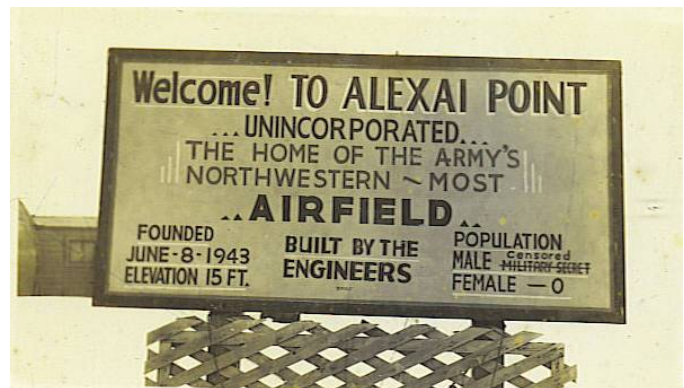


## Experiences of Attu Expedition ~ by Grote Reber ~ 9/3/1950 through 9/13/1950

Transcribed from 15 pages of notes hand-written by Grote Reber while he prepared to make radio observations at 465 MHz (65 cm wavelength) of the solar eclipse on 12 September 1950. Initial comments in italics and transcription by Whitham D. Reeve, Anchorage, Alaska.

*Reeve comments: A total solar eclipse took place on 12 September 1950 but the eclipse path only crossed United States territory at Attu Island, the outer-most island in the Alaska Aleutian Island Chain. An expedition to Attu was conceived and organized by John. P. Hagen of the Naval Research Laboratory (NRL) to observe the eclipse. Ten people participated in the expedition including Grote Reber, who worked for the National Bureau of Standards (NBS) at the time. Radio observations were made at 0.8, 10, 20 and 65 cm wavelengths (37.5 GHz, 3 GHz, 1.5 GHz and 465 MHz). The expedition even setup an 8 inch eclipse camera/telescope, a fool's errand considering the Aleutian Islands' notoriously and persistently poor weather. The Korean War was well underway by September 1950, so it is quite amazing this expedition – primarily involving Navy personnel – even took place.*

*The expedition personnel spent almost a month on Attu installing equipment at Alexai Point on Attu and preparing for the eclipse. At the time, Attu was inhabited only by about 25 Navy and Coast Guard sailors who operated and maintained a weather (aerological) station and a LORAN-A station. During World War II, two sets of runways were built at Attu, one adjacent to Casco Cove and Massacre Bay, the site of a wartime Naval Air Station and submarine repair facility (among other things), and another at the Army Air Forces base at Alexai Point. During the war both airfields were used to launch bombing campaigns against the Kurile Islands of northern Japan. The Alexai Point facilities were abandoned at the end World War II.*



*Reber kept hand-written notes of his time on Attu, and I obtained them through {[NRAO](#)}. My transcription includes, to the extent possible, Reber's (mis)spelling, capitalization, (lack of) punctuation and (questionable) grammar. Reber refers to the Navy's weather station at Massacre Bay, where the group was housed, as an "Aerological Station". The notes are interesting reading about a time when everything was done by hand the hard way. Apparently, no scientific papers were produced because of all this work except one by Reber (see References).*

*It is obvious from his notes that Reber did a lot of bellyaching (maybe from being around sailors, who, according to a sailor friend, have a sacred duty to bellyache). It also is obvious that the expedition was poorly planned in spite of a preparatory trip made to Attu by two NRL personnel prior to the expedition itself. Reber refers to Mauna Kea, Hawaii and Washington DC – Sterling, Virginia several times in his notes. These apparently were locations for some type of future work not associated with the solar eclipse observations at Attu but that he hoped would incur better planning. Reber's notes say nothing about the radio observations themselves or the electronic equipment, but several photographs of the equipment are in the NRAO archives {[NRAO-Photo](#)} and a few are included here in no particular order (see Credits).*

Based on other archival information ([NRAO-Arc](#)), the group of scientists traveled to Attu by air (probably on a Navy plane). Their equipment apparently went by sea and was carried at least part of the way (Adak to Attu) on the Navy tug USS Tawasa. The actual amount of equipment was not recorded, but it appears that at least 10 tons was transported and setup.

