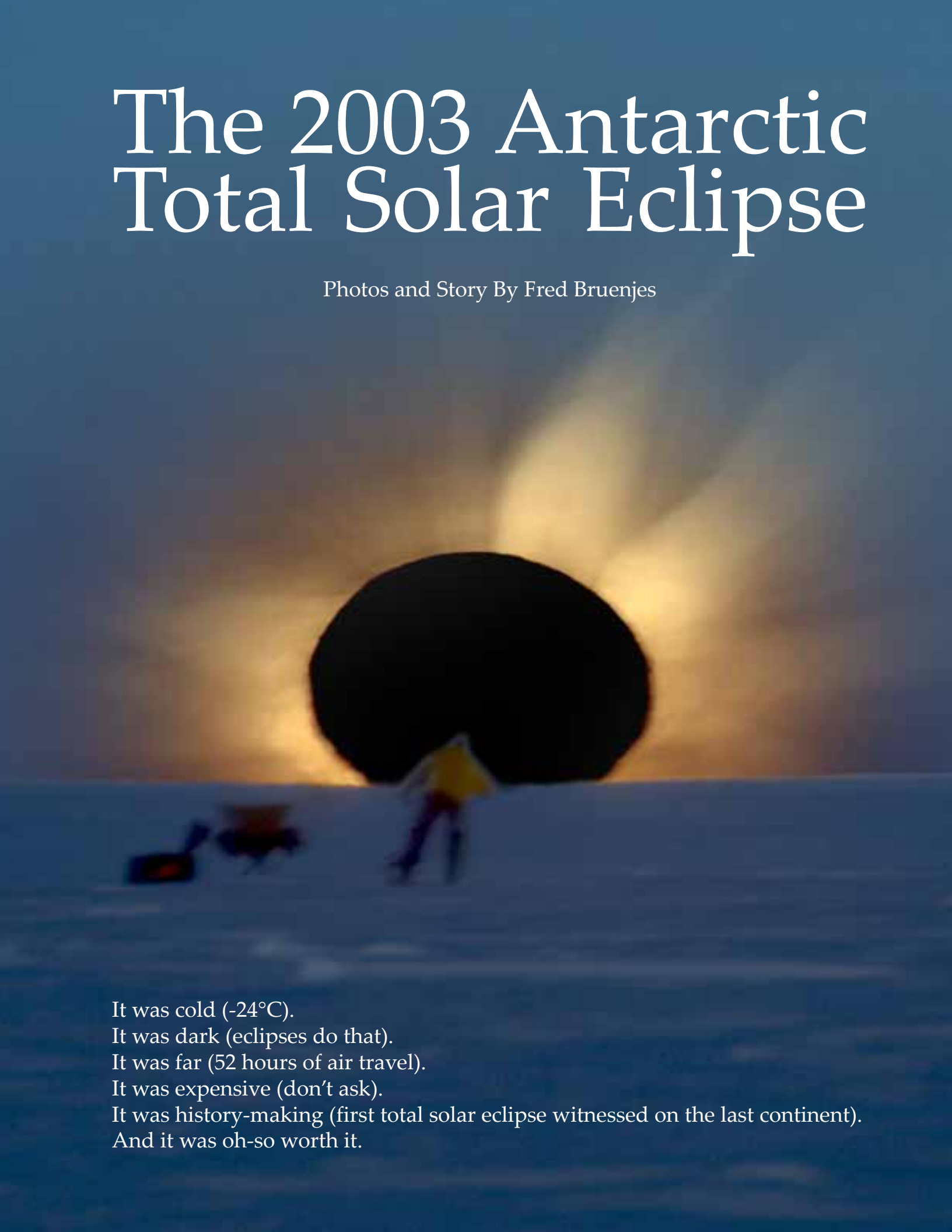


# The 2003 Antarctic Total Solar Eclipse

Photos and Story By Fred Bruenjes



It was cold (-24°C).  
It was dark (eclipses do that).  
It was far (52 hours of air travel).  
It was expensive (don't ask).  
It was history-making (first total solar eclipse witnessed on the last continent).  
And it was oh-so worth it.

# Map of Trip



Note: With about 90 people on the trip, I only got to know a few people. Please don't be offended if I didn't mention your name!

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For updates and other trip journals, please visit <http://www.moonglow.net>  
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## Map of Area Visited in Antarctica



Above is a satellite image of the area I visited. This map covers roughly 300km (200 miles) from top to bottom, and North is to the upper left. The leftmost X marks the site where I observed the eclipse from. The area is in among the Institut Geologii Arktiki Rocks. The cigar shaped rock outcrop just above the two X's is the Schirmacher Oasis, where the Russian Novolazarevskaya base and the Indian Maitri base are located. I overflew the bases, but didn't have time for a ground visit. The upper X is the location of the ice runway I landed on, and base camp. The darker blue color is bare exposed ice, the snow has been blown off by the fierce katabatic winds. At top left is the ocean, littered with sea ice and icebergs. Just inland at the top middle is India's old Dakshin Gangotri base (too small to be visible in this image). Near the bottom left of the image in a small bluish patch is the Blue-1 ice runway. At bottom right are the Wohlthat / Drygalski Mountains. The lower-right-most mountain in the image is about where the Lazarev meteorite was found. It was the first iron meteorite found in Antarctica, in 1961.

# Introduction

My hobby of chasing solar eclipses to remote corners of the globe continued this fall with a trip to Antarctica. I was part of the Astronomical Tours expedition to the Schirmacher Hills area, on the Princess Astrid Coast in Dronning (Queen) Maud Land, Antarctica. This area is near the coast of the continent, south of South Africa.

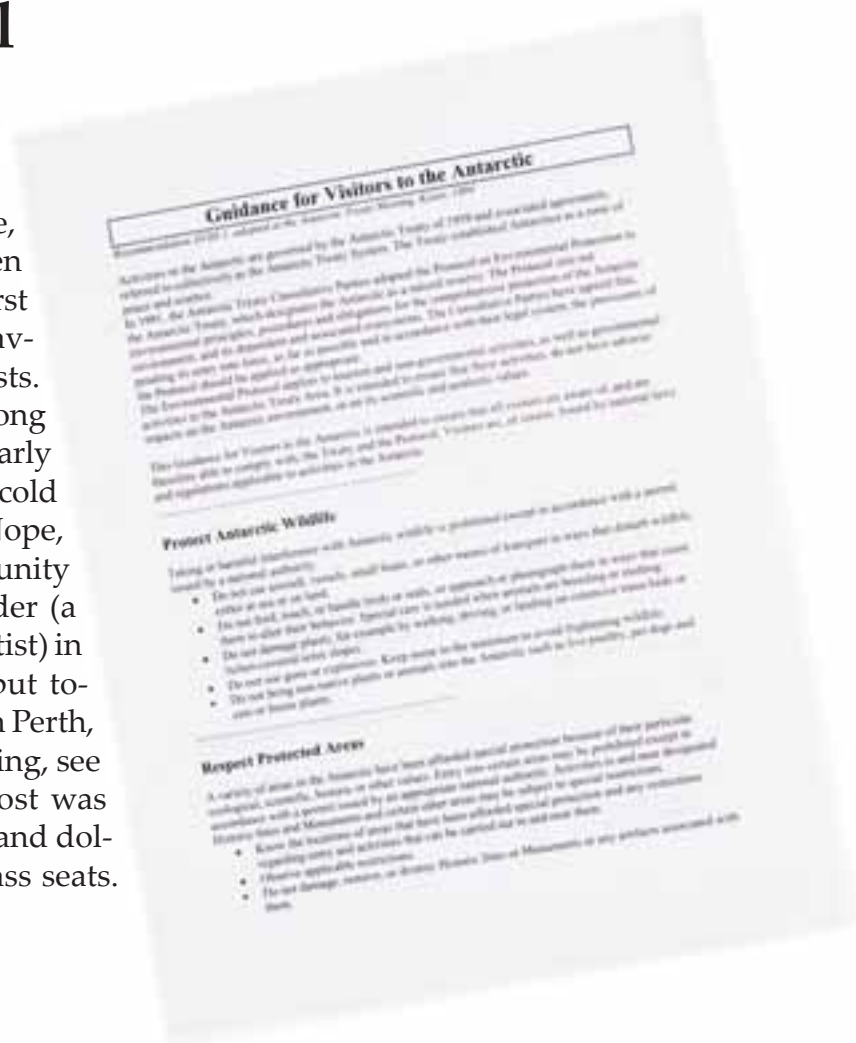
What is a total solar eclipse? Well, through an amazing coincidence in geometry, every few years the Moon blocks out the Sun creating a solar eclipse. The Sun is 400 times the size of the Moon, and 400 times as distant, so they appear to be the same size when viewed from Earth. When the orbit of the Moon takes it between the Sun and the Earth, the shadow of the Moon is cast upon the Earth. If the Moon is close enough to the Earth, someone located near the middle of that shadow will see the Moon exactly block out the Sun in a spectacular show. This is a "Total Solar Eclipse", arguably the most spectacular show in astronomy. Total Solar Eclipses (TSEs) happen every few years, in strips laid across seemingly random parts of the globe.

The eclipse wasn't the only reason for going on this trip, another big draw was the opportunity to actually walk on the Antarctic continent. Plus, the days before and after the Antarctic segment would be spent in Cape Town, South Africa, a city I have never visited. The remainder of this document is a day-by-day chronological account of the trip.

## Day-By-Day Journal

### Planning the Trip

Ever since the last Total Solar Eclipse, December 2002 in Australia, I have been thinking about this Antarctic eclipse. At first I completely shunned the possibility of traveling to Antarctica, because of the high costs. At the time, the options were a month-long voyage on a Russian icebreaker, costing nearly \$20,000 per person, or a week-long stay in cold tents on the ice for \$40,000 per person. Nope, not gonna do those! Then another opportunity developed: eclipse chaser Glenn Schneider (a Hubble Space Telescope instrument scientist) in association with Croydon and Qantas put together an overflight. A 747 would fly from Perth, Australia to Antarctica, do some sightseeing, see the eclipse, and return to Perth. The cost was much more reasonable (only a few thousand dollars), so I signed up for two business class seats. I'm a tall guy and I hate coach seats.







## Day 1: Sunday November 16th, 2003. San Diego to Atlanta.

After months of preparation, days of packing, and some last-minute Fedex overnight deliveries, it was finally time to head for the airport. In the final hours I had to resort to assigning each family member a suitcase and having them do the bulk of the packing while I collected and prepared the final items. I left only about 40 minutes later than I had planned, which was an amazing accomplishment given the months of preparation leading up to that moment. Once in the car I felt good, I didn't have the feeling that I had forgotten anything.

At the airport, security was unsurprisingly a major hassle. My bags (both checked and carry-on) were loaded with cameras, tripods, batteries, and cables, which caused each one to get the full cavity search. The teenage-looking attendant at the checked bag X-ray machine gave me bad directions, so I was waiting in the wrong place when they wanted to open one of my bags. Just as I figured out where my bag went I was horrified to see the TSA inspector hoisting great big bolt cutters up to my bag's lock. One snip and they were completely unpacking the bag that had been so carefully packed. I kept my cool and chatted with the inspector while he tried to determine the threat of my solar filters and sweatshirt. He was pretty nice, he explained how the emblem they wear on their sleeve has all sorts of September 11th symbolism: a flag with 9 stars and 11 stripes, the Twin Towers hidden in the eagle's feathers.



*Waiting to depart the San Diego Airport.*

I finally arrived at my departure gate exactly two hours after leaving my



*The desert, the Salton Sea, and Imperial Valley farmland.*

home's doorstep. While waiting for the plane I went over the plan ahead: fly to Atlanta, spend the night in a hotel, then fly on to Johannesburg and finally Cape Town. Cape Town is where we will spend several days before flying to Antarctica. The spare days in Cape Town will be used in case we need to fly to Antarctica ahead of poor weather.







The flight went well, I had a clear view of Southern California. I could see the Salton Sea, with farmlands irrigated by Colorado River water. As we plunged eastward into twilight the mountains below took on serrated angular forms. The movie that was playing was "The Hulk", and I have to admit that I was more entertained by a pink luggage tag twirling above me. It was caught out when the overhead bin was closed and was now spinning to and fro. Very soothing.

