

NATIONAL NEWSLETTER

The Eclipse of July 10th

At the time of going to press, a few rather meagre details of the eclipse story have come our attention. In the next issue of the *Newsletter*, we hope to give much more complete reports from the many Centres and individuals who journeyed into the total eclipse path. As expected, there were those who viewed the full glory of the July 10th event, and others who were disappointed as cloud banks moved in to blank out the whole sky show.

A postcard from our former Executive Secretary, Mrs. Marie Litchinsky, mentions that the large Calgary Centre expedition to Tuktoyaktuk, N.W.T., was highly successful; they had a "fantastic trip, and saw a truly beautiful eclipse".

The members of the Toronto Centre, by contrast, were completely clouded out at a location in Bonaventure on the south shore of the Gaspé. A few minutes before first contact a sudden rain squall caused near panic as valuable equipment was hastily removed to shelter or quickly covered with plastic sheets. At the time of totality, scores of pairs of eyes gazed up helplessly at the scudding cloud cover and the surge of darkness seemed all the more sinister under such disappointing conditions.

Three members of the McLaughlin Planetarium staff were with the Toronto Centre expedition and so missed a view of totality, but a fourth staff member, Dr. Thomas Clarke, had much better luck on a holiday trip to Nova Scotia. During the afternoon of the 10th, Tom drove to Malignant Cove on the northeast coast of the province, and along with dozens of other enthusiasts, witnessed a clear view of the eclipsed sun through a wide opening in an otherwise cloudy sky.

We understand, also, that Dr. Helen Hogg of the D.D.O. was fortunate in choosing a site on the Bay of Chaleur coast in New Brunswick. Although generally cloudy conditions prevailed at totality, a view of the corona and prominences was obtained.

But even for those who were completely clouded out, hope springs eternal in the astronomer's breast! We hear that already some of the young R.A.S.C. members have begun to save for an eclipse trip to the Sahara Desert next year!

A New Use for Polaris

A news bulletin from the U.S. Department of Commerce includes the following interesting item.

A Commerce Department scientist is using the North Star for something other than navigation. The famous shining "hub," around which the universe seems to turn due to the earth's rotation on its axis, is helping the Department's National Oceanic and Atmospheric Administration to measure high-altitude winds from the ground.

By sighting on the star with a simple, hand-made array of four small telescopes, the scientist can time the flow of turbulent patterns in the jet stream as they move from one telescope to the next.

The experimenter, Gerard R. Ochs of NOAA's Wave Propagation Laboratory, Boulder, Colorado, says the use of the North Star is more of a convenience than a necessity. Any star may be used. But tracking Polaris is easy because it is the only celestial object that appears nearly stationary from earth.

In a report presented at the recent spring meeting of the U.S. National Committee of the International Union of Radio Science in Washington, Ochs said the wind velocity and direction measurements compare well with those using instrumented meteorological balloons. An advantage of Ochs' passive remote sensing technique is that it can observe high-altitude winds continuously on clear nights and intermittently on partly cloudy nights.

The telescope array is set up in a small astronomical dome on Table Mountain, a flat-topped rise about 10 miles north of Boulder. The observing system consists of the four two-inch telescopes, whose objective lenses were taken from two pairs of binoculars bought at a local discount mart for \$35, and a servo mechanism to keep the array lined up with the wind direction.

Stars are so far away from earth that, although they emit light radiation in all directions, the faint rays that reach us are essentially parallel, travelling in one direction only. This is one of the necessary conditions for the remote wind-sensing system, enabling Ochs to determine the altitude of the wind he is measuring.

Rather than moving along in a perfectly smooth flow, winds generally contain irregularities, turbulent patterns, within the main current. The irregularities can be detected optically since they refract light slightly differently than the air around them. While the irregularities are of many sizes, Ochs has adjusted his telescope apertures to "filter out" all except two-inch-diameter patterns from 30,000-40,000-foot altitudes. As Ochs explains the technique:

"Light rays from the North Star passing the edge of an irregularity are refracted, or bent slightly while other rays pass straight through the turbulent patch. On reaching the telescopes some 35,000 feet below, the bent rays and straight rays converge. But the bent rays have travelled slightly farther, along the hypotenuse of an extremely elongated right triangle. The difference in the distance travelled is half a wave length of the light. Thus the waves interfere with each other leaving dark areas, which are recorded instantaneously on a moving chart.

"Other rays are bent at opposite edges of the irregularity. At their points of convergence, you can call it focus, they have travelled the same distance and their waves are in phase. Thus they reinforce each other and produce bright spots.

"Larger-than-two-inch irregularities at 30,000 to 40,000 feet produce patterns focussed below the telescopes and smaller irregularities are focussed above. The filter here is a natural one. But the parallel light from Polaris also is focussed at the telescopes by small irregularities at lower altitudes. In order to eliminate this low-altitude "noise" from our computations, we have fixed the instruments' apertures at two inches. Thus, the two-inch irregularity at say 35,000 feet causes a light change that fills the telescope opening, while a smaller scale turbulent patch at 10,000 or 20,000 feet produces a recognizably smaller amplitude change. Also, larger-than-two-inch irregularities at higher altitudes can be filtered out because of the simultaneous appearance of each pattern in adjacent telescopes."

The telescopes are arranged in such a way that individual turbulence patterns can be timed as they move from one instrument to the next, a distance of two inches. Since the irregularities are carried along by the general air flow, the wind velocity is represented by the movement of the pattern across the array.

