starlight.

It is more difficult to argue that Perseids are astronomical. They shine by atmospheric friction, no starlight involved. My take: meteors rock. If you must, call 'em shooting stars.

If only all arguments were as benign as refractor vs reflector, starlight vs atmospheric. Typing in “Battle Point” as your location at heavens-above.com provides predictions for lots of satellites. A sobering recent addition is

the otherwise unnamed North Korean satellite.

One battle worth fighting is the battle for knowledge. To learn more about the stars (and other celestial treats) join us at any of our always open-to-the public Planetarium Show and Stargazing sessions. Yes, some of us may share differing opinions. But we all love sharing the heavens above.

—Cheth Rowe

JULY 26

50th anniversary Syncom 2 launch (first Geosynchronous communications satellite)

JULY 31

Mars Spring Equinox

AUGUST

AUGUST 6 ● New moon

AUGUST 6-11 Oregon Star Party

AUGUST 7-10

Table Mountain Star Party

AUGUST 10 8:00 p.m.

Planetarium Show and Stargazing

AUGUST 12

Perseid meteor shower peak

AUGUST 20 ○

Full moon (6:45 p.m. PDT)

AUGUST 26 Neptune at opposition

SEPTEMBER

SEPTEMBER 5 ● New moon

SEPTEMBER 14 7:30 p.m.

Planetarium Show and Stargazing

SEPTEMBER 19 ○

Full Moon (4:13 a.m. PDT)

Any member who is planning to observe can invite others to join in by sending an email to bpaa@yahoogroups.com. To join our email group, send an email with your name to bpaa-owner@yahoogroups.com and we can enroll you. If you want to have web access to the messages and files, you can join the Yahoogroups by clicking the register link for new users on <http://groups.yahoo.com/>. Request to join at <http://groups.yahoo.com/group/bpaa/>. The system will send us a message, and we'll approve your request after we verify your membership.

I Saw the Keck and You Can Too



For me Mauna Kea, and the Keck in particular, are shrines to science. So when my wife and I laid plans to go to Hawaii, I hoped to visit. But I wasn't sure we could. We asked friends and consulted the Internet, but still didn't know what we would find when we got to the Big Island. Would we be able to get to the summit? See any of the telescopes? Would we need a guide? We had heard that car rental companies would not allow us to drive anywhere near the mountain, let alone to the summit. It is nearly as high as the summit of Mt Rainier, after all.

So what did we find? Yes, you can take your rental car to the visitor center, which is at about 9000 feet. It's not a hard drive. The road is paved and in good condition. Just be sure to tank up before you head away from the coast. Beyond the visitor center the road is dirt, much steeper, switchbacks and washboard. That part is off limits to rental cars. That is to say, nobody will stop you going there but you will have voided your rental contract. If you get into trouble it's a very long way in a tow truck. There is one exception. The Harper car rental company's slogan is "The Only Way to the Top." They allow you to take their 4-wheel drive vehicles to the summit, but they aren't cheap. The other way to get there is to go in a tour bus (4-wheel drive minibus) or bum a ride with someone else who did rent a 4-wheel drive truck. We chose the latter, and it was easy to get a ride, since there are four seats in 4-wheel drive trucks, many couples visit Hawaii, and many telescope geeks visit the Keck. So we fit right in. You can also go ahead and drive your 2-wheel drive rental to the top. I don't think I would do that. It's pretty steep, and the altitude means the car will be struggling with low oxygen.