Atlanta was an easy airport: getting bags and catching a courtesy shuttle to my hotel was a breeze. I was in my hotel room just over an hour after the plane touched down. After freshening up and calling home I went about downloading my photos to my laptop. Then I did a quick update to my website so that friends and family (and the general public) could follow along on the trip. I used an infrared link to a plain old tri-band GSM cell phone to call my ISP back



*Mountains at sunset in the Southwest.*



*Atlanta Airport Marriott hotel room.*

in California and upload the pictures. I then made sure that my alarm clock was set properly, I wouldn't want to miss tomorrow's flight! I got to sleep about midnight.



## Day 2: Monday November 17th, 2003. Leaving Atlanta.

I woke up at 5:30am and had a room service breakfast of eggs and sausage. The goal now was to check into my Johannesburg flight as early as possible to get the best chance at a good seat. I had reserved seat 86A (an upper deck coach class window seat with extra legroom) but didn't have much faith in South African's ability to hold it for me. When you have cheap tickets things like seat assignments ALWAYS get mysteriously screwed up. This time was no different, someone named "Helen" had taken my seat and the best they could give me was an upper deck aisle seat. I took it, as any upper deck seat would have more legroom than downstairs in cattle class.

The lines for security were really long, I had to walk for several minutes just to find the end of the line. I picked a line that seemed to be moving quicker than the others and patiently waited. As I got to the front of the line I saw why it was moving faster: it was for first class passengers only. Oops. I quietly slipped over into the adjacent economy class line.



*The South African Boeing 747-400 that took me to Africa.*

After clearing security I changed some US Dollars into South African Rands (none of the shops in San Diego had any Rands!) I then went to my gate, took a picture of our plane, and passed the time by uploading the picture to my website. I noticed a few other people with the distinctive hot pink Astronomical Tours luggage tags, and before long tour director Jen Winter introduced herself. She corralled together the other members of the group that were taking this flight and we set about getting to know each other. Jen shared her

baby pictures, much to the delight of everyone. She just had a baby girl a week ago. We were all amazed that Jen was doing so well, if it weren't for the baby pictures we probably wouldn't have believed her!

I boarded the plane and there was another problem: the upper deck of this 747-400 has no place to stow large bags. My backpack was bursting with a laptop, three still cameras, a video camera, lenses, cables, paperwork, books, and many more odd items. Easily \$10,000 worth of stuff. The flight attendant told me to remove whatever I needed for the flight and she would lock my bag in a hold. Great. The whole point of a carryon is to keep your belongings in your control the entire time. I reluctantly gave up my bag and spent the rest of the flight worrying about it.

Takeoff went well, and with a seat so close to the front of the plane I thought I could hear the sound of air rushing past the nose of the plane. I watched a movie or two before trying to sleep.

## Day 3: Tuesday November 18th, 2003. Arriving in Africa: Johannesburg to Cape Town.

It seemed like it would never be morning. I didn't get a wink of sleep on the plane. The fourteen-and-a-half hour flight came to a rough end, as the plane slammed to the ground in Johannesburg. We hit so hard that the supposedly terrorist-proof door to the cockpit flew open.

We (and I use "we" now that I have joined the tour group) gathered our bags and cleared customs. It was a very long walk from the international terminal to the domestic terminal and I was cursing my bags of equipment every step of the way.



*Out the window of my 737 in Johannesburg.*

We had more hassles when checking into the flight to Cape Town. South African Airlines had rerouted the flight, so my ticket said Atlanta to Cape Town, but now I needed to board a flight from Johannesburg to Cape Town. What should I do? I asked the same question to several people and got different answers each time. Finally we got it figured out.

When checking a bag one member of the group made the horrible mistake of telling the clerk "Please treat my bag gently, I have camera equipment in there". Translation: "Please steal my bag". They made him sign a waiver saying he would not hold them responsible if the equipment was damaged or lost. Which pretty much guarantees it will be. Ouch.

When we arrived at the gate we were amazed to see that in a giant long terminal there were exactly four chairs. And the flight had been delayed an hour. We sat on the floor and passed the time by sharing eclipse stories.



*Colorful tail and wingtip on 737s.*

The two hour flight felt almost as long as the fourteen hour flight I just came off of. The seats were that bad. On the bright side I did get a window seat and got some neat photos of the country. Just after take-off we looped around and could see the airport we had just left. Shantytowns gave way to farmland which gave way to wasteland.



*Clockwise from top left: Johannesburg, Johannesburg suburbs, farmland, wasteland.*

Cape Town seemed surprisingly familiar, as familiar as the opposite side of the planet can get. It has the same climate, population, sprawl, and topography as my home town of San Diego. We landed and got a surprise: no jetway, we had to walk down a stairway and into the terminal.

We gathered our bags once again (amazingly, the bag of cameras made it here) and met up with Rob Schreuders and Ryan Bluck, our Cape Town hosts. Rob is one of the people who organized the Antarctic segment, and Ryan is the tour guide responsible for us in Cape Town. We drove to The Cullinan Hotel. I checked into room 232 and did a little unpacking. This would be my home base for more than a



*Disembarking in Cape Town: no fancy airport here!*



12

week. In the afternoon I collected my Antarctic gear bag, a great big black bag containing sleeping bag, warm clothes, a parka, eating utensils, a chair, and various other goodies. I was a little overwhelmed by it all.

Dinner was "do your own thing", so I hooked up with Vic & Jen Winter, Karen Mendenhall, Bob Shambora, and a few other folks. We ended up going to the Green Dolphin Jazz restaurant (<http://www.greendolphin.co.za>), because it was the only one that didn't have

an hour-long wait. I had Pettiford's pork loin medallions. I don't have any pictures from this evening because I was too lazy to bring my camera. So of course there were many amazing and beautiful sights that evening. It was a memorable end to a very long day.



*Home for two weeks: The Cullinan Hotel in Cape Town.*



*Lobby and pool at the Cullinan.*

*The free gear given to everyone.*





## Day 4: Wednesday November 19th, 2003. Cape Town: Table Mountain, Lectures.

I woke up at 7:00am and felt great, I slept really well. I was impressed with the breakfast buffet in the hotel, all of the foods that Americans expect were there. After breakfast I wandered around the hotel a little to get familiar with the place. It has beautiful architecture inside and out.



*Meeting each other before leaving for Table Mountain.*

At about 9am we met in the lobby for our bus to Table Mountain. We introduced ourselves to each other while waiting for the last few stragglers to come down. More than half of the people in the group are Japanese. They will have a different Cape Town itinerary than us, the “western” guests. It makes things easier (90 people just can’t walk into a restaurant), plus there are cultural differences.



*Tablecloth effect on Table Mountain. Photo taken Day 11.*

Cape Town, it earned its name from the flat top. When the wind blows from the east, clouds form at the top of the mountain and spill over towards Cape Town. This effect is known as the Tablecloth, as seen in the photo above. Today was clear and beautiful, no tablecloth effect and no winds: a perfect day for a trip to the top of the Mountain on the cableway.

As the bus rounded curve after curve on the way to the cableway station, we got occasional glimpses of the mountaintop and of the city below us. The base of the cableway station already seemed

Our group encompasses every conceivable profession and type of person. We have plenty of scientists and engineers (I fall into the latter category), but we also have lawyers, a stripper, teachers, artists, and many more I didn’t have the time to learn about.

Table Mountain is a very large mountain right next to



very high, it was worthy of a drive up here even without the cableway. At the station we had to wait a short time for a cable car to become available. There are two cars, one goes up while the other goes down. The good weather meant that a lot of people wanted to go up today, and consequently we got packed into the car like sardines. Someone yelled at me for having a large backpack. Everyone was clamoring for a place at the windows. As the ride up started, they engaged the floor so that it would slowly rotate, to give everyone an equal chance at a good view. It was awkward with so many people on board. Oc-



*Table Mountain cable cars meet halfway above sheer cliffs.*

asionally someone would grab onto the window handlebars (which didn't rotate with the floor) and plow through the people standing at the edge.

At the top the sights were wondrous. The weather was idyllic, I couldn't have asked for a better day.

The mountain was a perfect combination of sweeping vistas and little details. Looking south we could see to the Cape, the southwestern-most point in Africa, tomorrow's destination. Peering over the edge we could see rock rabbits hiding in the crevices. Lizards abounded, I could see several types.

I made my way around the trails in a counter-clockwise direction. Every turn was a new discovery: a narrow canyon plunging downward, a wildflower, the wind-



*Scale model of Table Mountain.*



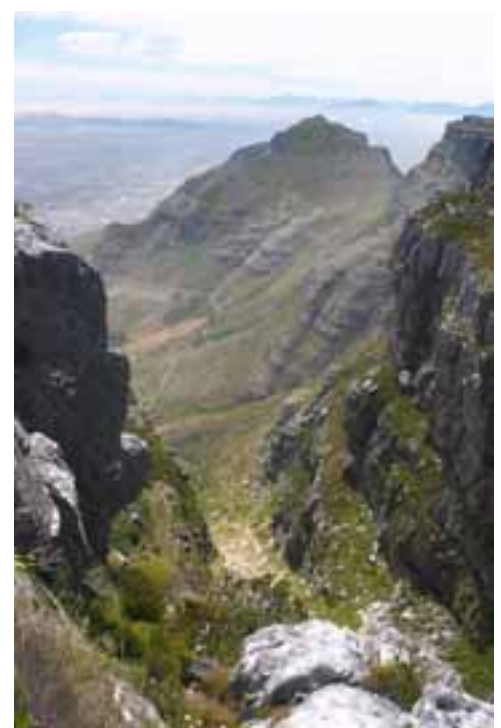


*View from top includes grand scenics, lizards, rock rabbits.*



swept top. About halfway through the hour-long hike I realized that I had forgotten two very important things: drinking water and sunscreen. On this bright clear day my skin was being roasted, and the hike was making me very thirsty. Oops.

The discomfort was worth it. As I neared the end of the loop trail I could





*Above: flat top of Table Mountain.  
Right: Robben Island, prison which held Nelson Mandela. Below: Cape Town.*



see downtown Cape Town, and even our hotel. Smoke plumes from distant fires were visible. It was odd to look down at the city from such a high altitude. People could be seen working and playing like little ants. In the distance we could see Robben Island, where Nelson Mandela was imprisoned for many years.



*Above: Cape Town's Waterfront District. My hotel is just off the bottom right.  
Left: view of southern end of Cape Town.*



Back at the Cableway we had to wait for the group to collect. We noticed the crescent Moon, a seemingly insignificant little hump shape. This little thing was what had brought us all here.



*Above: People seems like ants from atop the mountain.  
Left, below: A worker cleans massive cableway cables.  
Below: We see the crescent Moon which brought us here.*





After returning to Cape Town we had a few hours to kill before the afternoon lectures and safety briefings. A bunch of us went to the Waterfront district to find lunch. We settled on Balthazar's, a nice looking restaurant. First surprise: airport-style security before they



would let us in: metal detectors, look in every bag, the works. Second surprise: 200 wines. Third surprise: this is a lavish and leisurely restaurant. I was getting full on just the appetizers and almost forgot I had ordered a main course. The multi-course meals made us miss our bus back to the hotel. But who cares? This is what vacation was all about, relaxing with friends and telling stories.

While waiting for our meal Vic Winter, one of the expedition leaders, told us a harrowing tale about how this Antarctic expedition almost didn't happen. Apparently the fuel we would need to return from Antarctica to Cape Town had to be shipped to Antarctica months in advance. In fact, the Winters had to front a massive payment for it only a few days after starting to investigate whether to even do the trip. Talk about commitment. Once the supply ship arrived at the Antarctic coast, the fuel was pumped into two gigantic 50,000 gallon bladders that sit on the ice shelf. They only do this once a year, so this is the main supply ship for the entire region. The operation went without a hitch, but shortly after leaving the area the ship, the *Magdalena Oldendorff*, got stuck in the pack ice. The crew didn't have enough supplies to wait until spring when the ice melts, so a multinational rescue operation had to be launched to save the crew! It made news all over the world. Luckily, the rescue was successful and the ship was left to sit in the ice until the next season.



*View from the Waterfront: restaurants, seagulls, and boats.*

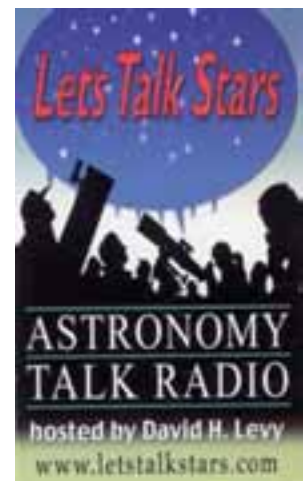


That wasn't the end of the bad luck. The ice shelf upon which the fuel bladders were resting calved, and one of the massive bladders simply fell into the ocean and sunk! That left us without enough fuel, and it looked like the whole trip would be cancelled. Insurance companies don't insure fuel sitting on ice (understandably) so it was looking especially bad for the trip organizers. However, persistence prevailed and a plan was hatched to arrange a swap. The Indian Maitri base had some extra fuel, and we could have it if we agreed to fly in some cargo for them. Our plane would be packed to the hilt with supplies on the flight down, but at least we could go.

