

Center for Astrophysics

Harvard College Observatory
Smithsonian Astrophysical Observatory

MEMORANDUM

To: Ed Lilley, Nat Carleton, Nat Hazen, Charles Whitney, Dennis DiCicco, and
John Wolbach
From: Owen Gingerich December 3, 1975
Subject: Restoration of 15-inch telescope

Some months ago George Field asked me to bring together a committee to formulate a plan for the restoration of the historic 15-inch telescope. I have spoken informally and individually to most of you about this, and there seems to be universal agreement that it would be ideal if we could restore the telescope to its original 19th-century splendor. At the same time it should be possible to install some kind of "sound and light" program in the dome so that it would be a very attractive exhibition area to show to guests of the Observatory.

Part of the difficulty in such an undertaking has been the lack of materials showing the original state of the telescope. Acting on an astute suggestion recently made by Joe Ashbrook, I have located the description and plates of the Pulkovo refractor, which was built by the same company as a twin to ours. I am enclosing copies of several sections of that material. At one point Ed Lilley had suggested that perhaps some of the machinist in our shop or in the Amateur Telescope Makers might be persuaded to take on part of the restoration as a hobby. I think that this possibility should be explored.

What we now need is a committee meeting to figure out how we can get cost estimates for this restoration and the related sound and light equipment. We can't seriously proceed farther on the project until we have such numbers.

OG/jj

XC: George Field
Bob Reed
Joe Ashbrook
Donald Menzel
David Wheatland

Enclosures



Center for Astrophysics

Harvard College Observatory
Smithsonian Astrophysical Observatory

DEC 11 1975

MEMORANDUM

December 11, 1975

To: Owen Gingerich

From: Donald H. Menzel

Subject: Restoration of the 15-inch telescope

I hasten to reply to the memorandum of December 3. Let me say, first of all, that I am thoroughly in favor of the restoration of the historic 15-inch telescope. In 1952, when I became Acting Director, I undertook at least partial restoration as a major project. It was in a most decrepit state, as John Wolbach will doubtless confirm. The restoration was undertaken largely by Arthur Wanamaker, under the supervision of G. Miczaika.

The beautiful brass fittings had been covered up with a number of thick coats of house paint. Our first task was to remove the numerous layers of paint, which revealed not only the beautiful brass but also a lovely mahogany tube.

At one stage in the restoration--I forget the precise details--Miczaika had removed the heavy counter weights on the eye end. In an attempt to lower the telescope objective for cleaning, one of the supporting ropes broke and the telescope fell, splintering the end of the mahogany tube, but not (fortunately) damaging the objective. A study indicated that the end of the tube was beyond repair and it was recommended that we replace that portion of the tube with a metal pipe, 15 inches in diameter. This was done and, of course, additional counter weights had to be made at the eye end.

The original clockwork drive had been replaced and worked on so many times, that we found no way of bringing it back to its original state or even making it work. As a result, Miczaika (probably with the help of Hector Ingrao), devised a modern electric drive, which worked for a while but was not too satisfactory. I don't know what its present situation is.

As a result of our efforts, the telescope was made to look very similar to its original appearance. After considerable search, we found red velvet that we used to re-upholster the seat of the observing chair. I noticed that this has largely worn out in the last quarter century.

December 11, 1975

-2-

The dome used to run on cannon balls, but these were replaced by a somewhat more modern mechanism, I believe under the Shapley regime. The cannon balls themselves had badly worn. I think one of them is still kept on exhibit. In my first experience with this telescope, about 1922, we used to turn the dome by the large hand wheel on the southeast side of the room.

The clock weights, as I recall them, were originally similar to those shown in the Pulkovo diagram.

The idea of a "Sound and Light" is excellent. We attempted something like that once in the rotunda, but the address system was stolen.

I might add, further, that in 1952, when I became Acting Director, the alcoves around the 15-inch were piled to the roof with old, unbound, useless publications and great quantities of "junk."

I do point out that Art Wanamaker, who will certainly recall the original restoration, still lives in the neighborhood, on Orrin Street. Although he is retired, perhaps he could be prevailed on to devote some time to further restoration, in which he was very much interested. I think that Dennis di Cicco would have many ideas on the project.

The exhibition should emphasize the fact that, when the 15-inch was built, it shared with the twin at Pulkovo, the distinction of being the largest telescope in the world. As exhibits on the wall, perhaps we can find a complete set of the beautiful Trouvelot drawings, made with this telescope, of Saturn, Jupiter, Mars, the sun, prominences, a comet, and the Orion Nebula. There probably were others, but I do not recall what they were. There used to be a number of these preserved in our observatory publications shed. Perhaps Mrs. Federer may know how to obtain a set.

I also point out that Hector Ingrao is still in the vicinity and perhaps might be called on for advice.

I shall be glad to help in any way I can.

One final point unrelated to the 15-inch, relates to the fact that the ceiling of the rotunda--after more than 25 years--needs some repair and refinishing. The constellations

Memo to Owen Gingerich

December 11, 1975

-3-

were painted on the interior of this dome by John Wolbach, who will be able to give good advice. Undoubtedly new materials are available in the way of UV-paints.

cc: Ed Lilley
Nat Carleton
Nate Hazen
Charles Whitney
Dennis di Cicco
John Wolbach
George Field
Bob Reed
Jose Ashbrook
David Wheatland

RESTORATION OF 15-INCH TELESCOPE

- MEETING -

December 17, 1975 at 3 p.m. in

Conference Room B-318

60 Garden Street

Owen Gingerich
495-7216

Center for Astrophysics

Harvard College Observatory
Smithsonian Astrophysical Observatory

MEMORANDUM

To: HCO 15" Telescope Committee
From: Owen Gingerich
Subject: MEETING, JANUARY 29, 2:00pm

Nathaniel Carleton
Dennis Di Chicco
Owen Gingerich
Edward Lilley
Robert Reed
Charles Whitney
John Wolbach

January 26, 1976

The meeting will be held in the Engineering Conference Room (Perkin 133).

Listed below are some of the tasks necessary in the restoration of the 15" telescope. At our meeting we should try to arrange these according to priority and we should discuss how to obtain cost estimates for each one.

