File

Derek de Solla Price "Of Sealing Wax and Strings," Natural History 93 (1984), No. 1, 49-56.

Georgia Institute of Technology
A UNIT OF THE UNIVERSITY SYSTEM OF GEORGIA
ATLANTA, GEORGIA 30332

COLLEGE OF SCIENCES AND LIBERAL STUDIES
SCHOOL OF SOCIAL SCIENCES
(404) 894-3198

February 13, 1984

MELVIN KRANZBERG
CALLAWAY PROFESSOR OF
THE HISTORY OF TECHNOLOGY

Ellen DeSolla Price
15 Yale Court
Branford, CT 06405

Dear Ellen:

Thank you for your lovely letter of February 3. First let us attend to some items of business.

Rahman is going ahead with his plans for a book dedicated to Derek, and I intend to contribute a brief article as do many others.

About Derek's Sarton lecture, I note that Larry Holmes wants it for Isis. Inasmuch as it was the Sarton lecture presented under the auspices of the History of Science Society to the AAAS meeting, I suppose it is only fair that Isis should be given the opportunity to publish it. Originally, because it was delivered at the AAAS meeting, I thought that it might be published in Science, the publication of the AAAS; I must admit that I simply cannot understand why Phil Abelson did not lay claim to it immediately. But if Science does not want to publish it, certainly Isis deserves the first shot at it.

Realizing that other journals and organizations might have a prior claim to the article, I wrote Derek that he might rework the article in several different ways so as to make it suitable for publication in other journals. After all, there is always some "left-over" research connected with any piece, and some of the materials which he did not employ in the Sarton lecture could be worked into the piece so that it would not be quite the same article and which might direct it at slightly different audiences. I had two journals in mind for the reworked articles: Technology and Culture and American Scientist.

Actually, the speech as given could have fitted equally well into T&C and Isis. However, T&C would not publish exactly the same article which appeared in Isis, so I was suggesting that he rework it so that it would be directed more towards the readership of T&C -- and thus have two articles from the same body of research. That is a perfectly honorable and legitimate thing to do, and had Derek lived, I am certain that he would have been happy to do so. But as it is, we are left with only the one article -- which Derek had apparently promised to Natural History beforehand (and perhaps that is why Ableson was unable to grab it for Science).

How did American Scientist get into the picture? Well, as you know, I am a past National President of Sigma Xi, and American Scientist is the official publication of that organization. Michelle Press, the editor of American Scientist, was present at Derek's speech; as we were leaving the auditorium, I told Michelle that she should try to grab it for American Scientist, and she shared my enthusiasm for it. (All this was before I discovered that Derek

had already promised it to Natural History.) So when I wrote Derek about the speech afterwards, I suggested that he prepare several different versions of it, one for T&C and one for American Scientist. Both are directed at different audiences, and Derek would have had the wit and sufficient additional materials to have produced articles making the same point which would be quite different in order to correspond to the differing interests of the readers of the journals. American Scientist has a circulation of over 120,000, and I wanted Derek's piece to reach that wide audience. At the same time, the implication that a great deal of modern science was really "applied technology" would have been greatly appealing to the historians of technology who comprise the readership of Technology and Culture.

At any rate, we are now left with only one piece, the original speech as given by Derek. Much as I would like to see it in Technology and Culture or in American Scientist, I realize that the fact that it was the Sarton Lecture gives Isis a prior "moral claim" on it. After all, the lecture was introduced by Erwin Hiebert, former president of the History of Science Society and president of the Division of the History of Science of the International Union of the History and Philosophy of Science -- so the lecture was considered as being in the domain of the history of science rather than the history of technology (but, of course, it actually dealt with both).

Hence I intend to lie low on this matter. However, if Isis should begin backing out, then I would suggest that you decide where it should go.

In any event, you can be certain that the article, no matter where it appears, will be cited in the literature for many years to come. Indeed, I certainly intend to refer to it in the piece which I write for Rahman's memorial volume. Oh yes, one more thing. Perhaps Natural History intended to pay for the article. However, none of the other journals which I have mentioned -- Science, American Scientist, Technology and Culture, Isis -- pay for articles.

I note that you have moved to a new house, and I can understand that. Derek described in great detail the house on Trumbull which he made certain fitted in with what he wanted. I can understand your reluctance to stay there, and I hope that you like your new house by the sea. However, I hope it is not too isolated and away from your many friends. It is not so easy to live alone after having had the joys of companionship for many years, especially when the kids have left home. I am glad that you plan on keeping busy socially and entertaining. I appreciate the invitation to stay at your home when I come to New Haven, and I hope that I shall be able to take advantage of it someday. I still remain active in Sigma Xi, but we tend to have our committee meetings in Washington or places which are slightly more accessible than New Haven in terms of airline schedules.

All I can say is keep your chin up and keep busy. You have lots of your own very interesting work to do and you have lots of friends, as well as some wonderful memories. That can help sustain you in this very trying time. One does not easily get over this kind of loss, and I want you to know that you

have lots of understanding friends who loved Derek and who care for you.

Sincerely yours,

Melvin Kranzberg

MK/cd

Ellen deSolla Price 50 Trumbull Street New Haven, CT 06510
after Feb. 21: 15 Yale Court, Branford, Ct. 06405
(203) 488-7499

Dear Mel,

Thank you for your sweet letter. I was nice of Hedvah to send you the program of "Tallulah" - even if we closed in New York, we have great hopes for the opening in London in June.- But it pleased me, because it was so sweet and provincial (in the best meaning of the concept) - We live in this crazy world, where I was so sorry for the death of your talented and wonderful wife, but din't do anything about that. I never knew how to write condolence letters - but after having gone through 400 of them, I have learnt the hard way.

I have heard from Rahman, and Ann has send him the materials he asked for.

Mike Moravcsik (Inst. of Thearetical Science, Uvin. Oregon)(Eugene, Oregon 97403) , is arranging for another medal in Scientometrics. And everybody seems to be busy writing the most beautiful things about Derek. He deserved every bit of it and would have loved it „ lot. But the nice thing is that he knew people cared, and he knew he had an impact. It is so important to me that he knew people cared for him when he was alive.- I don't have the feeling, if only he had known how much people cared for him , he knew ,and that is good.

As you can see, I have sold this house and bought another. This house was so much Derek's dreamhouse - and it became impossible for me to live here whithout him. So I bought a small house by the sea, and I will like it a lot. I must look forward and tax not backwards, I have to make a good life for myself in my new "house for one." It is hard to understand that I am "one" after 36 years of husband, kids, house and now it is just me. - I am not giving up entertaining, I do have lots of guest-space - and a deck, a pobol, a dock with a boat and loads of ducks - it is just different.

At long last, I got the release from "Natural History" we can publish the Sarton lecture if anybody wants to do it. Holmes wants it for Isis - - I don't know, what you want to do, but we have the copy right.- He was very slow, but I got his premission to day.(Larry Holmes, Master of Jonathan Edwards College, Prof. Hist. Of Med.) 70 Hight St. N.H.Ct 06520-(203)624-3575 and 436- 1451) You have to fix that betweem you.

If you ever come up the Conn . way, do let me know, in my "house for one" there is a separate floot for guest, and you are most welcome.

I do hope your project works out, we had so such fun with Rahman in New Delhi .

Yours sincerely

Ellen

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March 11, 1983

MELVIN KRANZBERG
CALLAWAY PROFESSOR OF
THE HISTORY OF TECHNOLOGY

Dr. Derek deSolla Price
History of Science
Box 2036, Yale Station
Yale University
New Haven, CN 06520

Dear Derek:

Thank you very much for your note of March 3. It so happens that I was trying to get you when you were out of the country, and Marty Klien told me that you had been in and out of the country and that you were again in good health and, as always, good spirits. Wonderful!

Yes, I agree with you, Fores is a nut -- and he is also getting to be somewhat of a bore with his constant bombardment of letters. The letter I sent you under separate cover represents my last attempt to be polite to him -- but I barely managed to do so.

By all means keep in touch with me, for you are always doing new and interesting things. Besides, we are very old and close friends -- even though we do not act very old. (I tell my friends I am in the heyday of my "sexties"!)

Sincerely yours,

Melvin Kranzberg

MK:tb

Yale University *New Haven, Connecticut 06520*

HISTORY OF SCIENCE

Box 2036, Yale Station

March 3, 1983

Dr. Melvin Kranzberg
School of Social Sciences
Georgia Institute of Technology
Atlanta, Georgia 30332

Dear Mel,

Just a note while I am back from one travel and going off on another tomorrow. But I did want to say something in response to your long letter to Michael Fores. Really I think you have been more than generous in your reaction. Personally I have been becoming more and more annoyed to the point where I must regard him as a bit of a nut sufficient that I would prefer not to have further correspondence with him, exhilarating though that might be. You really are a most generous and kind person but I fear it is going to be wasted on him.

Cordial greetings,

Derek d.

Derek deSolla Price
Avalon Professor of the
History of Science

DP/al

Ellen DeSolla Price 50 Trumbull Street New Haven, CT 06510

Dear Mel,

Thank you so much for
your kind letter.

I am not clear on the
status of the Sarton lecture -
I know he sold it to "The Natural
History" for publication in June.
I am not clear if it can
be published elsewhere. Derek was
angry, ~~they~~ they edided the "Derek"
out of it. Mark our son ↗315 EAST 12 St, N.Y. 10003 212-460-8322 is dealing
with them. Anthony Michaelis
(Interdisciplinary Science Reviews)
also wants it. Alas, it is so
far down on my list of stuff
to do, that I can't be helpful.
If you contact Natural History
they might tell you the arrange-
ment - and we might pull it.
They are only paying $1000.00 and
honor is more important.

I know you and Derek

always had a great time
together. He was sad when your
wife died.

We will miss them a lot.

Fondly

Ellen

Yale University *New Haven, Connecticut 06520*

HISTORY OF SCIENCE
Box 2036, Yale Station

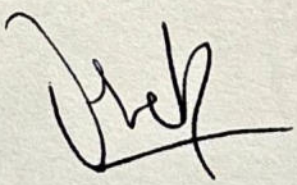
April 21, 1981

Professor Melvin Kranzberg
Editor-in-Chief, Technology & Culture
Department of Social Sciences
Georgia Institute of Technology
Atlanta, Georgia 30332

Dear Mel:

I've tried protesting before but will do it again. Please would you be kind enough to list my name in the Directory alphabetically by my surname PRICE rather than by the given middle name? If it will help any you could change the style of naming to DEREK DE S PRICE. The address is correct.

Sincerely yours,



Derek de Solla Price
Avalon Professor of the
History of Science

DP/al

TECHNOLOGY AND CULTURE

The International Quarterly of the Society for the History of Technology

May 8, 1981

Mrs. Orlie Higgins
Division of Journals
University of Chicago Press
5801 Ellis Avenue
Chicago, IL 60637

Dear Orlie:

The enclosed letter from Professor Derek Price is self-explanatory.

Please change the position of his listing in the SHOT alphabetical directory when it is published in the future. People will look for his address under "Price," not under his middle name "de Solla."

Sincerely yours,

Melvin Kranzberg

MK/awb
Enclosure
xc: Derek Price

Editorial Offices: Georgia Institute of Technology, Atlanta, Ga. 30332
Telephone: (404) 894-3198

TECHNOLOGY AND CULTURE

The International Quarterly of the Society for the History of Technology

March 5, 1981

Dr. Derek de Solla Price
History of Science
Box 2036, Yale Station
Yale University
New Haven, CT 06520

Dear Derek:

Thank you for your note of February 23 inquiring about the Schallenberg obituary. It is to go in TECHNOLOGY AND CULTURE, not the SHOT Newsletter.

However, we are delaying its publication until our July 1981 issue. The reason for the delay is that the July issue will carry Dick's article about the storage battery, and we thought it would be most fitting for your memorial article about him to appear in the same issue as Dick's own article.

Mention of an obituary article reminds me to inform you of my own sad news, which apparently you have not yet heard. I last saw you in Toronto at the AAAS meeting at the beginning of January, but I had to cut short my stay in Toronto and fly back to Atlanta because Deaux's condition had taken a turn for the worse and she had been forced to return to the hospital. She failed to respond to renewed treatments of radiation and chemotherapy, and she died on January 29.

Sincerely yours,

Mel

Melvin Kranzberg

MK/awb

xc: Carroll Pursell

Editorial Offices: Georgia Institute of Technology, Atlanta, Ga. 30332
Telephone: (404) 894-3198

Yale University *New Haven, Connecticut 06520*

HISTORY OF SCIENCE
Box 2036, Yale Station

February 23, 1981

Professor Melvin Kranzberg
Editor-in-Chief, Technology and Culture
Georgia Institute of Technology
Department of Social Sciences
Atlanta, Georgia 30332

Dear Mel:

I have just received the October 1980 volume of Technology and Culture and was a little surprised not to see the Schallenberg obituary; or was it to go in the SHOT Newsletter? Can you tell me where and when it might be appearing?

Sincerely yours,

Derek de Solla Price
Avalon Professor of the
History of Science

CC: Carroll Pursell

DP/al

GEORGIA INSTITUTE OF TECHNOLOGY
ATLANTA, GEORGIA 30332

MELVIN KRANZBERG
CALLAWAY PROFESSOR OF
THE HISTORY OF TECHNOLOGY

June 18, 1980

Dr. Derek Price
Department of History of Science
and Medicine
Yale University
Box 2036, Yale Station
New Haven, CT 06520

Dear Derek:

First my congratulations on having your bile duct unplugged. It took them a long time to find out but, thank goodness, they eventually did. One would have imagined that with the bile flowing freely once again, you could give vent to all sorts of splenatic thoughts; instead, you are euphoric. As Avalon Professor of the History of Science and Medicine, I am sure that you appreciate this demonstration of how modern medical science has progressed over the conceptual framework of earlier medical diagnoses--and how the modern technology of plumbing can be transferred to the medical profession. (Roto-rooter, indeed!)

All your friends are delighted that you have been "restored to pristine juvenility," but I have my suspicions as to whether or not your juvenility was ever very "pristine." However, that is now your charming wife's problem, not mine!

Thank you for your congratulations on the Roe Medal. I am sure that you and a number of my other friends had a great deal to do with my being awarded this great honor.

The news of the award came at a most propitious time, helping to bolster my sagging spirits. You see, Deaux had an operation about a month ago for an acoustic neuroma; instead, it turned out to be a malignant brain tumor of the worst kind (glioma, astrocytoma, grade 4). Interferon and chemotherapy do not work on this kind of brain tumor, and she has been undergoing massive radiation treatments. Despite the debilitating effects of the surgery, the radiation treatments, and the medication she has been receiving, her spirits remain high. She is determined to lick this thing, and her morale keeps my own spirits from sinking to the depths. All we can do now is wait and see how the tumor reacts to the radiation--and pray a lot.

Sincerely yours,

Mel

Melvin Kranzberg

MK/awb

Yale University *New Haven, Connecticut 06520*

DEPARTMENT OF
HISTORY OF SCIENCE AND MEDICINE

Box 2036, Yale Station

5/30/80

Dear Mel,

Congratulations on another well-deserved medal — Roe, roe, roe your boat.

Delighted also to record that at last they found out what was ailing me all year: — a plugged bile duct, now miraculously cured by a surgeon with a roto-rooter. I'm restored to pristine juvenility —

Derek

Yale University *New Haven, Connecticut 06520*

DEPARTMENT OF
HISTORY OF SCIENCE AND MEDICINE

Box 2036, Yale Station

July 18, 1978

Dr. Melvin Kranzberg
Department of Social Sciences
Georgia Institute of Technology
Atlanta, Georgia 30332

Dear Mel:

Thank you so much for your referee's report on the NEH application. I'm sure it will be in time for consideration. What has happened, in fact, is that Asger Aaboe, Martin Klein and I have all put in applications hoping for some three dozen students in residence next summer. That would make quite a large seminar session, almost like a scholarly meeting running for eight weeks. And if it all comes off it will be an interesting experience.

The dissolution of our department is the strangest thing. In a way it turns out to be an almost empty phrase. The only serious change, and that a considerable one, is that for two years we have not been able to take in any graduate students. However, Asger Aaboe, Martin Klein and myself are still together and will apparently to be housed together in our own building and with our own budgetary unit. None of us will go "into" other departments. I'm not qualified for any other department, Martin is already in Physics, and Asger in Mathematics and Near Eastern Languages - but strictly speaking these are subsidiary rather than principal appointments. It looks now as if the Medical School will soon appoint somebody to the Chair in History of Medicine, and, almost certainly, make another appointment so that we will be back up to the strength we had and will set about doing whatever we can to re-institute the status to get graduate students again and getting the show on the road once more. What happened is simply that Hanna Gray goofed pretty badly unless the purpose was not at all to save money but simply to hurt our pride and reputation.

As to the Smithsonian Institution appointment, I was a little peeved that my application was not even acknowledged and after seeing how things have operated a little more closely I'm pretty sure that I would be very reluctant to accept the job, whatever blandishments were offered. For one thing, it seems to me that they are setting up the job once again in such a way that nobody could do it effectively in the way it should be done, and, secondly, I'm really very happy living in New Haven with my present salary. I don't see how I could possibly move to the Smithsonian without taking a considerable cut in spending power and style of living, let alone, scholarly facilities.

Yours very cordially,

Derek de Solla Price
Avalon Professor of the
History of Science

DP:al

GEORGIA INSTITUTE OF TECHNOLOGY
ATLANTA, GEORGIA 30332

MELVIN KRANZBERG
CALLAWAY PROFESSOR OF
THE HISTORY OF TECHNOLOGY

July 5, 1978

Dr. Derek de Solla Price
History of Medicine and Science
Yale University
New Haven, Connecticut 06511

Dear Derek:

Your note of June 27 asking me to send in a recommendation for your NEH Summer Seminar arrived a little too late for me to make the July 1 deadline. However, I have sent off the recommendation, and I am certain that the NEH will not mind if it is a few days late.

John Burke has been giving one of these NEH seminars for college teachers on "Technology and Human Values" at UCLA for many years, and apparently with a great deal of success. Indeed, there was a writeup of Burke's seminar a few years ago in Technology and Culture, by Harry Eisenman; also there was a note by Burke indicating the changes which he made after his experience with the first year of the seminar (Eisenman's critique was based on that first year).

With your reputation and record, I don't see how the NEH could refuse this grant. But strange things do happen, and I always find it difficult to predict what federal granting agencies will do. At any rate, I gave you a good strong recommendation (of course), and I hope that you get the grant.

Is the dissolution of your department complete or do you have another year or so before the final curtain? Will you be going into the History Department, or some other department?

I assume that you know all about Otto Mayr's appointment as Acting Director of the NMHT while the search goes on. I don't think you should give up hope; you certainly remain a prime candidate.

Sincerely yours,

Mel

Melvin Kranzberg

MK;tb

National Endowment for the Humanities

DIVISION OF FELLOWSHIPS AND STIPENDS

OMB 128-R0033

806 15th Street, N.W.
Washington, D. C. 20506

SUMMER SEMINARS FOR COLLEGE TEACHERS

TO BE COMPLETED BY THE PROPOSER:

Name of Proposer: Derek de Solla Price
Institution: Yale University
City and State: New Haven, Connecticut
Field: History of Science

FOR USE OF RESPONDENT: (Please see back of this page for guidelines.)

Dr. Price is one of our country's best known historians of science and technology. His scholarly writings in both these related fields have been many and important, and it is not surprising that in 1976 he was awarded the Leonardo da Vinci Medal of the Society for the History of Technology for his outstanding contributions in that field. In addition, Dr. Price is one of the major founders of a new field: Science policy studies. He served as chairman of the International Commission for Science Policy Studies, and his work on that subject has helped establish it as a serious scholarly endeavor. There can thus be no doubt concerning Dr. Price's eminence -- indeed, preeminence !! in the world of scholarship.

There can also be no doubt about Dr.Price's stimulating and effective teaching. The quality of graduate students turned out by Yale's Program in the History of Science and Medicine, which he headed, attest to his ability in that respect. The college teachers in the proposed seminar will indeed be privileged to have an opportunity to study under his guidance.

The history of science and technology is of overwhelming importance in understanding general historical developments and in tracing the course of society today. Dr. Price's provocative course will challenge the students by introducing them to major concepts and developments which have helped shape the world of the past and present.

Finally, the students at this summer seminar can take advantage of Yale's marvelous scholarly resources and facilities, and also of concurrent courses in the history of science, which would augment Price's seminar. We can be certain that this seminar will be a challenging and rewarding experience for the students, and I therefore give this proposal my higest recommendation.

Signature of Respondent _____ **Date** July 5, 1978

Name and Title Dr. Melvin Kranzberg, Callaway Prof. of the History of Tech.

Department (or Position) Social Sciences

Institution (or Employer) Georgia Institute of Technology, Atlanta, Georgia 30332

NEH National Endowment for the Humanities

DIVISION OF FELLOWSHIPS AND STIPENDS

OMB 128-R0033

WASHINGTON, D. C. 20506
TELEPHONE: 202—724-0376

SUMMER SEMINAR PROPOSAL FACE SHEET

Application Number:

Date Received:

1. SEMINAR DIRECTOR (Name, Address, Zip)

Professor Derek de Solla PRICE
Avalon Professor of the History of Scienc
Yale University
Box 2036, Yale Station
New Haven, CT 06520.
TELEPHONE:

2. INSTITUTION (Name, Address, Zip Code)

Yale University
New Haven, CT 06520.

3. AUTHORIZING OFFICIAL (Name, Title, Address, Zip)

Joseph S. Warner
Director
Grant & Contract Administration
Yale University
New Haven, CT 06520.

4. TOTAL FUNDS REQUESTED

$48,954.

5. PAYEE (Check to be made payable to:)

Check to be mailed to:
Name and Title: Not applicable/
Address: letter of credit.

6. INCLUSIVE DATES OF GRANT:

From: January (Month) 1 (Day) 1979 Through September (Month) 30 (Day) 1979

7. SEMINAR TITLE: MAIN LINES IN THE HISTORY OF SCIENCE AND TECHNOLOGY

8. BRIEF DESCRIPTION:

The focus of the seminar is on explanations of why and how developments in science and technology happened as and when they did. We shall consider the main lines of steady evolution and the traumatic changes, ranging from the neolithic revolution through the twentieth century. The seminar will use key examples to show the relationship between science and technology, the balance between internal and external historical forces, the interaction of theory and experiment, and other cases where historical light can be shed on the problems of explaining the character of modern science and science policy.

This seminar is available to teachers with some special interest and commitment in the humanities and/or the sciences. It is being offered in conjunction with other history of science seminars given by Professors Asger Aaboe (History of Ancient Mathematics and Astronomy) and Martin Klein (History of Modern Physics).

Agreement: It is understood and agreed that any funds granted as a result of this request are to be used for the purposes set forth herein. Furthermore, the undersigned agree, as to any grant awarded, to abide by the relevant National Endowment for the Humanities policies as prescribed.