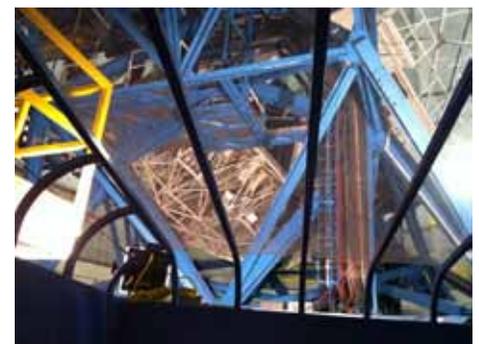
If you have a 4-wheel drive vehicle you can join a convoy from the visitor center for a free guided tour to the summit. You will be allowed inside one of the observatories (the Keck in our case) and shown around outside some of the others by a very well-informed guide (in our case an Astronomy student — and enthusiast — from the University of Hawaii). Even if you make your own way to the summit



you can still join the group, but only 4-wheel drive vehicles can join the convoy going up. However you get there, you will need warm clothes. And, there are a few restrictions about

who can go. Nobody under 16 years or pregnant. Nobody with respiratory or heart ailments. Nobody who has been scuba diving within the previous 24 hours. And there are frequent warnings about low oxygen levels, being careful not to faint and so on.

What does it mean to say 'you will be allowed inside one of the observatories'? It definitely does NOT mean you will be able to look through the telescope. Actually nobody gets to do that because these telescopes do not have eyepieces. They have cameras and other instruments. It means your group will be allowed into a small glassed in room from which you can see the telescope. You can't roam around and you can't see a whole lot from the viewing room but it was a lot more than I had expected to be able to see. I found it a bit disorienting though. Maybe it was the low oxygen. There was a lot of mirror. Very shiny of course. Also, a lot of trusses making up the structure of the scope. The dome is huge, but the telescope is too, and it's packed in there pretty tight. You can't step back and get a perspective view. It was hard to tell if I was looking at a structural part of the telescope or a reflection of it. But it was a thrill to see it.



Our guide said that it is possible to arrange much more extensive tours by contacting the operators of individual telescopes, but she did not know anything about how to do that or what the requirements might be. This is because she works for the University of Hawaii, which operates the site, and each of the observatories is an independent organization with its own staff, rules and budget. I hope to someday arrange a more extensive tour inside one of the observatories.

After dark, back down at the visitor center, the staff brings out a large number of very nice amateur telescopes for public star gazing. Again, there was a group of very well-informed



docents. This is an opportunity to see some southern sky objects that are never visible from Bainbridge Island. In fact the visitor center is a spectacular observing site. It's at about 9000 feet, warm(ish) and dry. Being near the tropics, it gets dark much earlier in the evening than it does at home in the summer. The down side is that there can be a lot of visitors —well over a hundred the night we were there — so there can be long lines at the better telescopes. Also, it seems that many people like to stay on the summit to watch the sunset. There were a lot of cars and minibuses coming down that road right past the visitor center and sweeping the patio with their headlights. Frustrating. But, if you are willing to stay late enough, you can out-last them and the crowds. You just have to be prepared for a long, late-night drive back.

— Malcolm Saunders



Sundial Project

Are you moved by the light?

Four years ago the BPAAs Board accepted a design for a significant, fully-functional sundial sculpture proposed by Bainbridge Artist Bill Baran-Mickle. The 10-foot tall metal and stone sundial will be installed on the berm just north of the Observatory. Russ Heglund, Board member and chair of the Sundial Committee, says the sundial will be both educational and be something beautiful that keeps time. BPAAs hopes the sundial will be a gathering place and will also enhance the experience at Battle Point Park. It's also the first element of BPAAs's ambitious long-range plan to improve the Edwin E. Ritchie Observatory.

The time has come for BPAAs to bring our sundial dreams to fruition. We've raised about half of our goal of \$25,000 largely through word-of-mouth fundraising and small cash donations during observatory events and at the Grand Ole Fourth booth. To get the rest of the way, we are planning a series of fundraising events in the very near future, including a crowdsourcing campaign. Follow our progress by liking us on Facebook, following us on Twitter (@BPAAstro), and signing up to receive our YahooGroup emails (*see box on page 3 for details*).

But why wait? Your donations to the Sundial Project are welcome at any time. Simply mail a check (payable to BPAAs; write "Sundial Project" on the memo line) to BPAAs Sundial Project, PO Box 10914, Bainbridge Island, WA 98110, or use the Donate! link on our web page. Mention "Sundial Project" in the comment field of the online form to ensure your donation helps the sundial see the light of day!