Reber commented on the weather each day of his visit to Attu and those comments are also transcribed here. Poor weather – rain and strong winds – blew through the area on eclipse day. Because of the weather and all the other problems, the data obtained were not very good according to a member of the group on Attu, Cornell H. Mayer {[Mayer](#)}.

I first visited the Aleutian Islands as a 5-year-old in 1953 and then flew there frequently in the late 1950s and throughout the 1960s. Given the extensive wartime activity during World War II, the Aleutians were always fun to visit and explore, especially before the government “cleaned up” their huge wartime and post-war environmental calamities. I never saw it, but I was told about a sign at the Attu airport that read “Attu is not the end of the world, but you can see it from here.” Attu also is known as “The last place on earth.”

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**Following is a transcription of Reber’s notes with his photographs interspersed:**

Road: The road from aerological station to Alexai Point is very bad. The airline distance across Massacre Bay is only about six miles. The shortcut route along edge of bay is about ten miles. However, detours bring the distance up to about twelve miles. The total elapsed time of transit is about 80 to 95 minutes. The original road built by army engineers in 1944 wound its way along edge of bay. Numerous cuts were made thru sides



Apparatus viewed from northwest, Attu, Alaska, eclipse expedition site

of hills which run down to water. This material was used to build up the intervening beaches to a sufficient height. Apparently the last detachment of troops left Attu in the summer of 1948. Since then the roads have deteriorated due to neglect. Floods due to melting snow last spring and heavy rains washed out several places in the road and particularly around bridge structures. These were not fixed at all, or done very badly. Several places the grades are over 30% for short distances where the trail dips down into and climbs out of washouts. Thus the vehicle must operate in low gear about half the time. Four wheel drive is imperative. None of the road is paved. The surface merely being crushed rock. While the drainage is excellent and no puddles exist in the road, a very bad dust is setup behind each vehicle. This not only covers any following vehicle but also may be blowing into originating vehicle by strong winds which are nearly always present. Some oil or asphalt covering is necessary to settle the dust. The was apparently built on a basis of expediency. Thus it winds around a great deal. This prevents any speed being attained on even the good parts. Since a considerable number of cuts were made where the ridges of the hills went right down to the sea, it was false economy not to

enlarge these, or tunnel, in order to straighten out the road. Since both sides of the road are near sea level and it follows the shore, the maximum altitude of the road is less than 100 feet. Thus, there is no reason for steep grade.

To the occasional traveller, a bad road is merely an irritation. However, to one who must traverse it two or more times a day the matter is intolerable. The price paid for a bad road is

- (1) Time of transit three times what is necessary. Transport done on paid time which is waste of salaries.
- (2) Great wear and tear on vehicles. Trucks not available due to times for repair. High repair cost.
- (3) Very poor gas mileage due to much use of low gear.

- (4) Bad effect on personnel who are all worn out by continuous bouncing and in a very bad humor when they arrive at job.

- (5) All merchandise must be securely tied down in vehicle to prevent shifting or falling out. This wastes time at both loading and unloading.

- (6) Merchandise is broken by bouncing.

- (7) Merchandise and personnel covered with dust at end of trip. Cleaning of both is a nuisance, aggravation and waste of time.

- (8) More vehicles needed due to greater use, large times out for repairs.

- (9) Increased possibility of accidents on road. This is particularly true in wet or freezing weather.

- (10) A poor road will require more costly maintenance of (way?).

All the above effects are visible on run between Washington and Sterling which has a high use factor. The same are even more visible on the run between Massacre Bay and Alexai Point which has a lower use factor but much worse condition. All the above must be considered in relation to any venture on Mauna Kea. Since no personnel will be housed at top, the run must be made twice a day or more. The price of the above inconvenience may easily be \$10,000 per year. If money is worth 7% it will be profitable to spend \$150,000 on road to reduce operating expenses.