- Resurfacing floor and repair of chair track
- Reupholstering and strengthening observing chair
- Repair of dome shutter
- Replacement of metal section of the telescope tube
- Removal of present electronic drive
- Facsimile of original drive
- Replacement of Clark drive
- Restitution of declination axis and circle
- New lighting system
- Sound and light program

OG:k-s
cc; George Field



JAN 30 REC'D

HARVARD COLLEGE OBSERVATORY

MEMORANDUM

January 29, 1976

To: O. Gingerich
From: R. G. Reed *BR*
Subject: 15" Telescope refurbishing

This will confirm our conversation. Certainly there is no objection to getting cost estimates for the various components as listed in your memo of January 26.

I must point out, however, that it is not clear to me how any Observatory funds can be utilized in this program. I think the only way it can be pursued is by getting foundation support and a start in this direction should probably be made promptly.

RGR/o

c. G. B. Field

Ed Lilley, Nat Carleton, Nat Hazen, Charles Whitney, and
John Wolbach
Owen Gingerich
Restoration of 15-inch telescope

Some months ago George Field asked me to bring together a committee to formulate a plan for the restoration of the historic 15-inch telescope. I have spoken informally and individually to most of you about this, and there seems to be universal agreement that it would be ideal if we could restore the telescope to its original 19th century splendor. At the same time it should be possible to install some kind of "sound and light" program in the dome so that it would be a very attractive exhibition area to show to guests of the Observatory.

Part of the difficulty in such an undertaking has been the lack of materials showing the original state of the telescope. Acting on an astute suggestion recently made by Joe Ashbrook, I have located the description and plates of the Pulkovo refractor, which was built by the same company as a twin to ours. I am enclosing copies of several sections of that material. At one point Ed Lilley had suggested that perhaps some of the machinist in our shop or in the Amateur Telescope Makers might be persuaded to take on part of the restoration as a hobby. I think that this possibility should be explored.

What we now need is a committee meeting to figure out how we can get costs estimates for this restoration and the related sound and light equipment. We can't seriously proceed ~~on the project~~ project until we have such numbers.

OG/jj

XC: George Field
Bob Reed
Joe Ashbrook
Donald Menzel
David Wheatland

Center for Astrophysics

Harvard College Observatory
Smithsonian Astrophysical Observatory

MEMORANDUM

To: HCO 15" TELESCOPE COMMITTEE
From: Owen Gingerich
Subject: MEETING: February 5, 1976

Nathaniel Carleton
Dennis Di Chicco
James Cornell
Owen Gingerich
Nathaniel Hazen
Edward Lilley
Robert Reed
Charles Whitney
John Wolbach

February 2, 1976

The meeting will be held in the engineering conference room (Perkin 133).

I have enquired with Harvard about their policy with respect to making Harvard buildings National Historical Landmarks and find that it is against their policy because of the bureaucratic hassles potentially involved in making any changes to the building or its adjacent environments. We could, however, arrange to have the Sears Tower listed in the National Registry of Historic Buildings.

Bob Reed points out that our proposed program will require outside support and that we should soon reconsider some proposals to foundations.

Listed below are some of the tasks necessary in the restoration of the 15" telescope. At our meeting we should try to arrange these according to priority and we should discuss how to obtain cost estimates for each one.

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- Replacement of metal section of the telescope tube
- Removal of present electronic drive
- Facsimile of original drive
- Replacement of Clark drive
- Restitution of declination axis and circle
- New lighting system
- Sound and light program

OG:k-s
CC: George Field



Center for Astrophysics

Harvard College Observatory
Smithsonian Astrophysical Observatory

MEMORANDUM

To: HCO 15" TELESCOPE COMMITTEE
From: Owen Gingerich
Subject: MEETING: February 5, 1976

Nathaniel Carleton
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- Restitution of declination axis and circle
- New lighting system
- Sound and light program

OG:k-s
CC: George Field

OG

FEB 13 REC'D



Mr. Owen Gingerich
Center for Astrophysics
Cambridge, Mass. 02138

Kissimmee, Fla.
Feb. 10, 1976

Dear Sir-

I read your item in the Feb. Sky & Telescope regarding
your proposed restoration of the Harvard College Observatory
15" Refractor.

Many years ago I viewed Jupiter there as a guest of
Leon Campbell. While I have no photographs for you I would
offer you the name and address of one who claims to have
been indirectly connected with the Clark firm which made
telescopes, and being so close to H.C.O. might possibly
have something to offer which would be useful to you.

His name is - Burton L. Fitzgerald
14 Maxwell Road
Milton, Mass. 02186 phone 696-0313

He was about retirement age at his most recent writing
which was March 1971. I have had no reply to a more recent
letter. With all good wishes for your success in the
task ahead.

Sincerely Edward W. Clement

1453 Sungate Drive Apt. 10

Kissimmee, Fla. 32741

MEMORANDUM

To: George Field
From: Owen Gingerich *OG*
Subject: Renovation of HCO Great Refractor

February 11, 1976

The Committee for the Renovation of the Great Refractor is unanimously of the opinion that the telescope ought to be restored as nearly as possible to its original state.

We also feel that the 15" refractor should remain as an operational instrument, available on special occasions for observing. This means that a facsimile of the original clock drive should be made from the detailed Pulkovo observatory plans. Although such a drive would not be satisfactory for photography it should suffice for most visual observing. Actually, the original drive proved less than satisfactory and was replaced after about ten years with a more accurate mechanism made by Alvin Clark. The Clark drive was removed in 1955 and apparently destroyed, and our present belief is that it would be more complicated to copy than the original Mahler and Merz drive; besides, we have fairly detailed plans to the original drive and lack them for the Clark mechanism.

We assume that the restoration of the telescope, the observing chair, and the presently unworkable shutters would be accompanied by a general renovation of the walls, floors, and lighting, and would include exhibits and a sound-and-light program. The lower rotunda area was only mentioned in passing, but would clearly require refurbishing at the same time.