The food at Balthazar's was delicious, and the portions were unlike anything I have seen outside of Texas. The waitress seemed offended that I hadn't eaten all of my barbecued ribs: I had to apologize, but there were two full racks there! It seems like everyone splurged, and in the end we were presented with a bill of 2100 Rand for 6 people. That's about US\$60 per person!



*Comet hunter David Levy and his photos of a comet he discovered. Named Shoemaker-Levy 9, the comet broke up and crashed into Jupiter in 1994.*



After lunch we took a very leisurely stroll in search of a taxicab. We found a cab and managed to make it back to the hotel in time for the

first lecture. Famed comet hunter David Levy gave a talk about his inspirations for astronomy, some thoughts on eclipses, and his comet-hunting experiences. Here is a photograph of the comet he co-discovered (Shoemaker-Levy 9), the comet that crashed into Jupiter in 1994. The image on the right is blurred because it was taken during the Northridge earthquake.

Next, Brian Warner (a Capetonian astrophysicist) gave a talk about the Sun's magnetic goings-on and what to expect at this eclipse. It was a fascinating talk, I learned things I had no idea about: did you know that the Earth's magnetic field flips on a million-year cycle? This means that sometime in the future, compasses will point south instead of north! During the changeover there is no magnetic field, so compasses won't work at all! Another interesting factoid is that the surface of the sun is the same temperature as the center of the Earth, 6000 degrees C.



*Professor Brian Warner explains the workings of the Sun.*

aircraft are the best, and obviously there isn't anyone else flying around down there that you could crash into! The briefing then went on into what not to do (mostly common sense stuff), the layout of the camp and the area, and then some tips on how to pack and what to wear. We also got some background information on Antarctica; can you believe that it is drier than the Sahara in terms of humidity and precipitation? We also learned that we are restricted as to when we can land;



*Antarctic briefing and training session.*



during the day the ice on the runway melts, making a dangerous slippery situation. We must land at midnight. It's a six hour flight, so that means an evening departure. The whole briefing left me a little bit uncomfortable, even scared. This was not going to be a walk in the park, this is an honest-to-goodness Adventure.

The whole group met for dinner in the hotel. The main topic of conversation at our table was eclipses, naturally. The first ques-



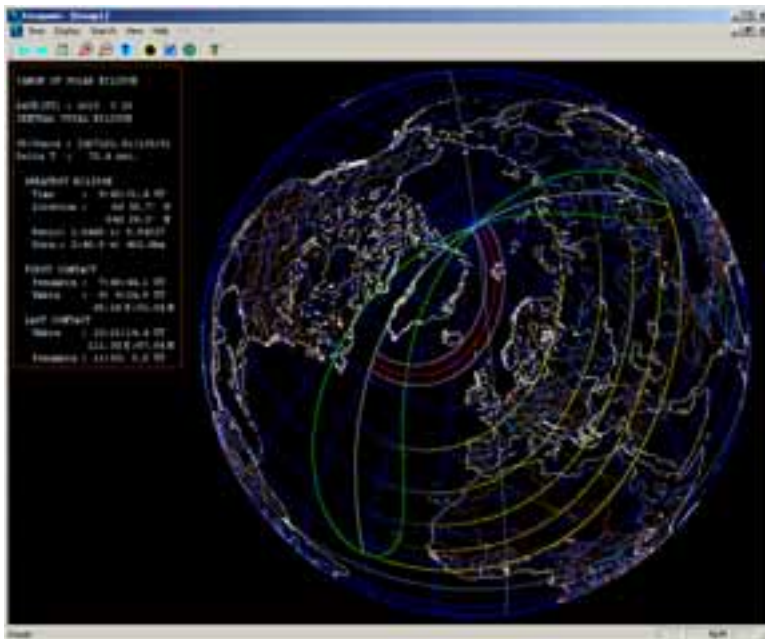


*Rob demonstrates how to pack the heavy parka into a tiny bag.*

tion was whether we could claim that ours was the first group to see a total solar eclipse from the Antarctic Continent. After much debate



*Map showing the area we will explore.*



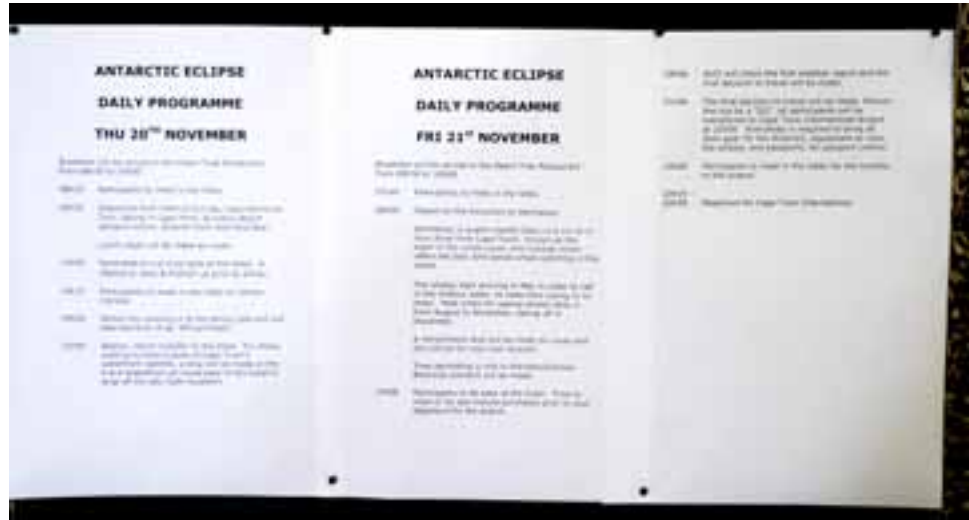
*On March 20th, 2015 a total solar eclipse will cross the North Pole. We made a pact to meet there.*

and some Internet research (via my laptop) we concluded that we really would be the first!

As part of the investigations into past Antarctic eclipses, I stumbled on a total solar eclipse in 2015. It will cross directly over the North Pole. What an opportunity: we could be the first group to see an eclipse in Antarctica, and the first to see an eclipse from the North Pole! We made a pact to meet again at the top of the world in twelve years. I didn't get to bed until 1am.

# Day 5: Thursday November 20th, 2003. Cape Town: World of Birds, Tip of Africa, Penguin Colony.

The outings continued today with a trip to the World of Birds aviary in the morning. It is the largest bird park in all of Africa, and I believe it. I took my time and worked my way through it by slowing and stopping to photograph each bird, waiting for the right moment. I could spend all day in here!



*Our itinerary was posted in the hotel lobby every day. World of Birds.*









Then I was in for a BIG surprise: upon exiting the cages I saw a map that indicated I had been through less than 10% of the whole park. I thought that last set of cages WAS the park! Yikes, no time to dawdle, we only had an hour or two here and if I was going to see it all I would have to hurry up! This is a “whole day” kind of place, not something you can see in an hour. I’ll let the pictures speak for themselves.



Bird Factoid: Male and female Ostriches are colored differently. The male is black, the female is brown. This is for camouflage, the male guards the eggs at night (dark black), the female during the day (brown).





Next we plunged south towards the Southwestern-most tip of Africa, the Cape Peninsular National Park. The thick clouds hanging at the mountaintops dampened the vista, but it was still very beautiful. There were patches of colorful wildflowers here and there. However, the most shocking sight along the drive was a submarine. One of South Africa's two military submarines was cruising along the coast.



**Above:** South African Navy submarine.



**Left:** Wildflowers and mountains at Cape of Good Hope.





*Bontebok (above) and Baboons (right) are found in the park.*



*Looking down at Cape of Good Hope, southwesternmost tip of Africa.*

Our first stop in the park was at Cape Point. We had lunch at the café, and climbed up to the lighthouse. Those less fit took the funicular up. I needed some exercise and was feeling adventurous, so I walked all the way out to Dias Point. This is the place where the Indian and Atlantic Oceans meet, and it sure feels like it on this narrow spit of land. It's got a real "ends of the Earth" feel.





*Above right: A lighthouse is perched atop sheer cliffs. It is covered in travellers' graffiti (below).*



*Above: Dias Point is one of the ends of the Earth. Indian Ocean is on the left, Atlantic on the right.*



*Above: World War II lookout bunker.*

*Left: Dias Point lighthouse.*





*Cape of Good Hope: Southwesternmost tip of Africa. Giant waves crash against the rocky shore.*



We slowly gathered back at the bus, and transferred from Cape Point to the Cape of Good Hope, a ten or fifteen minute drive away. This is the southwestern-most point in Africa, and only the second time in my life that I have stood at the end of a continent. It isn't the southernmost point in Africa, that point is a few hundred miles to the east and not nearly as impressive. It was hard to believe

that in a day or two I would be heading due south across this ocean, moving across almost forty degrees of latitude. I am very grateful to have the resources and ability to go to places like this!





*We go in search of penguins! Streets of Simonstown.*

Someone decided that it would be better for tourism if they had a less offensive name. When we were there they were honking away and a bit miserable because they were in the process of shedding their winter coats.

Our next stop was perhaps an hour's drive away, but it seemed much longer than that. We stopped at the famous Simonstown penguin colony, notable because the penguins are encroaching on the city. It's not uncommon to see a penguin stop traffic by waddling down a city street here.

These penguins are now called "African" penguins. They were formerly known as "Jackass" penguins because of the donkey-like honking



*The Simonstown colony of African penguins is large and very noisy. We excitedly clamored for a prime spot to observe them, from a wooden observing deck.*





*African penguins sun themselves after swimming.*







Back in Cape Town in the evening we went to dinner at the Africa Café, a themed restaurant designed for tourists. It offers a variety of foods from all across the African continent. It's served buffet style, except they bring the buffet to you in small bowls for four people at a time. After dinner they treated us to a dance performance. It was a bit touristy but a pleasant experience.



*The Africa Café served traditional African foods.*

## The Africa Café Menu

<http://www.africacafe.co.za>

### MOROCCAN CHICKEN AND ALMOND PIES

Fragrant pie of chicken and toasted almonds in phyllo pastry

### BOTSWANA SESWAA MASALA

Lean and succulent ostrich in a medium strength curry

### MALAWI CHICKEN MACADAMIA

Malawi chicken breast in macadamia nut sauce

### MALAWI MBATATA CHEESE AND SIM SIM BALLS

Sweet potato and cheese rolled in sesame seed

### IMIFINO PATTIES

Xhosa spinach and mealie meal patties

### SARDINES SENEGAL

Sardine in spicy Senegalese marinade served cold

### KENYAN QUICK FRY VEGETABLES

Vegetables lightly fried in coconut milk

### ETHIOPIAN ZAMBOSSA

Spicy curried mince in fine pastry

### ETHIOPIAN LENTIL CURRY

Lightly curried brown lentils

### CONGO SALAD AND JUNGLE DRESSING

Fresh leaves and vegetables with an orange and palm oil dressing

### UMBHAKO

Traditional xhosa pot-bread

### BASMATI RICE

### ITHANGA FRITTERS

South African pumpkin fritters, lightly dusted with cinnamon and sugar

### EGYPTIAN TA'AMIYA

Bean patties cooked with dill, coriander and parsley leaf

### DHANYA DIP

Medium strength dip of fresh tomatoes fresh chillies and coriander

We got back to the hotel very late, and were met with bad news. I mean REALLY bad news. Ilka Poll, an employee of the tour company, had flown in to Antarctica before the main group to make sure everything was ready for us. She had traveled to the eclipse viewing site and observed that the Sun had SET and was invisible during the time of day of the eclipse. Now, when you pay an obscene amount of money and travel to a remote corner of the world to see an eclipse, a major assumption is that the Sun will be ABOVE the horizon and visible during the eclipse! The experienced eclipse chasers in the group (myself, Bob Shambora, Jim Huddle, Xavier Jubier, Vic & Jen Winter) met in the hotel bar and hashed out the situation and what, if anything, could be done about it. We studied topographical maps, pored over laptop displays of satellite photographs, ran simulations and did calculations like we were madmen. We were gesturing Sun and Moon movements so hard we probably could have taken flight. The fact that several people had loaded up on alcohol meant that the problem seemed to take on epic proportions. The consensus conclusion was that the Sun is currently rising higher every day, and since we are still several days from the eclipse, it will eventually be high enough on eclipse day. We felt better (some more than others) and retired to our rooms. Next time I will be sure to bring a better assortment of software; even a simple planetarium program would have settled the matter.