Loading crates of eclipse expedition equipment onto truck, Attu, Alaska

Shelter: The only shelter at Alexai Point is an old quonset hut with one end knocked out. Part of it has a cement floor but the windows and rear door are gone. These were closed with celotex and an improvised lighting system installed. No heat whatever is provided. A few benches were installed to hold equipment. No chairs were provided. The open end of the hut was partially closed with celotex; but no front steps or porch was provided. This bad set of circumstances was due to poor planning and no realization of the consequences. The price paid for this situation is

- (1) Personnel not anxious to go to work because it will be a long cold day. Working at a cold job where it is possible to warm up for ten minutes every hour at all is something else.
- (2) The dampness is worse than the cold or exposure and wind. By raising temperature from 50° at 100% to 70° at 50% is a tremendous improvement merely by applying heat.

- (3) Dampness causes tools to become slippery and hard to handle also processes of rust are hastened. Work is delayed.
- (4) Even a slight drizzle will cause the personnel to be (irritable?) because there is no possibility of drying out.
- (5) The old quonset was adequate shelter from wind except when it came from direction of open end.
- (6) No plumbing facilities were available. Therefore it was impossible to even wash when hands became dirty or greasy.

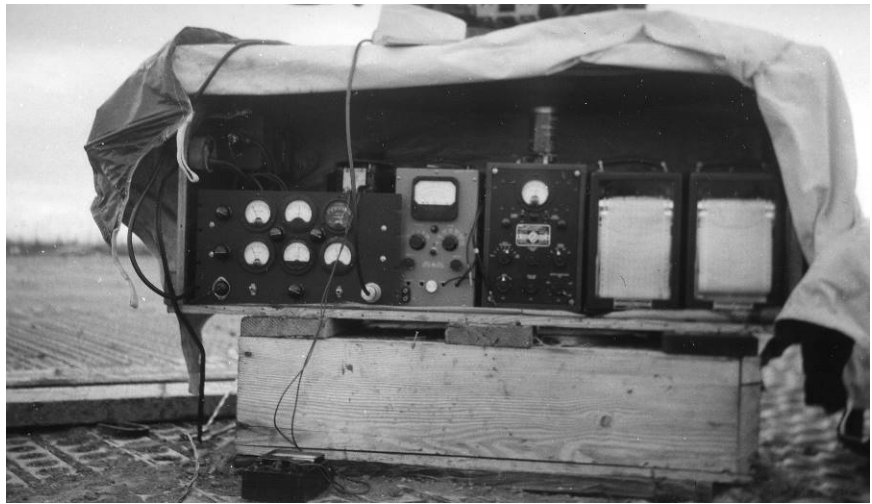
Transport: The only transport available was an old ten wheel truck of about 5 ton capacity with an open body having sides about 2 feet high but no tail gate; and a jeep with metal top and doors of homemade local vintage. Both were in poor order in that the doors didn't shut. Where tied shut no ventilation was provided, fumes from leaky exhaust was insufferable, the odometer didn't work and they were hard to shift plus a long series of flat tires. One wheel came off from truck because studs on brake drum broke off. The short wheel base of jeep made it very rough on the roads. While the truck had a longer wheelbase and more wheels it rode roughly also due to stiff springs. Once we had it loaded with about 6 tons of equipment and it rode much more smoothly. It was necessary to haul most (8 to 10) of the party in the truck because the commander wanted to use the jeep. The wind, rain and dirt made the trip miserable. Some mattresses were put in bottom of truck and this helped a bit. However, there was nothing to hold on to inside the truck and the personnel banged around badly, after 45 minutes of this treatment the rider was in no mood to do constructive scientific work. It was found that the truck rode quite a bit better if all the air was let out of the eight rear tires. This was alright for hauling personnel, but not for hauling heavy merchandise.

Any venture on Mauna Kea will require closed vehicles for hauling personnel. A heavy station wagon such as a Pontiac or Mercury will be satisfactory for scientific personnel and light apparatus. The contractor will need a good bus. It should not be like bus used from Washington to Sterling which is merely an army post bus and having seats which tip the wrong way. It should be like a Greyhound bus with comfortable seats and plenty of room. The drive up Mauna Kea will be 30 to 40 miles which is commensurate with drive from Washington to Sterling. Thus even tho the road is good, comfortable transport will be needed.