Signature: Person named in Item 1

Derek de Solla Price

Charles K. Bocklund

Deputy Provost

Signature: Person Named in Item 3

Proposal for NEH Summer Seminar entitled

"Main Lines in the History of Science & Technology"

1. In scope the seminar will attempt to be as far-ranging as possible to accommodate the previous training and inclinations of students. I shall give lecture-seminars on topics in history of science and technology from the neolithic revolution through modern science, concentrating more on the physical sciences than the biological or social. In methodological approach there will be an attempt to give both external and internal historical explanations and discuss their possible bearing on each other. The central interest of the seminar is as an introduction to the field of history of science and technology for the person already trained as a scientist or a humanist with a strong interest in the other mode. I hope that several students may take this seminar with those offered by my colleagues, Aaboe and Klein, using it as a forum to discuss wider implications of the fields more localized in subject-matter and period. (See description and bibliography of undergraduate/graduate course enclosed.)

2. For some years I have taught a semester undergraduate/graduate course along these lines (description enclosed), and I am at present working this into textbook format as an aid to undergraduate teaching. I am also active in research in the topics of the science/technology and the theory/experiment interfaces, and in the application of historical learning to surrent problems in science policy.

3. I envisage probably three two-hour lecture/discussion type seminars each week for the entire period. The final paper would be a ca. 15-page discussion on one of the topics dealt with. Individual meetings with students are easy to arrange since the faculty in our group have a traditional day-long open doors policy in our building, where an amply working library is housed.

4. This course is intended equally for those with humanistic or with scientific background. It can be taken on its own or in conjunction with the other two courses proposed by Aaboe and Klein.

5. For the last 10 years at Yale I have offered an introductory semester course in history of science and more specialized courses on sociology and politics of recent science, the science/technology relationship, scientific creativity, and science fiction.

6. The holdings of Sterling Memorial Library, Kline Science Library, Medical Historical Library, Beinecke Rare Book and Manuscript Library, and the Departmental Library are more than ample.

7. We would prefer to have either some prior commitment to history of science or (perhaps more likely) a suitable background in a related humanistic field (such as history, philosophy) together with a competence at some level within the sciences and mathematics (or vice versa).

8. Housing for participants in similar seminars and their families has, in the past, been found by the Visiting Faculty Office either in one of Yale's Residential Colleges or in town and that, I am assured, will hold for next year as well.

9. The following is a partial list of possibilities for extra-curricular activities. During the summer the Yale art galleries, the new British Art Center, the Peabody Museum of Natural History, and various other collections remain open. There is a series of open-air concerts, and Yale-in-Norfolk presents a series of chamber concerts (bus is available). For sports activities there are the Yale Playing fields, tennis courts, golf course, and gymnasium, and the Yale Yacht Club provides boats for sailing on the Sound.

Derek de Solla Price,
Avalon Professor of the History of Science.

Science, Technology and Society

Fall term 1977

Prof. Derek de Solla Price Office: 88 Trumbull St.
Tel. 64366

History of Science and Medicine 111a (Becton C031, Tu, Th, 2.30-3.45)

This is a one-semester general survey course without prerequisites, suitable for humanists and for scientists. It can be taken freshman through senior undergraduate years. As a graduate course (511a) it involves extra reading and written work. There will be midterm and final examinations, and two short essays (ca.2000 words) during term.

Any student missing a lecture is expected to make it up by auditing a tape of last year's lecture, available in Professor Price's office.

Required texts: D. deS. Price, Science Since Babylon, Enlarged Edition, Yale Univ. Press 1975.
S. Mason, History of the Sciences, Macmillan, 1966.

Recommended texts: Galileo, Discoveries & Opinions of Galileo, Doubleday, 1957.
H. Butterfield, Origins of Modern Science, Macmillan, 1965.

An introductory course on the relations between society and its evolving science and technology, from the neolithic revolution to now.

The aim of this course is to explain why developments in science and technology happened when they did and how they did, and what changes they produced to make further change possible or even necessary. Examining the interactions between the science and technology on the one side and historical, cultural and socio-economic conditions on the other, it concentrates on the major determinative events that shaped the general principles which still hold today and present us with many of the deepest problems and greatest hopes for mankind.

In this light, each determinative event in science and technology is considered both in its historical context and contemporary significance. Each matter of technical and of historical content will be developed as needed. It should help science students to get some professional understanding of the social context of their field, and aid humanities students in coming to grips with not merely the content of science and technology but the many ways in which this affects modern society and political and economic destinies and qualities of life.

SCHEDULE OF LECTURES, ESSAYS & EXAMS

Sept. 8 The neolithic revolution; how the first major technical changes led to the beginning of the culture of cities and of science, and how it led to the eternal continuation of technical change. No road back to Walden; mankind cannot opt out of scientific and technical evolution. The river valley civilizations and the birth of linear and then central cities. Civilization, civility, politics, police, politeness and other urban phenomena. The growth of writing.

" 13 The Sumerian and Babylonian civilizations of the Fertile Crescent of the Bible Lands and their sophisticated cuneiform writing. Babylonian mathematics and astronomy and its relevance to computer programming. The puzzle of a right brain dominated culture; comparison with Mayan astronomy and Indian art.

" 15 Ancient Egyptian civilization; a debunking of the prowess of its science, and an explanation of the technology of pyramids. The social significance of the technologies of beer and bread and a slave economy. The early civilizations of the Indus Valley and the Yellow River.

" 20 The early Mediterranean Civilizations and their left brain dominant emergence to the Golden Age of Plato and Aristotle. The relatively late flowering of Greek Mathematics. How mankind was first zapped by the paradoxical nature of irrationality in numbers. The rationale of Euclid's Elements of Geometry and its influence on scientific theory. The emergence of a new natural philosophy which includes alchemical element theory and astrology.

Sept. 22 Greek Mechanics and Roman Engineering. Craft workmanship and philosophical gadgetry, especially in the genesis of a long line of automata, planetariums and robots to simulate both the celestial and biological universe. The parallel developments in Chinese and Indian cultures and the continuity of such scientific crafts by transmission through Islam.

" 27 The Ptolemaic planetary theory, its evolution and strong influence on all later scientific theory. Presentation by animation of the comparison between Ptolemaic and modern astronomical theory. Why ancient theory was so accurate, and why the naked eye was more powerful than any instruments. The motivation for complicated mathematical theories.

" 29 How Greek science passed to the Arabs, and how Islamic science gave us universities, observatories, pharmacies, hospitals and other social institutions for science and medicine. The astrolabe as the masterpiece of ancient instrumentation; what it does and how it became the most valuable scientific antique. Ancient sundials and other instruments as non-useful decorations of historical significance.

Oct. 4 First essay due.
The rise of the European Middle Ages and science in the scholastic universities. The technicalities of astrology and alchemy and the beginnings of a craft literature for mining and other techniques. The medieval theory of motion and military science and the first research paper on magnetism. The isolation of Leonardo da Vinci, and his reflection of rich medieval technology. Windmills, stirrups the the breakup of the Feudal system.

" 6 The coming of printing and its acceleration of intellectual change and the Reformation. The feedback from printing to the scientific practitioners and the growth of urban artisans in science. Copernicus, Tycho Brahe and Kepler in the revolution of astronomical theory. Why the Copernican Revolution did not quite succeed.

" 11 Galileo and the telescope. The rise of artificial revelation as a New Philosophy. Why the telescope was invented when it was and why it led to a drastic revision of the program of science and to new instrument-making. The attitude of the Church and the so-called warfare between science and religion.

" 13 The birth of the first scientific societies and their new style scientific journals. How the Royal Society of London and the Academie des Sciences of Paris became the first of a far-reaching social organization of science that accelerated science to its modern pace. The sociological significance of the scientific paper as both the medium and the message. The role of papers and instruments in the Scientific Revolution.

" 18 The scientific work of Newton in Optics and his Principia as the foundation for
me exam all later mathematical physics. The professional and popular spread of Newtonian ideas. The priority dispute with Leibnitz and the contest between Cartesian and Newtonian heritage. The scientific women in Newtonianism. The slump after Newton.

" 20 No lecture.

" 25 The delayed scientific revolution in chemistry, and its relation to the discoveries of Galvani and Volta who looked for the secret of life and found electricity. Lavoisier and the non-disproval of the Phlogiston Theory. Naturphilosophie and its last great synthesis of all sciences, physical and social; why it failed and how it keeps trying to come back.

. 1 Scientific societies in the 18th century; the Lunar Society and the American Philosophical Society. Academies in Europe and the two great Transits of Venus expeditions. Science goes international.

Nov. 3 The force of Yankee ingenuity, and the spread of the railroad, electricity and scientific agriculture. Whitney and the myth of interchangeable parts. Relations between technology and science (little though that was) in the Industrial Revolution.

" 8 No lecture.

" 10 The new theories of Electromagnetism and Thermodynamics as the next round after Newton. Maxwell and British physics and its contest (which it lost) with German science. French science suffers defeat and tastes triumph with the crisis of 1896. The spurious discovery of N -Rays.

" 15 Darwin and Evolution, Lyell and Geology; the emergence of a new tradition in the biological and earth sciences. From Pasteur to cell biology; what were the new tools that began to make medicine scientific in a stronger sense. Science in engineering begins to have effects of a different sort.

" 17 From clockwork to machine tools and a new craft of precision machinery. Explorers of the inner atom; J. J. Thomson, Rutherford, and the genesis of nuclear science. The new craft of experimental physics and chemistry.

" 22 The work of Einstein in relativity, and the peaking of German science with Quantum theory. The scientific relations of World War I, the breaking of the German science machine. Industrial and governmental laboratories flourish in earnest.

" 29 Second essay due.
Between the wars; why did the great depression of the 1930s have almost no effect on the burgeoning of science? A new social process begins with a feeling that science might be planned for the good of mankind, but World War II is waiting in the wings. The flood of scientific refugees from the Nazis. Science in World War II - the atom bomb story and the interesting moral dilemma of discovering that, not the Germans, but the Japanese had indeed triedato make a bomb. Radar and the coming of a new electronic technology - the invention of the Route 128 (Boston ring road) syndrome for high technology.

Dec. 1 Missiles and space science. Back to astronomy where it all began. The conceiving of the term "Research and Development" and what it entailed for the political impact on post-war science. The coming of peace and the consequent construction of the National Science Foundation. How the Europeans were slow to follow suit on Big Science. The exponential rise of science. Consequences of the exponential growth of science for political and economic planning. The distribution of science around the world, and the special problems of underdeveloped and overdeveloped nations.

" 6 What does saturation in science imply for the technology of a nation? Are we into a no-growth type of post-industrial society. The invention of the computer from Pascal and Leibnitz and an even more ancient tradition and why it continues to be more than a machine that does arithmetic. The science and technology attributes of the computer revolution. Scientific information in the computer and the new librarianship of citation indexes and evaluation. The double helix as the most recent of the delayed scientific revolutions and its consequences for a new biology and medicine. The sociology of the double helix personalia and the rat race of competitive discovery. Why is "publish or perish" a good thing.

" 8 The jigsaw puzzle model of the way that science advances. Strategies of advance in science. What is the social license for basic science. The myth of technological application. Why technology grows the way it does. Possibility push versus market pull in innovation. The politics of technology are on a quite different basis from those of science. How not to shop for available technologies. Will the social sciences have a still more delayed scientific revolution - probably not; but what of the possibility of a big breakthrough

Fall term 1977

HSM 111a

Reference books - available on overnight loan Cross Campus Library:

Aaboe, Asger	Episodes from the Early History of Mathematics
Agricola, Georg	De re metallica...upon the development of mining...to 16th C.1556
Andrade, Edward N. da Costa	Rutherford and the Nature of the Atom
Andrade, "	Sir Isaac Newton:His Life and Work
Brahe, Tyge	Tycho Brahe's description of his Instruments & Scientific Work in Astronomiae Instauratae Mechanica 1598. (Available in Kline Sci.L.)
Brown, Sanborn C.	Count Rumford, Physicist Extraordinary
Chiera, Edward	They Wrote on Clay
Cline, Barbara L.	The Questioners: Physicists and the Quantum Theory
Cole, Sonia	The Neolithic Revolution
Crombie, Alastair C.	Medieval and Early Moden Science in the Middle Ages:5-13 C.,Vol.I; Science in the Later Middle Ages & Early Modern Times, Vol. II.
Crowther, James G.	The Cavendish Laboratory
Dales, Richard C.	The Scientific Achievement of the Middle Ages
Dibner, Bern	Alessandro Volta and the Electric Battery
Dijksterhuis, Edw.J.	The Mechanization of the World Picture
Drachmann,Aage G.	The Mechanical Technology of Greek and Roman Antiquity: A Study of the Literary Sources
Farrington,Benjamin	Francis Bacon:Philosopher of Industrial Science
Gade, John A.	The Life and Times of Tycho Brahe
Gamow, George	Thirty Years that Shook Physics: The Story of Quantum Theory
Gilbert, William	De Magnete, 1600.
Hall, Alfred R.	Scientific Revolution
Heisenberg,Werner, Max Born, Erwin Schrodinger,P.Auger	On Modern Physics (Available in Kline Sci. Lib.)
Kramer, Samuel N.	History Begins at Sumer
Kuhn, Thomas S.	The Copernican Revolution:Planetary Astronomy in the Development of Western Thought
Lee,Richard B. & I.Devore (eds)	Symposium on Man the Hunter
Merton, Robert K.	Science, Technology, and Society in 17th C. England
Neugebauer, Otto	The Exact Sciences in Antiquity
O'Leary, DeLacy	How Greek Science Passed to the Arabs
Ornstein, Martha	The Role of Scientific Societies in the 17th C.
Peregrinus, Petrus	The Letter of Petrus Peregrinus on the Magnet, A.D. 1269 (available in Medical Historical Library)
Price, Derek deS.	Little Science, Big Science
Randall, John H.Jr.	Aristotle
Ravetz, Jerome R.	Scientific Knowledge and its Social Problems
Sayili, Aydin	The Observatory in Islam
Schofield, Robert E.	The Lunar Society of Birmingham
Sharlin, Harold	The Convergent Century:The Unification of Science in the 19th C.
Shenstone, William A.	Justus von Liebig: His Life and Work
Singer,Charles, E.J. Holmyard,A.R.Hall (eds)	A History of Technology. 5 vols.
Smith, Alan G.R.	Science and Society in the 16th and 17th C.
Stahl, William H.	Roman Science: Origins,Development,and Influence to Later Middle Ages
Struik, Dirk J.	Yankee Science in the Making
Vitruvius	Vitruvius. The Ten Books on Architecture.
White, Lynn Jr.	Medieval Technology and Social Change
Wolf, Abraham	A History of Science, Technology & Philosophy in 16th & 17th C.
Wolf, Abraham	A History of Science, Technology and Philosophy in 18th C.

MELVIN KRANZBERG

CALLAWAY PROFESSOR OF
THE HISTORY OF TECHNOLOGY
EDITOR-IN-CHIEF
TECHNOLOGY AND CULTURE

March 15, 1978

Dear Mrs. Leskowitz:

This note is simply to confirm receipt of your note of February 28. I am flattered that Dr. Price has given my name as a reference for his candidacy for Director of the NMHT. He can be certain that I shall give him my very highest recommendation just as soon as I am asked to do so by the people at the Smithsonian.

Sincerely yours,

MK

MK:tm

DEPARTMENT OF SOCIAL SCIENCES
GEORGIA INSTITUTE OF TECHNOLOGY
ATLANTA, GEORGIA 30332
(404) 894-3198

Yale University *New Haven, Connecticut 06520*

DEPARTMENT OF
HISTORY OF SCIENCE AND MEDICINE

Box 2036, Yale Station

February 28, 1978

CONFIDENTIAL

Professor Melvin Kranzberg
Department of Social Sciences
Georgia Institute of Technology
Atlanta, GA 30332

Dear Professor Kranzberg:

I am writing for Professor Price who has just left on a three-week lecture tour in South America.

He is applying for the advertised position of Director of the National Museum of History and Technology at the Smithsonian Institution and has asked me to tell you that he has taken the liberty of using your name as reference. He regrets being unable to talk with you personally about this but only learned of the deadline date as he was leaving the office.

Sincerely yours,

Ann Leskowitz

Mrs. Ann Leskowitz
Secretary/Derek de Solla Price

al

File: Derek Price

Yale University *New Haven, Connecticut 06520*

DEPARTMENT OF
HISTORY OF SCIENCE AND MEDICINE

Box 2036, Yale Station

21 Dec '77

Dear Mel,

I cannot tell you how much I appreciate your so warm + friendly letter — it means such a lot to have such sympathy + kindness in the world. Ellen joins in sending you both our best greetings for the holiday season + the New Year!

Love

Derek

Thanks also for word of the MHT — it looks now as if I should be a candidate + so I'm filling up citizenship papers at long last

D

November 28, 1977

Dr. Derek de Solla Price
Department of History and Science of Medicine
Box 2036, Yale Station
Yale University
New Haven, Connecticut 06520

Dear Derek:

Thank you very much for sending me your paper on Extrinsic Value Theory for basic and "applied" research. I am pleased that there is such a large area of agreement between us, for I have long stated that such exercises as Project Hindsight and Project TRACES, in attempting to find direct linkages between basic scientific research and technological development, have been asking the wrong questions.

But I am not certain just what questions should be asked, if the attempt is to justify public investment in basic research. I have stated that one justification is the Zitgeist, that is, the pursuit of basic science characterizes a society that is, "on the move," willing to change, and hence open to innovation. But I confess that that is a very mushy kind of thing, and your argument on the avoidance of obsolescence, while still somewhat mushy, is probably better than mine.

Thanks for bringing this piece to my attention. It was good seeing you in Avalon -- and in such good health again. Weaux joins me in sending our best wishes to you and Ellen.

Sincerely yours,

Melvin Kranzberg

MK:tm

Yale University *New Haven, Connecticut 06520*

DEPARTMENT OF
HISTORY OF SCIENCE AND MEDICINE

Box 2036, Yale Station

November 21, 1977

Dr. Melvin Kranzberg
Department of Social Sciences
Georgia Institute of Technology
Atlanta, Georgia 30332

Dear Mel:

Here is the paper I referred to as being what I think is my most important contribution yet directly touching on science policy making and relating it to what little quantitative theory and political science theory we have. I don't know if I succeeded in saying it all clearly enough for many people seem to just glance at the paper and find it inconsequential instead of rather deep and elegant as any author hopes.

Cordially,

Derek de Solla Price
Avalon Professor of the
History of Science

DP:al

encl. - Extrinsic Value Theory ...

March 21, 1977

Dr. Derek J. DeSolla Price
Department of History of Science and Medicine
Yale University
Box 2036, Yale Station
New Haven, Connecticut 06520

Dear Derek:

Your secretary has informed my office that you were suddenly taken ill in Sicily and had to return to this country in order to recuperate. The puppose of this letter is simply to assure you of my concern and to send you my very best wishes for a speedy recovery.

Get well -- and soon.

Sincerely yours,

Melvin Kranzberg

MK:tm

Yale University *New Haven, Connecticut 06520*

DEPARTMENT OF
HISTORY OF SCIENCE AND MEDICINE

Box 2036, Yale Station

March 3, 1977

Professor Melvin Kranzberg
Department of Social Sciences
Georgia Institute of Technology
Atlanta, Georgia 30332

Dear Professor Kranzberg:

Your letter** of 2/14/77 to Derek de Solla Price has reached this office in his absence. He was taken ill while participating in an Institute in Italy and is returning to the U.S. shortly for further recuperation. Your ~~letter~~ will be brought to his attention as soon as he returns to this office.

Sincerely yours,

Ann Leskowitz

Ann Leskowitz, Secretary

**Would you be good enough to pass this information to Dr. John W. Prados whose letter I acknowledged early in February? Thank you.

February 14, 1977

Dr. Derek J. de Solla Price
Department of History of Science and Medicine
Yale University
Box 2035/Yale Station
New Haven, Connecticut 06520

Dear Derek:

I am writing this letter to you in my capacity as a member of the National Lectureships Committee of Sigma Xi. By this time, you have already received an invitation from Dr. John W. Prados (Vice-President for Academic Affairs of the University of Tennessee), who is chairman of our committee, asking you to serve as A National Sigma Xi Lecturer for 1977-78.

These are very distinguished lectureships, and I hope that you will accept the invitation tendered by Dr. Prados. We need men of your stature to challenge and stimulate the scientific research community and to acquaint the general public with the frontiers of scholarship.

Sincerely yours,

Melvin Kranzberg

MK:tm
cc: Dr. John W. Prados

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A UNIT OF THE UNIVERSITY SYSTEM OF GEORGIA
ATLANTA, GEORGIA 30332

COLLEGE OF SCIENCES AND LIBERAL STUDIES
SCHOOL OF SOCIAL SCIENCES
(404) 894-3198

MELVIN KRANZBERG
CALLAWAY PROFESSOR OF
THE HISTORY OF TECHNOLOGY

January 4, 1984
Dictated Dec. 15, 1983
Transcribed Jan. 4, 1984

Mrs. Ellen Price
50 Turnbull Street
Newhaven, CT 06510

Dear Ellen:

I have just received a letter from Hedvah Shuchman in which she enclosed a copy of the Showbill program for "Tallulah," which was produced by your son Mark and dedicated to Derek. Naturally, I was very much touched by it.

Hedvah also told me that the Smithsonian is planning on issuing a medal in honor of Derek, and I think that is entirely fitting. In the meantime, Dr. A. Rahman (India), another good friend of Derek's, has been writing me about a possible collection of essays dedicated to Derek, to be published by the International Institute for Science Policy Studies; I hope that this project will be carried through, inasmuch as Derek played a major role in the creation of that Institute.

Well, Ellen, this has been a sad year for all of Derek's friends, and especially for his family. I only hope that the years to come will be better for you and that you and your family will derive some consolation from the plans of Derek's many friends to honor his memory.

Sincerely yours,

Melvin Kranzberg

MK/cd

Georgia Institute of Technology
A UNIT OF THE UNIVERSITY SYSTEM OF GEORGIA
ATLANTA, GEORGIA 30332

COLLEGE OF SCIENCES AND LIBERAL STUDIES
SCHOOL OF SOCIAL SCIENCES
(404) 894-3198

MELVIN KRANZBERG
CALLAWAY PROFESSOR OF
THE HISTORY OF TECHNOLOGY

June 13, 1983

Dr. Derek Price
Department of History of Science
Yale University
Box 2036, Yale Station
New Haven, Connecticut 06520

Dear Derek:

A copy of your June 6 letter to Michael Fores arrived just as I was about to write you regarding other matters. But first let me thank you for attempting to set Fores straight, and I hope that your letter will put an end to the incessant bombardment of communications from him, which represent a waste of his and everybody else's time.

You have always been so tactful and diplomatic in the many years that I have known you that I must confess that I was somewhat surprised by the blunt tone which you adopted in your letter to Fores. However, on second thought, I realized that only direct language would bring the point home to a "tedious psychopath" (a wonderful description!). So you "did good," as they say in Cleveland, Ohio. I expect that your letter will have the desired results, but inasmuch as one can never predict psychopathic behavior, you might now be the object of a barage of letters from Fores as part of the "academic establishment" which he holds responsible for all his troubles. No matter what, thank you very much for trying to soothe the savage beast.

