

1103.1

CARNEGIE INSTITUTION OF WASHINGTON

Geophysical Laboratory
WASHINGTON, D. C.

mm	2/28	mm	3/14
ww		ww	
ADDRESS			
2801 UPTON STREET			

ARTHUR L. DAY
DIRECTOR

February 25, 1933.

Personal

Doctor Max Mason, President,
Rockefeller Foundation,
61 Broadway,
New York City, N. Y.

Dear Doctor Mason:

In view of the fact that sometime ago I gave you rather definite assurance that Corning would be ready to pour the 120" disc about March 1st, it is incumbent upon me to advise you that there will be some further delay. I spent yesterday and the day before in Corning and have a number of details to report to you, some of which I am sure will please you.

First, in regard to the delay in the schedule, I think I wrote you at the time that the lift which is to handle both of the large discs, although contracted for October delivery, did not actually reach Corning until after the first of the year. Even then it was thought that March first would see the erection completed, the mold prepared and everything in readiness for pouring. It has in fact proved to be a considerably longer task.

The plan was (and is) to erect the lift, the pouring and annealing furnaces, for the 200" disc at this time and to use them without further change first for the 120" disc and then for the 200" disc. This plan would eventually save some time and also the cost of two separate installations. The trouble now arises only from the fact that the task of erecting this heavy equipment has proved to be considerably greater than was anticipated and will require at least another month for its completion. It is unfortunate that the time factors in the program could not be more accurately forecast, but the delay after all is not very serious in view of the magnitude and novelty of the undertaking. Moreover there is reason to expect, as stated above, that a part of the delay will be caught up later. Then too, there are certain new reasons for believing that the later stages of the process may be further shortened.

This long period required for erecting the heavy equipment left certain members of the laboratory staff in a "flat spot", so to speak, while waiting for this equipment. They accordingly undertook two investigations which it was thought might yield something of advantage for the great disc.

The first of these was the quality of the surface to receive and hold its silver coating. It has been known in Corning for a considerable time that the surface of Pyrex varies somewhat with the heat treatment in the upper temperature zones (i.e. above the annealing temperature). To investigate this in some detail we asked Doctor Adams to furnish us accurate information regarding the kind, the strength and the time of exposure of the various solutions used in silvering. This was provided

promptly and various samples of the glass to which different heat treatments had been applied were put through this process of silvering and re-silvering with a view to demonstrating the optimum surface quality which could be obtained.

The second investigation arose from the disappointment which Doctor Hale expressed, as you will recall, when we decided to use standard Pyrex glass of expansion coefficient about 33 when it was known that we had developed other glasses with expansion coefficient something over 20 only. The obvious reason for this choice at the time was the very much more extensive experience with the behavior of standard Pyrex, which has long been regularly manufactured for chemical and other purposes as compared with the newly developed glasses which had never been made in great quantity or in large sizes. Furthermore, discs of standard Pyrex had been in use at Pasadena for a number of years in the solar telescope and elsewhere and had been uniformly satisfactory.

Notwithstanding the obvious pertinence of this reasoning the "flat spot" gave opportunity for, and indeed inspired, further work on these glasses of lower expansion and more careful tests of their physical properties, including this detail of depositing and removing the silver surface. In all of these tests the superiority of the new glass over the old was very clearly and quantitatively demonstrated. The new glass has also been tried out for stability at the mold contacts and the other details of technique which had been developed for the 60" disc and in all of these also its superior quality was clearly shown. The danger of devitrification is also so much smaller with the new glass as to amount to a different order of magnitude. There is hardly a possibility of producing devitrification in it during any reasonable time of exposure at the higher temperatures.

When all these facts were brought together at our conference yesterday it was concluded that these advantages were so considerable that we should assuredly fail in our duty to this problem if we did not make the effort to use this glass. Of course disadvantage lies in the fact that it must be melted in a special tank set aside for this purpose alone, but the additional cost thereby involved is hardly of sufficient moment to weigh against the advantages named above.

I think it will therefore please you to learn that a new glass of Pyrex type will be substituted for standard Pyrex in the remaining discs for the following reasons:

1. Its expansion coefficient is about 23 instead of 33, which in addition to the obvious advantages will reduce the annealing time by about 1/3rd.
2. Its chemical surface stability is so much greater than the older glass that re-silvering can be applied almost indefinitely without need for re-figuring the surface.
3. The danger of devitrification is eliminated.
4. Reducing the expansion coefficient by one-third not only reduces the annealing time in that proportion, but removes from the problem much of the sensitiveness and precise detail of the annealing operation and increases by that much the certainty of its success.

Doctor Max Mason,

-3-

February 25, 1933.

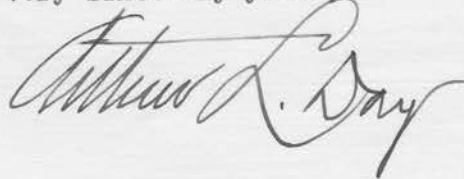
Indeed these advantages are so impressive and so fundamental to the success of the entire problem that I shall propose to Doctor Hale that we also cast a new 60" disc of this composition. This can be done in existing equipment alongside the large equipment without any loss of time and is, in my opinion, well worth while.

Personally I believe these results represent a distinct contribution by Corning to the success of the great disc and are sufficient I am sure to alleviate any impatience which may have been caused by the delays in erecting the heavy equipment.

I hope this news will please you.

With kind regards, believe me,

Very sincerely yours,

A handwritten signature in cursive script, reading "Arthur L. Day". The signature is written in dark ink and is positioned below the typed name "Arthur L. Day".

ALD/E.