465 mc apparatus (10 foot radar mirror)  
from north, close view, Attu, Alaska, eclipse  
expedition site

Planning: Aside from planning the scientific details of the apparatus for eclipse measures, the planning was practically non-existent. Hagen and Harrison made a trip to Attu for a few days in May. While the former is conscientious and tries hard, the latter is a loud mouthed incompetent. What transpired in May is unknown, but of small consequence. Any arrangements they made with the Aerological Station personnel were purely of the verbal or gentlemen's agreement type. Between May and



465 mc equipment, Attu, Alaska, eclipse expedition site

August 29<sup>th</sup> the Navy replaced all but one or two of the men present in May. The new officer in charge arrived about a week before we did. The new outfit knew nothing about any arrangements made with the old outfit and cared even less. We were provided with one old truck and a jeep plus any amount of gas we needed, provided we pumped it ourselves. This was the extent of cooperation of Aerological Station personnel. Within a few days a memorandum appeared on the bulletin board by the new officer in charge which notified the station personnel that Alexai Point was out of bounds. This effectively squashed any faint interest any of the crew might have had in our work. Thus it was now impossible to recruit any sailors to help on a goodwill basis during off hours. We were entirely on our own.

Facilities: The island was an immense supply dump at the end of the war, all kinds of equipment were available. About 1947 the Army came and took the best but left a wide variety of stuff. This was allowed to stay outside and rust even tho a great quantity of buildings were available. Thus everything was broken down and nothing would run. All this stuff seems to be written off as war loss because no one is responsible for it. I counted three quite similar motorized cranes. None would run, but all had some of the tires still inflated. Some of the windows were broken and one had a radiator missing. It seems very likely that one good one could have easily been made out of the three by a few days work of interested people. Since we had no crane, all heavy boxes we had to be lifted by us; a stupid result of mismanagement. The situation on cement mixers was the same, a dozen of all sizes were available but none would run. Thus all cement was mixed by hand using shovels. Since no one wanted anymore of this back breaking labor than possible, the foundations were made as small as possible; in fact, too small. A direct consequence was that the eclipse apparatus was rather unstable and quite difficult to get and maintain oriented. It also blew in the wind with considerable vibration. Thus the data somewhat impaired and this of



38,000 mc apparatus from south, Attu, Alaska, eclipse expedition site

course is the ultimate end of the expedition. A lot of time was wasted trying to bolster up the mountings with little success using planks. The foundations were poured on top of steel landing mat. This mat lay on sand and was quite springy. furthermore it transmitted vibrations over a considerable distance due to people walking (about 10 feet) and trucks moving (about 30 feet). The foundations should have been made directly in the sand with good wide bases. Unfortunately, no cutting torch could be found that would work. We had to dig all our own sand, gravel and boulders by hand because no operating power equipment was available. We hauled water in 50 gallon drums from the Aerological Station to make the concrete even tho ponds of fresh water were available less than 200 feet away because no pumps could (be) found that worked and no good hose. When we ran out, I even hauled a dozen buckets by hand from the ponds. Hauling water up hill is work! All this heavy work was done by technically skilled personnel which was a great waste and created some ill feelings as the personnel felt they had other more important things to do.

The scientific apparatus arrived in thirty nine cases of various sizes up to 6' x 6' x 9' and weights up to 700 pounds. The cases were numbered for shipping identification but there were no packing lists. since the packing was done by the shipping room at NRL, only a vague idea was had of their contents. Thus the wrong ones were opened first.

Two gas engine generators of 10 kW capacity were available on small two wheel trailers. After the tires were fixed, these were found to be in good operating shape. While both were 60 cycle, one turned out to be 110 V single phase, and the other 220 volt three phase. This complicated the switchover system. Both used spark ignitions but fortunately were not bad when moved 200 feet from electronic equipment. It might have been otherwise. We hauled gas for these in 50 gallon drums. First it was hand pumped from ground to drum on trucks. Then pumped again into tanks of engine driving generator. Both, a lot more work. A bucket of gas was kept handy to wash ones hands in.