And be sure to check us out, or perhaps volunteer, at this year's Grand Ole Fourth celebration and also at the Bainbridge Bluegrass Festival on July 27th.

—Frank Petrie, Sundial Committee



Steve Ruhl President's Message



Volunteers

Coming this summer, we have a need for your help. Our observatory is in need of some work. Our facilities officer, Nels, has a laundry list of maintenance items from simple cleaning of the dome, to rebuilding the doghouse (the box next to the dome on top of the observatory). As drier weather approaches we will be sending out emails requesting help. If you can, please do so. Our facility is eighty or so years old and does need a fair amount of work.

We will also need some assistance with the 4th of July booth and the Bluegrass



festival on July 27th. Both events are a meet and greet the public and are a lot of fun. If you drop me an email, I will make sure we include you in our planning. Thanks.

New Board Member

Please welcome Dave Janich to the position of Chief Astronomer. Dave took our series of Amateur Astronomy classes and Dave Fong's Intro to Astronomy course at Olympic Community College. He has been active with the club becoming the czar of the Losmandy mount and the head of the

telescope loaner program. Dave is a tinkerer, well-suited to the position of Chief Astronomer and to maintaining and continuing to improve the Ritchie Telescope.

Sundial

A major focus for our organization for the past few years is building a sundial on the berm north of the observatory. Now that we have official permission from the Bainbridge Island Metro Park & Recreation District, we are working on completing the funding for the sundial project. We are roughly at the half way point of the ~ \$25K required. The process of generating donations is slow but steady. We continue to apply for grants but there are many organizations out there and the competition is pretty fierce. And while I think our sundial is a noble cause (public art and science education), granting agencies may have other more noble goals such as feeding the homeless. I am still hopeful that we can find alternative granting sources and complete funding for the sundial. If you know of any agency or foundation that may be interested in supporting our project, please let me know.

Nels' Laundry List

- repair the water leak in the dome
- rebuild or reside the dog house and build a protective wall
- refinish the front doors
- clean the carpet
- install a fan in the upper corner of the meeting room
- cut hole and install covers in the meeting room door
- seal the awning over the front door
- wash the inside of the dome
- install wainscoting in meeting room
- raise the floor in the dome
- repair sheetrock and repaint

If you'd like to lend a hand, through donations or volunteering for a work crew, contact Steve, or Nels Johansen, BPA A Facilities officer, facilities@bpastro.org.



Rough wall inside the Observatory

Two Towers Observatory



The site staked out.

A permanent home observatory has long been one of my goals. At two of my three previous houses, I constructed permanent piers, without additional structures. But this time, after a good deal of family give and take, I built more.

“GIYF” (Google is your friend), or Decisions, Decisions

You can examine the cost versus the benefit of every option and construction technique. Dome versus roll-off roof is just the beginning. The web is a wonderful source of other people’s observatory construction ideas. This guy did his roll-off with rubber wheels on a track, this guy used garage door track wheels, this guy used a concrete pier, this guy has a bolted steel pier, and this guy has a steel pier that goes up and down. It becomes mind-numbing.

Design

Planning the details of an observatory is a long process. Use as many sources as you can. Learn from other people’s problems. And nothing is going to be perfect so you need to be adaptable. I used Sky Shed plans, but they only offered 6’ x 8’ and 8’ x 10’ observatories, and I wanted an 8’ x 8’, so I adapted the plans.

Harry Colvin, BPAAs member and past BPAAs president, has had his own observatory for a number of years. It has settled several inches. Like me, he’d used Sky Shed plans. Currently, his scope just barely clears the roof. So I modified the plans again, setting my foundation piers in concrete and making them adjustable.

“A real man doesn’t need a manual.” – Tim (The Tool Man) Taylor

At an astrophotography conference I heard a speaker who had constructed an observatory much like the one I was planning. He installed a garage door opener on it so he could close it from his house. The one down side: the garage door opener fob was thrown in a drawer, causing the the observatory to open during a downpour, ruining several thousand dollars of equipment. So my garage door opener requires a PIN. Not completely fool-proof, but I am working on that.