Now to turn to the two items about which I originally intended to write you. First, let me reiterate my congratulations on your beautiful Sarton Memorial lecture at the AAAS. Not only was it a virtuoso performance in terms of the polished language and delightful wit and irony displayed, but it was an excellent piece of scholarship -- plus which you made a major contribution which will certainly demolish some existing interpretations and stimulate a lot of thought and additional scholarship on this subject. It was an absolutely beautiful job, and throughout your presentation, I kept saying to myself, "I wish I had said that" -- and I probably will! With due attribution, of course.

Michelle Press, editor of AMERICAN SCIENTIST, heard your talk, and she was equally enthusiastic about it. She would like to publish it in AMERICAN SCIENTIST, but I assume that you have already promised it to SCIENCE, inasmuch as the talk was delivered under AAAS auspices and the Sarton Memorial Lectures are usually published therein. However, my guess is that you have enough material on this topic so that you could write another article making the same point and

reaching the wide audience (about 130,00 readers) of AMERICAN SCIENTIST.

Knowing your vast command of the subject matter and your ingenuity with words, I should also like to suggest that you write another piece making the same point for TECHNOLOGY AND CULTURE. Inasmuch as two quite different audiences are involved (with only slight overlapping), you could present your thesis in a very stirring article for T&C, which might include a sort of historiographical overview of the previous literature and interpretations of science/technology relationships. (I suppose that I could make the same argument for stressing different aspects of the topic in order to present your thesis in altered forms for publication in ISIS, STHV, and the new 4S journal, all of which would -- or at least should -- be receptive media for the point which you made so well and which should set off a major wave of revisionist examination of the older interpretations which you have so successfully destroyed.)

My mention of T&C above brings me to the other point which I want to discuss with you. Frankly, I was very surprised when you told me at lunch about the treatment of Carolyn Cooper's manuscript by T&C. All my contacts with Bob Post have indicated that he is a very thoughtful person, sensitive to the feelings of both his authors and readers, as well as possessed of sound historical knowledge and commonsense editorial judgment.

What shocked me even more was your statement that you might not renew your membership in SHOT as a result of this Cooper episode. Actually, Derek, I was really stunned by that. After all, you have been a stalwart member of SHOT since the very beginning, a member of the editorial board of T&C for many years, the recipient of SHOT's highest honor, etc., etc., etc. How could you even contemplate such an action, I asked myself, and shortly after my return to my return to Atlanta, I spoke with Bob Post and asked him what was the story on the Cooper manuscript.

Well, it develops that the story has a very happy ending. Indeed, Bob was surprised when I raised the question, because he informed me that, after some discussions between Carolyn and the editors, the manuscript had been revised and had been fully and definitely accepted for publication in T&C. That was done a couple of months ago, and all that remains to be done on the manuscript is for Carolyn to make some slight changes of a stylistic nature, not substantive -- and the manuscript will probably be published in the July 1984 issue (there is about a one-year backlog or "cushion" of articles). Post said that he was very happy with the final version of the article and that Carolyn also seemed pleased with the outcome.

Not every story of submitted manuscripts has such a happy ending -- look at the Fores "saga" -- but I am delighted that this one did. After all, it would be a great blow to the history of technology if Derek Price did not

maintain his strong interest in and support of SHOT and T&C. Besides, I was pleased to learn that Carolyn's manuscript will receive the publication and the audience which it so richly deserves.

Finally, turning to personal matters, I was delighted to see you looking and feeling so trim after all the many health problems you have had. And, of course, I was simply delighted by your wonderful AAAS talk. Again, my congratulations on a beautiful job.

Sincerely yours,

Melvin Kranzberg

MK:tb

July 11, 1977

Dear Derek: Price

There ain't no such thing as a free lunch, but I shall gladly take advantage of your kind offer in your July 11 letter when next I am in New Haven.

Deaux joins me in sending our best to you and Ellen.

Sincerely yours,

Melvin Kranzberg

MK:tm

Yale University *New Haven, Connecticut 06520*

DEPARTMENT OF
HISTORY OF SCIENCE AND MEDICINE

Box 2036, Yale Station

July 11, 1977

Professor Melvin Kranzberg
Editor-in-Chief
Technology and Culture
Georgia Institute of Technology
Atlanta, GA 30332

Dear Mel:

Just a line to give you my heartiest congratulations on your high honor which you so richly deserve. I am absolutely delighted, not only for your sake, but for ours, when doubtless you will be visiting the national shrine of Sigma Xi which is not a hundred yards from my office here at Yale. So, when you do, please note that we expect to have the privilege of giving you one of the few remaining free lunches in this world!

Yours very cordially,

Derek de Solla Price
Avalon Professor of the
History of Science

DP:al

July 26, 1976

Dr. Derek J. De Sola Price
Department of History of Science & Medicine
Yale University
Box 2036, Yale Station
New Haven, Connecticut 06520

Dear Derek:

I can't attend the Symposium on Quantitative Methods in the History of Science, to be held in Berkeley at the end of August. I know that you will be speaking on "Ups and Downs in the History of Science and Technology," and I should like to hear just what you have to say because I know that it will be filled with your usual provocative and stimulating insights.

Instead of waiting for publication of the prodeedings -- if and when they are ever published -- could you send me a copy of your paper? I would be most grateful. Besides, how can I be a member of the "invisible college" unless I know what is being said and thought at the frontiers of knowledge before they are "embalmed" by publication?

Sincerely yours,

Melvin Kranzberg

MK:tm

Check on other pictures from Bedini.

Squib on Price + Bedini.

Ask Price about Gerard citation on p. 5 — No footnote.

~~Footnote 8 of Price – Title of article in Singer(?)~~

Footnote 10 in Price Volume + issue no. of Sci. Amer.

~~Price, p. 15 – 2nd ¶ – Villars or Villard?~~

Price, p. 15 – ¶ 2 – Reference to Fremont missing.

Price, p. 21 – 2nd line – Reference to Witello.
" " – 1st ¶ – Documentation
" p. 22 – ~~Do~~ end of 2nd ¶ – Documentation of Melancthon
" p. 24 – Poisson documentation.

Fig. 1 - p. 4; Fig. 2 + 3; - p. 11

Fig 4 - p. 12.

Price, p. 16)

Figs. 5 & 6 - p. 15

~~Automata in History~~

Fig. 7 - p. 16; Fig. 8 - p. 18;

~~Squibs~~ Fig. 9 - p. 19; Fig. 10, p. 21;

Bedini; p. 1 - last line - Ctesibius or Ktesibios
(Cf. with Price) See also p. 21.

Figs. 11 + 12, p. 24;
Fig 13, p. 32.

Captions in Bedini article.

September 10, 1963

Mrs. Mary Rohn
Department of History of Science and Medicine
Yale University
Box 2036
Yale Station
New Haven, Connecticut

Dear Mary:

Thank you very much for your note of September 6 about the documentation for Derek Price's article on automata. Since Derek is off gallivanting (or should I say, doing the polonaise), we have no choice but to add the necessary documentation when the article reaches galley proof form.

Actually, Derek is a good and hard worker, and he deserves this European jaunt. I envy him but do not begrudge it to him.

How are things going with you? Is Dan still commuting between New Haven and New York? Is he teaching or painting? I suppose he is doing both.

Everything is pretty hectic in our department at Case. Everyone is publishing like mad, and our Graduate Program has burgeoned beyond our expectations. Harvey is head of the Department now and is doing a wonderful job. But I really don't have time to write all the news, for so much seems to be happening.

Please give my best regards to Dan and my love to you.

Sincerely,

Melvin Kranzberg

jc

Price MS

Yale University *New Haven, Connecticut*

DEPARTMENT OF
HISTORY OF SCIENCE AND MEDICINE

Box 2036, Yale Station

September 6, 1963

Dr. Melvin Kranzberg, Editor
Technology and Culture
Case Institute of Technology
Cleveland 6, Ohio

Dear Mel,

This is just a note to let you know that I have received your letter to Derek Price of September 4 asking for documentation on his automata article.

Price is in Europe attending an International Symposium on the History of Science and Technology in Warsaw, Poland and will not be returning to Yale until at least September 24, when classes will already have been in session for one week. I hope you will be able to make insertions in the proofs at a later date since September 15 is clearly impossible. The only help I can be is that the Antikythera article appeared in the June, 1959 issue of Scientific American.

Thanks for your many greetings to me -- and my very best wishes to you, Love and kisses, even! Mary

Mary Rohn, for
Derek J. de Solla Price

ILLUSTRATIONS for Bedini article.

Figure 1 - Mechanism of Hydraulic singing bird first described by Heron and illustrated in Les Raisons des Forces Mouvantes by Salomon de Caus, Paris 1615.

Figure 2 - Cock which surmounted the first Strassburg clock made for the Strassburg Cathedral in about 1350. At twelve o'clock it flapped its wings, opened its beak, thrust out its tongue, and crowed. Photograph courtesy the Strassburg Museum.

Figure 3 - Diagram of the mechanism of the cock in the Strassburg Museum. Reproduced from L'Horloge Astronomique de Strassbourg by A. Ungerer (Paris 1922).

Figure 4 - Astronomical table clock made in 1555 by Philipp Imser for Elector Ottoheinrich van der Pfälz. Photograph courtesy Technisches Museum, Vienna.

Figure 5 - Automaton of Lady Lute Player believed to be the work of Gianello Torriano. Photograph courtesy the Kunsthistorisches Museum, Vienna.

Figure 6 - Mechanism of Lady Lute Player. Photograph courtesy the Kunsthistorisches Museum, Vienna.

Figure 7 - Table Fountain of silver gilt and enamel, late Fourteenth Century. Courtesy the Cleveland Museum of Art. Gift of J. H. Wade.

Figure 8 - Drawing of the Fountain Tree made for the Mangu Khan in ca. 1345 by Guillaume Boucher. Reproduced from Voyages Faites Principalement en Asie Dans Les XII, XIII, XIV et XV Siecles by Pierre Bergeron, La Haye 1735.

Figure 9 - Silver net made by Hans Schlottheim of Augsburg in ca. 1580 for Emperor Rudolph II. Photograph courtesy British Museum.

Figure 10 - Thomas Dallam's Organ Clock reproduced from The Illustrated London News, 20 October 1860.

Figure 11 - Vaucanson's Duck. Illustration in contemporary prospectus, reproduced from Le Monde des Automates by Alfred Chapuis and Edouard Gelis, 1928.

Figure 12 - Mechanism of Vaucanson's Duck. Reproduced from Le Monde des Automates by Alfred Chapuis and Edouard Gelis, 1928.

Figure 13 - Sketch of Automatic Furnace. Reproduced from Manuscript Ll.5.8, folios 217-218, University Library, Cambridge. From photograph courtesy of the Syndics.

September 4, 1963

Dr. Derek J. de Solla Price
Dept. of History of Science & Medicine
Yale University
New Haven, Connecticut

Dear Derek:

While giving your article on automata a final editorial going-over before sending it to the printer, I find a few items of documentation missing. Therefore, I should appreciate your furnishing me with information on the following points:

Page 5: There is no documentation for the quotation about Caesar's funeral from Gerard. I think there should be a footnote giving the title of the book, place and date of publication, page, etc. Incidentally, are you sure this quotation is from someone named Gerard and not from Gerard Walter's biography of Caesar?

Footnote 10, page 10: What is the volume and issue number of the <u>Scientific American</u> in which your article on the Antikythera appeared?

Page 15, second paragraph: There is a reference to Fremont. Could you provide the exact reference fore this misinterpretation by Fremont?

Page 21, sendnd line: Documentation for the Witello reference; there might also be some documentation of the "writings on optics of classical antiquity mentioned in the first line.

Page 22, paragraph 2: Documentation of the Melancthon quotation.

Page 24, paragraph 2: Documentation for the statement from Poisson.

I should appreciate very much if you could get this information to me before September 15, when the material goes to the printer.

Bedini / Price, Ms

Turning to other matters, I was wondering if you had your Oak Ridge students provide some evaluation of their summer seminar at its conclusion. If so, was anything said regarding the history of technology or my particular participation in the seminar. I assure you that I am not looking for compliaments; adverse comments would be much more helpful to me in my future work.

Please give my very best regards to your wife and to Mary Rohn. You should be coming out here in October for the Sorby Centennial Conference, and I look forward to seeing you then.

Sincerely yours,

Melvin Kranzberg

MK:hw

SMITHSONIAN INSTITUTION
UNITED STATES NATIONAL MUSEUM
WASHINGTON 25, D. C.

July 25, 1963

AIR MAIL

Dr. Melvin Kranzberg, Editor-in-Chief
Technology and Culture
Case Institute of Technology
Cleveland 6, Ohio

Dear Mel:

With this letter I am returning the revised and retyped version of the manuscript on "The Role of Automata in the History of Technology" for your consideration, together with illustrations.

I have carefully checked all points indicated by the two referees and in your own letter, and have corrected and/or revised as indicated. I have also tried to condense the material in the areas noted, but not too successfully. Perhaps as you look over it again you may find passages which can be deleted without harm to the thread of the article. If so, please feel free to delete as you wish without the necessity of checking back with me. As you know, I have great difficulty in cutting my material.

Documentation has been supplied whenever it was missing. I have further supplemented some of the footnotes with additional references.

I have inserted references in the text to the illustrations, labelled them in accordance with your instructions, and provided origin when lacking. I have ordered new photographs from Vienna, Strasbourg and London to replace several of these; as soon as they arrive--which will be before mid-August--I will airmail them on to you and all you will need to do is to replace those you have with the new ones. Furthermore, I have taken the liberty of adding an additional illustration, of the magnificent astronomical clock with automatons by Philipp Immser. This is a photograph I acquired recently in Vienna when I examined the clock in person, and it will be a valuable addition, I believe.*

With reference to the referees comments regarding Bishop Virgilius, which appear on Page 13 , I have taken the liberty of incorporating part of the referee's comments into my footnote. Is this permissible?

Finally, the problem that existed with my grandiose last line is the article: I admit that this was a little far out and hard to justify on the basis of my exposition, so I have eliminated it.

***I have enclosed also a second photograph of this clock, labelled Figure 4a, showing the automata in the event that you have the space and wish to use it.**

All that we need are the new photographs, and I am assured of having these shortly. In each instance I have asked also for written permission to publish the illustration where I do not already have such permission. So we will be clear on that aspect.

Hoping that you will find the enclosed in good order, and with best regards, I remain

Sincerely,

Silvio.

Silvio A. Bedini
Curator
Division of Mechanical
and Civil Engineering

Encls: 1 MS
13 Illus.

July 16, 1963

Dr. Silvio Bedini, Curator
Division of Mechanical and Civil Engineering
Smithsonian Institution
Washington 25, D. C.

Dear Silvio:

I am pleased to report that your manuscript, "The Role of Automata in the History of Technology," has been accepted for publication in TECHNOLOGY AND CULTURE, along with Derek's accompanying article, and I am returning the manuscript to you for a few final revisions. I am also enclosing copies of the referees, and I should like you to revise your manuscript in the light of their comments and suggestions.

In addition to the suggestions of the referees, I have a few other suggestions of a minor nature. Some of these are simple stylistic matters. For example, the numbers of centuries should be spelled out and the word "century" should be uncapitalized (thus, "seventeenth century," not "17th Century"). Also, from the stylistic point of view, I note that your first five paragraphs start with "the." For the purposes of variety of expression, you might try and make some changes in this kind of prose style. Mix up your clauses a little more, and avoid the passive voice wherever possible.

There are also a couple of matters involving missing documentation. For example, on page 9, line 4, you mention "recent research" but you do not footnote it. I think that there might be some documentation regarding this recent research. On page 26 there should be some documentation on Mauler's opinion of Jacquet-Droz and Leschot. The reader might want to know the exact reference to Mauler in this case. There is a somewhat similar omission on page 25, line 2. There you mention "conflicts and problems," but you do nothing expository on these conflicts and problems. Unless you intend to explain what you mean, then these should not be mentioned.

You will note that one of our referees suggests a considerable condensation of your article. I agree with him, for you often tend to include material which, while interesting enough in itself, does nothing to advance the thesis which you are endeavoring to demonstrate. For example, on page 24 you include an entire paragraph on Maillardet's automaton in the Franklin Institute. The

information regarding the destruction and reconstruction of that automaton is interesting but does not help to make the point of your article. You could incorporated that information in a footnote instead of diverting the reader's attention from your thesis. The important thing is to keep to the point in the text; that will not only sharpen your article but will also shorten it.

My final comment is in regard to the illustrations, the references to them in the text, and the captions of the illustrations. Nowhere in the text do you refer the reader to the illustration accompanying that portion of the text. Please make this clear by parenthetical insertions referring the reader to the appropriate figure.

Also, the complete caption for each illustration should be put on back of that illustration. Please do not have them back to back as you have now. Furthermore, your captions with the photographs now are incomplete, and the real caption is on the sheet headed "Illustrations." Make certain that the caption you want is pasted on the back of the appropriate illustration. I note that in at least one case the legend for the caption does not agree with the text. Figure 3 is labeled as the work of Guanelo Torriano; in the text on page 12, the name is given in a somewhat different form. Please make certain that the caption and the textual reference are consistent.

Finally, the caption for each figure should include an exact attribution of its origins and assurances of permission to print, where these are necessary. You will note that one of the referees points out that certain figures will not reproduce satisfactory. If you have better pictures of these items, please substitute them where possible.

I think that takes care of all the items. Although this might seem like a lengthy letter, the actual demands on your time for making these revisions should not be too great. If you could make the necessary changes by mid-August and return the revised manuscript to me, that would help me a great deal. As you can see from the copy of my enclosed letter to Derek, I hope to be able to fit this pair of articles into the Winter issue or, at the very latest, the Spring issue. They are both excellent articles, and I hope you agree with me that yours will be even better after you have revised it in accordance with the suggestions of our referees.

Sincerely yours,

Melvin Kranzberg

jc
cc: Dr. Derek Price

July 16, 1963

Dr. Derek J. Price
c/o Humanities Institute
Oak Ridge Institute of Nuclear Studies
P. O. Box 117
Oak Ridge, Tennessee

Dear Derek:

This letter is merely to provide formal and written notice of the acceptance of your article, "Automata and the Origins of Mechanism and Mechanistic Philosophy," for publication in TECHNOLOGY AND CULTURE. The reports of our referees were very favorable, so no surgery, either major or minor, need be applied.

However, I thought you might to make one or two revisions on the basis of the comments made in regard to the paper on this same topic at the Oak Ridge Institute. If you have any revisions or corrections, please send them to me and I shall incorporate them at the proper points in the paper.

The only unfavorable comment in regard to your paper from one of our referees was to the effect that there is a paucity of punctuation. I shall remedy this lack by sprinkling commas and semicolons throughout the paper wherever I think they might be needed.

Finally, there is the matter of illustrations. In your covering letter for the manuscripts, you said that you decided to omit illustrations from your portion of this joint effort and I "might consider the illustrations to Silvio's paper as belonging to both." That is fine, but you might want to make specific reference to some of Silvio's illustrations in the text of your article. If so, please let me know where you would want such references placed.

If Silvio can make the minor revisions asked of him in time, I hope to be able to place both these articles in the Winter 1964 issue, which goes to the printer at the beginning of September. However, even if he finishes his revisions on time, I may not be able to publish it until the Spring issue. Nevertheless, you may be sure that these articles

will appear no later than next Spring's issue. They are a good pair of articles, and I am pleased to have the opportunity to publish them in our journal.

Sincerely yours,

Melvin Kranzberg

jc
cc: Dr. Silvio Bedini

Yale University *New Haven, Connecticut*

SCHOOL OF MEDICINE
333 Cedar Street
Yale Medical Library

5 June 1963

Mr. Melvin Kranzberg, Editor-in-Chief
Technology and Culture
Case Institute of Technology
Cleveland 6, Ohio

Dear Mel:

Under separate cover and by Certified Mail, I am returning you the two manuscripts that you recently sent me having to do with automata. When I agreed to review these manuscripts, I did not know that one of them was by Derek Price. In my own editorial capacity I always take the position that a member of a group should not review a manuscript done by another member of that group. Therefore, since I am a member of the Department of History of Science and Medicine of which Derek is Chairman, I have not reviewed his manuscript. However, I have gone over Silvio Bedini's paper and have the following criticisms.

1. The first sentence will have to be changed by qualifying the word "machines." Perhaps "complex" could be added.

2. On page 9 the word "jacquemart" occurs for the first time and should be defined.

3. The third paragraph on page 27 is not accurate as you can see from the enclosed reprint.

4. The last sentence is not justified by data presented in the paper. Moreover, it is my feeling that automata had little if anything to do with the various machines mentioned in this sentence. If they did, this fact should be clearly demonstrated in the body of the paper.

5. It is also suggested that pages 5-6, 8, and 12-26 be condensed.

6. Figures 1, 3, and 4 will not reproduce satisfactorily.

I do not feel too strongly about any of the above suggestions except number 4. Therefore, I recommend acceptance providing that some cognizance be taken of suggestion number 4,

Sincerely,

Fred

Frederick G. Kilgour
Librarian

FGK/gt

L. SPRAGUE de CAMP
278 Hothorpe Lane
Villanova, Penna.

6 May 63

Dr. Melvin Kranzberg
Dept. of Humanities
Case Institute of Technology
Cleveland 6, Ohio.

Dear Mel:

I have read the two papers you sent me and return them herewith. It looks to me as if you have the material for a whole issue of T&C devoted to automata.

The Price paper is excellent; ça va sans dire. Derek has a point about the relationship of automaton-making to general mechanical progress and states it well. My only criticism would be a trivial one: that Derek tends to underpunctuate, and the piece would be better for a judicious sprinkling of commas. You could take care of that.

The Bedini paper is also excellent, especially with its illustrative material. I would urge that one section, on pages 11 and 12, be reworded. After telling about the medieval tales of talking heads and mechanical flies, the author starts the next paragraph with the statement: "Even if these were not apocryphal..." which is a little vague and gives the impression on a hasty reading that maybe there was something to these stories after all. All these stories, of course, belong to the general body of legends of the mechanical wonders of Virgil the Magician, a legendary character made up of parts of Publius Vergilius Maro the poet, Heron of Alexandria, and the common folklore figure of the magician of the Merlin type. "Bishop Virgilius" is a Christianized version of this figure. See the excellent book covering the whole corpus of legend, VIRGIL THE NECROMANCER, by John Webster Spargo (1934). It might also well be brought out that medieval and ancient men were inclined to exaggerate the possibilities of automata just as they did those of poisons. Cf. the story in Polybios of the mankilling robot kept by Nabis, tyrannos of Sparta.

Cordially yours,

L. Sprague de Camp

Mr. Allan Easton
17, Heathgate
London, N. W. 11
England

June 7, 1963

Mr. Easton

"Automata, and the

Origins of Mechanism and Mechanistic Philosophy"

April 29, 1963

Dr. Frederick C. Kilgour
107 Haverford St.
Hamden, Conn.