A preliminary group should have been sent out with adequate letters of introduction and authority to get affairs in order before the scientists arrived. A minimum of demands should be; one motorized crane in working order to lift heavy pieces; one cement mixer in order to make concrete; one motor shovel to dig sand, gravel and boulders; fix up quonset hut and install heating plant and wash facilities; layout north-south line and pour foundations in accordance with supplied plans; mount tank on truck or fix tank truck for hauling water; get sofas or combined seats for hauling personnel in truck and fix roads at important places. The last is a very important item and was very aggravating. All kinds of road building equipment including scrapers, shovels, drags and pile drivers were available but nothing was in operating shape. Plenty of rock drills and explosives were on hand also if quarrying were to be done. Immense quantities of piles, beams and planks plus hardware were available to fix bridges if necessary. All the makings of a first class construction group were available including at least 50

Caterpillar tractors of all kinds up to 20 or 30 ton jobs with diesel engines. Unfortunately, nobody was interested or cared. The staff at the Aerological Station was charged with running the station only and thats all. They



3000 mc apparatus from north, Attu, Alaska, eclipse expedition site

seemed privileged to loot and destroy whatever else they wished on the island. Most were incompetent on matters other than their assigned duty. A Lt. was in charge. He seemed only mildly interested in the station and not at all in other matters. The navy policy is to replace all personnel after six months duty at this station. All hands (25 total) had only one idea in their minds. That was to get out as soon as possible after six months and to do as little as possible while on Attu. The feeling of unimportance and insecurity pervaded the entire establishment.

The question of foundations for telescope mounts was aggravating in more ways than one. Until these foundations were in, no mountings could be setup. With no mountings, no electronic gear could be installed. Until the electronic apparatus was installed nothing could be tried out and thus there was a lot of anxiety to learn what, if anything, was broken; and how much fixing would have to be done. Thus everything depended on the foundations. Now the foundations had to be installed on north-south line so that the polar mountings would function. The maps were poor and the steel landing mat caused large errors in compass reading. Thus recourse was necessary to solar or stellar observations. A theodolite had been sent but nobody knew which box it was in, because there were no packing lists. When this was found, a long run of cloudy weather started. Altogether, about three days were lost on this mixup before the foundations were poured.

While two engine generators were available, no thought had been given to connections, regulators, etc. These were improvised in a crude way by semiskilled technicians on the job. Since the quonset hut was 300 feet from apparatus some housing was necessary for electronic apparatus. No provisions had been made. Some boxes with looted tarpaulins were erected in a rather unsightly mess and tied down to landing mat with ropes.

Quarters: The quarters for the men were in some ways better and some ways worse than expected. Six of the men (including me) were quartered in one room about 15' x 20' using foldable deck beds. Adequate locker space was available and a table with four chairs was present. Abundant light from overhead fluorescent fixtures was good. Two more men chose to live in a nearby quonset hut where there was more space but less light and heat. The other three lived with personnel of the station at various places. Most of us used the crews wash room. This caused an overload in morning but was reasonably satisfactory otherwise.

The food was good, hearty well cooked and plentiful. Fresh foods were quite lacking and none was grown on island and the ship came with supplies only once a month. Milk was served on average of once a day. Fruit consisted of apples (in not very good condition) and oranges. The milk seems to have come frozen from Seattle. When thawed it contained a lot of fine particles of wax from the cartons. These stuck to inside of ones mouth plus made it taste bad.

Hours of Work: Breakfast was served from 7:00 to 7:30, lunch from 12:00 to 12:30 and supper from 5:00 to 5:30. Since it takes 40 minutes to get out to Alexai Point from Aerological Station, work would not begin much before 8:30 and we had to quit at 4:00 in order to get back to eat. A half



Antennas and equipment at Attu, Alaska, eclipse expedition site, viewed from west

hour was taken for lunch. This made a working day of 7 hours which wasn't bad, but a bit short. The main difficulty was that we were operating on Adak time which is about an hour and a half ahead of Attu local time. Thus we were really starting about 7:00 am and quitting at 2:30 pm. The mornings were always cold and wet. Usually the afternoons were much better even tho the sun may not shine because things warm up and dry out a bit. Actually, we often quit just about the time things were best. The work should have started about two hours later and continued about three hours later. This poor timing was brought about by schedule of morning and evening meals.

Any venture on Mauna Kea should adjust the working schedule to the best hours of the day. Work should probably end about sunset, so that a return may be made while still light.