The night wasn't over. I needed to have my packed freight bag down in the lobby early the next morning, so I spent several hours unpacking, sorting, and repacking. I didn't get to sleep until 3AM.



## Day 6: Friday November 21st, 2003. Hermanus Whale Watching.

I woke up only two hours after getting to sleep. I just laid in bed, exhausted from yesterday's activities and last night's scare. I got my wakeup call at 6:30am (wakeup calls at this hotel never seemed to come on time; they were early, late, or made even though I didn't ask for them).

At 8AM sharp I dropped my freight bag in the lobby. I still had three carry-on bags with me. After a great breakfast we boarded the bus and headed out for some whale watching in Hermanus.

It was a long drive to Hermanus, so we had plenty of time to think. Racing along the freeway, I couldn't help but think that OSHA (the Occupational Safety and Health Administration back in the USA) would have a heart attack here. Workmen were riding to construction sites atop loaded semi trucks. Safety standards and working conditions seem awful here.

As we passed mile after mile of shantytowns, I felt very privileged to be going to Antarctica. Here were thousands of people that will never be able to leave their own city, yet I am able to go to the ends of the Earth.

*The pretty seaside town of Hermanus has a museum.*



*Above: Miles of shantytowns lined the Cape Town freeway.*



*Above: Scenic country about an hour east of Cape Town.*







Whale watching was a bust. Of the entire group, I was the only person to see a whale in Hermanus, and that was only because I had a powerful telephoto lens and could see to the other side of the bay. I saw a few puffs of whales spouting before they dove. I wouldn't have seen it had I not been on whale-watching cruises back in the USA. I knew what to look for.

*Thar she blows! I was the only person who spotted a whale. Can you spot it? The puff at dead center is from a whale.*



*Dassies (Hyrax) live among the rocks.*



*Hermanus used to be a whaling town. This is where the whales were pulled up and butchered.*

Still, Hermanus was a beautiful little town, and many in the group enjoyed shopping and eating lunch there. I spent all my time watching for whales, so I had to scramble to find some food just minutes before the bus left. I found a fast food restaurant: the Wimpy Burger, and ordered a burger, chips

(French fries) and a Coke to go. I ran back to the bus and ate my lunch as we drove back towards Cape Town.

We took a different route on the way back, and it was a good thing we did. The coast here was very beautiful, and even better, a whale was sighted just past the waves. By the time I was able to get out of the bus it was mostly submerged with only a fin sticking out. This worked the group into a near frenzy after an eventless day.



*Below: the second whale I saw, but it was the first and only for everyone else in the group. The sighting elicited shrieks of joy after a disappointing day.*



*Below: This was a stunningly beautiful location, with an unspoilt southern coastline. This is actually "False Bay," not the Indian Ocean itself.*





*We gather for a weather briefing. Will we see the eclipse?*

‘what?’). Unfortunately the weather has changed dramatically. I spoke with the base this afternoon, and the front that had passed over had a small front behind it. Currently the cloud is 8/8<sup>th</sup>, it’s 850 meters (ceiling), the wind is 20 meters per second, ground temperature -18 degrees, and they have snowstorms. According to formal weather reports, all flights to Queen Maud Land are banned for the next 24 hours. So we are not allowed to fly. The Ilyushin cannot land in cloud cover that is lower than 2000 meters. But there is some good news. (Chuckles from the crowd). The good news is that the weather looks to clear on Sunday morning, and we have at least a 48 hour window where the weather will be good. Which means that the possibility of seeing the eclipse are getting in fact better and better. Now perhaps some of you realize why we required you to come earlier and leave later. And this is the Antarctic at its absolute best: the weather is unstable, the conditions are unstable, and we have to fit in with what God gives us. So, what is the plan. The plan is that we take the Saturday that we would be on the ground, and we make that Saturday Monday. So instead of leaving directly after the eclipse, we will now leave 24 hours later. But there is some more bad news: (dramatic pause, crowd holds breath) ...the sandwiches are going to be stale. (Uproarious laughter from crowd). And I’m sorry about that, but it was important to make sure that the aircraft was ready, which included all our provisions. So please, if the sandwiches are a bit stale, drink some water. (More laughter).



Back at the hotel we met for an Antarctic weather briefing. Robert Schreuders of Cape Tour Charters led the briefing, stopping occasionally for the Japanese translator:

“Good evening to all of you and welcome, thank you for coming. It’s the old story: I have good news, and I have bad news. Let me give you the good news first. The good news is that the aircraft is loaded, all your bags are on board, the food’s there – good point, our cooking equipment is there, we have all our gear onboard. It’s refueled, the pilots are... sober. The bad news is, we cannot leave. (Crowd shouts



*Rob Schreuders has good news & bad news.*

“So... we have made the decision that we are going to wait a full 24 hours. Let’s give the weather a chance to get out of the way, and go. As opposed to: we have a point of no return in the aircraft. And if the weather closes or hasn’t cleared in time we then are forced to turn back if the weather is not good, and we are not prepared to take that risk. Because once we are in the air and then turned back is a lot more disappointing than waiting here for additional three or four hours and then leaving.



“Uh, just to backtrack a bit... a further bit of bad news is that the storm that brewed up has wiped out our view site. All the stuff that had been erected, the canopy and the wind barrier and the toilets have been taken away by the wind. Um, so I can tell you that the staff have been tent-bound for the last 24 hours. It’s been so bad that they took rations into the tent and they were not allowed to leave the tent to go to the mess tent which is all of 50 meters. So they’re not having a good time down there.

“When we get there you will realize the state of the conditions down there. It’s very easy for me to stand here and tell you about it but once you get there you will understand. I can give you some examples, is that some of the equipment at the end of last season is still buried under the snow and we can’t find it. We’ve only opened up the camp on the 5<sup>th</sup> of November and the weather during the winter has been so bad that there are certain things that we still haven’t found. One of the aircraft was buried up to its lower wing, and actually [had to be] cut out of the snow. So we decided in the interests of the group safety NOT to leave early and to watch the weather. And we’ve been watching the weather every four hours for the last three days.

“(unintelligible) ... the runway is frozen, however, because of the storm, and the temperatures which are now -18, the same constrictions don’t apply. So we can, as long as we are running into the end of the storm, land at virtually any time of the day. It doesn’t there heat up as quickly as it does here.”

After a nice dinner, I went to bed humbled but optimistic.



*Table Mountain is lit at night. A puff of ‘tablecloth’ clouds are visible.*

*The Waterfront at night, from the table at my restaurant.*



## Day 7: Saturday November 22nd, 2003. Cape Town: Observatories.

The bad weather in Antarctica has caused a re-shuffling of the itinerary, so today we will be touring the observatories of Cape Town. The morning started with a talk by Professor Brian Warner to give us an overview of the history of astronomy on Cape Town. He decided to give the lecture here in the hotel, rather than shout while out at the various sites.



*Prof. Warner's slide: The road sign to Sutherland Observatory urges removal of dentures due to the rough road!*

Of particular interest to amateur astronomers is that the information for the southern sky in the New General Catalogue was collected right here in Cape Town by John Herschel. Also in Cape Town, Nicolas Louis de Lacaille named the constellation Mons Mensa (Table Mountain): it's the group of stars right under the Large Magellanic Cloud, so the LMC effectively becomes the "tablecloth" cloud effect.

We piled in the bus and drove over to the observatory. On the way there I got a shock and a reminder: there were Christmas decorations peppered through the city. It certainly didn't feel like November down here, where the seasons are reversed.



*Prof. Warner gives a fascinating history of South African observatories.*

The Cape Town Observatory was the second southern hemisphere observatory. It was the first in the world to measure the distance to another star, by measuring the annual wobble (parallax) of Alpha Centauri as the Earth orbits the Sun. Attempts were also made here to measure the diameter of the Earth, but the results were inaccurate at first because the gravitational attraction of nearby mountains was not accounted for properly!



*Christmas decorations seem out of place in summer.*





*South African Astronomical Observatory building.*

task. It now serves as a library and office building. Professor Warner pointed out the remnants of the astronomical instruments, such as a calibration lens hidden in the wall, a clock, etc.

Elsewhere on the grounds are the real observatories and telescopes. We had a particular treat when we stumbled on a display



*Observatory clock made by W. Hardy.*



*Prof. Fairall tells some history.*

The domes of the Observatory were removed long ago. The architect of the building didn't know much about astronomy and so the building was poorly suited to its'



*Transit telescope removed, the building is library and office.*

*An old calibration lens is hidden in the wall.*



commemorating the 1994 crash of Comet Shoemaker-Levy 9 into Jupiter: the famous Mr. Levy was right here with us!

Inside the large telescope dome we got a surprise treat when they showed us the moving floor. Rather than use ladders to climb up to the telescope, the floor has hydraulic lifts!



*David Levy with photos of his comet.*



*Extreme wideangle view of inside of dome.*

*The massive telescope was awe-inspiring.*



*We set our watches to the observatory's clock.*







*Observatory dome and Table Mountain. It's spring down here, so the plants are in full bloom.*



It was a real treat to get this private VIP tour of the observatory. On the way out we had a bit of an incident: the bus was too big and while turning around to exit the compound, it broke the security gate controls! Oops! Our wonderful tour guide Ryan tried to cover up the evidence...





*Our bus pulverized the security gate cardreader. Tour guide Ryan covers up in front of Prof. Warner.*



*David Levy poses next to the Herschel Mounment, the site of one of the most important telescopes in history. Astronomers still rely on the data and discoveries gathered here.*

Our next stop was the Herschel Obelisk, the site where Herschel's great telescope stood during the years when he did his work. It's wonderful that there are still signs of it; the paired site in the northern hemisphere is now underneath a motorway. The oldest portion of the site is the marble cylinder, which is a survey point left by Herschel (by necessity the location of the observatory was known very precisely, this marker was left for future surveyors). The obelisk was erected later as a monument to the work done here. The land was eventually given to a school, and so today the monument stands in the middle of a schoolyard.





By now it was getting hot out; my thermometer reported 34C (93F). Our bus had a very tricky time getting through the narrow streets surrounding the school. Before long, we were stuck. I mean stuck. Only by inching the bus back and forth was the driver able to free us. It wasn't the driver's fault per se; this area was not meant for bus access. The heat and frequent turns eventually caused the bus to lose maneuvering pressure, so we had to stop and wait 60 seconds after each turn. I was starting to wonder if we would miss our flight...



*Inside is the original survey marker the monument was built around.*

Eventually we got out of the neighborhood and headed to the South Africa Museum Planetarium in the heart of downtown Cape Town. Planetarium Director and Professor Tony Fairall gave us a special private planetarium show. He gave us an orientation of the southern sky, went over some of the African mythology, and then set up the planetarium projector to show us what to expect during the eclipse. This was very helpful; he pointed out which stars we might see and how to get our bearings. It was very restful after a hot day.

*A personalized planetarium show introduced us to African stories and gave us a sneak peek at the stars and planets we might see during the eclipse.*





*View of the downtown park from the museum.*

Another weather briefing was held in the evening, and it brought more bad news. We still couldn't leave, the weather was still bad. The temperatures were now -28C (-18F), with 60 mile per hour winds. What a change from the hot temperatures we had earlier in the day! The bottom line of the briefing was that "we ARE going" (in Rob's words). We should prepare to leave on a moment's notice. We are on call starting at 4AM. The leaders are getting hourly weather updates and we will be awakened in the night if the weather improves earlier than expected. If we haven't heard anything by 6:30AM we are to quickly eat breakfast.

Time is running out. Our day-and-a-half weather buffer time is now down to three hours. The news from our icebreaker friends (the month-long \$20,000 a head eclipse trip) is also bad: the seas are very rough, everyone is seasick, they are abandoning their plans and running away from the storm. It will be a miracle if they see the eclipse.

*Another weather briefing brings mostly bad news.*





## Day 8: Sunday November 23rd, 2003. Cape Town to Antarctica.

I woke up at 5:45AM. I collected all of my bags and got everything ready so that I could leave on a moment's notice. I was down at the restaurant at 6:30AM sharp, but as with previous mornings they were late opening. Rumors were percolating about with whispers of when we would leave. I sat down to a nice breakfast and was about halfway through my meal when Vic Winter came up to me. "Do you want to go to Antarctica?" he asked. My reply was something along the lines of "HELL YES!!!". "Then be in the lobby in half an hour!". This was the news I had been waiting for! The time was 7:20AM. I tried to finish my breakfast but couldn't. I was too excited.