In 1970 Nathan Hazen looked into the history and condition of the great refractor and came up with a budget of \$26,000. When we consider inflation, contingencies, certain additional restoration including the drive, and a projection system, we feel that a realistic price tag would now be \$40,000-\$50,000. This would allow the machining and repair work to be done professionally and swiftly, but it assumes that the design of the exhibits and the sound-and-light show would be done in-house and not contracted to professional designers. (As you know from the AAS experience with the TGEA interactive exhibits, such things can be surprisingly expensive.)

Our preferred plan of action would be to gain foundation support for this entire sum. We have no suggestions as to where this money could be raised. We are willing to cooperate, but would need professional help.

As a fall-back position, we would propose that the money be raised

Memo
George Field
Page Two
February 11, 1976

through a series of donations in the \$2,000-\$5,0000 range, and that the donors would be commemorated on a marble plaque similar to the original tablet now in the 15" dome. We suppose that a number of societies and individuals would enjoy having their names associated with such early patriots as John Quincy Adams and Nathaniel Bowditch. Presumably you would need Corporation permission not only for the solicitation of funds but for the idea of putting up a commemorative plaque. Should this scheme be preferred, we would expect to work up an advertizing brochure.

There are various ways in which the capital cost can be decreased at the expense of a longer renovation time and the continued supervision from staff members. Some interest has been shown by individual members of the Amateur Telescope Makers in carrying out specific projects such as the construction of the clock drive, repair of the observing chair, and even the reparation of the shutters. We may in any event find that the craftsmanship of skilled amateurs is more satisfactory than professionals who have little understanding of historical astronomical instruments.

We of the committee feel that the ball is now in your court and we do not propose to reconvene until we have further instructions from your office.

Nathaniel Carleton
Dennis Di Cicco
James Cornell
Owen Gingerich
Nathan Hazen
Edward Lilley
Robert Reed
Charles Whitney
John Wolbach

OG:k-s

cc/R Reed

Center for Astrophysics

Harvard College Observatory
Smithsonian Astrophysical Observatory

MEMORANDUM

13 February 1976

To: Owen Gingerich

From: G. B. Field *GBF*

Subject: RENOVATION OF THE GREAT 15" REFRACTOR

Many thanks for the splendid committee report on the renovation of the 15". I concede that, indeed, the ball is now in my court; please give me a few days to get in shape, so that I can return it with a winning stroke.

GBF/pb

Center for Astrophysics

Harvard College Observatory
Smithsonian Astrophysical Observatory

MEMORANDUM

March 3, 1976

To: Owen Gingerich

From: George B. Field *GBF*

Subject: Renovation of 15" refractor

I have not forgotten you and the good work of your committee. I shall take up this matter at my next staff meeting, March 10.

Center for Astrophysics

Harvard College Observatory
Smithsonian Astrophysical Observatory

MEMORANDUM 12 March 1976

To: O. Gingerich, N. Carleton, D. Di Cicco, J. Cornell, N. Hazen,
A. E. Lilley, R. Reed, C. Whitney, J. Wolbach
From: George B. Field *GBF*
Subject: Renovation of the 15" refractor

Discussion of the renovation of the 15" refractor was held at our last staff meeting; let me emphasize that your thoughtful committee work is greatly appreciated.

While I agree that the renovation project is worthwhile and one that should be pursued, I am unwilling to commit unrestricted HCO funds to its accomplishment. Furthermore, a campaign to raise the money needed through a series of smaller donations should be considered only as a last resort, as such programs frequently bog down well short of their goals. Finally, I feel that the sound-and-light show you propose is of dubious value, at best, and I would not favor its inclusion.

It appears to me that solicitation of private foundation grants for the renovation is the best course of initial action. I have authorized Bob Reed to engage a professional fund-raiser for the purpose of pursuing this approach, and we are reserving sufficient funds for consulting fees to permit a thorough study of the matter.

JUL 20 REC'D

HARVARD COLLEGE OBSERVATORY

MEMORANDUM

16 July 1976

To: Distribution

From: N. L. Hazen

Subject: 15" Telescope Renovation

At a meeting in June it was agreed that the various ideas and suggestions relating to the renovation of the 15" telescope should be assembled into a "shopping list" so that a) the scope of the proposed effort could be reviewed, added to or altered, and b) costing of the individual elements could proceed. Enclosed is such a list for your consideration which I think reflects most of the thoughts expressed in previous meetings. It is my understanding that Bob Reed's office would coordinate the accumulation of suitable costing information, preparation of a proposal and ultimately the implementation of the work.

NLH:mc
Enclosure

DISTRIBUTION

E. Arcand
N. Carleton
J. Cornell
D. DiCicco
O. Gingerich ✓
E. Lilley
R. Reed
C. Whitney
J. Wolbach

15" Refractor Renovation

Telescope:

Rebuild wooden tube end.
Straighten out counterweight shaft.
Remove relatively modern additions:
 unnecessary counterweights.
 accessory mountings.
 electrical cabling.
Add contemporary accessories:
 cross hair illuminator.
 measuring eyepiece.

*See W. 11
th*

Drives and Mount:

Disassemble, clean, refurbish.
Strip of unnecessary recent gear:
 Electrical R.A. and Dec. drives.
Design/build/restore declination index circle and clamps.
Design/build/restore R.A. index circle.
Design/build R.A. drive per original drawings

Dome:

Repair sill and upper track bolting, as required.
Restore lower ball tracks and install balls.
Remove electrical dome machinery.
Build/install handwheel.
Aperture door repair:
 Repair and refit lower sash frames and doors.
 Replace upper door fittings.
 Refasten door drive frame.
 Rebuild door drive winch including new gears.

Observer's Chair

Refasten and paint frame.
Refit and adjust drives.
Rebuild and reupholster chair

Tower

Strip and rebuild observing level flooring:
New plywood subfloor (refasten chair rails and
installation of water proofing).
Repair west wooden door and east iron door.
Repaint interior, including dome, at observing
floor level.
Install improved lighting at observing floor
level.

Displays & Exhibits

Furnish observing floor alcoves as original.
→ Display pictorial/explanatory material at observing level.
Revise or update 1st floor displays as desired.