“Instructions are only for people who don’t know what they are doing.”

– Bob the Builder

Sky Shed uses garage door track wheels. I do not like the way they work—cantilevered so they cannot take much load, riding in a track, moving laterally and making a lot of noise. You need one every eighteen inches or so and at eight dollars a wheel, they are not cheap. I have used a grooved caster in other applications and

liked the result. The grooved wheel can sit on a sixteen-foot piece of angle iron track. They are six dollars a wheel and each wheel can hold 750 pounds. The one advantage the garage track does have is that it captures the wheel so it cannot move vertically. This could be important in a strong wind, so I added a series of ½” steel pins in each of the corners to prevent the roof from being blown off in a storm. I am not inclined to observe while a storm is blowing so I am not concerned about this issue when the roof is opened.

Construction

Call the city for a utility survey before you dig: It’s free and they come out pretty quickly. In my case my site was near two water towers, and so, likely to be near a water main. The city came out and marked the location of a twelve-inch water main. They also told me that there were wires for telemetry buried in the trench between the two water towers, and that the water main should be four feet down. They were wrong about that — after some careful digging I found the main eighteen inches down. After the survey I moved the observatory site westward.

My first step was to stake out the site with special attention to the location of the pier. The pier is the most significant piece of the observatory. Whether you use a concrete pier or bolt a steel pier to a concrete footing, the foundation must not flex. It needs to be below the frost line, and massive. Mine goes down four feet and consists of concrete, rebar, rocks, and other suitable aggregate, topped with a set of cinder blocks that provide a level surface. I used a 12” Sonotube to form the top 4’ pier, placing conduit for cables to control the telescope inside.

Once I filled the tube with wet concrete, I placed six foundation bolts that I then bolted to my telescope mounting plate. Once the concrete cures, I can remove the plate and do any required machining. Eventually, I’ll



Close up of top of pier showing foundation bolts and conduit

smooth the pier by filling the voids with grout and painting it.

For the building, I used pier blocks set in concrete with adjustable brackets to hold the 4x6 floor members. Even though nothing is touching the ground, I used pressure treated floor joists. The floor and walls are standard stick construction, 16" on center for both.

I wrapped the frame in Tyvek, a membrane that keeps water out, and covered it with siding.

For the roof support structure/ pergola I used 6x6, purely for the esthetics — 4x4 construction would be sufficient for roof support.

I center-drilled the two vertical 6x6s to allow for an adjustment bolt on the bottom. Placing the horizontal 6x6 on top of the two vertical 6x6s was the single most difficult part of the entire construction, because of the sheer mass of the pressure treated and semi-water-logged 6x6.

On the top of the end box structure on the pergola I laid angle iron tracks for the roll-off roof. I also placed a weather station on the end

of the pergola, out of the way of roof movements. And of course, I cannot wait to try it.

I next placed the angle iron tracks and the carriages for the wheels. Each side has three wheels sandwiched between two 2x4s. Then I placed the 16' lengths of angle iron along the two top edges of the observatory and pergola, placed the carriages on top of the angle iron, and clamped several cross members to connect the two carriages. After checking that everything was square, I moved the structure from the observatory to the pergola and back again. Once I was satisfied that the angle iron tracks were properly located, I secured the track, tied the two carriages together with a couple



Observatory clad in siding and the pergola in place

of 2x6s at each end, and installed a set of rafters straight from the Sky Shed plans. I chose a metal roof. Now that I had accurate measurements, I could go ahead and order the roof.



Pier with Floor and Wall Construction

Zero Light



Waiting for a roof

While waiting the ten days it took for the roof to arrive, I proceeded with electrical and drywall work. I put in outlets for all of my telescope stuff, the garage door opener, and two sets of lights (one red, one white). At the point where the electricity comes into the observatory, I installed a ground-fault interrupt plug for safety's sake.

When the roof came, I covered the rafters with 3/8" plywood and tar paper and installed it.