*My Cullinan hotel room just before leaving.*



*Above: Boarding the chartered bus to the airport. The leaders count and recount to check for everyone.*

We piled on the bus, with the last person boarding at 8:10AM. At the airport, we were given our tickets, and had to go through security. It took a while, with 90 heavily clothed people, each with large packs. On my way to the gate someone in the airport asked me where were going with all of this cold weather gear. I proudly told him: "Antarctica." "Oh", he said, with seemingly no surprise.

*Airport security took a long time.*



*Luggage tag.*





Plane ticket to Antarctica! *Below:* waiting to go to plane.



*Above:* Your author and diehard eclipse chaser Fred Bruenjes waits to board the bus to the plane.

Our Russian cargo plane was parked on the opposite side of the runway, so we had to wait for buses to take us to the plane. The Japanese group got to go first, because they were seated in the rear of the plane. We took pictures of each other while waiting. The bus finally came, and we understood why we had to wait so long; the bus isn't allowed to simply drive across the runway: it has to drive AROUND it.



*Above:* the Russian-built Ilyushin IL-76TD cargo plane that will take us to Antarctica.



*Above:* driving around the runway to get to the plane.



*Right:* The IL-76 is a massive and sturdily-built plane. Look at all the tires!





*Above & left: Boarding the cargo plane via ladder was tricky.*



As we exited the bus and scrambled to get in line to board, I was getting really excited. Up to this point we had done a pretty routine collection of “touristy” things that mostly any tourist could do. Now the adventure was beginning for real. This was no passenger plane; the strange shape of the plane and the screeching noises it made as the engine turbines blew in the wind were unlike anything I’ve experienced before. We even had to board the plane by a small ladder!

Once inside the plane, the realization that we were doing something special was reinforced. Instead of a neat, clean compartment with overhead stowage, the plane was exposed and mechanical, with a spacious ceiling and small seats. Stenciled Russian safety warnings were scattered over various surfaces. Flags and banners were hanging along the walls, to make

*The spacious and utilitarian inside was a shock to most.*





*ALCI's Vasiliy gives safety instructions.*

They distributed earplugs, and when the engines were started I was very glad to have them. It was deafening. Vasiliy instructed us on the procedures and plan. The door was closed and the sound went from deafening to almost deafening. A video projector had been rigged up to a camera in the navigator's pit underneath the cockpit, so we had a good idea of what was going on outside. After a long taxi, the plane turned, gathered speed, and gently lifted off at 10:45AM.

We quickly crossed the coast and turned south. Our hosts cracked out the food (now famously stale - it's a couple days old from the delayed takeoff). The video projector was used to keep us updated on our ETA and conditions on the ice. We are traveling at 750km/h (470mph), altitude 10600m (35,000ft), the runway is cold at -5C (21F) and 5m/s (11mph) winds, visibility is 50km (30 miles).

it a little more inviting. Our only lavatories were two portapotties in the back of the plane. Every available nook and cranny was stuffed with something. Emergency equipment here, someone's bag over there, food stuffs under there. I managed to find places for all of my bags and squeezed into my seat. It was more comfortable than I expected. I was sitting in seat 4D (aka 17), an aisle seat.



| Flight information |          |                   |                       |
|--------------------|----------|-------------------|-----------------------|
| CPT - Novo         |          | 23 nd of Nov 2003 |                       |
|                    |          |                   | Novo Runway 3000x90 m |
| Take off           | 08:33    | Air temp          | -7C                   |
| Flight time        | 0:00     | Pressure          | 910 hPa               |
| Distance to Nova   | 4100 km  | Bank              | 180                   |
| Arrival time       | 14:53    | Clouds            | 1000 m                |
| Airspeed           | 700 km/h | Visibility        | 10 km                 |
| Altitude           | 2000 m   | Wind              | 12 m/s                |
| Outside temp       | -10 C    |                   |                       |
| ETA                |          | 14:53             |                       |





We got invited into the navigator's pit one by one. I bumped my head on the way in despite warnings. The plane is flown by crack Russian test pilots - the most experienced pilots there are. I now felt much better about the safety of the plane. Crew are shuffling back and forth with uniforms that carry nametags like "Test-Flight Engineer", "Test-Navigator", "Load Master", "Radio Operator", and "Test-Pilot".



*Above: inside the navigator's pit. Ancient and leading-edge technologies side by side.*



We crossed the Antarctic Circle ( $66^{\circ} 33'$  south latitude) at 13:35UT and celebrated with champagne in styrofoam cups. I passed.



*Above, left: Crossing of the Antarctic Circle ( $66^{\circ} 33'$  S) was celebrated with champagne. Below: land ho! Our destination is spotted.*

We began our descent at about 14:00UT. People started to put their cold weather gear on. The cockpit video camera picked out the oasis near where we will land, with distant mountains visible from 100km (60 miles) away. The air was REALLY clear.

I finished putting on my gear just minutes before landing. With no discernable ground features I couldn't tell how close we were to landing. The runway just appeared out of nowhere and we were soon sliding down it. The time is 14:25UT. Less than nine hours to the eclipse and we made it!





This is the Novolazarevskaya airstrip, which is also the ALCI (Antarctic Logistics Company) base camp. The main Russian and Indian base complexes are located a few tens of miles from here, this was just the only place suitable for an airstrip.

I gingerly climbed down the ladder and onto a black tarp they had rolled out on the ice. I guess that's the Antarctic version of a red carpet. After stepping off the tarp

people were slipping and sliding across the ice, it's just like being on a skating rink. Everyone was acting like children, we were all REALLY excited to be here!



*We climbed down off the plane via a ladder and onto slippery ice. Everyone was acting like children, the excitement and sense of wonder was overwhelming.*





I was immediately struck by how desolate of a place this is. I have been to some really lonely places on previous eclipse trips (the Australian Outback and African Bush most notably) and this place is orders of magnitude more barren. Aside from the people, there is no natural life in sight except for a lone pesky Skua bird that's looking for scraps of food.



I collected my bags and our group went to the mess tent for a "family meeting". My GPS indicated these coordinates: 70d 49' 26.0" S, 11d 38' 47.4" E. We agreed to sleep in a storage shed, as our tents were still trashed or missing.



*Staying upright on the ice took determination and care.*



*Left (upper & lower): the mess tent.  
Below: sleeping quarters, some demolished.*



I took my bags to the shed. As I was about to drop my bags and start unpacking, I learned that the scenic flights would be commencing immediately. I tried to find out when my flight was – I was NOT going to miss this opportunity. I learned that I was scheduled to fly tomorrow morning, after the eclipse, but they had one seat left on



*Antonov AN-2 biplane scenic ride.*



a flight RIGHT NOW that I could grab if I wanted. I jumped at the chance, who knows if the weather will be bad tomorrow and I will lose my chance? ...I would later regret the decision.





I got the jump seat at the rear of the Antonov AN2 biplane. The seat faces the exit door, not the front of the plane. The planes had to idle for a long time to let them warm up and to unfreeze the skis from the ice (even in warm weather the AN2 takes a while to get moving). As the pilot gunned the engine for take-off I was thrown sideways (towards the back of the plane) onto a huge pile of blankets and survival gear.



*Aircraft shadows over ice crevasses.*



*Above: AN-2 biplane flying high above the ice. With amazingly clear air we could see perhaps a hundred miles!*

We had a SPECTACULAR view of base camp, and a real surprise when the second AN2 took off right after us and popped up alongside us. We headed south towards the mountain range. Originally this was to be a coastal flight so that we could see icebergs and penguins, but it was decided that the mountains would be a better choice. They are in one of the most inaccessible locations in the world, perhaps only a few hundred people have ever visited them.



*We were invited up to the cockpit.*



*Kashiwa-san and I shared the window. We flew over and among jagged, pristine, and unclimbed peaks.*

We flew between soaring, jagged peaks. With no sense of scale I initially wasn't sure if they were hundreds or thousands of feet high. As we descended and came to land in a valley on the ice it was clear that these peaks were very, very high. The clear air easily deceives you.



*Left: evidence of glacier movement: streaks of debris.*

*Below: We landed in a valley, we may well have been the first humans to ever set foot here.*







*Westliche Petermann Range, with Grähorna Peaks. All unclimbed. (?)*



We got out of the plane and were met with the coldest conditions I have ever experienced to this point. According to my weather meter it's -11C (12F) with a 21kph (13mph) wind, but that may be conservative because I just had it inside my coat. My GPS reads 71d 32' 54.3" S, 12d 14' 56.9" E. This is the furthest south I have ever been. I tried to take pictures but it was difficult



*The unpolluted dry air is so clear and the land so devoid of familiar landmarks that these mountains seemed small and close; they are actually towering and distant.*

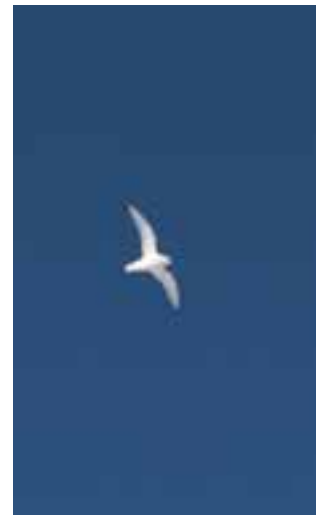


in these conditions. One of my cameras stopped working properly, and the display on another died. It turned out that the problem with the first was camera was the so-called "A factor", in other words: me. I couldn't think straight in the cold and had put the camera in the wrong mode. The other camera was fine once it warmed up again on the plane.



*Above: Fred Bruenjes, your author and photographer, in front of AN-2.*

*Below: a lone snow petrel was the only sign of life we saw here.*







< Peak Valery Chkalov, climbed & named in 2003.  
*Below: windswept plains reveal the shiny bare ice.*



*Distant mountains with razor peaks.*

**Bottom right:** Schirmacher Oasis is the only dry land in this area. The lower left is a glacier, the upper right is ice-covered ocean.



Before returning to base we flew over the Schirmacher Oasis. This is beachfront Antarctic property. The Indian Maitri and Russian Novolazarevskaya bases are located here because it's the only solid ground suitable for a base in this area. The Russian base is a motley assemblage of trailers and containers. I guess it's whatever you can fit onto a plane or offload from a cargo ship. We are scheduled to visit the bases tomorrow, I can't wait to see them up close.





*The Schirmacher Oasis (also known as the Schirmacher Hills) are dotted with frozen lakes. The ice is only on the surface; the Russian and Indian bases have pipes that go through holes drilled in the ice, to pump up the fresh water below.*



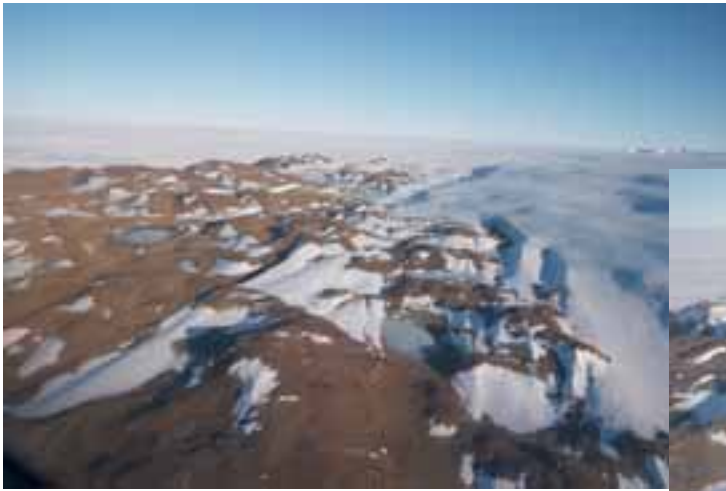
*Above: looking out at India's Maitri base.*



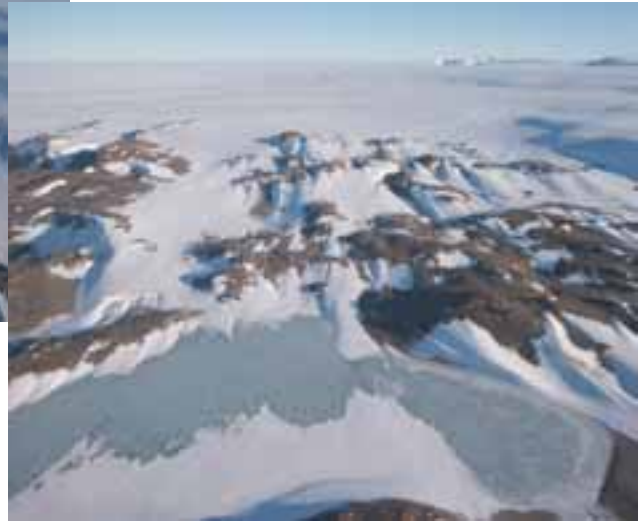
*Russia's Novolazarevskaya base is a motley assemblage of containers and old equipment. Large structures are very difficult and expensive to construct.*







*The eastern end of the Oasis.*



*Glacial ice, and lots of it!*



Back at camp I ate dinner (horrible cold tasteless stuff), and then consolidated and packed my equipment. I managed to fit everything into two bags. Later I realized why: I was wearing every single piece of clothing I had brought! Well, except for a pair of boot liners (socks). It was just too cold to take off my boots in order to put those on.