HARVARD COLLEGE OBSERVATORY

MEMORANDUM

July 29, 1976

To: George B. Field
From: Robert G. Reed *BR*
Subject: 15" Telescope Renovation

RECEIVED

JUL 30 1976

G. B. FIELD

Attached is a memorandum received from Nate Hazen which briefly outlines the scope of repairs and renovations of the 15" telescope.

We are in the process of getting some cost estimates. This is going to take approximately a month due to the fact that so many people are on vacation and several individuals within the Center will be involved. There are certain areas that will not involve any direct capital expenditures. The major part of the work involving the dome, the observer's chair, and the tower will be handled by B & G and will be included in our maintenance cost. Of course, this still represents money and if we could get these costs included in any donors largess it would be most welcome.

I think that the second and third items under the last paragraph of Displays and Exhibits are an extra. These are within Gingerich's particular field of interest. They will, of course, be quite costly and I suggest they be handled as an alternate. If Owen will tell us what he wants we can cost it out.

This is in the nature of a progress report which you might feel you would like to send to Mr. ~~Eys~~ *Taves*. I can if you wish draft a letter.

RGR/s

enc.

Bob - please remind me of this in the fall.

Center for Astrophysics

Harvard College Observatory
Smithsonian Astrophysical Observatory

MEMORANDUM

To: Nat Hazen
From: Owen Gingerich
Subject: 15" Telescope Renovation

August 2, 1976

Your memo of 16 July 1976 looks good, and I hope that we can proceed full-steam ahead in accumulating the costing information. My only addition would be on the very last item, "Displays and Exhibits," where I would like a line item "Install a sound-and-light slide program in the 15" dome." Including it in the cost estimates does not mean that we are committed to it, but leaving it out at this early stage may make it difficult to incorporate later.

OG/jj
Xc: B. Reed

OG

11-
Fifty " -
Telescope
Y

RECEIVED

DEC 8 1976

G. B. FIELD

HARVARD COLLEGE OBSERVATORY

MEMORANDUM

December 7, 1976

To: George Field
From: R. G. Reed *RG*
Subject: 15" Telescope renovations

Gene Arcand has obtained an estimate covering the 15" telescope renovations. It consists of work to be done by B & G in an estimated amount of \$5,350, to which I add \$1,000 contingency for a total of \$6,350, which will be for:

Repairs to the floor.
" to the observer's chair.
Painting.
Improved lighting.

The Model Shop has come up with a budget of \$10,000, to which I add \$1,000 for a total of \$11,000. A detailed list of what is proposed is available should anyone wish to peruse it.

Our goal is to provide a repaired instrument which is operable, but obviously does not provide the counterpart of a modern scientific instrument.

We do not have a price which essentially relates to suggestions and requests made by Owen Gingerich. We suggest budgeting \$6,000 for these items, \$1,000 of which would go towards new carpeting in the exhibition area of the rotunda, and the balance of \$5,000 would be available for Owen's items to use as he sees fit. In addition to the Sound and Light Show--to which I still take a dim view--he has had in mind of putting in contemporary surrounding furniture compatible with the 19th Century period.

George Field

-2-

December 7, 1976
15" Telescope

Total estimated cost then is \$23,350, which should be rounded out to a \$25,000 funding request.

When you think the time is appropriate to present the problem to Mr. Taves, we could arrange a meeting in which more detailed information was available.

✓ del. 12/15/76
KK

Bob, great.

RGR/o

Can someone draft a 2 page summary of the project including

- 1) Thumbnail sketch of the history
- 2) The current state
- 3) What we want to do
- 4) Cost
- 5) How it would impact public.

G.

Center for Astrophysics

15-INCH - FIELD
Harvard College Observatory
Smithsonian Astrophysical Observatory

MEMORANDUM

August 1, 1978

To: Owen Gingerich

From: George B. Field *GBF*

Subject: The 15-inch

We discussed today the renovation of the 15-inch. I am enthusiastic about it, and want to help bring it about if possible. However, we should proceed with deliberation.

One issue that I would like to clarify is the relationship of such a project to other CFA efforts in public education. As you know, I am trying to increase our efforts in this area, and have allocated Jim Cornell a staff position to help him in putting together interesting public programs. I have asked Eric Chaisson to head an advisory committee to me, to be sure such programs are of high quality. As we have already discussed, I hope you will serve on this committee.

Beyond that, I see a role for both Harvard and the Smithsonian in displaying artifacts of astronomical interest. Harvard, because of the 15-inch and the other instruments you referred to; Smithsonian because of its tradition and strength in the area.

So I tentatively think in terms of a display area which includes the 15-inch and other instruments, funded jointly by Harvard and Smithsonian. As we discussed, the bulk of the Harvard funds would have to come from private donors.

When we are on the plane to Washington next week, we can discuss some of these matters further.

cc: Eric Chaisson, James Cornell
John Gregory, Bob Reed

GBF/lg

Center for Astrophysics

Harvard College Observatory
Smithsonian Astrophysical Observatory

MEMORANDUM

To: Eric Chaisson
From: George B. Field *GBF*
Subject: Great Refractor

September 12, 1979

As you recall, your report of January 1979 stated in passing that the restoration of the Great Refractor should move forward. I agree.

In view of the HCO unrestricted budget situation, I have resisted the temptation to fund such a restoration from that source. Dr. Ernest ("Pancho") Taves of the Howard Visiting Committee has told me that he is personally quite interested in seeing such a restoration accomplished, since he makes a hobby of such things and has a strong interest in astronomy. I feel he would be an appropriate person to head up a fund-raising effort, and to contribute himself. In view of this, I asked in 1976 that some figures be developed by a committee headed by Owen Gingerich; the relevant correspondence is attached. However, soon thereafter the Menzel Professorship was started, and we decided to ask Taves' support for that. That campaign is now complete (with Taves' help), and now we can consider going to him for help.

Owen's memo gives a plan for fund raising; his estimate in 1976 was 40-50K; Bob Reed mentions 25K. However, "restoration" is an elastic concept. At one end, one could paint the dome, fix the shutter, and repair key mechanical items for approximately 5K. On the other hand, a full-up project including exhibits and sound-and-light show could well be 50K or more in current dollars.

I suggest that we get a start on this project by identifying the highest priority items which could be done for 15K, say. I would then approach Taves with a proposal for this amount. If successful, we could use this start to go after additional funds.