Dear Dr. Kilgour:

Thank you very much for agreeing to referee the Manuscript entitled, "Automata, and the Origins of Mechanism and Mechanistic Philosophy".

Right now this article is in the hands of another referee and as soon as it is returned to us we will send it to you for your perusal.

Thank you very much for your consideration in this matter.

Sincerely yours,

Hazel Willis
Secretary to
Melvin Kranzberg

hw

SOCIETY FOR THE HISTORY OF TECHNOLOGY

Case Institute of Technology
Cleveland 6, Ohio

L. Sprague de Camp
278 Hothorpe Lane
Villanova, Pa.

April 22, 1963

Dear Mr. de Camp :

We are in receipt of a manuscript entitled, "Automata, and the Origins of Mechanism and Mechanistic Philosophy" which has been submitted for consideration for publication in TECHNOLOGY AND CULTURE. Will you referee this manuscript for us and give us your comments regarding it?

Please let me know as soon as possible whether or not you will do this, and, if so, I shall send the paper on to you.

Sincerely yours,

Melvin Kranzberg

Melvin Kranzberg
Editor-in-Chief
TECHNOLOGY AND CULTURE

P.S. If, for some reason, you are unable to referee this manuscript for us, can you suggest another qualified person who can do so?

OK — send it

L. S. de C.

L. Sprague de Camp
278 Hothorpe Lane
Villanova, Pa.

April 22, 1963

Mr. de Camp

"Automata,

and the Origins of Mechanism and Mechanistic Philosophy"

April 22, 1963

Dr. Lynn White, jr.
Dept of History
University of California
Los Angeles 24, Cal.
Dr. White

"Automata, and

the Origins of Mechanism and Mechanistic Philosophy"

Dr. Frederick G. Kilgour
107 Haverford St.
Hamden, Conn.

April 22, 1963

Dr. Kilgour

"Automata, and the

Origins of Mechanism and Mechanistic Philosophy"

April 11, 1963

Dr. Derek J. de Solla Price
Dept of History of Science and Medicine
Yale University
New Haven, Conn.

Dear Dr. Price:

This will acknowledge receipt of your manuscript, "Automata, and the Origins of Mechanism and Mechanistic Philosophy", which you have submitted for consideration for publication in TECHNOLOGY AND CULTURE.

You will hear from Dr. Kranzberg regarding the status of your manuscript just as soon as it has been read by our referees.

Thank you for submitting this paper to us.

Sincerely yours,

Hazel Willis
Secretary to
Melvin Kranzberg

hw

Yale University *New Haven, Connecticut*

DEPARTMENT OF
HISTORY OF SCIENCE AND MEDICINE

Box 2036, Yale Station

April 3rd 1963

Dr. Melvin Kranzberg,
Case Institute of Technology,
Cleveland 6, Ohio.

Dear Mel,

Enclosed are the articles by Silvio and myself, about which C. Donald O'Malley has spoken to you. I hope you will find them acceptable for publication in the journal. Because illustrations to both articles would have been so similar, I decided I could safely omit them from mine. You might consider the illustrations to Silvio's paper as belonging to both.

Best wishes.

Yours sincerely,

Derek J. de Solla Price,
Avalon Professor of
History of Science.

TECHNOLOGY AND CULTURE

The International Quarterly of the Society for the History of Technology

December 13, 1977

Dr. Derek de Solla Price
Department of History of Science and Medicine
Yale University
Box 2036, Yale Station
New Haven, Connecticut 06520

Dear Derek:

Thank you for your frank expression of opinion in your letter of December 5. I appreciate your position on this point, and I see no reason why you should be "picked on," as you put it.

Although I have not forwarded your letter to my informant, I have written my correspondent to inform him (her/it) that the matter is too trivial to waste space on, that you would find it offensive, and that "honorary" implied unofficial and unpaid (which you were). Hence, I did not think that it would be worth the trouble to raise questions about the matter.

Besides, Derek, you are a friend of mine of long standing, and I appreciate very much your services to the history of technology. Why should I want to offend you in this matter and blow up a trivial point into a dispute? My proffered correction was meant to avoid that situation. Obviously, you are still very sensitive to these painful memories of the past -- just as I am equally sensitive to similar memories of past slights and injustices perhaps arising from the same reasons. Hence, I understand your reaction.

I hope that my correspondent will respect my judgment on this matter and consider it as closed. Of course, if my informant is insistent upon our publication of a "correction" then I shall have to rethink my dropping this matter, especially if he (she/it) should decide that she (he/it) should appeal to the Editorial Board or Executive Council, claiming that I had published an incorrect statement in Technology and Culture and refused to publish a correction. I don't really

think that the matter will come to that. So don't worry about it. My informant would be shown in a very bad light if it (he/she) tried to make a "big thing" out a trivial distinction between "honorary curator" and "official curator."

Turning to other matters of more immediate interest, I was in Washington for a committee meeting at the same time as the opening reception for the "Atom Smashers: Fifty Years" exhibit at the Smithsonian. So I went and saw a lot of old friends there. Naturally, there is much speculation among the members of the staff re the new director. I did a lot of listening, and I learned that one of those who had "applied" was William McNeill, who is a very distinguished professor of history at the University of Chicago and the author of The Rise of the West, which won the National Book Award a few years ago. I doubt if McNeill has applied as such, but I should imagine that his name was brought into the proceedings by Neil Harris, who is also a professor of history at Chicago, and who is a member of the Search Committee for the new director of the NMHT. Inasmuch as there is no prerequisite that the director of the NMHT be an historian of science and/or technology, he can be a general historian -- and McNeill certainly is a very distinguished one. (Boorstin, as you may recall, was not an historian of technology until he became director of the museum, and then he proceeded to learn a lot about the history of technology.)

I did not find out who all the members of the Search Committee are, but I did learn that Harry Wolff is one of them, and that Phil Lundeberg, of the Smithsonian staff, is another. Also, a woman from the curatorial exhibits staff is a member of the Search Committee. Some of the Smitsonian friends with whom I spoke mentioned that now might be a good time to have a "museum person" rather than a professional historian as director.

Oh, yes, one member of the Smithsonian staff who is being mentioned as a possible director is Peter Marzio. I don't know him very well, but I do know that everyone thinks highly of him. However, he is very young and as yet does not have very much of a reputation outside the Smithsonian itself.

I gather that the Search Committee is already at work. Hindle's resignation does not take affect until June or July.

The above are all the rumors -- and facts -- I could collect about the search for a new director during the course of cocktail chitchat. It will indeed be interesting to see what happens. Good luck!

Sincerely yours,

Mel

Melvin Kranzberg

MK:tm

September 14, 1976

Dr. Derek de Solla Price
Department of History of Science and Medicine
Yale University
Box 2036, Yale Station
New Haven, Connecticut 06520

Dear Derek:

This is belated thanks for sending me a copy of your paper for the Berkeley symposium. Your pulse-taking measurements are very interesting. I take it that your explanations for the post-Scientific Revolution slump and the low profile of the Industrial Revolution are tentative. Assuming that your measurements correctly take the pulse, we now have the task of explaining these unexpected results.

Well, that will give lots of historians employment -- or at least, research projects -- for many years to come.

Thanks again for sending me a copy of your paper. I hope that the symposium went well.

Sincerely yours,

Melvin Kranzberg

MK:tm

The Book of Knowledge of Ingenious Mechanical Devices by Ibn al-Razzaz al-Jazari. Translated and annotated by Donald R. Hill. Dordrecht/Boston: D. Reidel Publishing Company, 1974. Pp. xxv + 285; illustrations, limited edition. $96.00.

There is no doubt that this book satisfies the outstanding desideratum of historians of Islamic technology. We have at last a good English translation of the complete text and diagrams of the Arabic treatise on water-clocks, automata, trick drinking vessels, phlebotomy measures, water-raisers, and other sundry mechanisms composed by Ibn al-Razzāz al-Jazarī in 1206 A.D. for his patron, the Artuqid prince of Diyār Bakr in Upper Mesopotamia. It is common to all cultures that the record of skilled engineers and sophisticated craftsmen is notoriously incomplete. Their artifacts, once broken, have become outmoded junk and almost completely perished, and for those few that wrote about their work it is only exceptionally that the texts have been copied and recopied once the devices were vanished and the artisans and their first apprentices dead. Given the mortality of unique manuscripts, most of what we know textually of medieval high technology is from long chains of copies of copies, and thus there survive now only a few works remarkable for their philosophical value or for their pretty pictures. Worse still, for the Arabic and other non-Western works, there is only a rare bird of a scholar who has the linguistic skill without a certificate of total ignorance in all things scientific and technical. Even the few texts that survive have rarely found editors, even more rarely translators, and most rarely of all skilled commentators.

The present work gets a summa cum laude for survival and importance, an A for translation, B for the commentary, perhaps a poor C or even a D for the policies of the publisher. Having now the

complete and easily readable text there emerges an impression that adds surprisingly little to that we have long had from the German version published in 1915 by Eilhard Wiedemann and Fritz Hauser. The old version was maddening in that one could not tell which was translation, which paraphrase, commentary, insertion or deletion; one was always afraid that some vital passage had been missed. In the complete version there are indeed a few places where new material is forthcoming, but the main scene is as before. The most important impression is that this exuberant technology of philosophical toys in the tradition of Heron of Alexandria is not just some sort of trivial distraction of an affluent or slave society, taking them away from useful machines, but the main stream of fine mechanic skill which flourished in the later lines of clockmakers and scientific instrument workshops and became the prime moving force of both the Scientific and the Industrial Revolutions.

There is no doubt that we are here dealing with a corpus of ingenious mechanisms built around an extensive repertoire of linkages, hydraulic devices, and other sophisticated mechanic skills which must have been passed on from master to apprentice as well as transmitted by texts such as this. Furthermore, the tradition shows a mixture of a strong continuity from Hellenistic times through the Islamic and Christian middle ages until relatively modern times, and a discontinuum of individual and idiosyncratic modifications and rediscoveries at every stage. The self-filling intermittent syphon and the anaphoric clock water-flow zodiac regulator are both features that are found near the beginning of the record and survive to the end. The automatically tipping scoop-shaped bucket seems like an innovation that begins in Islam and continues through. Other special devices, like al-Jazari's combination lock mechanism, may be individual innovations that spread,

or they may be a flash in the pan; we simply do not know enough of the tradition yet to resolve such matters. Unfortunately though Dr. Hill has demonstrated his excellent competence in combining the skills of the arabist with those of the engineer, he frankly admits an inadequacy of general knowledge of the history of technology. It shows, alas, and more of a pity, circumstances must have been such that Professor Lynn White who fired Dr. Hill with his just enthusiasm for the important task, has been unable to provide him with quite enough of the background which proves lacking.

I make this criticism very diffidently, for perhaps the truth of the matter is that nobody yet knows quite enough to put together the pieces of the puzzle as they now exist. Certainly Dr. Hill could have used the well-known sections of water-clocks and on locks which are available in H. Diels, Antike Teknik (Teubner, Leipzig/ Berlin, 3rd ed., 1924) and the tract on the Gaza clock also edited by the same great historian of technology. Perhaps one might have made something historically of the fact that the Jazira area includes the town of Harran which now appears to be the focal origin for the Islamic astrolabe, another main line of scientific fine mechanics. He might, too, have been able to derive some benefit from the fact that there actually survives a medieval Islamic water-clock in Fez which shows many Jazari features and for which a brief description was published by this reviewer in Actes du X^{e} Congres International d'Histoire des Sciences (Ithaca, 1962), Vol. I, Hermann & Cie, Paris, 1964, 599-602. None of these works seem to be mentioned in Dr. Hill's bibliography, though they may have been known to him.

Then again, in discussing the anaphoric clock water-regulator -- a device already adequately explained by Drachmann -- Dr. Hill loses heart too readily at the one place where the traditional number-squeezing

techniques of historians of astronomy can be used to make sense of that one place in the text where astronomical numbers are given. He tells that "the reader is strongly advised not to try to derive the actual angular dimensions from the passage" (p. 242) but in fact it does not seem difficult to squeeze the truth from a text that is lucid though with some errors. The empirically determined unequal divisions of the zodiac circle fall at 16 (or 17) Aries, 10 (or 11) Taurus, 30 Taurus, 30 Gemini, 30 Cancer, 20 Leo, 14 (or 13) Virgo, 12 Libra, 19 Scorpio, 30 Sagittarius, 11 Aquarius, 18 Pisces. Most of the uncertainties may be due to the common error of confusing ordinal and cardinal numbering of degrees. Though not done adequately enough in the technical commentary it is a simple matter to compare these angles with the given data for day-lengths and show that the errors exist but seem acceptable.

The book is very well produced, almost to the point of luxury, though I was somewhat surprised to find that the large page size that makes it look like a coffee-table edition had not been dictated by any need for very large plates, and the expense had given only one color reproduction from all the many glorious original pictures which are quite deservedly famous in their own right amongst art historians. Then again it was a little shocking to find something other than the most meticulous and careful proof-reading; it is at best "normal". The half-tones and line illustrations are superb, the typography and binding most couth. In this context, however, one must register a protest which is more than the usual scholarly shock at high book prices. If we historians of technology cannot perceive and adapt to technological change who else can? In an age when we leave theses to be "published" by University Microfilms, and engage in samisdat circulation of small circulation monographs by xerography and photo-offset, one should not

behave like Reidel. Printing a few hundred copies of a book at $100 each instead of a few thousand at a more normal price measured in a small number of tens of dollars cannot be anything but ego inflation for author and publisher at a distinct disservice to our community. My own xerox copy of the Wiedemann and Hauser German translation of Jazari cost less than $10, was easy to get (I cannot understand the claims that it was difficult of access), and though maddening in its own scholarly way may have been less inconvenient than I had thought. I am delighted that Dr. Hill has done such a good job for us in the translation, I sympathize with the publishers over the economic changes in scholarly publishing, but register a protest that it is simply not quite up to snuff as history of technology and as publishing for scholars.

Derek de Solla Price
Yale University

Dr. Price is Avalon Professor of the History of Science and Chairman of the Department of History of Science and Medicine at Yale University. He has published extensively on the history of scientific instruments, including a recent monograph, Gears from the Greeks, The Antikythera Mechanism - A Calendar Computer from ca. 80 B.C., in Transactions of the American Philosophical Society, 1974.

Yale University *New Haven, Connecticut 06520*

DEPARTMENT OF
HISTORY OF SCIENCE AND MEDICINE

Box 2036, Yale Station

9/24/75

To: Melvin Kranzberg

From: Derek Price

Please see attached!

October 1, 1975

Charles Scribner's Sons
597 Fifth Avenue
New York, New York 10017

Dear Sir:

Please send the following book for review in Technology and Culture:

Scientific Instruments, by Harriet Wynter and Anthony Turner

We would greatly appreciate your sending the above book to the address on the bottom of this letterhead at your earliest convenience.

Sincerely yours,

Susan Fuller
Secretary to Melvin Kranzberg

To: Mel Kranzberg

I'd like to review this for T&C.

Thomas S. Price

Order Form

To: Harriet Wynter Ltd.,
352 King's Road,
London SW3 5UU

American purchasers should refer to
Charles Scribner's Sons Inc. of New York

Please supply _____ copy/copies of *Scientific Instruments*
(ISBN 0 289 70403 0) £12.50 each (plus postage and
packing 54p)

I enclose remittance for _____

Name (capital letters please) _____

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Address _____

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In case of difficulty please write to the publishers

STUDIO VISTA

35 Red Lion Square, London WC1R 4SG

A division of Cassell and Collier Macmillan Publishers Ltd.
Regd. No. 778391 England
Kern House, 61/62 Lincoln's Inn Fields, London WC2A 3XB

Printed in England

Among the many different collector's pieces that change hands in the saleroom, none has perhaps as deeply evocative an appeal as the scientific instrument. Ancient telescopes, sextants, orreries, astrolabes and other tools once used for investigation and discovery contrast sharply with the machines of modern technology, and today are bought and sold for large sums of money.

The manufacture of scientific instruments developed when the metaphysical desire to look at the sky to make some sense of existence was superseded by the physical need to chart it in order to facilitate living. A man needed only his imagination to draw a hunter in the night sky, but to fix his latitude he required carefully made quadrants and complicated mathematical tables. When he needed only an approximate measure of his land, he could pace it out with his own feet, but when his business required that he know its dimensions exactly in standard acres, he had to call upon the knowledge of a trained surveyor with a sophisticated and precision-made theodolite.

As can be seen from the 270 black and white and 28 colour photographs in this volume, many of the instruments produced for these practical uses are also extremely beautiful. With durability in mind, they were diligently tooled in brass and wood, with the craftsman's name proudly inscribed as a token of the care that went into their making.

A fine quality Maghribi Astrolobe, North Africa, eighteenth century.

Wherever possible, the illustrations have been drawn from private sources and collections, and each one is accompanied by a lengthy, factual and detailed description, ensuring that this lavishly produced volume will be an invaluable source book.

Scientific Instruments has been written with both the serious collector and the interested layman in mind. The story begins with Arab instruments produced in the European dark ages, and then proceeds to the discoveries and inventions made by Western man as he began to explore and master the world around him; it is accordingly with the surviving instruments from the mid-sixteenth century to the mid-nineteenth century that the authors have been mainly concerned.

Culpeper-type Compound Microscope. First half of eighteenth century.

Contents: Preface, Astronomy, Navigation, Sundials, Surveying, Optics, Glossary of Terms, Further Reading, Acknowledgements for Illustrations, Index.

272 pages, 28 colour, 270 black and white and 34 line illustrations, 300 x 212 mm, £12.50, ISBN 0 289 70403 0

The Authors

Harriet Wynter is a well-known London dealer in antiques, who has specialised in scientific instruments for many years. She has made several broadcasts on radio and television and is also the author of a book on porcelain.

After reading History at Oxford, *Anthony Turner* specialised in the seventeenth century and in scientific instruments. He has worked in several museums in Great Britain and now combines writing with antiquarian bookselling.

October 1, 1975

Dr. Derek Price
Department of History of
Science and Medicine
Yale University
New Haven, Connecticut 06520

Dear Derek:

We did not receive a review copy of Wynter and Turner, Scientific Instruments. However, we are delighted that you have volunteered to review it for us, and we are writing to the publisher for a review copy. If and when we receive a review copy, we will send it posthaste to you for review.

Thank you very much for calling this book to our attention. You are undoubtedly the right man to review it.

I have just received a note from Gus Ranis about another meeting of our committee. However, I hope to see you before then at the SHOT meeting in Washington.

Sincerely yours,

Melvin Kranzberg

SOCIETY for the HISTORY of TECHNOLOGY

International Quarterly: *TECHNOLOGY AND CULTURE*, Georgia Institute of Technology, Atlanta, Ga. 30332

December 3, 1973

Dr. Brigitte Schroeder-Gudehus
Institut D'Histoire Et De
Sociopolitique Des Sciences
University of Montreal
Case postale 6128
Montreal 101 Canada

Dear Dr. Schroeder-Gudehus:

Thank you very much for your letter of November 20. I can appreciate your reluctance to write the kind of article which would relate the work of your Commission to the history of technology. Perhaps I can persuade our good friend Derek Price to undertake such an article, or to get someone who is a specialist in technology policy to write one for us, which would provide not only substantive material about technology policy but also information concerning your Commission.

Sincerely yours,

Melvin Kranzberg

MK:wl

cc: Derek Price

UNIVERSITÉ DE MONTRÉAL

INSTITUT D'HISTOIRE ET DE
SOCIOPOLITIQUE DES SCIENCES

le 20 novembre 1973

Professor Melvin Kranzberg
Technology and Culture
Georgia Institute of Technology

A t l a n t a , Ga. 30332

Dear Professor Kranzberg,

Thank you very much for your letter of October 18, - I have to apologize for this late answer.

I understand very well the reasons which make you reluctant to publish the report on the second annual meeting of the International Commission for Science Policy Studies in your journal.I must confess, on the other hand, that I hardly see a possibility of reporting on more "substantial" matters, such as scholarly, publishable contributions. These meetings will always deal with organizational problems, - that is, after all, what they are for. - I would gladly agree to the publication of a brief announcement - if space is available - of the fact that the meeting had been held : place and dates.

Unfortunately, it would be difficult for me to write that sort of report you are suggesting, i.e. relating the work of the Commission to topics focussing on problems directly relevant to the history of technology or technology policy. I am not familiar with the latest research done in the field of technology policy and should rather avoid writing on such a highly complicated subject.

Yours sincerely,

Brigitte Schroeder-Gudehus

Case postale 6128, Montréal 101

Agenda?

SOCIETY for the HISTORY of TECHNOLOGY

International Quarterly: *TECHNOLOGY AND CULTURE*, Georgia Institute of Technology, Atlanta, Ga. 30332

December 10, 1973

Dr. Derek de Solla Price
Department of History of Science
and Medicine
Box 2036, Yale Station
Yale University
New Haven, Connecticut 06520

Dear Derek:

Thank you very much for your letter of December 5. I had not thought about a whole issue of Technology and Culture devoted to the interface between technology and technology policy, but it does make a good deal of sense.

There are several ways one might go about it. One way, of course, would be simply to write around to people who are concerned with the problem and commission articles from them. Another would be to develop some program sessions at our annual meetings which would be the source of such papers. Still another possibility would be for someone to sponsor a conference whose proceedings would furnish the contents of a theme issue. All of these have their own peculiar advantages and disadvantages.

Let me think about this matter, and also discuss it with some of our colleagues at the San Francisco meeting. Since this is not a matter which requires immediate action, we can afford the leisure of thinking about it before deciding upon a single course of action. Naturally, your inputs to any discussion of this nature would be most welcome. Indeed, you would probably be the key person involved, no matter which course of action we might take. Hence I should like to have your suggestions on this matter before I leave for the San Francisco meeting immediately after Christmas.

Best wishes for the holiday season.

Sincerely yours,

Melvin Kranzberg

MK:wl

Yale University *New Haven, Connecticut 06520*

DEPARTMENT OF
HISTORY OF SCIENCE AND MEDICINE

Box 2036, Yale Station

December 5, 1973

Dr. Melvin Kranzberg
Department of Social Sciences
Georgia Institute of Technology
Atlanta, Georgia 30332

Dear Mel:

Thanks for your letter of November 28th. I agree with you that we need some scholarly and provocative writing on the interface between technology and technology policy. This is of course very much more a matter for individual scholars than for any committee activity. I would like to see a whole number of Technology and Culture devoted to this theme and if you can find other people interested in this area I would certainly be willing to try to write one of the articles. I don't think I'm going to be able to get down to such a thing before the summer but it is a worthy cause and if you push it I'll really make the effort.

Sorry again that I won't be seeing you in San Francisco.

Cordially,

Derek de Solla Price
Avalon Professor of the
History of Science

DP:al

Price

SOCIETY for the HISTORY of TECHNOLOGY

International Quarterly: *TECHNOLOGY AND CULTURE*, Georgia Institute of Technology, Atlanta, Ga. 30332

September 5, 1973

Dr. Derek de Solla Price
Department of History of
Science and Medicine
Box 2036, Yale Station
Yale University
New Haven, Connecticut 06520

Dear Derek:

Thank you very much for your letter of August 23 with all your good news. Congratulations on completing the monograph on the Antikythera mechanism. Yes, it would probably go very well in the SHOT monograph series, which we are still publishing with the MIT Press. The hooker is that each monograph requires $1500 subsidy which must be furnished by the author (which most authors obtain from a financial grant either from their own institution or as part of an item for publication in the budget of their research grant). SHOT does not have the money to finance these monographs.

