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DEPARTMENT OF THE INTERIOR,
GENERAL LAND OFFICE.

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Olympia, Wash., Nov. 9, 1911.

Mr. Arthur D. Kidder,
U. S. Supervisor of Surveys,
Denver, Colo.

My dear Mr. Kidder:

The generally poor condition that ail of the new Young and Sons instruments both solar compasses and solar transits ^{came in} prompts me to write you about them. Mr. Kingsbury got me to go over them after they came in from the field in order that none might be put away for the winter without knowing that it was in good condition. The aluminum parts of every instrument except one solar compass were covered with a heavy coat of the white oxide of aluminum and on several instruments this had worked in so readily under and into the compass box, and under the vernier glasses that it was almost impossible to read the graduations. One of the solar compass aluminum spindles was so corroded that it would not turn at all, until it was oiled thoroughly and pulled apart. This was probably due to carelessness; however it shows that in the hands of the average transitman aluminum is not a very satisfactory metal for instruments up here in the dampness of the forests, where it is impossible to keep the instruments dry all of the time. I have tried to take good care of my instrument but the aluminum corrosion works in, in spite of all that I can do. The corrosion seems to be the greatest where the aluminum is mounted adjacent to a bronze surface and I attributed that to the

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galvanic action that probably would be caused by the electric couple. Aluminum and copper are farther apart in the electro-chemical series than even zinc and copper, but I believe from what I have read that unless the water between aluminum and copper is charged with common salt, a thin film of oxide covering the aluminum prevents galvanic action.

I do not believe that the life of such aluminum instruments in these forests will be over three seasons at the very most, unless some protective coating of a non-corrosive metal can be successfully put on the aluminum, which I know to be very difficult because of that same high position of aluminum in the electro-chemical series.

Another great fault of the instruments has been the fact that the compass boxes very readily admit water from the top on the compasses. The glass should be set in some waterproof glue, or balsam which I have used very successfully, or else the construction should be changed so that the box will shed water.

The Burt solar compass that you purchased from W. and L. E. Gurley came in in perfect condition, and when put side by side with a Young and Sons' instrument I must say that the difference in care of construction is very marked. The tangent screws especially are so much better cut and fitted on the Gurley instrument.

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Quotation from the remainder of Mr. Chubb's letter is omitted for the reason that the same does not pertain to the above subject.

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Signed: Very sincerely,

W. Morris Chubb.