I hope the Committee on Public Education will consider the matter once again. In particular, I would like your recommendation on how to proceed with a proposal to Taves. Owen tells me that Nat Carleton might be interested in helping out.

cc: O. Gingerich

Center for Astrophysics

Harvard College Observatory
Smithsonian Astrophysical Observatory

MEMORANDUM

To: John Huchra
From: Owen Gingerich
Subject: 15" Telescope

August 16, 1983

John Wolbach points out a historical error in my previous memo: The damage sustained to the tube of the telescope occurred under the supervision of G. Miczaika and not H. Ingrao as I stated.

I remarked that this was the largest telescope made by the firm of Mahler and Merz, which is correct since Mahler died in 1845; however, the Merz firm continued for many years and built other somewhat larger refractors with essentially the same design and counterbalancing.

OG/jj

Xc: J. Brainerd I. Shapiro
 N. Carleton J. Wolbach



MEMORANDUM

To: John Huchra
From: Owen Gingerich
Subject: 15" Refractor

August 4, 1983

The 15" Refractor is a great historical treasure, the largest surviving instrument from Fraunhofer's successors, Mahler and Merz in Munich. Among its notable "firsts" was the daguerreotyping of the star Vega in the middle of the last century.

I applaud the enthusiasm with which some renovations are being made. We lost the possibility to do this several years ago when Bob Reed, then Business Manager of HCO, blocked the efforts for liability insurance reasons. Nevertheless, I wish to urge great caution in making any changes to the instrument.

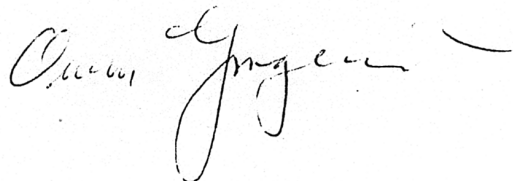
The "renovation" in the early 1950s undertaken by Donald Menzel and Hector Ingrao have turned out to be a considerable disaster. For example, the original German driving mechanism did not work very successfully because the worm gear did not have a large enough radius; therefore Alvan Clark placed a large driving sector at the north end of the pier. This was dismantled and destroyed by Menzel and company. In the process of adding the present drive clutch, the telescope "got away" and crashed into the dome, splintering the upper end of the fine mahogany tube. Fortunately, the lens had been removed at the time. The damage remains with us, however, both in the upper metal section of the tube and in the unsightly counterweights near the eyepiece.

One reason that there was relatively little protest when the telescope was closed down as an observing instrument is that it does not perform much better than the 9". Glass and lens making techniques were not nearly as good for the early 15" compared to the later 9" refractor. That, plus the great convenience of the shorter telescope, means that for most purposes the 9" is the preferable telescope. With its very long focal length, the great refractor is good for planets, but the nights when it can be put to effective use are very few. Nevertheless, there is a great thrill for the public in actually looking through such an impressive old instrument, and this may well be enough justification for the efforts you propose.

I still wish that the instrument could be restored as nearly as possible to its 1850 splendor. It would be nice to have some historical exhibits around the dome showing other instruments of the period. In my most ambitious fantasies, I envision the office halfway up the stairs converted into a period room at the time of Pickering, Henrietta Leavitt, and Annie J. Cannon. It would be possible for the Observatory to get back the famous rotating desk used by Pickering and Shapley, and I suppose the Smithsonian Institution might even help to provide appropriately clothed mannequins representing the three scientists just named. It would make a lovely exhibit for Open Nights and would complement the modern astronomy shown in the rotunda below.

OG/jj

Xc: I. Shapiro J. Brainerd
 N. Carleton J. Wolbach



15 inch

To: I. Shapiro, members of the 15" Refractor Committee
From: J. Huchra
Re: Discussions-7/25/83

We held a short meeting Monday afternoon to discuss plans and policies for the repair and use of the Great Refractor. This is a quick and dirty summary of same.

There was general agreement that our first concern would be to assure the safety of the telescope and dome for use by "qualified" observers, especially on open nights for supervised viewing by the public. There will be only a small number of people who will have access to keys for the telescope and ancillary equipment - initially the members of this committee.

We discussed the steps required to achieve operational status for the telescope:

1. Inspection of the dome shutter, in particular the "middle" shutter, by a qualified engineer (probably Nate Hazen). Initially this will be done from the outside of the dome on the external ladders. Lubrication of the shutter rails will be done if necessary. We will consider adding a counterweight to the middle shutter mechanism, if necessary.

2. It is desirable to re-key the door to the dome and to put locks on (a) the on/off toggle switch on the console - a computer key will do, (b) the telescope-pier connection - a padlock will do, and (c) the shutter gear and ratchet - again a padlock and chain. If possible, we would like the last three to be on the same key or combination. These precautions are necessary to keep people from turning on the drive while the telescope is clamped to the pier, etc.

3. Check and repair the clutch on the drive. Nat, Mike and I think that a quick fix might be to rough the surface of the pad on the present clutch. We'll try this first.

4. Repair the missing teeth on the middle shutter gear. This can be done either by finding a surplus gear (improbable) or by having a welder build up the two missing teeth.

The only one of the above steps required before the telescope can be used at a low level (hand pointed and tracked) is #1. The others are the first steps to make the telescope a fully working instrument. We also discussed future plans such as refurbishing the chair and painting the dome, but we don't want to make concrete recommendations regarding these yet.

In attendance

Jim Brainerd
Nat Carleton
John Huchra
Carol Johnson
Steve O'Meara
Mike Rudenko
Jurgen Schmidt
John Wolbach

CC.