Second, I look forward to receiving an account from Gene Skolnikoff of your commission's meeting in Delhi as a basis for a report in Technology and Culture.

Third, we are waiting for Multhauf's final version of his paper of last December on the historiography of technology. If it comes in on time, these papers, including yours, should appear in our January issue. It might have come in and be in a separate stack of mail on my desk. I just returned last night from an ICOHTEC meeting in Warsaw, so I have not yet had time to go through all my mail. The papers by Ferguson and Layton have been received, and I have made some alterations in your remarks to account for changes which they made in their final papers. I think you will approve when you see the galleys.

Sincerely yours,

Melvin Kranzberg

MK:wl

Yale University *New Haven, Connecticut 06520*

DEPARTMENT OF
HISTORY OF SCIENCE AND MEDICINE

Box 2036, Yale Station

August 23, 1973

Professor Melvin Kranzberg
Department of Social Sciences
Georgia Institute of Technology
Atlanta, Georgia 30332

Dear Mel:

Thanks for asking. Our International Commission for Science Policy Studies meeting in Delhi was excellent. Gene Skolnikoff is writing up an account of it and I will send him a copy of this letter as a reminder to submit the draft to you as a basis for a report in Technology and Culture.

As to a possible article for Technology and Culture I can only say I am working full blast at my final version of the Antikythera mechanism monograph. It now looks as if it will be a 150 to 200 page piece with a lot of diagrams and I must say that I think it is by far the best thing I have done. At the moment at any rate I feel a certain euphoria at having twenty years of research notes suddenly come together and take meaning. At all events, it is the hardest job of work I have done in many years and I don't want to stop to write an article. Indeed, I think when it is done I will rest for quite awhile before making any soup from these old bones.

I might inquire, however, whether you would like it as part of the monograph series that we used to have and perhaps still have? Are you and M.I.T. Press still together in putting out such a series?

May I ask also at this time when my notes on the historiography of technology are due to go out in Technology and Culture? Have the other papers all come in and been prepared?

Yours cordially,

Derek de Solla Price
Avalon Professor of the
History of Science

DP:al

cc: E. Skolnikoff

File: Derek Price

Yale University *New Haven, Connecticut* 06520

DEPARTMENT OF
HISTORY OF SCIENCE AND MEDICINE

Box 2036, Yale Station

11 Sept 73

Dear Mel —

Welcome back!

As to Antikythera — not on your life will I find $1500. On the contrary since its a spectacular I intend to profit!

Cordially

Derek

NATIONAL SCIENCE FOUNDATION

PROPOSAL RATING SHEET

Reviewer

Dr. Melvin Kranzberg
Department of Social Sciences
Georgia Institute of Technology
Atlanta, Georgia 30332

Proposal No.: P3S1056-H&PS
Investigator: Derek de Solla Price
Institution: Yale U
Please return to:
If possible by 2/26/73

Comments (*Continue on additional sheet if necessary*)

There is no doubt about Price's qualifications and his excellent work on the history of scientific instruments. The projects outlined in his proposal are extremely worthwhile; they have been awarded NSF grants in the past and they merit continued support. However, I have a couple of minor questions to raise, for the proposal shows evidence of having been put together hastily and hence does not spell out in detail some of the work which is to be done.

For example it is not clear why or how the "considerable calculation, drawing and historical research" (p. 2) on the antikythera mechanism should take up three more years of work. Another example: What "new classes of instruments" (p. 3) will emerge from the computerized checklist of astrolabes? Still another example: Price claims that the photograph collection of scientific instruments "is already in use," but I have seen no announcement of its extent, location, availability, etc.

All the above are trivial quibbles. There is no doubt that this project possesses great scientific merit and is worthy of support. About the only question that one might reasonably ask is whether the support should be for two years or the three years, as requested in the proposal.

OVERALL RATING

- [x] EXCELLENT
- [ ] VERY GOOD
- [ ] GOOD
- [ ] FAIR
- [ ] POOR

Signature of Reviewer: Melvin Kranzberg Date: 3/12/73

Other suggested reviewers (*optional*):

NSF Form 173, January 1968

File

Proposal to the National Science Foundation

for continuation of GS-28993

HISTORY OF SCIENTIFIC INSTRUMENTS

Submitting Institution	Yale University
Proposed Starting Date	July 1, 1973
Time Period	Three years

Derek de Solla Price

Derek de Solla Price
Principal Investigator
Soc. Sec. #577-54-4343

Martin J. Klein

Martin J. Klein, Chairman
Department of History of
Science and Medicine

Joseph S. Warner
Grants and Contract Administration
Yale University
(203) 436-4760

Date

This is an application for an extension for approximately three years of the research grant GS-28993 which was originally awarded for a period of approximately two years beginning July 1, 1971, for research entitled "History of Scientific Instruments". The reason for the extension lies in unexpectedly rich returns from the two principal projects listed in the original application. These far-reaching advances have necessitated a great deal of additional work and promise results which may be of fundamental importance in the history of technology.

1. Research on the Antikythera Mechanism.

As explained in the original application (p. 4) the fragments of the Antikythera Mechanism which date from the first century B.C. and provide the only known example of a complicated scientific device from antiquty have previously been identified as a geared astronomical computing machine. Long ago the evidence from the visible remains of the gears, dials and inscriptions had been exhaustively studied, and I therefore projected an examination by gamma radiography and x-rays.

My optimism in being able to persuade the authorities of the Greek National Museum and of the Greek Atomic Energy Commission were fully justified, and I was fortunate in securing complete cooperation from both. I was doubly fortunate in that Dr. Ch. Karakalos of the Greek Atomic Energy Commission gave his whole-hearted time and energy far beyond the call of duty and was able to make a long series of excellent gamma-radiographs over a wide range of exposures so as to reveal every internal detail so precisely that gear teeth could be counted on every wheel recorded.

Optimism was vastly exceeded by the revelations of these photographs. Whereas I had expected only to find a small amount of hidden mechanism, the photographs revealed that virtually the entire gear trains of two of the three dials had been preserved together with the first half of the third dial. The counts of gear teeth were so precise that the astronomical ratios involved could now be determined and I was able to show that the main portion of the gear train was concerned with establishing the ratios of the Metonic calendrical cycle in which 19 annual solar revolutions correspond with 254 ecliptic revolutions of the Moon and 235 lunar synodic months. Other gear trains were now identified as corresponding to a lunar year of twelve synodic months and to a luni-solar display orrery. An eclipse computer is suspected but cannot yet be confirmed.

This identification yielded also a confirmation of the otherwise almost incredible conjecture I had been led to some years earlier in which a large turntable in the machinery had to be identified as a true differential gear in which two angular motions are added mechanically to produce a third. This type of sophisticated arrangement is otherwise unknown and unmentioned until the 16th century when it again appears in astronomical connections in clockwork and is then part of the mechanical repertoire continuous to its use first in looms and then in the back axle of motor cars.

The completeness and sophistication of the evidence make it essential to give a much fuller account than had been intended and this will involve considerable calculation, drawing and historical research for which this extension is now sought. The discovery

confirmed in archaeological date and provenance now borders on the spectacular and every care must be exercised so that the full publication meets the highest scholarly standards.

2. Computerization of a Checklist of the World's Astrolabes.

As detailed in the original application (pp. 5-6) an attempt was made to list by computer a previously published Checklist of Astrolabes in order to update and systematize the information. A very successful program for this was devised by Miss Sharon Gibbs, working on a Smithsonian Institution postgraduate fellowship and this scheme was put into operation by Miss Janice Henderson. The complete Checklist being thus handled it was discovered that a sorting of the data by Artist, Date, Collection, Diameter of Specimen, etc., produced such a large amount of self-checking information that ghosts and omissions could be detected as expected. What had not been suspected is that this procedure gives so powerful a systematization that the computer can class together previously undated and unascribed specimens and lead to new identifications beyond the reach of even the best connoisseur of such instruments.

We have now been able to go even farther with this method by an ingenious program which will code for key-punching a description of the characteristic openwork rete pattern on the front of the astrolabe. We believe that this will lead to many further identifications and new classes of instruments, thus enormously adding to the scholarly value of the operation.

The preliminary results were communicated to colleagues in the field by distribution of preliminary printouts. We found to our gratification that they were sufficiently impressed to offer their own data

for addition to the pool. M. Alain Brieux of Paris is sending us a very complete set of information on all extant islamic instruments, and Mr. and Mrs. Roderick Webster of the Adler Planetarium, Chicago, will permit us to use their notes on both Eastern and Western astrolabes, thus again increasing the available corpus and making it possible to bring the work to a stage very near completeness in a single round estimated now to last for a little over one year if we include all the rete patterns coded by the new scheme.

This extension, though taking rather longer than had been anticipated, will produce such a comprehensive corpus that we now plead for the extension to make it possible and to continue beyond it to reaping some of the rewards that will come from a much more powerful classification system.

So far as we know this is the first time that a computerized museum cataloguing scheme has been successful to the point of not only producing a printout which can be updated and corrected with little trouble, but has also yielded new scholarly results and identification proceeding from a systematization beyond the power of a human classifier. As such it has been the subject of much appreciative comment from colleagues concerned with anthropological and biological specimens and a separate account of the methodology seems to be called for.

3. Other Projects.

The sorting and reorganization of the collection of photographs of scientific instruments has proceeded to plan and is rapidly nearing completion. It is already in use, and is much more readily available

Where

than hitherto as a resource usable by researchers in this field, all of whom are freely given access to it for research purposes.

The index of instrument makers has had some delay in its preparation by Mr. and Mrs. Webster and the data is not therefore in a state ready for computer manipulation. Some rough trials have been made by hand count, but the methodology is not yet in a ready state. It is anticipated work on this may be possible by the summer of 1974.

Tours have been made and instruments catalogued in Leningrad as planned and in Copenhagen and several German museums. The collection at Dresden was, however, unfortunately not available for inspection as planned and that visit has had to be deferred.

The expansion of the work on the Antikythera Machine and on the Computerized Checklist have resulted in the delay of the projected anthology of writings on the History of Scientific Instruments. Materials are still, however, being collected and this project will be revived as soon as possible.

The facsimile series of star maps has been delayed by the publishers pending the appearance of the first work in this series, a catalogue of star charts. This catalogue by Mrs. Deborah Warner was delayed but has just now been completed so that it is hoped that the rest of the project may be able to go forward with little further delay.

4. Explanation of Budget.

The budget is similar in essence to that of the original grant with the difference only that both assistants who have worked on the

research may be available for continuance for part of the period now that Miss Gibbs will be finishing her Smithsonian Fellowship. It would be a very great pity if either of these valuable and now highly trained researchers were unable to continue this work and bring it to completion.

The Principal Investigator will also be working during this period on a research into Science Policy Studies; this is described in an application now being submitted to the Division of Social Sciences, Science Policy Research Section, of the National Science Foundation. For the present research on instruments, summer salary is being asked for the Principal Investigator for one summer not covered by the other application and which is intended for the provision of a period of extended writing-up of the two main projects.

As before, a considerable amount of secretarial time is consumed in work of this sort, necessitating correspondence with hundreds of museums and collectors and much calculation. For this reason special funds are asked for secretarial assistance and computer and xerox operation, as well as the taking and mounting of photographs and engineering drawings.

Proposed Budget

	1973/4	1974/5	1975/6
1. Principal Investigator: Summer salary (at 2/9)	--	6,250	--
2. Secretarial assistance: part-time	2,500	2,625	2,755
3. Postdoctoral Associate(s): 12 mths. @ $7500 / yr.	15,000	7,875	--
Total: Salaries & Wages	(17,500)	(16,750)	(2,755)
4. Fringe benefits: estimated @ 11% 1973/4; 12% in subsequent years	1,925	2,010	331
Total: Salaries, Wages & Fringe	(19,425)	(18,760)	(3,086)
5. Expendable equipment & supplies, including xeroxing and photographs	600	400	700
6. Travel: domestic*	375	375	--
foreign**	1,300		
7. Computer costs	200	200	200
8. Publication costs: cost of reprints, etc.	200	400	400
Total: Direct costs	22,100	20,135	4,386
9. Estimated Indirect Costs @ 71%	12,425	11,893	1,956
Total:	34,525	32,028	6,342

Total for three years: $72,895

* 1 visit to Chicago: airfare 143.00
1 visit to Washington, D.C.: airfare 72.00
5 days @ $30 per diem 150.00
375.00

** 1 visit to Paris/Oxford: airfare 400.00
30 days @ $30 per diem 900.00
1,300.00

DEREK JOHN DE SOLLA PRICE

Personal details:

Born 22 January 1922 at London, England, British Citizen

Married Ellen Hjorth of Copenhagen, Denmark, 1947

Three children (born 1950, 1952, 1960)

Degrees:

B.Sc.	(1st Hons) University of London (External)	1942
Ph.D.	(Physics) University of London (External)	1946
Ph.D.	(History of Science) University of Cambridge	1954
M.A.	(Honorary) Yale University	1960

Present and Previous Posts:

Avalon Professor of History of Science, Yale University	Since 1962
Professor of History of Science, Department of History of Science and Medicine, Yale University	1960-1962
Chairman, Department of History of Science and Medicine, Yale University	1961-1964
Visiting Professor of History of Science, Department of History, Yale University	1959-1960
Curator of Historic Scientific Instruments, Yale University	Since 1960
Donaldson Fellow, Institute for Advanced Study (School of Historical Studies), Princeton, New Jersey	1958-1959
Consultant in History of Physics and Astronomy for planning new U.S. National Museum of History and Technology, Smithsonian Institution, Washington, D.C.	1957

Nuffield Foundation Award for Research in the History of Scientific Instruments, University of Cambridge (Christ's College)	1955-1956
I.C.I. Fellow in the History of Science, University of Cambridge (Christ's College)	1951-1954
Lecturer in Applied Mathematics, University of Malaya, Singapore	1947-1950
Commonwealth Fund Fellow in Mathematical Physics, Princeton University, New Jersey	1946-1947
Research Assistant in Physics and part-time Lecturer, S.W. Essex Technical College	1942-1946

(During part of this period I was engaged in research of military importance, for the British Iron and Steel Research Association under the direction of Dr. H. Lowery and under the Chairmanship of Mr. D.A. Oliver.)

Honorary Posts, Consultantships, Fellowships, etc.:

Academic Director, Summer Institute for Humanistic Discussions of Science, Oak Ridge Institute of Nuclear Studies	1963
Pegram Lecturer, Brookhaven	1962
Member, Science Information Council, National Science Foundation	1962-1966
Member of Council, History of Science Society	1961-1963
Member of Editorial Board, ISIS	1964-1970
Member of Council, Society for the History of Technology	1960-1964
Member of Editorial Board, Technology and Culture	Since 1959
Member of Editorial Board, Journal of the History of Medicine and Allied Sciences	1964 -1969

Honorary Research Associate, Smithsonian Institution	Since 1959
Consultant, National Science Foundation	Since 1959
Corresponding Member, International Academy for the History of Science	1958-1966
Active Member, International Academy for the History of Science	Since 1966
Examiner in the History of Science, University of Cambridge. Preliminary, Part I Natural Science Tripos 1955 and 1956. Natural Science Tripos 1956.	
Member of Council, British Society for the History of Science	1953-1956
Honorary Secretary of the Sub-Commission for an international cataloguing of antique scientific instruments. International Union for the History of Science: Commission for Bibliography	1953-1956
Honorarium from University of Cambridge, History of Science Committee, for acting in charge of the Whipple Museum of the History of Science	1953-1956
National Institutes of Health Annual Lecturer	1966
Standing Committee on Meetings of the American Association for the Advancement of Science	1966-1968
Associate Member, Comite Belge d'Histoire des Sciences	1967
Member, Advisory Souncil, Science of Science Foundation, London (now Science Policy Foundation)	Since 1964
Guggenheim Foundation Fellow, appointed for Quantitative Studies on the Economics and Demography of Science	1969
Chairman, Joint Working Committee for UNESCO and International Union for History and Philosophy of Science for the preparation of a monographic study of the national and international scientific communities, especially relating to the problem of the proper fostering of such a community in developing countries.	1969-1970

Member, Editorial Board, Science Policy Studies, since 1970
Macmillan & Co. Ltd., London

Member, Science Policy Panel, President's Science Advisory Council 1970-1971

Chairman, Sociology of Science Section at the International Sociological Association Meeting in Varna, Bulgaria 1970

Technical Program Chairman, American Society for Information Science 1970 Meeting, Philadelphia, Pa. 1970

President, International Commission for Science Policy Studies since 1971

Fellow, Honour Residence of National Bank, Copenhagen 1972

Member, UNESCO Mission to Evaluate Science Policy in Egypt. 1972

Member, AAAS, Committee on Science and Public Policy 1973

Publications

DEREK J. DE SOLLA PRICE

Books

AN OLD PALMISTRY (an edition of the Middle English treatise contained in MS. Digby Roll 3). Heffer, Cambridge, 1953. xvi & 47 pp.

THE EQUATORIE OF THE PLANETIS (with a linguistic analysis by R.M. Wilson). A manuscript treatise ascribed to Chaucer. Cambridge at the University Press, 1955. xvi & 214 pp.

HEAVENLY CLOCKWORK. THE GREAT ASTRONOMICAL CLOCKS OF MEDIEVAL CHINA: A MISSING LINK IN HOROLOGICAL HISTORY. (In collaboration with Drs. Joseph Needham and Wang Ling). Monograph No. 1 of the Antiquarian Horological Society. Cambridge at the University Press, 1960. xv & 254 pp.

THE COLLECTOR'S SERIES IN SCIENCE (a series of facsimile editions of historical scientific books, edited, with the addition of prefatorial material). Basic Books, Inc., New York.

Volume I. NATURAL MAGICK, Giambattista della Porta, 1957.

Volume II. ON THE MAGNET, William Gilbert, 1958.

Volume III. PIROTECHNIA, Biringuccio, 1959.

SCIENCE SINCE BABYLON. Yale University Press, New Haven, 1961. x & 149 pp. Paperback edition 1962. Arabic edition, Beirut 1963. Polish edition, Omega Books, Warsaw 1965. Indian edition, 1970.

LITTLE SCIENCE, BIG SCIENCE. Columbia University Press, 1963. ix & 119 pp. Paperback edition, 1965. Russian edition, Academy of Sciences, Moscow 1966. Italian edition, Valentino Bompiani, Milan 1967. Polish edition, Omega Books, Warsaw 1967. Japanese edition, Sogensha, 1970. German edition, 1971. Romanian edition, 1971.

Unpublished book

A HISTORY OF BLAKENEY HAVEN, NORFOLK - A GREAT MEDIEVAL SEAPORT. 1959.

Books (continued)

Editor of Prentice-Hall History of Science Series for Young Readers

ERNEST RUTHERFORD, ARCHITECT OF THE ATOM, Peter Kelman and A. Harris Stone, 1969.

LIEBIG, THE MASTER CHEMIST, Louis Kuslan and A. Harris Stone, 1969.

MENDELEYEV: PROPHET OF CHEMICAL ELEMENTS, Peter Kelman and A. Harris Stone, 1970.

ROBERT BOYLE, THE GREAT EXPERIMENTER, Louis Kuslan and A. Harris Stone, 1970.

Published Papers

1941 a. AN ASPECT OF THE FUTURE OF SCIENTIFIC RESEARCH. Journal of the South-West Essex Technical College and School of Art 1, 1941, 195-196.

b. MODEL TO ILLUSTRATE TRANSVERSE WAVE MOTION. Journal of the South-West Essex Technical College and School of Art 1, 1941, 55.

1943 a. THE EMISSIVITY CHARACTERISTICS OF HOT METALS, WITH SPECIAL REFERENCE TO THE INFRA-RED. (In collaboration with Dr. H. Lowery.) British Iron and Steel Research Association Publication 7/1943, 36 pp.

1946 a. THE INFRA-RED EMISSIVITY OF METALS AT HIGH TEMPERATURES. Nature 157, 1946, 765.

b. SOME UNUSUAL SERIES OCCURRING IN N-DIMENSIONAL GEOMETRY. Mathematical Gazette 80, 1946, 149-150. (Note 1907)

c, NOTE ON THE CALCULATION OF OPTICAL CONSTANTS. Proc. Phys. Soc. LVIII, 1946, 704-706.

1947 a. THE EMISSIVITY OF HOT METALS IN THE INFRA-RED. Proc. Phys. Soc. LIX, 1947, 118-131.

b. THE TEMPERATURE VARIATION OF THE EMISSIVITY OF METALS. Proc. Phys. Soc. LIX, 1947, 131-138.

1949 a. A THEORY OF REFLECTIVITY AND EMISSIVITY. Proc. Phys. Soc. LXII, 1949, 278-283.

b. AUTHOR'S REPLY. Proc. Phys. Soc. LXII, 1949, 663.

1951 a. QUANTITATIVE MEASURES OF THE DEVELOPMENT OF SCIENCE. Archives Internationales d'Histoire des Sciences 14, 85-93; and Actes du VI Congres International d'Histoire des Sciences, Amsterdam 1950, I, Hermann & Cie, Paris, 1951, 413-421.

1952 a. THE EARLY OBSERVATORY INSTRUMENTS OF TRINITY COLLEGE, CAMBRIDGE. Annals of Science 8, 1952, 1-12.

b. THE EQUATORIE OF THE PLANETIS. The Times Literary Supplement, 29 February and 7 March, 1952; 51 I, 164 and 51 II, 180.

c. CHAUCER'S ASTRONOMY. Nature 170, 1952, 474-475.

d. THE EQUATORIE OF THE PLANETIS. (Reprinted from items 14 and 15 with facsimilies, additions, etc.) Journal of the South-West Essex Technical College and School of Art 3, 1952, 153-168.

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File: Price

SOCIETY for the HISTORY of TECHNOLOGY

International Quarterly: *TECHNOLOGY AND CULTURE*

September 14, 1972

Professor Derek J. de Solla Price
Department of History of Science
and Medicine
Yale University
56 Hillhouse Avenue
New Haven, Connecticut 06520

Dear Derek:

Thank you very much for your letter of September 8. My sincerest congratulations on finally solving the problem of the Antikythera machine. That is a really splendid contribution, and I am really proud of you. (I share in the glory of my friends.)

I note that you are writing up the story in book form. You could write up at least part of the story for an article in Technology and Culture. It has been a long time since you have sent us a manuscript, and I always like to publish something by you. (Your article on the relations between science and technology, which we published many years back, is one of the most cited of articles ever to appear in our journal.)