The Attu experience brought out forcibly a situation which is present also at Sterling. Where it is necessary to transport personnel over long distances on paid time (even on unpaid time) it will be much better to work long days. This is because the ratio of working time to total elapsed time increases. If weather conditions permit, a working day of 10 hours with a total elapsed time of 12-1/2 hours should not be a hardship on anyone (1 hour each way and 1/2 hour for lunch). On such a schedule it will be best to work 4 to 6 days and then take 1 to 3 days off to rest, and repeat. The off periods may be adjusted to bad working weather if suitable forecasts can be secured. Rest days are important.



Weather station at Attu

On Attu we got off on the wrong foot, at first it was attempted to eat all those meals at the Aerological Station. Four truck rides a day were killing and the day was so short that little work was done. Then they started sending out sandwiches for lunch. This was also bad. Finally they brought hot food which was luke warm by time it arrived. They never did get up to hot coffee for lunch. The situation was still poor.

Any venture on Mauna Kea will require a really good hot lunch to be served with hot coffee. Also someone should dish out the lunch to prevent the early and greedy from robbing the rest. A suitable place to work and cleanup is also necessary.

Some of these ideas finally sank in, and for the last five days on Attu we ate two meals at the Point each day. We probably got in ten working hours that way, as we returned to station about 9:00 pm. Nobody complained much but it was obvious people were becoming very tired. It would have been better to be able to rest a few minutes after cleaning up and then eating the evening meal at the station.

The idea of days off didn't seem to occur to the management. Some people worked every day we were there. I took two days off, the 10<sup>th</sup> and the 13<sup>th</sup>. Continuous work without rest is poor, because peoples minds begin to get dull and wrong decisions are made and the work is not expedited. Even tho the person doesn't spend the day off resting, he has an opportunity to go elsewhere and see other things and places. This is refreshing in itself.

Toward the end the management must have realized the party was in no mood to do a lot more heavy manual labor because they secured the help of some sailors to load and unload the boxes onto trucks. We, however, packed and closed all the boxes plus repaired or made new ones, as was needed.

#### Weather Comments at Attu 50° 50' N 173° 11' E:

Aug 24<sup>th</sup> Arrived at 1200 noon scattered clouds with sunshine at times. No (?), need Parka



- Aug 25<sup>th</sup> Cloudy in morning with rain and thunder. Partly clear with little rain in afternoon. Parka in morning, Sweater in afternoon. Rainbows in morning and evening.
- Aug 26<sup>th</sup> Partly cloudy in morning. Clear and sunny in afternoon. Warm north light breeze. Light sweater needed.
- Aug 27<sup>th</sup> Clear and sunny all day. Warm light breeze. Took long walk (10 miles) in afternoon. Beautiful day. Took off shirt for heavy work in afternoon.
- Aug 28<sup>th</sup> Clear in morning. Partly cloudy in afternoon. Nice day. Only shirt or light sweater needed.
- Aug 29<sup>th</sup> Cold drizzle all day. Heavy clouds, light wind. Miserable day. Used Parka all day with hood up.
- Aug 30<sup>th</sup> Clear and sunny all day. Blue sky. Little wind. Only shirt needed for hard work.
- Aug 31<sup>st</sup> Faint (?) at times in morning. Afternoon wet and drizzle. Heavy clouds. Can't tell where sea ends and sky begins. Steady SW wind all day. Parka needed at all times mostly with hood up.
- Sept 1<sup>st</sup> Cloudy in morning. Need Parka because of ground fog. Afternoon sunny and (?), light breeze. Work in shirt sleeves.
- Sept 2<sup>nd</sup> Cold wind all day. Used Parka at all times mostly with hood up. Morning cloudy with ground fog and drizzle, afternoon sunny and cold.
- Sept 3<sup>rd</sup> Cool & cloudy all day. Little wind, damp. Use Park then & hood to keep warm because no sun, except when doing heavy labor a sweater is adequate.
- Sept 4<sup>th</sup> Cold & cloudy all day. Calm in morning. Windy and rain afternoon. Used Parka and rain coat all day. Most miserable day yet. Got soaked returning in open truck.
- Sept 5<sup>th</sup> Cloudy all day. Little wind. Used parka with hood down all day except for heavy work a sweater was sufficient.
- Sept 6<sup>th</sup> Cloudy and drizzle all day. Used rain parka. Considerable wind. Saw rainbow for few minutes in late afternoon.
- Sept 7<sup>th</sup> Cloudy all day except for a few hours near noon. Drizzle in morning & evening. Used parka with hood due to wind except in sunshine near noon when a sweater was adequate.
- Sept 8<sup>th</sup> Morning cloudy & rain. Afternoon considerable sun. Slight wind. Took off parka when sunny. Rainbows in morning. First day in more than a week there was sun at 4:30 (totality time).
- Sept 9<sup>th</sup> Cloudy & rain showers most of day. Sun peeked thru faintly at times. Used parka all the time except when wind died down & rain stopped. Remained at Alexai Point until after sunset. The sun set across Massacre Bay behind some mountains which had black clouds above their tops. The rays of the sun were cut off on bottom side by mountain peaks and displayed against clouds a perfect rising sun emblem of Japan in red orange (?).
- Sept 10<sup>th</sup> Stayed at Aerological Station all day. Sun faintly visible thru clouds. Too much wind outside to use only a sweater unless working hard.
- Sept 11<sup>th</sup> This is day of the eclipse. Atrocious weather. Morning heavily overcast; by noon a wind started and by 3:30 there was a howling gale from south with a lot of rain. Used rain parka and was nice and dry except for feet which got wet because forgot to bring rubber overshoes. The moderate exercise of