D. Latham
J. Bisbee
O. Gingerich ✓
N. Hazen
C. Hughes

Struve Wilhelm 1793-1864

Description Sci 505.50

planches ASTR 478.45

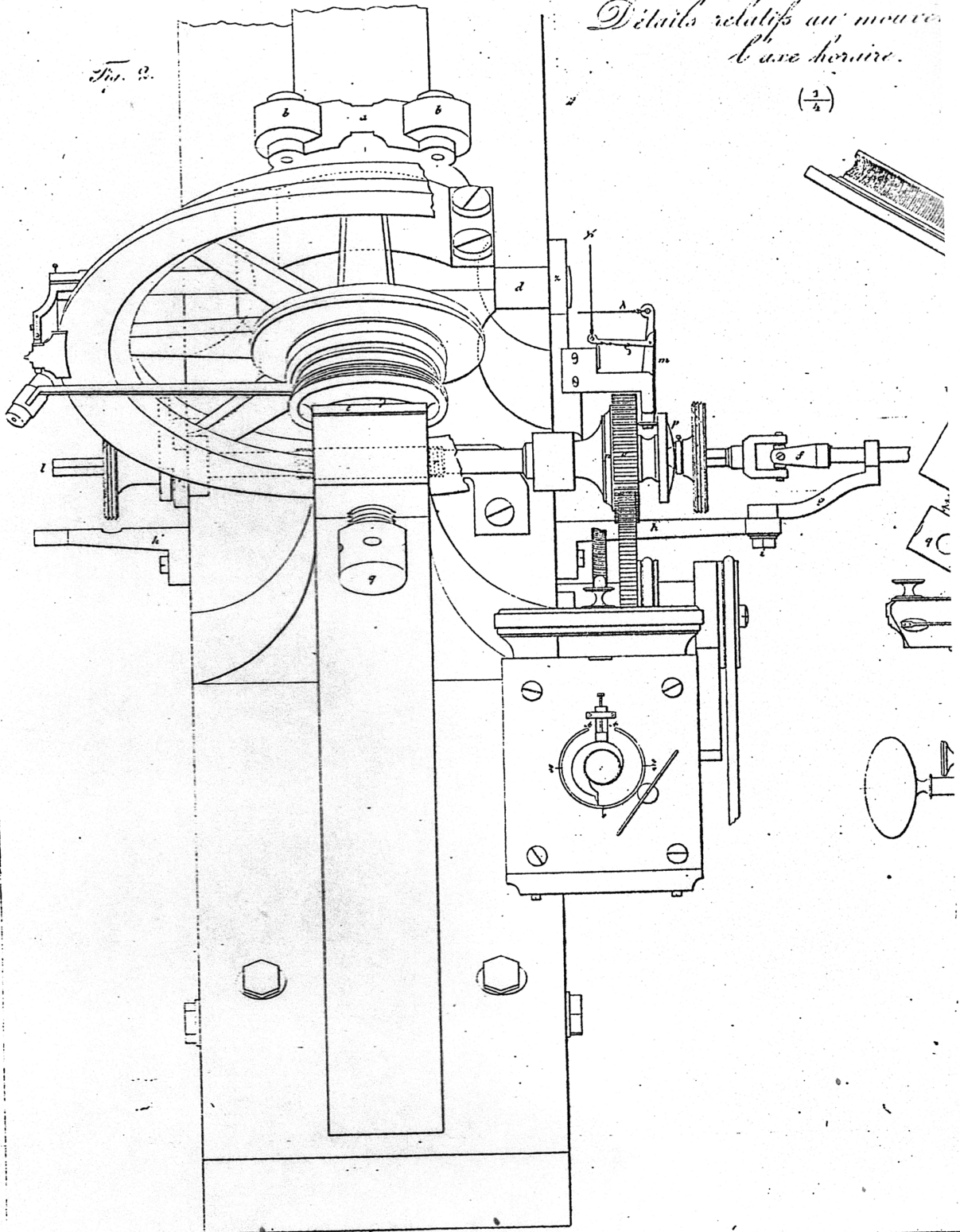
Description de L'Observatoire
astronomique de Poulkova

TELESCOPE PARALLACTIQUE DE

*Détails relatifs au mouvement
à axe horaire.*

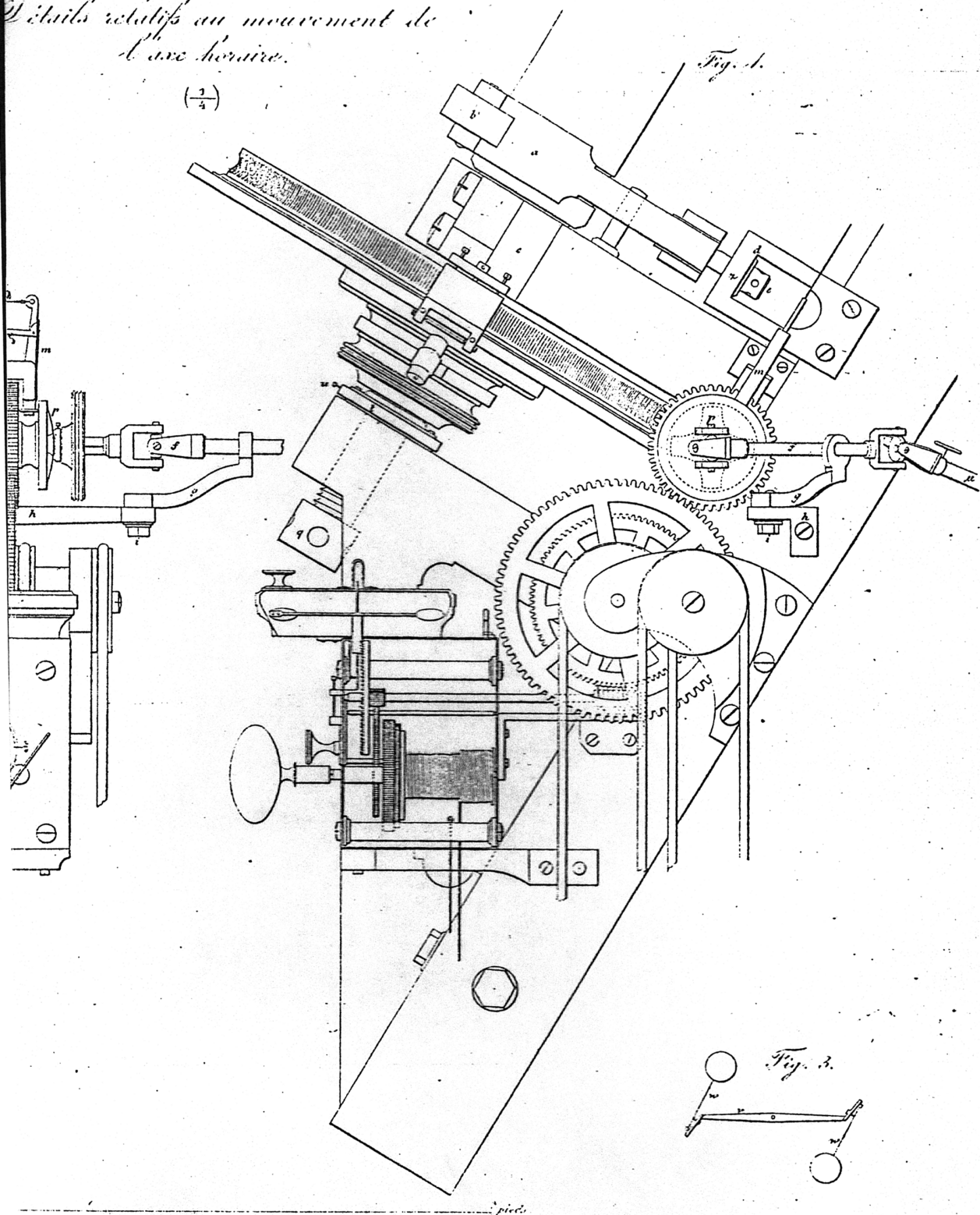
($\frac{1}{4}$)