The four telescopes are placed two-by-two in an L-shape array. One set of two measures the wind velocity and the other set helps keep the array pointed in the right direction. If the direction finders detect pattern movement, a servo-mechanism aligns them across the wind flow until no motion is seen. The velocity telescopes are therefore automatically lined up along the wind flow.

The North Star is at an angle to the wind direction, but this is a fairly easy correction to put into the system. Other stars may be used, but since they are not fixed in position like Polaris, they would require an astronomical clock drive. The angles would change continuously, complicating the wind computations. However, the added flexibility might make a multistar array feasible.

While the system is not workable in daylight, Ochs says, it might be used as a night-time supplement to the national meteorological network.

Attention Solar Observers!

I am presently trying to organize a group of solar observers to aid me in studies of the Wilson effect and sunspot motions. Experience is not necessary, but would certainly be of advantage.

More specifically, the following are needed:

1) High resolution diagrams of spots near the limb, whether or not they exhibit the Wilson effect, which is an apparent foreshortening of the penumbra on the side closest to the centre of the disc, giving the appearance of a bowl-shaped spot.

2) Daily motions, drawn (or photographed!) by projection, of the entire disc. These must be extremely accurately done, with the celestial east and west points *accurately* marked. This, unfortunately, is only possible with an equatorial mount, but those with alt-azimuth mounted telescopes can help with the Wilson effect studies.

It would be much appreciated if any solar observers, or observational co-ordinators for centres with active solar groups, would contact me at the address below for more detailed information.

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Toronto Centre

Summertime is for Picnics

Several Centres arrange annual outings for their members. The Hamilton Centre has done this for some years and in recent times has invited the Niagara Falls Centre to join in the festivities at La Salle Park just outside the city. A friendly baseball rivalry has sprung up between the two Centres. Last year the Niagara Nudniks nine defeated the Hamilton No-Stars but the Hamiltonians hope to reverse this trend!

Towards the end of August, the Toronto Centre will also hold their annual picnic; this year to Albion Hills, a conservation area outside the city. Combined with the picnic will be a members' Star Night. It promises to be a gala event. Are there other Centres which carry out a similar summer programme?

Murphy Strikes Again!

On the night of July 9, 1972, I fell asleep in my tent under the starry skies of Les Mechins, Quebec. Great expectations filled my soul, as, tomorrow, the shadow of the Moon would sweep down on me, creating a total solar eclipse. My plan was to provide television coverage, by means of video-tape, for the many people back home in Hamilton. Assured by my Technical Director, Al Bauld, that the equipment was in perfect order, slumber came easily. I had forgotten, however, about Gremlin Murphy, who interferes in every conceivable way with astronomers and their doings. Murphy's word is law, and that Law states: "Whatever can go wrong, inevitably will!"

Consequently, instead of sleeping until 8 or 9 a.m. as usual, I awoke, full of excitement at 4 a.m. It was already light! Wanting to know whether the clear weather had remained overnight, I dashed quickly from the tent, stumbled over my camp stove, and fell flat on my face! Nevertheless, the weather was clear, and with a sense of well-being, I commenced to make several cups of coffee.

When Al awoke at 9 a.m., I decided that it was time for breakfast . . . pancakes! I mixed up the batter according to the recipe and dumped it into the frying pan. It promptly burned! To avoid starvation, Al made the rest of the pancakes!

Since he had done the cooking, I volunteered to do the dishes. The main item of concern was the pot in which we had mixed the pancake batter. I reasoned that if I put in some water to dilute the batter, and then heated it, the batter would simply pour from the pot, leaving me with very little work to do. For some mysterious reason, the batter promptly burned leaving the bottom of the pot coated with black!

I spent the next hour cleaning the pot with a mixture of gravel and water. Eventually, the pot was as shining as new. For a final touch, I filled the pot with water, swished it around, and promptly poured it down my trousers leg!

Undaunted, I decided that we should go down to the village of Cap Chat to see who had arrived for the solar spectacle. Since the road in the vicinity of Cap Chat was under construction, everything in the car, including its two passengers, became covered with dust. Fleeing the man-made Sahara, we returned to Les Mechins and cleaned up.

Throughout all these misfortunes, the Sun had been shining brightly. With optimism, we set up the television equipment and began interviewing the astronomers who had set up camp nearby. All went well until precisely one hour before totality! Then Murphy struck with a vengeance!

Thin clouds began to appear, then medium clouds, and finally, 30 minutes before totality, thick black clouds began to infest the atmosphere. Since there were holes in the cloud layer, we decided to stay put, rather than risk the heavy traffic which would inevitably result when thousands of astronomers began to race toward clear weather.

As totality neared, the cameras were turned on me, and I began to ad lib my way through the darkness. Our plan was to turn the cameras upward during totality, photographing the eclipse through the holes in the clouds. Murphy, however, assured us that there would be no holes, hence I had to describe what was happening during the darkness, including the ringing of the churchbells in Les Mechins.

Feeling that Murphy could do us no further harm, we packed away the television equipment, and the next day, set off for home. On arrival at Cable 8 TV, the tapes were played back. Horrors! Though the playback on the monitor at Les Mechins had shown the tape to be of perfect quality, for some mysterious reason, the tape was now covered with vast areas of television "snow", wiping out all of our material!

Murphy had struck again. The verdict was that the tapes were unusable. Hence, Al and I dissolved into two lumps, weeping copiously.

Nevertheless, the 1973 eclipse is drawing nearer, and I have it on good authority that Murphy has no passport for a journey to the Sahara. We'll see!

K. Chilton