## The Eclipse

We then met and decided how to get to the eclipse site. I had a lot of equipment to set up so I needed to get there sooner than the rest of the group. I went in the advance team with Vic & Jen Winter, David & Wendee Levy, Bob Shambora, and some other folks I don't know. We drove in a tracked vehicle that belongs to the Indians, a slow vehicle that took an hour to make the trip. I would describe my mood as one of cautious optimism. The locals described the weather as "exceptional". The sky was absolutely fantastically clear so we were essentially guaranteed to see the eclipse. Or so I thought...



*Packed into the tracked vehicle going to the eclipse site.*



*Above: Eclipse chasers spread out across the ice.*

Upon arriving at the site there was a problem, South wasn't where it was when Jen surveyed the site in February. A large rise would block our view of the eclipse. Don't ask me what happened because I don't know. To come all this way, spend all this money, have perfect weather, and miss the eclipse because of a snow bank would not do.

*Below: Our immediate group set up away from the ice ridge.*





The Indians had towed a container full of equipment out here and could not move it. Jen's radio was out of range of base camp so we couldn't do anything to try to coordinate a move to a new site. We could not move south or west due to crevasses. Some of the Japanese started to try to climb the snow bank to the south and we had to send Chris Jackson our mountaineering guide after them. East was no better as far as crevasses. So that left north, we started hiking that way in the hope that as we got further from the ridge we would see over it better. We arrived at a suitable place only about 30 minutes before totality. My GPS read 70d 52' 12.8" S, 11d 25' 57.0" E.

There was no time left to set up all of the equipment I had brought, so I had to prioritize and set up whatever I could. It was so bone-chillingly cold that batteries and cameras were dying left and right. Put a fresh battery in and it's dead within minutes. My fancy Meade LXD55 tracking mount decided it was in the northern hemisphere and refused to track the sun in the correct direction. I couldn't fix it because I couldn't make out the display in the bright surroundings. Oh well. At this point I wished I hadn't gone on that scenic flight until tomorrow. It would have given me more time to prep my equipment.

Standing next to me (to my right) was David & Wendee Levy, next to them was Jen & Vic Winter, then Bob Shambora, Karen Mendenhall, and finally Jim Huddle. To my left were Charles Simpson, Casper Badenhorst, and perhaps a few more people. We made sure to stand line-abreast so as not to get in each other's way.

The seeing was absolutely terrible, on the order of several arcminutes. Extinction was about two stops (25% of the Sun's light was making it through the atmosphere, a really large amount and a testament to the extremely clean air here). David Levy spotted shadow bands around 10 minutes before totality, an exceptional amount of time. This is the first time I have ever seen shadow bands. They looked like a shadow of smoke. We could see the Moon's shadow coming in



*The Moon covers all but a slim crescent of the Sun. Note how the lower tip is clipped by the ridge.*

*The approaching shadow is visible to the left in the sky.*





*Second contact diamond ring. Colors are real, as I remember them.*

can see him just left of the sun. This is the second contact diamond ring, you can see some red prominences and whitish corona. I have corrected the color to remove the reddening that comes from the low solar altitude, to better show the prominences. The ridge was still high enough to block part of the sun.

Just after second contact we could see some nice prominences. The wind was so strong that it shook my sturdy mount and blurred many of my images. The sharpest photos I have come from my video camera, as shown at right. This image is an average of the 30 best frames in two seconds of video. I used a JVC JY-HD10U hidedef video camera (set to SD mode: 852x480x60fps progressive), with a 3X Kenko teleconverter, and Registax software to select and average frames. Then curves, saturation, and resize in Photoshop.



*TOTALITY! False color view of prominences and corona.*

Totality was wonderful, I concentrated on observing visually while working cameras with the back of my mind. My binoculars were out of focus and I had a hard time adjusting them because of the cold. Looking around, I did not see any aurora. There was some spatial variation in sky brightness but nothing I would consider aurora. I could only see two radii of corona. The corona was orange or brown near the horizon, changing to a greenish tinge up higher.

well to the left of the Sun. The anti-solar shadow was huge and black all the way to the horizon, I wish I could have gotten a picture of that (the camera died due to cold).

As totality approached I blindly took pictures with my cameras, hoping to get something. Because we had backed up from the designated observing site there was someone in my field of view. You



The image below is a highly processed composite of four images that's intended to be a more artistic representation of what the eclipse felt like. I have increased the color saturation slightly to better show the green thru red corona colors, otherwise the image is truthful. In the processed image the coronal streamers and polar brushes really come out. The person in the photo is the Japanese painter and illustrator Kagaya (<http://www.kagayastudio.com/>). He was set up directly in front of me. I didn't notice him before the eclipse because of the intense sunlight, so it was a complete accident that he was in my photo. At left is his "freight bag", a large soft suitcase in which we placed our cold weather gear, tripods, and so forth. Next to that is a collapsible chair, with his sleeping bag laying on it. At the moment of this photo he was leaning over to take a picture with his camera. I am very happy that Kagaya was in my photo, it makes the composition much more interesting.

*Composite image of totality attempts to recreate the view seen by the eye.*



I could tell the eclipse was coming to an end, because some prominences popped out from behind the Moon at the left edge. This video capture (using the same method as the video image earlier) was taken just before the eclipse ended at third contact. The eclipse took place about 15 minutes after local midnight, so the Sun was rising during totality. In this



*More prominences signal that the end of totality is near.*

photo you can see how more of the corona was visible than at second contact (compare the distance between the “points” where the horizon meets the Sun: they are now closer than in the photo above).

All too soon the eclipse ended and the Sun peeked out from behind the moon. The third contact diamond ring is below, you can still see a hint of corona around the left guy. Totality had lasted 1 minute, 18 seconds. Shadow bands again were visible for 10 minutes after totality. We were absolutely elated, we had done it! We (well, several hundred of us)

became the first people to see a total solar eclipse from Antarctica. A whole continent, 6 billion people in the world, and we were the first ones. Amazing! This also marks the first time I’ve seen the midnight sun, as the eclipse was just after midnight local time.

It wasn’t until now that I began to realize just how cold it was here. Someone’s thermometer was reading -11F (-24C), and the winds were blowing at 10-15mph (15-25kph), so the “feels like” windchill was -35F (-37C). By far this is the coldest place I have ever been. People that had taken their gloves off for just a couple of minutes were now regretting that, they were now within minutes of getting frostbite. Luckily Jen & Vic planned ahead and had chemical handwarmers to pass out.

Above us we could now see the NHK’s special jet that broadcasted the eclipse back to Japan and the Discovery Channel. As I packed up my equipment (pretty much everything had died from the cold, no point in sticking around), David made a call in to the Discovery Channel for a live interview and related his descriptions with schoolboy giddiness.



*Third contact diamond ring, corona is just barely visible.*

*David Levy is interviewed by the Discovery Channel via satellite phone.*





Before leaving I took a few moments to stop and just soak in the place. To borrow Astronaut Buzz Aldrin's words, it was a place of magnificent desolation, as barren and inhospitable as the Moon he walked on 34 years ago. I really feel like an astronaut. Our mission started with training, progressed to space suit fit checks (cold weather clothing), aborted liftoffs (weather delays), finally a real liftoff (the Russian cargo flight), a landing, and a successful fulfillment of our mission. Would

there be a tickertape parade when I returned home to San Diego? Of course not, what was I thinking. As I stood there on the ice I was overcome, I tried to express my feelings to those around me but I couldn't find the words. "Unbelievable" was what came to mind. This place was simply unbelievable. As I looked north and followed my long shadow up to the horizon I noticed that the horizon seemed to stretch forever (see photo at left). In the dry pristine air we were seeing perhaps a hundred miles, all the way to the distant ice-covered ocean. I just could not believe where I was.



*Karen (in yellow) and Vic (in red) after totality.*

*Our shadows stretch toward the horizon and ice-covered ocean.*



I got a cup of too-hot chicken noodle soup and climbed back into the tractor that had brought me here. We began the long journey back to base camp. The adrenaline was wearing off and it seemed like a very long ride. Actually it WAS a long ride, because something broke down on the way back and we had to wait a while for it to be fixed. I passed the time by flipping through my pictures of the eclipse and was overjoyed at the results I had gotten. We got into camp very late, I crawled straight into my sleeping bag. I was so very cold, I hadn't warmed back up from the eclipse site. Later in the night someone set up a blast heater and it got a little bit better. At some points in the night I wasn't sure if I was hot or cold. I think that's a bad sign. There was a struggle among the folks in the shed: some wanted the heat on, others thought it was TOO hot and didn't like the six foot flames the heater occasionally spewed! I felt like I was sleeping on a bed of ice. Actually I WAS sleeping on a bed of ice, there was only a tarp, the cot, and a sleeping bag between me the thousand-foot-thick sheet of ice.

## Casualties of the Cold: What Worked and What Didn't

Much of my equipment had problems in the extreme cold. Here's how it stacked up:

**Canon G1** digicam – Battery died 1-2 minutes before totality due to cold. No time to change battery.

**Canon 10D** DSLR – No problems.

**Canon D60** DSLR – Color LCD display quit working at coldest temps.

**JVC JY-HD10U** hodef video camera – No problems.

**Kestrel 4000** Wind/Weather meter – Clock screwed up when temperature fell below -20c.

**Suunto Vector** watch – No problems.

**Meade LXD55** mount – Lost memory, screen too dim/sluggish to use.

**Sony TR2A** laptop – No problems. Kept battery inside coat when not using.

**Homebuilt Controller** – Clock malfunctioned (Murphy's Law at work: the only component not rated for subzero temperatures was the clock).

## Creating the Totality Composite

The signature image of my trip to Antarctica is a composite photo showing the Sun during totality, with a fellow eclipse chaser superimposed on the Sun (see front cover or page 64). This image was intended to convey the feeling of the eclipse, the emotions it evoked, rather than be a strict scientifically precise representation. I guess I succeeded in evoking emotions, because I have gotten a phenomenal reaction to it: everything from "it's a Photoshopped fake" to "I love it, how can I buy a print". To the doubters: this is a real image, I was really there and that's what it really looked like. Interestingly, people who have never seen a total solar eclipse think it's fake, while people who HAVE seen a total eclipse (particularly those with me in Antarctica) think I got the image exactly right! The image was the Astronomy Picture of the Day on December 8th, 2003, was CNN.com's Space Scene of the week starting December 17th, 2003, and appeared in Sky & Telescope's April 2004 issue. My website got half a million hits during December 2003.

This sidebar shows how the image was made, and how it differs from reality. Let me start by saying that the image is a composite of four photos. The Sun's corona (the diffuse halo with streamers that reach outward) has an incredible range of brightness. Near the Sun it's very bright, as bright as a full Moon, and it then tapers down quickly into the twilight around it. No camera (except some one-of-a-kind hideously expensive scientific cameras) can capture this range of brightness in a single exposure, so multiple exposures are required to capture the full range of brightness. The conventional wisdom with film cameras is to take exposures one stop apart. The superior quality of a low-noise digital SLR camera allows that to be expanded to three or four stops.

On the next page are two photos of my equipment setup, taken during testing at home before the eclipse. It is substantially similar to the setup I used so successfully in Australia. Yes, I took this entire kit to Antarctica!