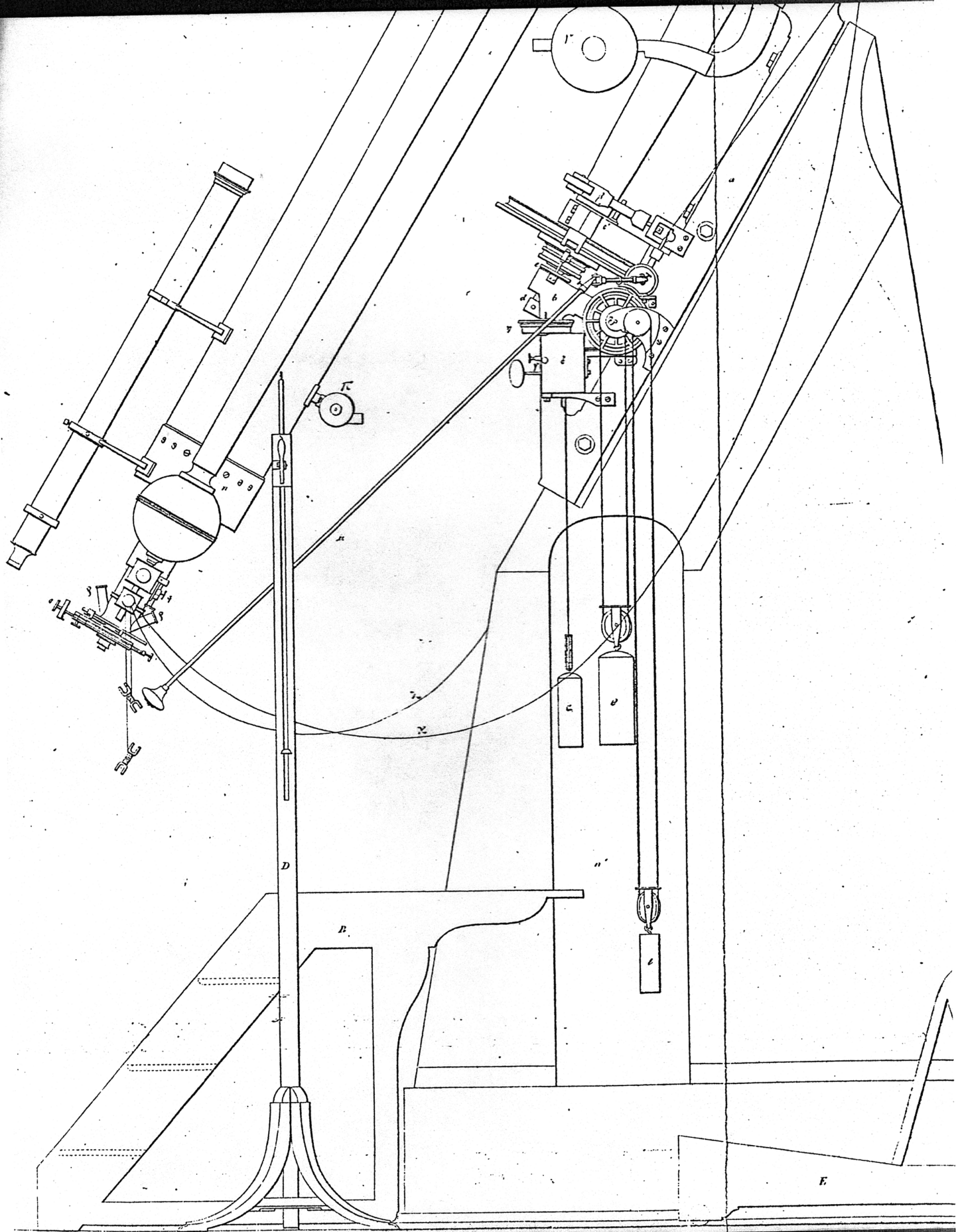
Fig. 2.



*Détails relatifs au mouvement de
l'axe horaire.*

$(\frac{1}{4})$





Center for Astrophysics

60 Garden Street
Cambridge, Massachusetts 02138

Harvard College Observatory
Smithsonian Astrophysical Observatory

25 January 1984

M E M O R A N D U M

31 JAN 1984

To: Owen Gingerich
From: Irwin Shapiro IS
Subject: Eye piece Holder from Great Refractor

Jeffrey Hoffman would appreciate a paragraph or two describing the history and use on the Great Refractor of the eyepiece holder which I delivered to him in Houston last week. Could you provide me with such a brief description so that I may send it on to him? Thanks very much.