Reber in parka and mittens on day of eclipse, September 12, 1950, Attu, Alaska

cranking azimuth wheel of mounting most of afternoon kept me quite warm. The rain (?????...???).  
The wind at Point probably above 30 mph and gusts to 50 mph.

Sept 12<sup>th</sup> Cloudy all day. Rain until 3 pm. Used rain parka outside. Worked inside in unheated quonset hut most of time packing boxes. Sweater was satisfactory.

Sept 13<sup>th</sup> Cloudy in morning. Considerable wind. Used Parka outside. By noon the sun came thru weakly. Afternoon cloudy again. Need Parka because of wind.

Sept 14<sup>th</sup> Reasonably clear and sunny, cool. Need Parka when just standing around. Left on Tawasa at 10:00 am.

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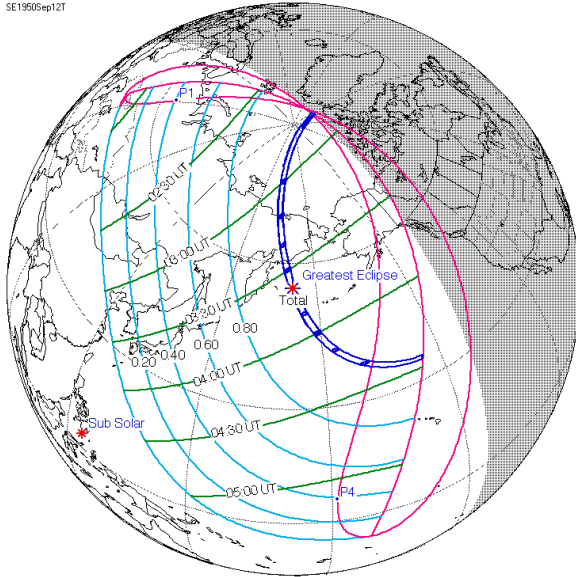


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{Mayer} Interview with Cornell H. Mayer on 30 September 1971:  
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#### Credits:

{NRAO} Papers of Grote Reber: "Expedition to Attu, Alaska, to view solar eclipse of September 12, 1950," *NRAO Archives*: <https://www.nrao.edu/archives/collections/show/269>

{NRAO-Pho} NRAO Images: Papers of Grote Reber, "Expedition to Attu, Alaska, to view solar eclipse of September 12, 1950," *NRAO Archives*, accessed June 21, 2021:  
<https://www.nrao.edu/archives/collections/show/450>

{NRAO-Arc} List of Pictures of Trip to Attu: <https://www.nrao.edu/archives/items/show/13123>