*I tested equipment at home before leaving for the eclipse.  
The lower SLR is a 10D with a 90mm F/13.9 Mak-Cass scope.*

So the plan was to take a series of exposures three stops apart, plus some shots around second and third contact to see the prominences. To accomplish this I built a standalone controller box, which had been preprogrammed with a script of exposures for four of my seven cameras. The controller is the square silver box with a 4x4 keypad. Now, I have a rule for the minutes before total eclipses: if a piece of equipment doesn't work on the first try, give it a second try, if it fails again then CHUCK IT! So as it turned out, the extremely cold weather at the eclipse site caused the controller to malfunction (I believe either batteries or the clock were the culprit), and I ended up doing the exposure sequence by hand. I wanted to focus on observing the eclipse rather than fuddling with cameras, so during totality I mindlessly moved the exposure control on my cameras back and forth while pushing the shutter buttons. See the previous sidebar on page 67 for a camera-by-camera account of how things performed (or didn't). Anyway, the result was a bunch of blurred or underexposed or overexposed photos with only a handful of usable images. Luckily the good ones were in the right ranges to do a composite. Below are the four images that went into the composite, presented exactly as they came out of the camera.





*Above (four images): These are the raw, straight-out-of-the-camera images that went into my now-famous composite image of totality. Exposure times were 2sec, 1/10sec, 0.5sec, and 6sec. Lens: Canon 100-400mm F/4.5-5.6L IS at 400mm F/8. Camera: Canon D60 DSLR, ISO 100.*

The images above have incorrect color, because the camera's auto white balance system was fooled by the strange environment. Notice how the colors shift from image to image. None of the images have colors that match what I remember.

The first step in creating the composite was to convert the RAW camera images into 16bit linear TIFF files. These files preserve the raw data from the camera, have fixed white balance, and have a nearly linear relationship between true brightness and pixel value. I chose the 1/10s, 0.5s, and 6s exposures for the coronal composite. I normalized the pixel values into intensity by dividing each pixel value by the image exposure time. The images were then blended together by masking out the overexposed and underexposed regions in each image and stacking them. Then a radial gradient intensity filter was applied to compensate for the range of brightness in the corona. The result is this image:



*Step 1: Blended stack of 1/10, 0.5, and 6 second exposures.*

I couldn't get the radial gradient quite right, the middle corona is too bright. In reality the corona drops off in brightness like the earlier raw images, so this was a compromise to keep things within the range of consumer computer monitors. The gradient has



the unpleasant side effect of making the Moon jet black. This is incorrect, that area should be roughly the same color as the surrounding sky. There is no easy way of fixing this, and in truth it actually mimics the behavior of the eye: things appear darker when they're next to a bright object. The bright inner corona makes the Moon appear darker than it really is.

Now the image above has a big problem in that the colors are wrong. They're close, but they're not what I remember. So I used Photoshop to slightly alter the balance and saturation of the colors. This is where I depart from reality slightly: the image at right has colors that are more saturated than they were in real life. I did this to add to the excitement of the image. It's a subtle change (compare with image above) but I think it was necessary. I also rotated and cropped the image, and painted out the bright blue artifact at the 8 o'clock position on the Sun. This artifact came about because the person in the photo moved between the exposures.

Next I performed some radial blur sharpening in Photoshop, a standard technique used in eclipse images. This makes the coronal streamers slightly more defined. (Middle right)

The radial gradient algorithm doesn't know about the ground, so the ground near the Sun is darkened as if there was visible corona there. That's a defect that needs to be corrected by superimposing the ground without a radial gradient filter. I chose to superimpose (see lower right) a different image than the one used for the outer corona, because as you can see in the fourth raw image the person is kneeling and it's not apparent there is a person there.

After getting this far into the processing I felt that the image was a little too dark and moody, when our emotion was much more one of joy and celebration, so I upped the brightness a little. The final image then was cropped.

The image isn't perfect, but overall I'm pleased with it. I can't wait until the 2005 eclipse so that I can give it another try.

*Step 2: Color correct, rotate, crop, paint.*



*Step 3: Radial blur (emphasize streamers).*



*Step 4: overlay foreground.*



## Day 9: Monday November 24th, 2003. Antarctica to Cape Town.

People started getting up at 6AM. I was dead tired and was determined to sleep in. They had scenic flights to catch starting at 8AM. I finally got up (I don't know what time it was, I didn't really care). Breakfast was awful but it was food and I was glad to have it. I packed my bags and then took some time to charge my batteries, empty my camera's memory cards, look over some photos, and relax a little in the mess tent. Vic and Jen were busy uploading reports and photos to their web site and the Discovery Channel. They offered to upload something to my site but I declined, it would be too complicated to arrange.



*Above: Skua bird on top of mess tent.  
Right column: Inside the mess tent,  
people ate, relaxed, & filed reports.*





*Above: Panorama of base camp. Our tents are on the left. Below: generator, toilets / ice melter (water for drinking, washing, flushing), yellow mess tent. The toilets broke from heavy use so we used a portapotty in the mess tent.*



*Above: High Definition TV camera used by the NHK (Japanese) to broadcast the eclipse live.*

*Right: NHK's satellite dish, uplink tent, and switching center.*

*Below: The Gulfstream II that was outfitted with special windows for TV cameras. It too broadcasted live.*





*Above: the ice runway.*

*Left: taking a little stroll to nowhere.*

I took a short walk around the camp to kill time. It turned out that the next storm was closing in quicker than expected so we would have to leave early. The tour of the Russian and Indian bases was scrapped, much to my dismay. As a consolation there would be a shorter walk around the runway. I happily accepted this and had to scurry to catch up to the group that had already left on the walk.

*Closeup of ice texture. We could see down 2-3 inches (5 cm) into the ice, which was filled with bubbles.*



The walk turned out to be disappointing, it was tiring to walk on the ice, and a little boring (you see ice, then some more ice, and LOOK... OVER THERE... MORE ICE!) It was also a destinationless walk as nothing of interest was in walking distance of the base camp. I turned around at 70d 50' 14.1" S, 11d 37' 48.5" E. I did learn how hard it is to move around on the ice. Without crampons you have to be very careful of where you step. I was feeling proud about not having fallen, when right before reentering the base I fell smack dab on my behind good and proper. Pride goes before a fall!



*Above: Fred Bruenjes. I was feeling warm from walking.*



*Above, left: Unfortunately, the presence of humans inevitably brings pollution. Above is a dump, left is a drop of oil from a vehicle.*

*Below: view of aircraft.*





*Above: fencing match. Mountain on left is Tallaksenvarden, another of the NHK live broadcast sites.*



*Left: I believe that photographer Woody Campbell managed to arrange for this strange dance performance.*

In an hour or two we would have to leave, or risk being pinned down for days. I killed time by milling around camp. Carol Howat was playing her violin, there was a fencing match, and some other tomfoolery.



*Above: the last few people pack up in our sleeping shed. Red-haired Jen has her back to my cot. It took our eyes quite a while to adjust to the dark interior when entering. Left: everyone signed Debbie O'Neill's jacket.*





*Above: this tank-like vehicle practically flies across the ice.*



*Above: taking a final few pictures and loading up the plane. Notice that we are bringing the portapotties back.*

*Right: the official weather station and radio shack for the airstrip, and the two AN-2 biplanes that ferry tourists and scientists all around the area.*



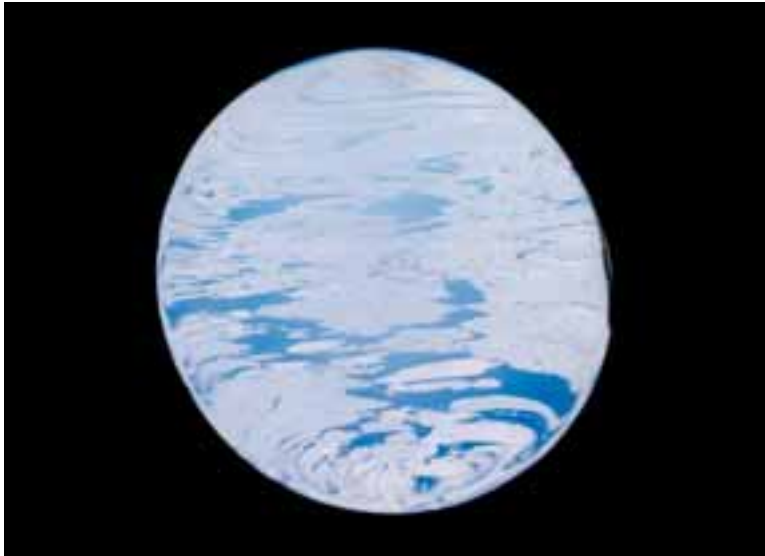
I dropped off my luggage and chatted with people. We then got the signal to head for the plane. After a few final photos I boarded the plane. I was sad to go, I wanted to see more of the place. I was also happy to go, I was very cold and relieved that I wouldn't have to spend another night here.

Someone remarked that it was much easier to load the plane this time, as we were wearing everything we had brought and so our bags were smaller. People also seem more accustomed to their gear. We took off at 14:25UT, exactly 24 hours after landing. Weather delays and weather threats had cut our stay in half, but I was satisfied with what we had accomplished.





*Above: Fred says goodbye to Antarctica, boards the plane.  
Right: the pilots buzzed base camp at high speed!*



*Above, below: icebergs! As we flew straight north and away from Antarctica the bergs died away.*



After liftoff I noticed that the plane was making some strange turns, and I soon remembered that it was being flown by crack test pilots who wanted to show off a little: they did a high speed low altitude pass right over base camp. I loved it, I wonder if we blew down any tents! Pilots would never get away with a maneuver like that on a commercial flight in the US.



I spent a lot of the plane ride writing in my notebook. I had not taken time to write during the time on the ice, so now I was doing a brain dump onto the little notepad.

The cockpit video returned and as it was now nighttime we could see the lights of Cape Town. We landed safely and taxied to a regular gate. After disembarking the plane we took a few photos and boarded a shuttle bus. We had left South Africa and now we had to go through customs the same as any other international arrival. We also had to claim our bags





at the normal baggage carousels. It was quite a sight again as we tramped through the airport with all of our gear.

As we left the customs area we were greeted by a representative of INTAARI, the Russian base operator. Because we had missed the opportunity to visit the Russian base, he was here to stamp our passports as a consolation. I love passport stamps, I'm glad I have one from Antarctica.

*Above: lights of Cape Town and the runway. Back to civilization!  
Below: after climbing down the ladder, we went through customs.*



I got back to the hotel, hauled all of my gear up to my room and discovered that my room key didn't work. I'm not sure why, maybe it was the cold or something magnetic in my wallet. I had to drag everything back down to the front desk and get the key reprogrammed. Finally arriving in my room, I took a hot shower, called home to relay my success, dropped immediately to sleep (about 12:30am), and dreamed of the next eclipse: Tahiti or the Galapagos in 2005. Much warmer weather there. Mmm.

## Day 10: Tuesday November 25th, 2003. Cape Town: Rest Day, Post-Eclipse Celebration.

Today was a rest day. I didn't get out of bed until 9:00AM, and only then so I could get some breakfast before the restaurant closed. I spent the day in my hotel room, writing and uploading items to my website as well as checking email. The only activity today was a post eclipse celebration dinner. We were all bussed over to Bloemendal's Restaurant in wine country. We arrived just in time to see a beautiful sunset, complete with the tablecloth cloud effect over Table Mountain. After it darkened we could see Mercury, Venus, and the Moon hanging over the western horizon. Since our group has a lot of astronomers (both professional and amateur) the southern sky was again a focus of attention. We could see Orion, the False Cross, and Mars through holes in the clouds. The restaurant staff were taking pictures of us, they couldn't understand why we were more interested in what was going on outside than inside...



*Above: meeting for dinner, we spotted the Moon and Venus. Below: Tablecloth over Cape Town.*





***Above:** Moon, Venus, and Mercury are visible above the lights of Cape Town. Table Mountain is just visible.*

***Right:** Bob Shambora, David Levy, and Vic Winter survey the night sky through holes in the cloud deck.*



After we all straggled in, we ate dinner and David Levy gave a nice talk. He let us write comments in his actual observing logbook, a real honor. He later mentioned my written comment in *Sky & Telescope Magazine* and on his radio show (I wrote something like: "The corona and prominences were spectacular, but the incoming shadow and shadow bands are what I will remember this eclipse for."). A representative (whose name escapes me) from the Japanese Oriental Astronomical Association also gave a talk and introduced a few members of the Japanese part of our group. Other members of the group were allowed some time to share their feelings, and finally gifts were presented to the group leaders. Dinner finally broke at about 11:30pm. The group split up: some returned to the hotel, and some went back to the Herschel Monument for an observing session. I was very tired and feeling slightly under the weather, so I had to pass on the observing session even though I desperately wanted to go.