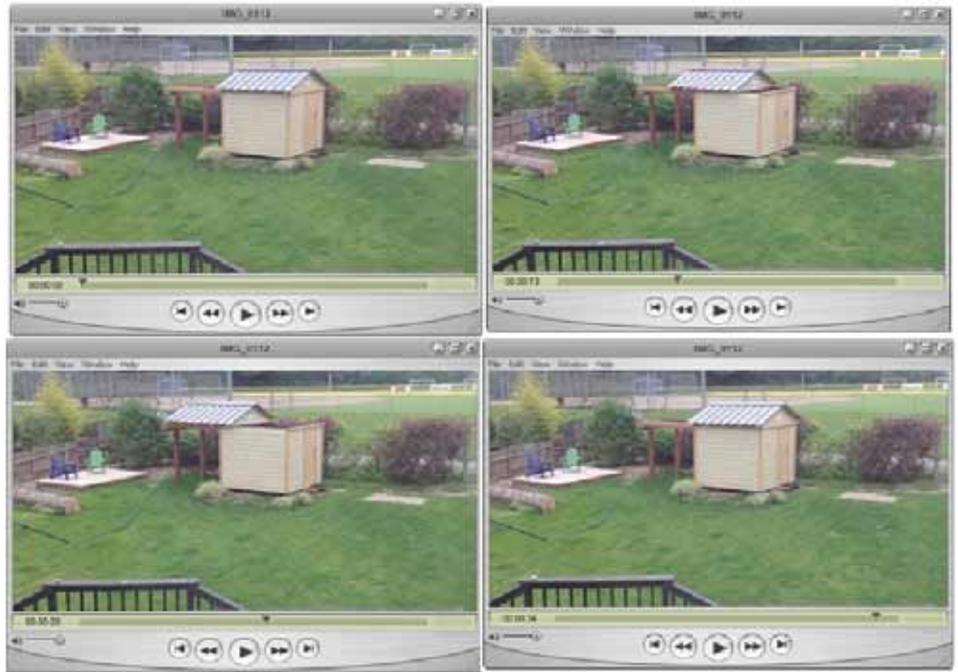


The metal roof

Next I installed the garage door opener. This is what you might call a specialized installation. The instructions are only rough guidelines. I trimmed about one foot from the belt and about six inches from the track. Oh, and the track is inverted since the roof is above the opener. I also had to disable the safety closing light. I set the force of the opener as low as it will go. I can stop the roof from opening by simply grabbing the roof and holding it.

I painted the interior with flat black to minimize stray light, then installed a few shelves and a couple of webcams. Victory!

So what is next? I am of the opinion that you always tinker with telescopes and I am sure the observatory is the same, so it will never be complete. I still need to dig a trench to connect the electricity: but that will not happen till



Clips from the remote opening testing movie



All ready to image

after my daughter graduates in June. I'll give it a coat of paint sometime this summer.

And then there is always more automation.

If you are so inclined, I would be happy to show you around. Just let me know. I'm placing The Sky Shed plans in the BPA library. — *Steve Ruhl*



First Light — M97 & M108

Seeing Stars....Astronomy 0.001



The Spiral Galaxy from Battle Point

A clear, warm night:
Lying on the grassy slope
You ask, “Where am I?”
“Here,” replies a classmate.
Someone else adds, “Now.”

From left to right, unending,
A fulgent swath of winking puzzles
Challenges you insistently: What? Why?
Clusters, holes, patterns,
Urgently encrypted messages.
Relentlessly the world’s halo
Rushes across your sky.
“Hold still,” you call.

You haven’t stirred, and yet
Your friends have grabbed your hands;
“Steady there,” they shout; “hold tight!”
“Where are we going?” a voice cries,
And others, “Flying, spinning,
Swirling, faster, faster,
Faster.”

“Help!” spirals round you.
“I’m tumbling inward.”
“Or flung away?”
You hear yourself,
“Let me off. I’m dizzy.”
“Not yet,” the answer echoes in your ears;
“One turn’s two hundred thirty million years.”

— Anna Edmonds

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