IS/nm

C/R w Shapiro

Center for Astrophysics

Harvard College Observatory
Smithsonian Astrophysical Observatory

MEMORANDUM

To: Irwin Shapiro
From: Owen Gingerich
Subject: Harvard's Great Refractor

February 10, 1984

In February 1970 Nate Hazen put out a booklet entitled "The 15-Inch Great Refractor of the Harvard College Observatory: A Study of its History, Current Condition and Future Utilization." I have drawn the following information primarily from his report.

The 15-inch refractor was built by the firm of Merz and Mahler in Munich, the successors to Fraunhofer and the leading opticians of the day. It was a twin of the 15-inch refractor built for the Pulkova Observatory in 1839; ours was delivered in 1846 and became operational in June 1847. These remained the largest refractors in the world until Clark completed the 18½" Dearborn refractor around 1866.

With the refractor, William Bond made an independent discovery of the eighth satellite of Saturn in 1848, and also, two years later, of Saturn's inner, dusky ring. The telescope is also famous for having taken the first daguerreotype of a star, Vega in July 1850. In general the telescope was used for the determination of stellar positions and visual observations of planets, variable stars, comets, and nebulae. Beginning in 1877, under Pickering's directorship, the telescope was used primarily for photometry until 1912, when active use of the telescope ceased.

During the present century, almost all of the eyepieces and other parts have been pirated for other uses, and during the 1950s the telescope suffered an unfortunate period of "modernization." The eyepiece holder sent to Jeffrey Hoffman seems to be one of the few remaining original accessories, and its precise use is hard to pinpoint. We hope that eventually the telescope can be restored to its 1850 splendor, becoming a valuable historical instrument and impressive exhibit. The few remaining accessories would then become all the more precious.

OG/jj

Owen

JUN 30 1987

Harvard-Smithsonian Center for Astrophysics
Optical and Infrared Astronomy Division

M E M O R A N D U M
Wednesday 24 June 1987

To: Bob Kirshner
From: Nat Carleton *Nat*
Subject: 15-inch telescope restoration

An item that should be part of the upcoming anniversary celebration of HCO is the restoration of the 15-inch telescope. This was the first great instrument of the observatory, and it should be put into a state in which we are proud to show it off. In its present state of sad neglect it is a disgrace to our institution and a poor show of disrespect for our history.

The restoration is a substantial project in the \$200k range. The work seems to divide into six major areas:

- 1.) Restoration of the telescope tube
- 2.) Replacement of the mechanical drive
- 3.) Refurbishment of the telescope chamber and observer's chair
- 4.) Repair and restoration of the dome and shutter
- 5.) Repair of the roof and exterior of the building
- 6.) Preparation of materials for public information

The recent history of the telescope is sad to relate. In 1955 or so it was subjected to a disastrous "modernization". In the course of a disassembly operation the telescope was allowed to swing free, out of balance, and the front end crashed down, smashing the front two feet or so of the laminated wooden tube. The objective lens miraculously survived, and the smashed wood was crudely replaced by some metal tubing. The old mechanical drive components were removed and apparently thrown away (although I hope we may still find some of them), and were replaced by a poorly engineered electrical drive.

In 1969 Nathan Hazen, then the chief engineer of HCO, made an excellent study of the state of the telescope and of its technical history, and set out a good plan for its restoration. This plan went to waste, with only a couple of half-hearted

attempts at beginning to think about sources of funding.

In the 1960's and 1970's the telescope was occasionally used on open nights, but the dome and shutters were difficult to operate reliably and the electrical telescope drive was so clumsy as to be nearly inoperable. In 1983 some of the graduate students and young technical employees set out to improve the telescope drive, but at that time we found that the dome and/or its support rail had gone sufficiently out of shape that the dome could not be rotated. The drive repair was abandoned after some of the components had been removed, and the telescope has been totally dead since that time.

The appropriate course of action now would be to start with Nate Hazen's report and essentially bring it up to date, documenting all the repair and restoration work that must be done and preparing a good cost estimate and plan. This effort in itself will cost several man-weeks of time, and therefore will probably require a preliminary small fund-raising effort. With a plan and cost estimate in hand, we could begin the main effort to raise funds for the restoration and then, God willing, actually do it, in time for the anniversary.

I would be very interested to take part in this effort, and I believe that John Wolbach, Owen Gingerich, and John Huchra are also quite interested. I hope that your committee and Irwin can decide on a means of proceeding and put some of us to work. The ideal person to prepare the plan would of course be Nate Hazen, but I doubt that he could spare the time from his present work at the Center for Earth and Planetary Physics. Tom Hoffman is another possible contributor, and I know of one or two local contractors who specialize in restorations and might be good consultants on the building and dome. Phil Bisaga would of course be an important contributor.

cc: P. Bisaga
O. Gingerich
J. Huchra
D. Latham
I. Shapiro
J. Tagiuri
J. Wolbach

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14 November 1988

Ms. Elsa Fitzgerald
Assistant Director
Massachusetts Preservation Project Fund
80 Boylston Street, #310
Boston, MA 02116

Dear Ms. Fitzgerald:

The "Great Refractor" at the Harvard College Observatory is an important historical landmark in American science. For five years after it was opened in 1847, it was the twin of the largest refracting telescope in the world, and during that interval it took the first daguerreotype of a star. The instrument was the glory of the first serious research observatory in America, and in fading splendor it has stood on its immensely solid granite pier ever since.

For a number of years it has seemed to me that the telescope is a historical artifact of the first rank, a precious historical record of the days when professional science was just beginning in this hemisphere. Unfortunately, the telescope and its setting have suffered from the inevitable ravages of time, not to mention assorted attempts to renovate things. The telescope itself needs expert restoration and the magnificent old observing chair by William Bond needs almost immediate attention, but before these steps can be taken it is necessary for the dome to be repaired so that it will not leak.

The telescope has been admired by the hundreds of visitors who come every year to the regular Open Nights and observing sessions, but over the last decade the state of the telescope has become an increasing embarrassment to Harvard College Observatory. With the proper renovative steps this instrument could once again become an object of pride and a source of inspiration for our historical scientific heritage in Massachusetts.

Sincerely yours,



Owen Gingerich
Senior Astronomer, Smithsonian
Astrophysical Observatory
Professor of Astronomy and the
History of Science, Harvard University

OG/jj