*Left: the group meets for a farewell dinner and eclipse roundup.*

*Below: David Levy gave a talk and invited us to sign his observing log.*

*Far below: An Oriental Astronomical Association member, plus Jen Winter, Wendee Levy, Deepak Bhimani, and Vic & Jen Winter all gave nice talks.*



*Above: Jen Winter, trip organizer extraordinaire.*

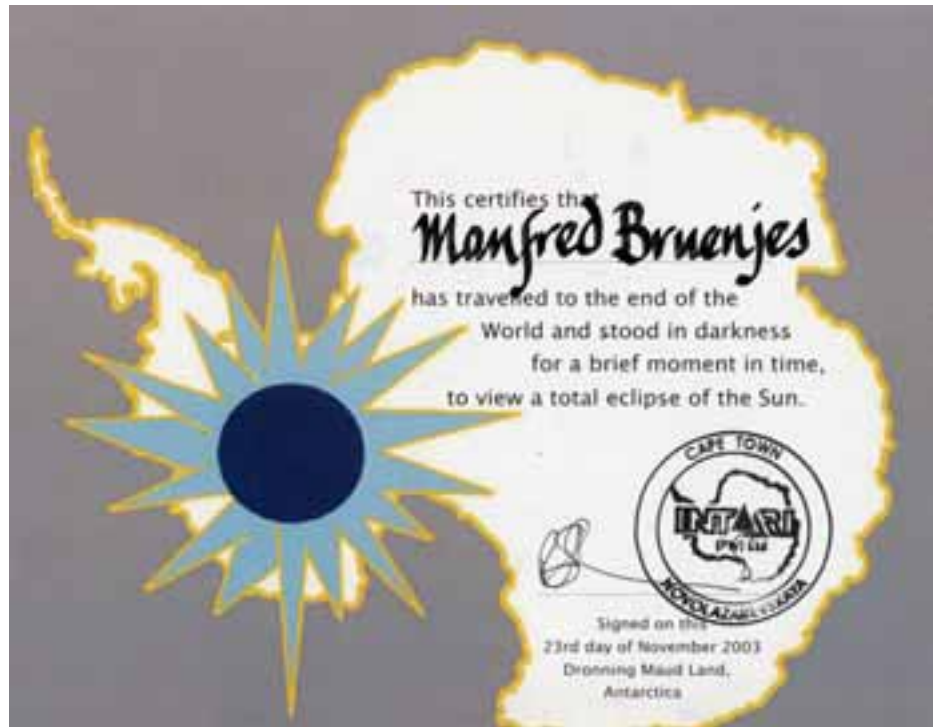




*Above: appreciation books were presented to several people, including Rob Schreuders who arranged much of the Antarctic details. He flashed a rare smile.*

*Right: We all received certificates to prove we had been to Antarctica.*

*Below: Everyone received a pin.*



*Far left: Postcards were printed to commemorate the expedition.*

*Left: We had the opportunity to purchase cool commemorative shirts. This is the design on the back.*



## Day 11: Wednesday November 26th, 2003. Leaving Cape Town.

After a wonderful vacation and a successful eclipse chase, it was time for the trip to come to an end. At breakfast I finally managed to get a piece of toast that wasn't completely blackened. My freight bag had torn so I swapped it for another that was left by a Japanese group member. I had to frantically pack as check-out time was 11:00AM and I made it out exactly at 11. I had an evening flight, with my ride



*Much of the group gathered one last time to say goodbye.*

to the airport departing at 4:30PM so I killed the time by sleeping... in the hotel lobby. In between naps I swapped stories. The "Secret Society of Antarctic Solar Eclipse Chasers" was born, and our Cape Town tour guide Ryan was made an honorary member. Our bus left the hotel at about 5PM and we had to endure some rush-hour traffic on the way to the airport. I was getting a little anxious, but I needn't have worried: my flight was delayed and we didn't take off until 10PM! We killed time in the airport by eating ice cream. For some incomprehensible reason a bunch of us had a craving for ice cream after returning from The Ice!



*Above, right: lots of luggage for everyone.  
Below: saying goodbye. Right: Traffic jam!*





## Day 12: Thursday November 27th, 2003. Arriving Home in San Diego.

I was so tired that I actually slept about 8 hours on the return flight, which is a record for me. I barely noticed when we landed on Sal Island in Cape Verde for routine refueling. I was really beat from the Antarctic segment and still recovering. Some folks came within minutes of getting frostbite and have extremities that are still feeling numb, days after the cold.



It was really strange to be back in America. Cape Town was in the midst of spring, so it was a shock to return to the U.S. on Thanksgiving Day. The Macy's parade was on TV in the airport, interspersed with Butterball turkey tips. I transferred to my flight to San Diego and was home in time for Thanksgiving dinner. All of my luggage made it safely. I spent more time flying for this trip than I have in any previous trip: fifty-two and a half hours aloft!

The trip was definitely worth it. I got to see an amazing show in an amazing place, and I got to know some really interesting people. The next total solar eclipse will be near Tahiti or the Galapagos in April 2005, and I will surely be there. The antithesis to this Antarctic eclipse will come in 2006 when we converge on the Sahara Desert! Oh and yes I am dead serious about being on a plane above the North Pole on March 20<sup>th</sup>, 2015. See you there?



*I flew over the VLA (Very Large Array) radiotelescopes on the way home. As far as I had gone on this trip, these telescopes see out incredibly farther!*

*Speaking of phoning home... the total cost of cellphone calls to my ISP back in San Diego (for uploading daily trip updates to the Internet) was about US\$700! The whole trip cost about \$17,000.*

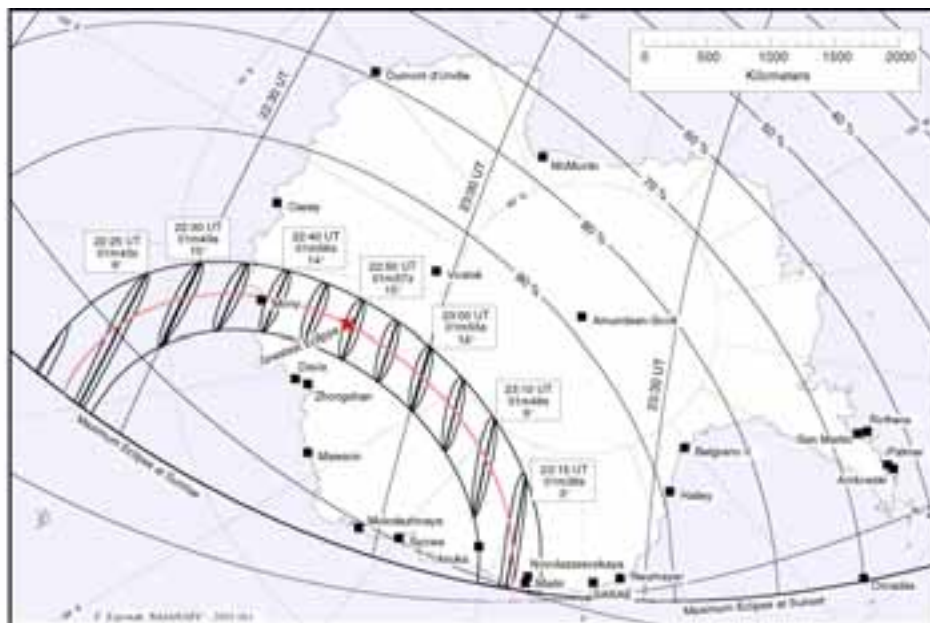
## Table of Flights

| Date(s): | Flight Leg:                               | Takeoff:    | Landing:    | Length: | Approx. Distance: | Aircraft: |
|----------|---|-------------|-------------|---------|-------------------|-----------|
| 16       | San Diego, California to Atlanta, Georgia | 1:44p PST   | 8:18p EST   | 3h 34m  | 1892mi 3045km     | 767-300ER |
| 17-18    | Atlanta to Johannesburg, South Africa     | 10:38a EST  | 8:06a SAST  | 14h 28m | 8439mi 13581km    | 747-400   |
| 18       | Johannesburg to Cape Town, South Africa   | 11:20a SAST | 1:05p SAST  | 1h 45m  | 790mi 1271km      | 737-800   |
| 23       | Cape Town to Novo, Antarctica             | 10:53a SAST | 14:25 UTC   | 5h 32m  | 2561mi 4122km     | IL-76TD   |
| 23       | Novo to Mountains                         | 16:27 UTC   | 17:14 UTC   | 47m     | 52mi 84km         | AN2       |
| 23       | Mountains to Novo                         | 17:39 UTC   | 18:25 UTC   | 46m     | 52mi 84km         | AN2       |
| 24       | Novo to Cape Town                         | 14:25 UTC   | 10:10p SAST | 5h 45m  | 2561mi 4122km     | IL-76TD   |
| 26-27    | Cape Town to Sal, Cape Verde              | 9:55p SAST  | 2:50a WAT   | 7h 55m  | 4433mi 7134km     | 747-400   |
| 27       | Sal to Atlanta                            | 4:05a WAT   | 7:56a EST   | 7h 51m  | 3964mi 6379km     | 747-400   |
| 27       | Atlanta to San Diego                      | 1:08p EST   | 2:18p PST   | 4h 10m  | 1892mi 3045km     | 767-300ER |

That's a total of 52 hours 33 minutes in the air, using seven different aircraft, for a total distance travelled of about 27,000 miles (43,000 kilometers). Traveling all the way around the Earth at the Equator takes 25,000 miles (40,000 kilometers), so this trip involved more air miles than an around-the-world flight!

Timezone notes: PST=UTC-8, EST=UTC-5, SAST=UTC+2, WAT=UTC-1.

## Map of Eclipse Path Through Antarctica



*I was at the bottom, near Novolazarevskaya. Map courtesy of Fred Espenak, NASA/GSFC.*

## Packing List

1.4x extender  
 1/4-20 bolts  
 1/4-20 nuts  
 1/4-20 washers  
 100-400 lens  
 17-40 lens  
 25mm eyepiece & caps  
 3x Kenko vidcam extender  
 50mm lens  
 8mm lens  
 AA batteries  
 AAA card  
 adjustable wrench  
 Alarm clock  
 angle finger  
 backpack  
 Balaclava  
 Barlow & caps  
 Batteries for Kestrel  
 battery grips  
 Beach towel  
 Binoculars  
 Black electricians tape  
 blank Digital8 video tapes (60 minutes ea)  
 blank Digital8 video tapes (90 minutes ea)  
 BP511 batteries  
 BP511 charger  
 BP511 charger power cable  
 Cellophane tape  
 Cellphone  
 CF laptop adapter  
 clothes  
 controller, cables, batteries  
 Copies of passport, immunization records  
 D batteries for LXD55  
 D60  
 D60/G1 to USB cable  
 Film  
 G1  
 Gaffer's tape  
 GPS  
 Headphones  
 itinerary  
 Kestrel  
 Kestrel interface  
 keyring flashlight  
 Laptop  
 Laptop battery  
 Laptop charger  
 laptop IRDA adapter  
 large flat screwdriver  
 lens blower  
 lens cleaner (liquid and tissues and qtips)  
 level  
 luggage  
 luggage tags on luggage  
 lxd55 2" mounting bar  
 lxd55 autostar  
 lxd55 autostar cable  
 lxd55 battery holder  
 lxd55 counterweight tube  
 lxd55 dovetail  
 lxd55 mount  
 lxd55 tripod  
 lxd55 tripod feet w/ bolts/nuts  
 Mak telescope  
 Maps  
 Memory cards (CF)  
 M-F 1/8 stereo cable  
 Microdrives, one in D60, one in G1  
 mini combo screwdriver  
 needlenose pliers  
 New eyepiece projection adapter  
 Old eyepiece projection adapter  
 passport  
 Pen for immigration forms  
 Photoshop  
 Plane tickets  
 Power plug converter - huge one  
 Power plug converters: Sth African, Euro  
 Reading material  
 Rebel batteries CR123A  
 Rebel G camera  
 regular pliers  
 remote->D60 cable  
 remote->Rebel cable  
 Rolled spare baader material  
 Serial cable  
 Short serial cable (laptop to controller)  
 Small scissors  
 soft copies of all manuals  
 Solar filter (for binocs)  
 Solar filter (for vidcam)  
 Solar filters (for Mak, 100-400)  
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 ... and I didn't forget ANYTHING this time!



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