Perhaps the story of the differential gear would be most interesting for our readers. Apparently you have discovered an ancient anticipation of a device which had to be re-invented centuries later. I think it would make a very good story, and perhaps if you could provide us with a drawing suitable for reproduction on our cover stock, we can feature it on our cover as well as within the journal. How about it? (As a matter of fact, at the moment I am badly in need of a cover design for our April 1973 issue, which goes to the printer in another three weeks. Do you think that you could whip up an article on the differential gear mechanism along with a drawing in that limited time?

Turning to the other matter mentioned in your letter of September 8, I shall be pleased to have a report on the meeting on the International Commission

for Science Policy Studies, and I look forward to receiving the report from Dr. Spiegel-Rosing. Yes, I shall be glad to send you my thoughts and questions about it when I receive it.

Also, you might provide me, in my capacity as Chairman of the USNC/IUHPS, with a shorter report for the next meeting of the U. S. National Committee.

The thought also struck me that we might publish a brief report on the International Commission in Technology and Culture. We try to keep our members informed of symposia, conferences, and the like. The real question is whether or not the International Commission did something of interest for historians of technology which would justify publication in our pages. There is no point in carrying a report if this first meeting did not deal with matters which are of immediate interest to historians of technology. (What I think I am suggesting is that you prepare a series of reports on this meeting touching on the highlights which would be of interest to specific groups; for example, one report for Technology and Culture dealing with items of interest to historians of technology, another, say, for Science, still another for ISIS, and yet another for journals specializing in science policy studies.)

So, welcome back. I am pleased that your year abroad was so successful. You are badly needed here, for I hear disturbing rumors about your program at Yale. Don't give up the ship!

Sincerely yours,

Melvin Kranzberg

MK:wl

cc: Dr. Henry David

Yale University *New Haven, Connecticut 06520*

DEPARTMENT OF
HISTORY OF SCIENCE AND MEDICINE

56 Hillhouse Avenue

September 8, 1972

Professor Melvin Kranzberg
Editor-in-Chief, Technology and Culture
Department of Social Sciences, Georgia Institute of Technology
Atlanta, Georgia 30332

Dear Mel:

Just a note to tell you that I am newly back from a splendid sabbatical in Copenhagen where at long last I got out the problem of the Antikythera machine, finally solved it, and now it is to be written up in book form. The saga ends with the grand denouement by gamma radiation and x-ray analysis which showed all the details of the gearing and proved the object to be an almost complete calendar and eclipse computer from the 1st century B.C. The history of technology interest is that it really does use a differential gear which was not otherwise invented until 1720.

What I also did in Europe was a lot of work in science policy including the first big meeting of our International Commission for Science Policy Studies which you remember was set up in Moscow last summer. Henry David has suggested and I also agree that in your role as chairman of the USNC/IUHPS you should be advised of all these goings on so I'm having Dr. Spiegel-Rösing send you a full copy of the report from our meeting and when you get it I would be happy if you would let me know your thoughts and questions.

Yours cordially,

Derek J. de Solla Price
Avalon Professor of the
History of Science

DJP:al

DIVISION OF SOCIAL SCIENCES

NATIONAL SCIENCE FOUNDATION

PROPOSAL RATING SHEET

File

Please evaluate this proposal for scientific merit including the competence and potential of the investigator(s). Comments are also solicited on the appropriateness of the budget for carrying out the work proposed. An overall rating for merit as well as a brief discussion will be appreciated.

Proposal No.: P1 S0748-H
Investigator: D.J. de Solla Price
Institution: Yale Univ
Please return if possible by:

Comments (Continue on additional sheet if necessary)

Derek Price is such a well-known scholar that it is scarcely necessary to comment on his qualifications for this project. Indeed, many historians will applaud his decision to return to the history of scientific instruments after his decade-long diversion into the quantitative study of science and scientists; some of his pioneering work in that field has been rudely handled by critics who find it lacking in statistical rigor.

Price is well-qualified in the history of scientific instruments, ranking among the half dozen or so most knowledgeable men in the world in this specialized field.

The project outlined by Price strikes me as being somewhat too ambitious to accomplish in two years, and the NSF should realize that it will probably be asked to extend and augment this grant at the end of the two-year period. In addition, some of the projects included strike me as less worthy of support than other parts of the proposal. Let me go through it point by point.

In Price's Antikythera article (Scientific American, June 1959), I thought he had been pretty definite about the workings and operation of this mechanism. Now we learn that he still has some doubts. I have checked with metallurgists to see if radiographic examination, as proposed by Price, would dispel these doubts. My experts assure me that Price is correct on this point, providing that great care is taken in photographing different views of the mechanism. This part of the proposal strikes me as a worthy contribution; Price should now be able to write the "definitive" publication on this vexing and important question.

A checklist of extant sundials and astrolabs in also worthwhile. My only question is the need for computerizing this checklist; the number of instruments involved and their characteristics might not be so great as to justify the cost if older, less expensive ways would do. However, computerizing the checklist might save time and money in the long run.

OVERALL RATING

[ ] EXCELLENT
[✓] VERY GOOD
[ ] GOOD
[ ] FAIR
[ ] POOR

Signature of Reviewer:

Institution

Case Western Reserve University
Cleveland, Ohio 44106

NSF Form 9-32 July 1967

"Reviewers' comments are solicited and received in confidence by the National Science Foundation, an agency of the U.S. Government, and will be given maximum protection from disclosure permitted under applicable laws, including 5 U.S.C. 552 (The Freedom of Information Act)."

Although Price asks no funding for his analysis of the history of extant star globes and celestial charts, it is a valuable project, and it fits in with the rest of his work. Similarly, the index of Western scientific instruments makers should be a valuable source, and it certainly deserves support. Price's sloppy utilization of statistical data in his work on the sociology of science might make his interpretation of his index data somewhat suspect, but at the very least it will provide others with the data which will enable them to view critically Price's statistical interpretations.

I have doubts if Price's brief visits to Dresden and Leningrad museums will result in any meaningful "analysis" of the scientific instruments in those collections. These visits strike me as just visits, or at the best, "fishing expeditions." But he might come up with something, and the amount asked for subsistence in Dresden and Leningrad is small in terms of the total sum requested. We could assume that Price would visit these museums even if we were not to grant him the subsistence.

Finally, an anthology of historical writings on scientific instruments is certainly desirable. However, as outlined by Price, I wonder if this represents much in the way of scholarly research; the project itself is worthwhile, but the propriety of its support by the NSF is questionable.

All told, Price's proposals for scholarly work and development of basic data in the history of scientific instruments are excellent and seem deserving of support. However, I find some parts of his work to be of questionable value. Instead of supporting the entire package, NSF might support portions of it selectively.

Proposal to the National Science Foundation

Division of Social Science

[History and Philosophy of Science]

for a grant for scientific research "History of

Scientific Instruments"

22 Jan 1971

Date

Derek J. de Solla Price
Principal Investigator

Asger H. Aaboe
Chairman, Department of the
History of Science and Medicine

Joseph S. Warner
Grants and Contract Administration
Yale University
(203) 436-4760

Principal Investigator	Derek J. de Solla PRICE Avalon Professor of the History of Science
Social Security Number	577-54-4343
Office Address	Department of History of Science and Medicine 2036 Yale Station New Haven, Conn. 06520
Telephone	(203) 436-4366
Grantee Organization	Yale University
Title of Proposed Research	History of Scientific Instruments
Desired Starting Date	July 1, 1971
Duration of Proposed Grant	2 Years
Total Sum Requested	$ 40,984

Summary of Proposed Work

The investigator proposes to make a radiographic examination of the fragments of the Antikythera Mechanism and to complete a monographic publication of this important object. He also proposes to computer index an up-dated catalogue of the world's astrolabes, to complete the editing of a series of publications on celestial cartography, the analysis of an index of instrument makers, the examination of collections of old scientific instruments in Dresden and Leningrad, the collection and publication of an anthology of old and new scholarly writings on the history of scientific instruments.

Outline of Proposed Investigations

After some years of research directed largely towards the sociology of science, scientific communication, and science policy studies, I have now turned again to my field of research, the history of scientific instruments. Several continuing interests in this field have now begun to mature and colleagues have asked me to take up previous studies, bring them up to date and publish, and to help raise this important area in the history of science and technology to a new level. I seek this grant, the first I have ever requested from this Division of the National Science Foundation, to enable me to begin such a task. If it is awarded I hope, as opportunity permits, to explore the following main lines:

1a. A radiographic examination of the corroded fragments of the complicated geared computing machine known as the Antikythera Mechanism, dating from the first century B.C. and probably the most enigmatic scientific artifact from classical antiquity.

1b. Final preparation of a monographic description of the Antikythera Mechanism. This will depend on the new examination providing some additional clues on the function of the gear trains. If there is little new evidence the final monograph can be prepared within a year; if there is much it may well be worth a longer program of study and publication.

2. Computerizing and bringing up to date a Checklist of Extant Eastern and Western Astrolabes. The list, originally published in 1961 and containing about 300 instruments is now almost double the size and cannot conveniently be managed without computer sorting. It is hoped also to experiment with the possibility of classifying rete patterns as an aid to the identification of anonymous and undated instruments.

3. An analysis of the history of extant star globes and celestial charts and atlases. I have accepted the editorship-in-chief of a series of facsimile editions and research monographs in this area and feel that this may provide several opportunities for interesting research in an area which has remained closed by the unavailability of a sufficiency of comparative material even in the best libraries.

4. Study of new research material arising from the collection by Mr. and Mrs. R. M. Webster of the Adler Planetarium, Chicago, of an Index of Western Scientific Instrument Makers to 1850. This monumental work will make available an order of magnitude more names than have ever been collected hitherto. There is some possibility that it may be sorted by computer, and we shall then have the raw material which I have hoped for many years might be there as a basis for historical analysis of this central craft. I may note that as a partial instigator and collaborator in this work I have full access to the data and some control of its technical detail.

5. Analysis of extant scientific instruments in the Mathematische-Physikalische Salon, Dresden and at the Hermitage Museum, Leningrad. These two fine collections are virtually the only important collection in the world that I have never yet had the privilege of studying firsthand. The 13th International Congress for the History of Science which will take place in August 1971 in the USSR has now given me an opportunity to meet with the directors of both museums and they have personally invited me to work with their collections. It is rare to be given an entrée to the parts of the collections not on public display and I am anxious to have this chance.

6. I have begun to collect and set in order material for an anthology of old and new scholarly writing on the history of scientific instruments from antiquity to the present day. Such a volume would contain a great deal of the standard literature which is scattered often in obscure publications and not readily available to professionals, and it will also include some pieces by myself and by colleagues that I think are needed for the future growth of the field. Such a volume will take a lot of collection and some hard writing but I am convinced that it is needed and eminently publishable for the commercial press.

Specific Details of Proposed Activities

1a and 1b. The Antikythera Mechanism:

I published a preliminary account of researches on the Antikythera Mechanism in Scientific American, June 1959, and have approximately half of a definitive monograph on the subject already prepared. Unfortunately it became evident that the fundamental problems of the construction of the gear trains and their functions remained obscure and could not be solved without further evidences from interior parts of the mechanism concealed by corrosion products and accretions from its 2000 years of submersion in sea water in the Antikythera shipwreck. The authorities of the National Archaeological Museum in Athens were unwilling to permit any cleaning or separation of the fragments until a definitive publication had been made and I could not make this definitive publication without evidence.

On the advice of metallurgist colleagues I now believe that the impasse can easily be broken by using modern techniques of radiographic examination by means of radioactive or X-ray sources and a Polaroid film pack. I do not believe there will be any problem with Museum permission for such an examination for they have liberally afforded me all facilities in the past and I believe that the American School of Archaeology and university colleagues in Athens will be happy to make facilities available for photographs to be taken. I believe that with two weeks of such work including re-examination of the fragments by conventional means I can bring the research to a rapid conclusion and finish this important

monograph. It should be remarked that the machine is the oldest complicated scientific artifact and gives us evidence of a remarkable technological development not otherwise attested from any manuscript or historical source. There is however not the slightest doubt as to the date and authenticity for the fragments are covered with fragmentary astronomical inscriptions in Greek lettering of the period.

I propose to make local arrangements through the American School of Archaeology in Athens, Director, Professor Homer Thompson, and with the University of Athens and the Atomic Energy Commission for the availability and use of radioactive material and portable X-ray equipment. There is some difficulty in budgeting accurately for these facilities but the best advice that I have is that $800 should be ample for everything involved. Professor Thompson and the director of the National Archaeological Museum have already given their help on previous occasions and I had already been asked to submit the final monograph for publication by the American Philosophical Society who have published the recent researches on the other archaeological materials from the Antikythera shipwreck. I estimate that the new examination could proceed quite quickly taking four or five working days so I have allotted a total stay of two weeks in Athens and request support for travel and subsistence.

2. I have worked recently with a graduate student on a catalogue of some 300 extant Greek and Roman sundials. This student, Miss Sharon Gibbs, was able to perform a very effective sorting and analysis of the

data using punch cards and computer methods which were not available when I first prepared preliminary lists of instruments in the 1950s. The most important of the lists prepared was my Checklist of Astrolabes. It has drawn a great many new contributions and I have had a continuous series of additions far beyond the number that could be incorporated and indexed in a systematic way. I have also had continuing requests for information from my files and it is apparent that the list has been serving a useful purpose for scholars, collectors and museum curators. I expect that Miss Gibbs will be returned from her research in Europe by September 1971 and I therefore request funding to enable me to use her services for a computer indexing of the complete checklist. I believe that here, too, there should be no difficulty in publishing the updated version of the list either in the Journal for the History of Astronomy or some other suitable periodical.

The budget for this project includes some secretarial help for the considerable labor in checking with museums and collections and some labor in sorting the massive photograph collection which I have built up and which will now need to be indexed in a way compatible with the rest of the data file.

3. The series of facsimiles and monographs in the history of celestial cartography is being supported and organized commercially by the firm T.O.T. (Theatrum Orbis Terrarum) Publishing Company Ltd., Director

Nico Israel, The Netherlands. I am therefore requesting no special funding for this project but list it merely for completeness in the description of my researches in this area.

4. The index of instrument makers has been supported by Mr. and Mrs. Webster from their own funds and now in part from the Adler Planetarium in Chicago. There is a possibility that IBM may donate computer assistance for the massive task of setting the entire index on computer for sorting and updating. It is likely that the entire index will become available in this way by January 1972 and at that time I would like to use a small sum for preliminary runs to make feasible studies for ways of using this data to provide quantitative historical indexes of the rise and fall of instrument making at the chief centers in Europe.

5. The director of the Mathematische-Physikalische Salon, Dr. H. Grötzsch, has invited me to spend a few days working with their collection which is the world's fourth largest after the Museum of History of Science in Oxford, the Adler Planetarium and the British Museum. The director of the Lomonosov Museum in Leningrad, Dr. V. L. Chenakal, has invited me to tour with him the small but important collection at the Hermitage in Leningrad and attempt to find an important Roman sundial, parts of which seem to have been mislaid and to see the small

but important collection of scientific objects. Since I will be travelling in Europe in any case I seek no further travel support but merely some subsistence.

6. I have discussed this projected book on the history of instruments with Dr. Michael Hoskin, University of Cambridge, who is considering it for publication in his standard works, formerly the Oldbourne History of Science Library series. I have begun to list important articles already published by such authorities as Henri Michel, Silvio Bedini, Francis Maddison, G. R. Taylor, Henry King, D. W. Waters, Hans-Gunther Körber, John North and many others. After establishing a bibliography of the most important papers I will ask permission for their use, perhaps with updating, and in the case of some pieces published originally in other languages for translation. I then intend to commission four or five additonal pieces to fill gaps and to write two or three chapters myself on the interplay between science and technology in the history of instruments and on the growth of scientific apparatus making in the late 19th and early 20th centuries. The pulling together of this work will require some further secretarial help which is requested in the budget.

Proposed Budget

	1971/72	1972/73
Principal Investigator Summer Salary (at 2/9)	$ 5333	$ 5333
Secretary Half time	3000	3000
Graduate Student Assistant	--	4650
Fringe Benefits 6.8% of total salaries for non-TIAA	567	884
Indirect Costs 60% of salaries	5000	7800
Xerox and Photos	700	700
X-ray and Radiography	800	--
Computer and Key Punch	500	1000
Domestic travel	300	300
Air fare to Athens Round trip tourist class	817	--
Subsistence in Athens, Dresden and Leningrad (4 weeks at $25/day)	300	--
Total	$17,317	$ 23,667
Total for two years	$40,984	

Yale will cost share in accordance with current Foundation Policy.

DEREK JOHN DE SOLLA PRICE

Personal details:

Born 22 January 1922 at London, England, British Citizen

Married Ellen Hjorth of Copenhagen, Denmark, 1947

Three children (born 1950, 1952, 1960)

Degrees:

B.Sc.	(1st Hons) University of London (External)	1942
Ph.D.	(Physics) University of London (External)	1946
Ph.D.	(History of Science) University of Cambridge	1954
M.A.	(Honorary) Yale University	1960

Present and Previous Posts:

Avalon Professor of History of Science, Yale University	Since 1962
Professor of History of Science, Department of History of Science and Medicine, Yale University	1960-1962
Chairman, Department of History of Science and Medicine, Yale University	1961-1964
Visiting Professor of History of Science, Department of History, Yale University	1959-1960
Curator of Historic Scientific Instruments, Yale University	Since 1960
Donaldson Fellow, Institute for Advanced Study (School of Historical Studies), Princeton, New Jersey	1958-1959
Consultant in History of Physics and Astronomy for planning new U.S. National Museum of History and Technology, Smithsonian Institution, Washington, D.C.	1957

Nuffield Foundation Award for Research in the History of Scientific Instruments, University of Cambridge (Christ's College)	1955-1956
I.C.I. Fellow in the History of Science, University of Cambridge (Christ's College)	1951-1954
Lecturer in Applied Mathematics, University of Malaya, Singapore	1947-1950
Commonwealth Fund Fellow in Mathematical Physics, Princeton University, New Jersey	1946-1947
Research Assistant in Physics and part-time Lecturer, S.W. Essex Technical College	1942-1946

(During part of this period I was engaged in research of military importance, for the British Iron and Steel Research Association under the direction of Dr. H. Lowery and under the Chairmanship of Mr. D.A. Oliver.)

Honorary Posts, Consultantships, Fellowships, etc.:

Academic Director, Summer Institute for Humanistic Discussions of Science, Oak Ridge Institute of Nuclear Studies	1963
Pegram Lecturer, Brookhaven	1962
Member, Science Information Council, National Science Foundation	1962-1966
Member of Council, History of Science Society	1961-1963
Member of Editorial Board, ISIS	1964-1970
Member of Council, Society for the History of Technology	1960-1964
Member of Editorial Board, Technology and Culture	Since 1959
Member of Editorial Board, Journal of the History of Medicine and Allied Sciences	1964 -1969

Honorary Research Associate, Smithsonian Institution	Since 1959
Consultant, National Science Foundation	Since 1959
Corresponding Member, International Academy for the History of Science	1958-1966
Active Member, International Academy for the History of Science	Since 1966
Examiner in the History of Science, University of Cambridge. Preliminary, Part I Natural Science Tripos 1955 and 1956. Natural Science Tripos 1956.	
Member of Council, British Society for the History of Science	1953-1956
Honorary Secretary of the Sub-Commission for an international cataloguing of antique scientific instruments. International Union for the History of Science: Commission for Bibliography	1953-1956
Honorarium from University of Cambridge, History of Science Committee, for acting in charge of the Whipple Museum of the History of Science	1953-1956
National Institutes of Health Annual Lecturer	1966
Standing Committee on Meetings of the American Association for the Advancement of Science	1966-1968
Associate Member, Comite Belge d'Histoire des Sciences	1967
Member, Advisory Souncil, Science of Science Foundation, London	Since 1964
Guggenheim Foundation Fellow, appointed for Quantitative Studies on the Economics and Demography of Science	1969
Chairman, Joint Working Committee for UNESCO and International Union for History and Philosophy of Science for the preparation of a monographic study of the national and international scientific communities, especially relating to the problem of the proper fostering of such a community in developing countries.	1969-1970

Member, Editorial Board, Science Policy Studies, Macmillan & Co. Ltd., London	1970
Member, Science Policy Panel, President's Science Advisory Council	1970
Chairman, Sociology of Science Section at the International Sociological Association Meeting in Varna, Bulgaria	1970
Technical Program Chairman, American Society for Information Science 1970 Meeting, Philadelphia, Pa.	1970

Publications

DEREK J. DE SOLLA PRICE

Books

AN OLD PALMISTRY (an edition of the Middle English treatise contained in MS. Digby Roll 3). Heffer, Cambridge, 1953. xvi & 47 pp.

THE EQUATORIE OF THE PLANETIS (with a linguistic analysis by R.M. Wilson). A manuscript treatise ascribed to Chaucer. Cambridge at the University Press, 1955. xvi & 214 pp.

HEAVENLY CLOCKWORK. THE GREAT ASTRONOMICAL CLOCKS OF MEDIEVAL CHINA: A MISSING LINK IN HOROLOGICAL HISTORY. (In collaboration with Drs. Joseph Needham and Wang Ling). Monograph No. 1 of the Antiquarian Horological Society. Cambridge at the University Press, 1960. xv & 254 pp.

THE COLLECTOR'S SERIES IN SCIENCE (a series of facsimile editions of historical scientific books, edited, with the addition of prefatorial material). Basic Books, Inc., New York.

Volume I. NATURAL MAGICK, Giambattista della Porta, 1957.

Volume II. ON THE MAGNET, William Gilbert, 1958.

Volume III. PIROTECHNIA, Biringuccio, 1959.

SCIENCE SINCE BABYLON. Yale University Press, New Haven, 1961. x & 149 pp. Paperback edition 1962. Arabic edition, Beirut 1963. Polish edition, Omega Books, Warsaw 1965.

LITTLE SCIENCE, BIG SCIENCE. Columbia University Press, 1963. ix & 119 pp. Paperback edition, 1965. Russian edition, Academy of Sciences, Moscow 1966. Italian edition, Valentino Bompiani, Milan 1967. Polish edition, Omega Books, Warsaw 1967. Japanese edition, Sogensha, 1970. German edition, 1971.

Unpublished book

A HISTORY OF BLAKENEY HAVEN, NORFOLK - A GREAT MEDIEVAL SEAPORT. 1959.

Books (continued)

Editor of Prentice-Hall History of Science Series for Young Readers

ERNEST RUTHERFORD, ARCHITECT OF THE ATOM, Peter Kelman and A. Harris Stone, 1969.

LIEBIG, THE MASTER CHEMIST, Louis Kuslan and A. Harris Stone, 1969.

MENDELEYEV: PROPHET OF CHEMICAL ELEMENTS, Peter Kelman and A. Harris Stone, 1970.

ROBERT BOYLE, THE GREAT EXPERIMENTER, Louis Kuslan and A. Harris Stone, 1970.

Published Papers

1941 a. AN ASPECT OF THE FUTURE OF SCIENTIFIC RESEARCH. Journal of the South-West Essex Technical College and School of Art 1, 1941, 195-196.

b. MODEL TO ILLUSTRATE TRANSVERSE WAVE MOTION. Journal of the South-West Essex Technical College and School of Art 1, 1941, 55.

1943 a. THE EMISSIVITY CHARACTERISTICS OF HOT METALS, WITH SPECIAL REFERENCE TO THE INFRA-RED. (In collaboration with Dr. H. Lowery.) British Iron and Steel Research Association Publication 7/1943, 36 pp.

1946 a. THE INFRA-RED EMISSIVITY OF METALS AT HIGH TEMPERATURES. Nature 157, 1946, 765.

b. SOME UNUSUAL SERIES OCCURRING IN N-DIMENSIONAL GEOMETRY. Mathematical Gazette 80, 1946, 149-150. (Note 1907)

c. NOTE ON THE CALCULATION OF OPTICAL CONSTANTS. Proc. Phys. Soc. LVIII, 1946, 704-706.

1947 a. THE EMISSIVITY OF HOT METALS IN THE INFRA-RED. Proc. Phys. Soc. LIX, 1947, 118-131.

b. THE TEMPERATURE VARIATION OF THE EMISSIVITY OF METALS. Proc. Phys. Soc. LIX, 1947, 131-138.

1949 a. A THEORY OF REFLECTIVITY AND EMISSIVITY. Proc. Phys. Soc. LXII, 1949, 278-283.

b. AUTHOR'S REPLY. Proc. Phys. Soc. LXII, 1949, 663.

1951 a. QUANTITATIVE MEASURES OF THE DEVELOPMENT OF SCIENCE. Archives Internationales d'Histoire des Sciences 14, 85-93; and Actes du VI Congres International d'Histoire des Sciences, Amsterdam 1950, I, Hermann & Cie, Paris, 1951, 413-421.

1952 a. THE EARLY OBSERVATORY INSTRUMENTS OF TRINITY COLLEGE, CAMBRIDGE. Annals of Science 8, 1952, 1-12.

b. THE EQUATORIE OF THE PLANETIS. The Times Literary Supplement, 29 February and 7 March, 1952; 51 I, 164 and 51 II, 180.

c. CHAUCER'S ASTRONOMY. Nature 170, 1952, 474-475.

d. THE EQUATORIE OF THE PLANETIS. (Reprinted from items 14 and 15 with facsimilies, additions, etc.) Journal of the South-West Essex Technical College and School of Art 3, 1952, 153-168.

e. CHAUCER'S ASTRONOMY. Friday Evening Discourse, 28 November 1952, at the Royal Institution. Journal of the Royal Institution, 1953. 12 pp.

1953 a. THE CAVENDISH LABORATORY ARCHIVES. Notes and Records of the Royal Society X, 1953, 139-147.

b. MUSEUM OF THE CAVENDISH LABORATORY: AN OUTLINE GUIDE TO EXHIBITS. Cambridge University Press, for the Cavendish Laboratory, 1953, 6 pp.

c. THE EQUATORIES OF THE PLANETIS. Bulletin of the British Society for the History of Science I, 1953, 223-226.

d. THE CAVENDISH LABORATORY. Oil (Electrical Issue) 2, 1953, 30-32.

1954 a. A COLLECTION OF ARMILLARY SPHERES AND OTHER ANTIQUE SCIENTIFIC INSTRUMENTS. Annals of Science 10, 1954, 172-187.

b. IN QUEST OF CHAUCER - ASTRONOMER. Cambridge Review LXXVI, 1954, 123-124.

c. DESCRIPTION OF A MANUSCRIPT OF CHAUCER'S TREATISE ON THE ASTROLABE. Repository No. 7, Book Catalogue of William Dawson and Sons Ltd., January 1954, 20-21.

1955 a. HOW MODERN PHYSICS BEGAN. Atomics in the Service of Mankind, Daily Mail Publications, 1955.

b. THE MATHEMATICAL PRACTITIONERS. Journal of the Institute of Navigation VIII, 1955, 12-16.

c. MEDIEVAL LAND SURVEYING AND TOPOGRAPHICAL MAPS. The Geographical Journal CXXI, 1955, 1-10.

d. SOME EARLY ENGLISH INSTRUMENT MAKERS. Endeavour XIV, 1955, 90-94.

1956 a. CLOCKWORK BEFORE THE CLOCK. Horological Journal 97, 810, and 98, 31, 1955/56. Reprinted, as a brochure, by Antiquarian Horological Society, London, March 1956. Reprinted, and published in English, French, German, and Spanish by Journal Suisse d'Horologerie et de Bijouterie, Lausanne, 1956.

b. TWO MEDIEVAL TEXTS on astronomical clocks. Antiquarian Horology 1, 1956, 156.

c. LORD KELVIN, HERO OF THE ATLANTIC TELEGRAPH. Times Educational Supplement 47, 16 November, 1956, 1348.

d. A MEDIEVAL FOOTNOTE TO PTOLEMAIC PRECESSION. In Vistas in Astronomy I, (edited by A. Beer as a Festschrift for Professor F.J.M. Stratton), 1956, 66.

e. THE PREHISTORY OF THE CLOCK. Discovery XVII, 1956, 153-157.

1956 f. CHINESE ASTRONOMICAL CLOCKWORK (with Drs. J. Needham and Wang Ling). Nature 177, 1956, 600-602. Reprinted in Actes du VIII^e Congres Internationale d'Histoire des Sciences (Florence-Milan, 1956) Vol. I, Hermann & Cie, Paris, 1958, 325-328.

g. LOOKING FOR ASTROLABES. Discovery XVII, 1956, 257.

h. SCIENCE REVIEW: C'EST MAGNIFIQUE MAIS CE N'EST PAS DAGUERRE. Cambridge Review 77, 1956, 436-7. (Review of The History of Photography from the earliest use of the camera obscura in the eleventh century up to 1914, by Helmut Gernsheim, Oxford University Press, 1955.)

i. AN INTERNATIONAL CHECKLIST OF ASTROLABES. Archives Internationales d'Histoire des Sciences, 32/33, 1956, 40 pp. (Also published as a separate booklet for general sale.)

j. ANCIENT INSTRUMENTS IN PEKING. Discovery XVII, 1956, 357-358.

k. TWO MARINER'S ASTROLABES. Journal of the Institute of Navigation IX, 1956, 338-344.

l. THE EXPONENTIAL CURVE OF SCIENCE. Discovery XVII, 1956, 240-243. Also in Bernard Barber and Walter Hirsch (eds.) The Sociology of Science, The Free Press, 1962, 516-524.

m. J.J. THOMSON, O.M., F.R.S. Il Nuovo Cimento, N. 5 (Supplement to Vol. 4, Ser. X), 1956, 1609-1629.

n. Sir J.J. THOMSON, O.M., F.R.S. A Centenary Biography. Discovery XVII, 1956, 494-502.

o. THE SCIENCE OF SCIENCE. Discovery XVII, 1956, 179-180.

1957 a. SCIENTIFIC INSTRUMENTS, UNWRITTEN DOCUMENTS OF THE HISTORY OF SCIENCE. National Academy of Sciences, Washington, D. C. 4 pp. Abstract in SCIENTIFIC APPARATUS, UNWRITTEN DOCUMENTS OF THE HISTORY OF SCIENCE. Science 125, 1957, 750.

b. CARTOGRAPHY, SURVEY AND NAVIGATION TO 1400 - SURVEY IN THE MIDDLE AGES, pp. 513-517. PRECISION INSTRUMENTS: TO 1500, pp. 582-609. THE MANUFACTURE OF SCIENTIFIC INSTRUMENTS FROM C. 1500 TO C. 1700, pp. 620-647. In Charles Singer, E.J. Holmyard, A.R. Hall and Trevor I. Williams, A History of Technology III: From the Renaissance to the Industrial Revolution c. 1500 - c. 1750, Oxford: Clarendon Press, 1957.

c. Foreward contributed to Silvio A. Bedini, Johann Philipp Treffler; Clockmaker of Augsburg. Reprinted from Bulletin of the National Association of Watch and Clock Collectors, Inc., 1956-1957, 1957.

1958 a. LEONARDO DA VINCI AND THE CLOCK OF GIOVANNI DE DONDI. Antiquarian Horology 2, 1958, 127-128.

b. THE SCIENTIFIC RESOURCES OF AMERICA, Science Perspectives I, No. 2, 1958.

c. FAKE ANTIQUE SCIENTIFIC INSTRUMENTS. Actes du VIII^{e} Congres International d'Histoire des Sciences (Florence-Milan, 1956) Vol. I, Hermann & Cie, Paris, 1958, 308 & 394.

1959 a. THE SCIENTIFIC HUMANITIES - AN URGENT PROGRAM. Basic College Quarterly (Michigan State University), Winter 1959, 6-14; also, The Graduate Journal (University of Texas), Fall 1959, 298-306.

b. CONTRA COPERNICUS. A CRITICAL RE-ESTIMATION OF THE MATHEMATICAL PLANETARY THEORY OF PTOLEMY, COPERNICUS AND KEPLER. Institute for the History of Science, University of Wisconsin, Madison, Wisconsin, 1957. Reprinted in Critical Problems in the History of Science (ed. Marshall Clagett), University of Wisconsin Press, Madison, 1959, 197-218.

c. THE FIRST SCIENTIFIC INSTRUMENT OF THE RENAISSANCE. Physis I, 1959, 26-30.

d. ON THE ORIGIN OF CLOCKWORK, PERPETUAL MOTION DEVICES AND THE COMPASS. Contributions from the Museum of History and Technology, Smithsonian Institution (Paper 6 in United States National Museum Bulletin 218), 1959, 81-112.

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Yale University *New Haven, Connecticut 06520*

DEPARTMENT OF
HISTORY OF SCIENCE AND MEDICINE

Box 2036, Yale Station

File

July 13, 1971

Professor Melvin Kranzberg
Division of S!ecial Interdisciplinary Studies
Case Western Reserve University
Cleveland, Ohio 44108

Dear Professor Kranzberg:

Your letter of June 21 regarding an inquiry from Professor Gerard Leahy of Western Australian Institute of Technology did not arrive until after Dr. Price had gone to Yugoslavia. He will return to the office for two weeks before leaving for the Moscow meetings and will see your letter at that time.

Sincerely yours,

Ann Lerkowitz

Secretary to
Derek J. de Solla Price
~~Avalon Professor of the~~
History of Science

al

The Western Australian Institute of Technology

HAYMAN RD., SOUTH BENTLEY, 6102. TELEPHONE 68 1931. TELEGRAPHIC CODE: WAINTECH
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File

File No.:

Reply to:

Your Ref.:

13th July, 1971.

Professor Melvin Kranzberg,
Department of History,
Case Western Reserve University,
CLEVELAND .. OHIO 44106.
U.S.A.

Dear Professor Kranzberg,

I am writing to thank you for the kindness you extended to me by writing to Dr. Derek J. de Solla Price on my behalf.

All good wishes,

Yours sincerely,

Gerard Dleahy

GERARD D. LEAHY.

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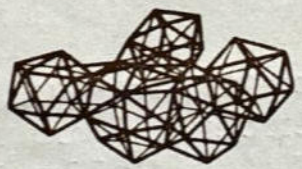

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SLIT OPEN HERE

June 21, 1971

Dr. Derek J. de Solla Price
Department of History of Science
& Medicine
Yale University
New Haven, Connecticut

Dear Derek,

I am taking the liberty of forwarding the enclosed letter from Professor Gerard Leahy of Western Australian Institute of Technology. It seems to me that you are much better qualified than I am to answer the specific questions raised by Professor Leahy.

Since my field of specialization is the history of technology, I know that you are much better qualified than I am to direct Professor Leahy's attention to literature on the History and Philosophy of Science. Having surveyed the teaching of the history of science in the United States and, indeed, the status of the history of science throughout the world, you are in a position to answer some of Professor Leahy's questions by sending him copies of your published reports. Furthermore, I know that you have a special knowledge of an interest in Australia, so that you can answer Professor Leahy in terms of the specific social and academic contexts involved.

Therefore, I should appreciate it if you would take the trouble to answer Professor Leahy. I hope that this letter reaches you before you take off for Yugoslavia (I note that you will be participating in a conference there next month). As for myself, I look forward to seeing you at the International Congress in Moscow in August.

Sincerely yours,

Melvin Kranzberg

MK/mb
cc: Professor Gerard D. Leahy

Derek Price

December 17, 1970

Dr. Derek J. de Solla Price
Dept. of the History of Science & Medicine
Box 2036
Yale Station
Yale University
New Haven, Connecticut 06520

Dear Derek:

This letter is belated acknowledgement and thanks for your sending me the printed version of your Edison Foundation talk and the pictorial section of the New Haven Register for October 25. In the case of the latter, I must confess that I was both amused and pleased -- amused to find you "suspended in the universe" andd pleased to see the well-deserved recognition accorded you.

I am somewhat disturbed, however, by the rumor -- I suppose it is more than a rumor -- that you will be leaving this country next year to take up permanent residence in Australia. They will undoubtedly benefit by your talents "down-under," but it seems to me that youuhave made a unique contribution to the history of science and technology in this country and we will suffer an immeasurable loss by your departure. (I must use the term "immeasurable" carefully when corresponding with someone who is engaged in measuring the immeasurable!) I have no doubt that you will continue to make scholarly contributions while you are in Austrialia, but that is not quite the same thing as having you in this country.

In any event, I hope that the rumor is not completely true, and that you will be dividing your time between Australia and the United States, and that we will continue to have the benefit of your wit, wisdom, and provocative scholarship.

Sincerely yours,

Melvin Kranzberg

MK/fc

March 9, 1970

Professor Derek J. deSolla Price
Dept. of the History of Science & Medicine
Yale University
New Haven, Conn.

Dear Derek:

Thank you very much for sending me a copy of your very interesting paper, "Measuring the Size of Science," published in the Israel Academy of Sciences and Humanities Proceedings.

As you know, I am very interested in, and supportive of, your efforts to develop quantitative studies in the history of science and technology. In the present paper you do a very good job of measuring the number of scientists in relation to their geographical distribution and per-capita wealth, but I am still interested in getting your ideas on interpretations of such data, especially possible causal connections among various factors. Your past correlations have led you to some interesting "laws" about the exponential growth of science, and I look forward to your interpretations of some of the new correlations you have discovered in order to provide us with some new Derekian "laws."

I haven't seen you in a long time. When will we get together again?

Sincerely yours,

Melvin Kranzberg

MK/fc

Derek Price

January 6, 1970

Dr. Derek J. deSolla Price
Dept. of the History of Science & Medicine
Box 2036
Yale Station
New Haven, Connecticut 06520

Dear Derek:

Thank you very much for sending me an offprint of your article on portable sundials which appeared in Centaurus. It is an admirable and much-needed survey of this type of scientific instrument.

Not to be outdone, I am sending you a reprint of a paper touching upon one of my interests, technology assessment. Like you, I believe that the historian can utilizedhis historical perspective to participate in the dialogue concerning important current issues.

I wish you had been present at the SHOT meeting in Washington. We had a number of very good program sessions touching upon matters which are of special interest to you. Our sessions were well attended, including those programs which dealt with very specific items in the history of technology. It would seem that the history of technology is beginning to acquire a constituency of its own and is not wholly dependent upon those historians of science who happen to have some slight interest in technological matters. I suppose that represents some progress.

We missed you in Washington,. My very best wishes for the year to come.

Sincerely yours,

Melvin Kranzberg

MK/fc

November 24, 1969

Dr. Derek J. de Solla Price
Dept. of History of Science & Medicine
Box 2036
Yale Station
Yale University
New Haven, Connecticut 06520

Dear Derek:

Thank you very much for your letter of November 18 -- and thank you also for sending me a copy of your letter to Professor Avery of the University of Hawaii regarding an opening there in the history of technology.

Yes, Projects Hindsight and TRACES are deserving of special treatment in Technology and Culture. Even though each of them possesses serious defects, both of them deal seriously with one of the major problems in the history of technology and hence ddserves attention in our journal. I hope that the Washington program will come forth with something publishable. If not, perhaps we can prevail upon you to do a little review article on Hindsight and TRACES for us. How about it?

My dear friend, please do not feel unwanted by SHOT. Merely because your term on our Advisory Councileexpired does not mean that we do not want or need your help. If you will look at the masthead of Technology and Culture, you will see that you are one of our valued Advisory Editors, and you can continue to help us as in the past. For reasons which I am certain that you can appreciate, we try to spread the honors around and avoid having members serve in two capacities -- as Advisory Editors and as members of the Advisory Council or Executive Council; it does not always work out that way, but we try to give as many members as possible a real sense of participation in the organization and our

publication. So, you can be sure that we still value your help, and we expect you to continue to assist us in the future as in the past.

Sincerely yours,

Melvin Kranzberg

MK/fc

Yale University *New Haven, Connecticut 06520*

DEPARTMENT OF
HISTORY OF SCIENCE AND MEDICINE

Box 2036, Yale Station

November 18, 1969

Dr. Melvin Kranzberg
Editor-in-Chief
Technology and Culture
Case Western Reserve University
Cleveland, Ohio 44106

Dear Mel:

It was in fact the program shown for Washington for Project Hindsight and Project TRACES that made me think we ought to have a proper review of these as History of Technology, and Technology and Culture. Quite apart from the value of these approaches as studies of the relation between science and technology, they are also pioneering efforts in the History of Technology itself. My own feeling is that they are rather bad efforts, and this reflects unfavorably on their usefulness.

By the way, not being one to keep quiet about these things, I give vent to a feeling that I was rather sorry to be thrown off the Advisory Council which I served on from 1960 to 1964 and if it is proper, would willingly offer myself if the Society wants me to come back and do some work in some capacity or other.

Yours cordially,

Derek J. de Solla Price
Avalon Professor of the
History of Science

DJP:fo

November 10, 1969

Dr. Derek J. de Solla Price
Department of History of Science & Medicine
Yale University
Box 2036 Yale Station
New Haven, Connecticut 06520

Dear Derek:

This is in brief response to your note of November 7. I am sorry that you will not be attending the Xmas meetings, but I note that you are more interested in attending the AAAS meetings; inasmuch as SHOT and HSS meet in alternate years with the AAAS, we will eventually have the opportunity to get together--even if it is only at longer intervals than I should like.

We had not thought of having a review of Project TRACES in TECHNOLOGY AND CULTURE, primarily because they did not send us a review copy for that purpose. However, SHOT is certainly taking cognizance of that report. We have an entire program session at our meeting in Washington on Project Hindsight and Project TRACES. The subheading of the topic for that program session is something like "Quantitative Histories of Science-Technology Relationship." So, we try to keep our members abreast of things. Incidentally, and as you might suspect, this program session was arranged on the initiative of SHOT, not of the History of Science Society, although it is to be a joint SHOT-HSS program session.

That's all for now. It is always good to hear from you.

Sincerely yours,

Melvin Kranzberg

MK/mb

Yale University *New Haven, Connecticut 06520*

DEPARTMENT OF
HISTORY OF SCIENCE AND MEDICINE

Box 2036, Yale Station

November 7, 1969

Mr. Melvin Kranzberg
Division of Special Interdisciplinary Studies
Case Western Reserve University
Crawford Hall
Cleveland, Ohio 44106

Dear Mel:

I think it is very difficult to draw conclusions about the significance of the statistical surveys for history of science. The statistics for scientists are certainly significant, and that I have been publishing; but beyond pointing out that there is one historian of science for every 500 scientists, I do not see what one can do. It seems a reasonable ratio.

No, I am sorry that I shall not attend the Christmas meetings. If I attend a meeting at all at that time, it would be the AAAS where I find rather more appreciation of my work than I do amongst the historians. There will be plenty of others from our department attending the meeting, however, and I am sure we can find some other good opportunities, you and I, to discuss, a thing I would much welcome.

Lastly, let me urge you to have a major review in Technology and Culture for a very interesting report which has just been released: Volume I, "Technology in Retrospect and Critical Events in Science", * Prepared for: The National Science Foundation by The Illinois Institute of Technology Research Institute under Contract NSF-C535, December 15, 1968. The Planning Director was Charles E. Falk, who is now Planning Director of National Science Foundation, and I fancy that the results they have on the importance of basic research to technological innovation will be much used and quoted in national policy decisions. It is a sort of hindsight look at a Project Hindsight.

Yours very cordially,

Derek J. de Solla Price
Avalon Professor of the
History of Science

* It contains quite nice histories of:
1 Magnetic Ferrites
2 Video Tape Recorders
3 Oral Contraceptive Pill
4 Electron Microscope
5. Matrix Isolation.

DJP:fo

December 2, 1969

Dr. Derek J. de Solla Price
Dept. of History of Science & Medicine
Box 2036
Yale Station
New Haven, Connecticut 06520

Dear Derek:

This is just a brief note to thank you for sending me a copy of your very interesting article, with Joseph V. Noble, on the waterclock in the Tower of the Winds. It is a fascinating object, and you have done a fascinating article on it. Again, my congratulations.

Sincerely yours,

Melvin Kranzberg

MK/fc

December 3, 1969

Dr. Derek J. de Solla Price
Department of History of Science & Medicine
Yale University
New Haven, Connecticut 06520

Dear Derek:

Thank you very much for your letter of December 1. Your point about the lack of scholarly apparatus in the comments on Mesthene's article by Ramo, Drucker, and Dupree is well taken. I should have liked to have seen some documentation for their statements.

The point, of course, in publishing that symposium was that we believed Mesthene's statement to be a manifestation of a large block of current thinking about the relationships between technology and society, and hence was deserving of publication, providing we had some critiques accompanying it. Personally, I do not think that the comments were very incisive. But at least they represented approaches to the questions raised by Mesthene from three different points of view.

No, publication of that symposium did not mean that we were unable to publish more technically historical material like the article by Shelby. The sad fact is that we do not get very much in the way of manuscripts which represent the nitty-gritty of the history of technology, as exemplified by the Shelby article. This is a situation which has plagued Technology and Culture throughout its history, and I am afraid that it reflects the paucity of scholarship in this field despite our ten years of endeavoring to further it. But we are still trying, and I do think that there are a few more scholars working in this field than there were when we started.

We had received some criticisms about our previous exhibit reviews, so I was pleased to receive your compliments on Hippen's exhibit review. A couple of people have told me that the exhibit reviews do not seem to be meaningful unless one has actually seen the exhibit in question. I believe, however, that in a field such as the history of technology where the artifact is so important, exhibit reviews serve much the same purpose as book reviews--and I do think that our exhibit reviews are getting better and better. At least I learn something from them, and that is my ultimate criterion in judging the worth of any article.

Thank you very much for sending me your views on the October issue of Technology and Culture. As an Advisory Editor, you are expected to provide me with a critique of every issue, and I hope that you will continue to do so. I always value your comments.

Sincerely yours,

Melvin Kranzberg

MK/mb

Yale University *New Haven, Connecticut 06520*

DEPARTMENT OF
HISTORY OF SCIENCE AND MEDICINE

Box 2036, Yale Station

December 1, 1969

Dr. Melvin Kranzberg
Editor-in-Chief
TECHNOLOGY AND CULTURE
Case Western Reserve University
Cleveland, Ohio 44106

Dear Dr. Kranzberg:

I hope you will reply directly to Avery at Hawaii and hopefully find him someone for the post.

Since you remind me I am an Advisory Editor and since the latest Technology and Culture just came in, I take advantage of this by making a criticism. The enclosed letter will indicate my concern about papers like several of those in your Symposium on the Mesthene program. I think it is a great pity to permit people like Ramo, Drucker and Hunter Dupree to get away with ex cathedra pronouncements devoid of scholarly apparatus. Although the exchange was as a whole somewhat interesting, I do not think it contributes greatly to scholarship in the History of Technology and hope it did not mean refusing more interesting material like that of Mr. Shelby.

By the way, in that splendid article I see no reason to use the German term "Baugeometrie" when "building geometry" would do just as well. I also want to hand out compliments for the superbly written exhibit review by Hippen.

Cordially,

Derek J. de Solla Price
Avalon Professor of the
History of Science

DJP:fo
Enclosure

Yale University *New Haven, Connecticut 06520*

DEPARTMENT OF
HISTORY OF SCIENCE AND MEDICINE

Box 2036, Yale Station

October 25, 1968

An open letter to editors of scientific journals, particularly to those publishing technological papers and articles for the general reader.

Dear Colleague,

Now that citation indexing has become a valuable and integral part of the computerized systems by which we gain access both to archival and to research-front literature, the editorial practices regarding citations may need reexamination. Such things used to be rather arbitrary matters of taste and con ention; now, with this new use, they should be treated as are the titles of the articles published. Over the past few decades we have come to prefer titles that contain several useful descriptors of the content, so that the work may be noticed adequately by those who use key-words, permuted title indexes and pages of contents. In just the same way as we prefer not to use titles carrying little description, we should avoid any attitude to citations that takes no advantage of this facility.

In the past we used citations as a means of giving credit to previous researchers, of noting authority for statements and data not part of the conventional wisdom, and even for historical piety or learned decoration. Today, if we cite another work we also say in effect, "If you were interested for any reason in that previous work, you may also have some interest in this new contribution which is in some way based upon it".

A paper that carries no such citations is in effect divorcing itself from cumulative scholarship in that area; a paper padded with too many that are largely decorative creates random noise in which it may get lost. Editors and their referees should therefore help their authors and readers by encouraging authors to cite work strongly related to their contributions. This is especially important in technological journals and in articles for the general reader where hitherto citations were often customarily avoided. Three or four citations, preferably given as end-notes, would often be quite sufficient for good use; one is very much better than none at all. Please help by regarding the absence of citations as being just as odd as the absence of a paper title or the absence of an author's name.

Yours sincerely,

Derek J. de Solla Price,
Avalon Professor of the
History of Science.

Enclosure: Ethics of Scientific Publication, Science, Vol. 144, pp. 655-657.

October 30, 1969

Dr. Derek J. De Solla Price
2036 Yale Station
New Haven, Connecticut 06520

Dear Derek:

This is just a note to thank you for sending me your survey of the history of science profession published in Technology and Society.

I found your statistical studies to be fascinating, although I am not certain what the significance of the implications might be. For example, you point out that there is about one member of our profession for every 500 scientists or 50 physicists or 200 chemists. Should there be some optimum ratio?

If you were to turn your attention to historians of technology per se, I suppose that you would find an even smaller number in comparison with the number of engineers. Will this tell us anything that we don't already know, except tell us in more specific terms what we already suspect to be the case? And what should we do about it?

What I suppose I want from you, Derek, is some kind of interpretive summary of these admirable statistical surveys that you have been conducting. And I hope that that is what you intend to give us when you complete your preliminary data on the demography of our profession. You will be well equipped to draw forth some conclusions--and suggestions--and I hope that you will attempt to do so.

Turning to other matters, I hope that you will attend the annual meetings of SHOT and HSS in Washington in December. I remember that you swore off attending these meetings as long as we continued to meet at this time of the year and with larger organizations. However, I hope you don't remember and that you will attend. You are one of the leaders of the profession, and I think it important that you participate in our activities. After all, even when you and I disagree--which is seldom--I still respect your opinions, and I always welcome your advice and suggestions. I don't want to be deprived of them.

Sincerely yours,

Melvin Kranzberg

File

April 9, 1968

Prof. Derek J. de Solla Price
Department of History of Science and Medicine
Box 2036, Yale Station
Yale University
New Haven, Connecticut 06520

Dear Derek:

You are absolutely right in your letter of April 2 regarding the possible change of dates for future meetings of SHOT. We will simply consider the matter tabled until such time as HSS acts on the matter. At that time, we can take the matter off the table, for SHOT will be forced to react to any action taken by the HSS.

I agree with you that the prospects of action by HSS seem somewhat remote. Perhaps the change will only come when one of larger organizations, AAAS or the AHA makes a change, thereby forcing HSS to reconsider the entire problem. But let's not hold our breath until that time comes about.

Turning to other matters, I had some good things to say ~~that~~ unless the editor blue-pencils them--about your work on the ~~dec~~dissemination of scientific communications in a semi-popular book review article, on some trends in recent scientific publications, which will appear in a special book review number of Scientific Research in April. In that article I express the hope that you will eventually put your researches and scattered articles on this topic into a book. How about it?

Also, I know that you have not lost interest in--although you might not have much time for--work on scientific instruments. In case you do find time to pursue your investigations on scientific instruments, please don't forget the possibility of an article for TECHNOLOGY AND CULTURE. You know that I always welcome something by you in our journal. TECHNOLOGY AND CULTURE seems to be an excellent medium for ~~dec~~disseminating your ideas, for I frequently find your articles on automata and on the relations between science and technology cited by other articles. So, please don't forget us.

Sincerely yours,

MK/rc

Melvin Kranzberg

Yale University *New Haven, Connecticut 06520*

DEPARTMENT OF
HISTORY OF SCIENCE AND MEDICINE

Box 2036, Yale Station

April 2, 1968

Professor Melvin Kranzberg
Secretary
Society for the History of Technology
Case Western Reserve University
Cleveland, Ohio 44106

Dear Mel,

Just a line to thank you for your letter and to say that I absolutely agree. The thing our little committee has to push on is HSS and the probability is that if they do indeed change then SHOT would inevitably, and probably gladly, follow them in it. I shall keep pushing, but I am rather dubious about any immediate change in the heart of HSS. Too many people seem to need to go to either the AAAS or the AHA and all of them say they have no money or time to go to HSS as well. For myself, I would go to HSS but almost never to AHA and only sometimes to AAAS, and anyhow I have money and time to do what I damn well please. For the mean time, let us then drop the matter so far as concerns SHOT.

When our committee gets somewhere and issues a report you will of course have it. The above is just my personal attitude.

Yours cordially,

Derek J. de Solla Price,
Avalon Professor of the
History of Science.

October 8, 1968

Professor Derek J. Price
Dept. of History of Science & Medicine
Box 2036
Yale Station
New Haven, Conn. 06520

Dear Derek:

Thank you for sending me a copy of your Edison paper on "The Difference Between Science and Technology." As with all your work, I found it immensely stimulating.

My informants tell me that you are traveling around the world, or about to do so, so this "fan letter" might not catch up with you for some time. But I have not forgotten your pronouncement at the Paris meeting that you are returning to your "first love," the history of scientific instruments, and I look forward to receiving some manuscripts from you for possible publication in Technology and Culture.

Have a good trip, and thanks again for the published version of your talk.

Sincerely yours,

Melvin Kranzberg

MK/fc

File: Derek Price

Yale University *New Haven, Connecticut 06520*

DEPARTMENT OF
HISTORY OF SCIENCE AND MEDICINE

Box 2036, Yale Station

March 25, 1968

Professor Melvin Kranzberg
Secretary
Society for the History of Technology
Case Western Reserve University
Cleveland, Ohio 44106

Dear Professor Kranzberg,

Thank you for your letter of March 20 addressed to Dr. Price. He is abroad at present, but will certainly see your letter on his return in April.

I know that Dr. Price is at present preparing a report to the Council of the History of Science Society on the proposal to move the time and place of the annual meeting of the Society, and I am sure he will make a copy of this report available to you.

Yours sincerely,

Christine M. Tattersall.

Secretary to Dr. Price,
Avalon Professor of the
History of Science.

March 20, 1968

Dr. Derek J. de Solla Price
Department of History of Science &
Medicine
Box 2036 Yale Station
Yale University
New Haven, Connecticut 06520

Dear Derek:

I have one item of unfinished business left over from the SHOT annual meeting, and I don't know what to do with it. That item is your proposal to move the SHOT annual meeting to a different time, and your appointment as a committee of one to draft a statement which might be sent to SHOT members for their reaction to your proposal.

I realize that you have been very busy, which might be one reason why you have not written me about this matter. However, I have not written you either. Perhaps there is a realization on both our parts that such a questionnaire addressed to our members, while providing us with some interesting information, might still might not be very decisive in determining the time and place of the annual meeting. For the fact is--and I am certain that you are entirely aware of this--that SHOT depends greatly on cooperation with our sister organization, the History of Science Society. I doubt if we are strong enough to meet separately from the HSS, and I further doubt if our members would approve of any unilateral action on our part which might affect this cooperation. In the words of the TV commercial, "What's a girl to do?"

If you really want SHOT to change the time and place of its meeting, your problem, as I see it, is really to get HSS to change its meeting time and place. If the HSS would change, I am certain that SHOT would be forced to follow the HSS lead.

Perhaps you see the matter differently, and if so, I should appreciate hearing from you about this. I certainly do not want to thwart the will of our members nor to attempt to stifle you on this point. But I just don't see what could be accomplished by polling our

members on a change in time of the annual meeting when the SHOT Executive Council clearly expressed its determination to stay with the HSS in regard to meeting times.

As a matter of fact, members of the SHOT Executive Council who are also members of the Council of the HSS were asked to serve as liaison just incase the HSS were to change its meeting time, so that SHOT could immediately do likewise. In other words, we are back at the same point: SHOT will do whatever the HSS does in terms of meeting times.

I have the feeling that some time in the future the HSS and SHOT will probably change their meeting time, but obviously we are not yet ripe for such a change. Don't get discouraged. Just keep bringing the subject up at every meeting of SHOT and HSS until you eventually wear down the resistance. Of course, if the AHA or AAAS were to change the times of their meetings, this would certainly bring about some changes for SHOT and HSS.

But this discussion gets us nowhere. Let me know just what you would like me to do in terms of the action--or inaction--taken at our annual meeting, and I shall try to follow through with the appropriate measures.

I hope all goes well with you.

Sincerely yours,

Melvin Kranzberg

MK/mh

NASA ROUTING SLIP

	CODE	NAME *(if necessary)*		ACTION
				APPROVAL
1.	Case WR	Peg Kramberg		CONCURRENCE
				FILE
2.			✓	INFORMATION
				INVESTIGATE AND ADVISE
3.				NOTE AND FORWARD
				NOTE AND RETURN
4.				PER REQUEST
				RECOMMENDATION
5.				SEE ME
				SIGNATURE
6.				REPLY FOR SIGNATURE OF:
7.				

REMARKS:

FROM:	CODE: EH	NAME: EUGENE M. EMME NASA Historian	DATE: 10/20

NASA Form 26 (Rev. Jan. 1963)

U.S. GOVERNMENT PRINTING OFFICE : 1963 OF—671845

Prof Loewenberg:
FYI, but not direct feedback
to Derek. I called him.

EUGENE M. EMME, HISTORIAN
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
WASHINGTON, D. C. 20546

Gene

Yale University *New Haven, Connecticut 06520*

DEPARTMENT OF
HISTORY OF SCIENCE AND MEDICINE

Box 2036, Yale Station

File

October 16, 1967

Dr. Eugene M. Emme
NASA Historian
National Aeronautics and Space Administration
Washington, D.C. 20546

Dear ~~Dr. Emme~~ Gene,

I have just returned to Yale after a long trip abroad and write to thank you for not one but a whole pile of excellent NASA publications which have reached here during my absence. They are particularly welcome for I have recently begun to think a lot more, and even to write, about problems of organisation and instrumentation of modern science in their historical context. I think I have to produce a book on this and will take next year a leave to get the job started.

May I ask your help towards this end. I would like very much to get a first hand experience of the feel of space technology at its highest, and would like therefore very much to be present at the big Apollo shot when it comes off. Can your office please help me to get some sort of accreditation? I suppose I could in fact pass myself as a correspondent of one of the newspapers or scientific journals, perhaps the easiest would be through the London Daily Telegraph for whom I do quite a lot of unofficial work, but it seems more direct to ask you if I could not swing it directly as a researcher on the history of science and of modern science. Would you let me know if you can help?

Yours very cordially,

Derek J. de Solla Price,
Avalon Professor of the
History of Science.

File: Derek Price

Yale University New Haven, Connecticut 06520

DEPARTMENT OF
HISTORY OF SCIENCE AND MEDICINE

Box 2036, Yale Station

October 26, 1967

Dr. Eugene M. Emme
NASA Historian
National Aeronautics and Space Administration
Washington, D.C. 20546

Dear Gene,

Many thanks for your letter. I will look forward to hearing from your Mr. Brian Duff. I spoke of the matter too with Frederick Ordway who was just here yesterday, and he also offered help. So it looks as if I should be coming to see you some time within the next year. Ordway seems to me a very brilliant chap and I think you are very lucky to have such a one. I look forward to reading his 'History of Rocket Flight.' I suggested to Ordway, and now duly pass on to you, my somewhat hesitant opinion for what it is worth that the history of recent government operations in NASA, AEC, and other Agencies seems in a peculiar and perhaps dangerous professional position. I think that, in spite of the work of Hunter Dupree and others, there is a wide and widening rift between people who work on recent history and those who work on more classical history of science, technology and medicine, that is everything from the Babylonians to the early days of quantum mechanics. I have been quite struck at Yale by the temperamental and professional differences between historians of science in our classical sense on the one hand and people from the History Department who happen to be interested in industrial and organizational recent history. On reflection I find little reason, except a love of neatness, for wishing the two professional groups to merge or to prevent their splitting apart.

I see, of course, the matter from only one side and would welcome your views from where you stand. To take a slightly different tack, if one did want to do anything I'd suggest the way to do it would be for you people and the AEC, and perhaps Hunter Dupree, to call a special three-day meeting on the history of recent science and technology, use that opportunity to form yourself into a coherent group and either found a separate society with its own journal (which might be rather a pity), or make yourselves into a strong and vocal sub-group of the History of Science Society with a session and with prizes at the Annual Meeting.

False — Ordway cannot work for NASA

True, & not news

Good, but I would say it is more than this

Good but Derek didn't remember Goddard essay or AIAA award, let alone the SHOT? & T&C. Who's the sub-group?

Dr. Eugene M. Emme

October 26, 1967

In a way it would be very useful to have such a group pulling together the historians of science from one science and the 'science and public policy' people from the other. What do you think?

Yours sincerely,

Derek J. de Solla Price,
Avalon Professor of the
History of Science.

I agree! & there are other sub-cultures in history.

DEREK JOHN DE SOLLA PRICE

Personal details:

Born 22 January 1922 at London, England

Married Ellen Hjorth of Copenhagen, Denmark, 1947

Three children (born 1950, 1952, 1960)

Degrees:

B.Sc.	(1st Hons)	University of London (External)	1942
Ph.D.	(Physics)	University of London (External)	1946
Ph.D.	(History of Science)	University of Cambridge	1954
M.A.	(Honorary)	Yale University	1960

Present and Previous Posts:

Avalon Professor of History of Science, Yale University	Since 1962
Chairman, Department of History of Science and Medicine, Yale University	1961-1964
Professor of History of Science, Department of History of Science and Medicine, Yale University	1960-1962
Curator of Historic Scientific Instruments, Yale University	Since 1960
Visiting Professor of History of Science, Department of History, Yale University	1959-1960
Donaldson Fellow, Institute for Advanced Study, (School of Historical Studies), Princeton, New Jersey	1958-1959
Consultant in History of Physics and Astronomy for planning new U.S. National Museum of History and Technology, Smithsonian Institution, Washington, D.C.	1957

Nuffield Foundation Award for Research in the History of Scientific Instruments, University of Cambridge (Christ's College) 1955-1956

I.C.I. Fellow in the History of Science, University of Cambridge (Christ's College) 1951-1954

Lecturer in Applied Mathematics, University of Malaya, Singapore 1947-1950

Commonwealth Fund Fellow in Mathematical Physics, Princeton University, New Jersey 1946-1947

Research Assistant in Physics and part-time lecturer, S.W. Essex Technical College 1942-1946

(During part of this period I was engaged in research of military importance, for the British Iron and Steel Research Association under the direction of Dr. H. Lowery and under the Chairmanship of Mr. D. A. Oliver.)

Honorary Posts, Consultantships, Fellowships, etc.:

Academic Director, Summer Institute for Humanistic Discussions of Science, Oak Ridge Institute of Nuclear Studies 1963

Pegram Lecturer, Brookhaven 1962

Member, Science Information Council, National Science Foundation 1962-1965

Member of Council, History of Science Society 1961-1963

Member of Council, Society for the History of Technology 1960-1964

Honorary Research Associate, Smithsonian Institution Since 1960

Consultant, National Science Foundation Since 1959

Corresponding Member, International Academy for the History of Science Since 1958

Examiner in the History of Science, Cambridge University. Preliminary, Part I Natural Science Tripos 1955 and 1956. Natural Science Tripos 1956.

Member of Council, British Society for the History of Science 1953-1956

Honorary Secretary of the Sub-Commission for an international cataloguing of antique scientific instruments. International Union for the History of Science; Commission for Bibliography 1953-1956

Honorary Adviser on antique scientific instruments to the Department of British and Medieval Antiquities, British Museum, and to the National Maritime Museum, Greenwich 1953-1956

Honorarium from Cambridge University. History of Science Committee for acting in charge of the Whipple Museum of the History of Science 1953-1956

Publications

DEREK J. DE SOLLA PRICE

Books

AN OLD PALMISTRY (an edition of the Middle English treatise contained in MS. Digby Roll 3). Heffer, Cambridge 1953. xvi & 47 pp.

THE EQUATORIE OF THE PLANETIS (with a linguistic analysis by R. M. Wilson). A manuscript treatise ascribed to Chaucer. Cambridge at the University Press, 1955. xvi & 214 pp.

HEAVENLY CLOCKWORK. THE GREAT ASTRONOMICAL CLOCKS OF MEDIEVAL CHINA: A MISSING LINK IN HOROLOGICAL HISTORY. (In collaboration with Drs. Joseph Needham and Wang Ling). Monograph No. 1 of the Antiquarian Horological Society. Cambridge at the University Press, 1959. xv & 254 pp.

THE COLLECTOR'S SERIES IN SCIENCE, published by Basic Books, Inc., New York; a series of facsimile editions of historical scientific books, edited, with the addition of prefatorial material.

Volume I. NATURAL MAGICK, Giambattista della Porta, 1957.

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SCIENCE SINCE BABYLON, Yale University Press, March 1961. x & 149 pp. Paperback 1962. Arabic edition, Beirut 1963.

LITTLE SCIENCE, BIG SCIENCE, Columbia University Press, May 1963. ix & 119 pp. Paperback 1965.

Unpublished book

A HISTORY OF BLAKENEY HAVEN, NORFOLK - A GREAT MEDIEVAL SEAPORT. 1959.

Papers on Physics and Mathematics

1. THE EMISSIVITY CHARACTERISTICS OF HOT METALS, WITH SPECIAL REFERENCE TO THE INFRA-RED. (In collaboration with Dr. H. Lowery). Publication 7/1943 of the British Iron and Steel Research Association. 36 pp.

2. THE INFRA-RED EMISSIVITY OF METALS AT HIGH TEMPERATURE, Nature, Vol. 157, 1946, p. 765.

3. SOME UNUSUAL SERIES OCCURRING IN N-DIMENSIONAL GEOMETRY, Mathematical Gazette, Vol. 80 (1946) Note 1907, 149-50.

4. NOTE ON THE CALCULATION OF OPTICAL CONSTANTS, Proc. Phys. Soc. LVIII, 1946, 704-706.

5. THE EMISSIVITY OF HOT METALS IN THE INFRA-RED, Proc. Phys. Soc. LIX, 1947, 118-131.

6. THE TEMPERATURE VARIATION OF THE EMISSIVITY OF METALS, Proc. Phys. Soc. LIX, 1947, 131-138.

7. A THEORY OF REFLECTIVITY AND EMISSIVITY, Proc. Phys. Soc. LXII, 1949, 278-283.

Papers on the History of Science

1. QUANTITATIVE MEASURES OF THE DEVELOPMENT OF SCIENCE, Archives Internationales d'Histoire des Sciences, 14, 85-93; and Actes du VI Congres International d'Histoire des Sciences, 413-21, Amsterdam 1950.

2. THE EARLY OBSERVATORY INSTRUMENTS OF TRINITY COLLEGE, CAMBRIDGE, Annals of Science, 8, 1-12, 1952.

3. THE EQUATORIE OF THE PLANETIS, The Times Literary Supplement, 29 February and 7 March, 1952.

4. CHAUCER'S ASTRONOMY, Nature, 170, 474, 1952.

5. THE EQUATORIE OF THE PLANETIS, (reprinted from items 13 and 14 with facsimilies, additions, etc.) Journal of the S. W. Essex Technical College, III, 155-159.

6. CHAUCER'S ASTRONOMY, Friday Evening Discourse, 28 November 1952, at the Royal Institution. Journal of the Royal Institution. 12 pp., 1953.

7. THE CAVENDISH LABORATORY ARCHIVES, Notes and Records of the Royal Society, X, 139-147, 1953.

8. MUSEUM OF THE CAVENDISH LABORATORY, AN OUTLINE GUIDE TO EXHIBITS, Cambridge University Press, for the Cavendish Laboratory, 1953. 6 pp.

9. THE EQUATORIE OF THE PLANETIS, Bulletin of the British Society for the History of Science, I, 223-226, 1953.

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11. A COLLECTION OF ARMILLARY SPHERES AND OTHER ANTIQUE SCIENTIFIC INSTRUMENTS, Annals of Science, 10, 172-187, 1954.

12. IN QUEST OF CHAUCER - ASTRONOMER, Cambridge Review, October 30, 1954, 123-124.

13. HOW MODERN PHYSICS BEGAN, in Atomics in the Service of Mankind, Daily Mail Publications, 1955.

14. THE MATHEMATICAL PRACTITIONERS, Journal of the Institute of Navigation, VIII, 1955, 12-16.

15. MEDIEVAL LAND SURVEYING AND TOPOGRAPHICAL MAPS, The Geographical Journal, CXXI, 1955, 1-10.

16. SOME EARLY ENGLISH INSTRUMENT MAKERS, Endeavour, XIV, 1955, 90-94.

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File

May 29, 1967

Dr. Derek J. de Solla Price
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Dear Derek:

Thank you very much for your kind words of my review of the Holiday book. It really was not that good a review, but I appreciate the generosity of your sentiments.

I had not realized that my comments were so out spoken nor that they might be especially newsworthy to a British audience. I should be interested in learning what the reactions of Michaelis might be.

I learned from Bob Schofield, via Fred Kilgour (who has been consulting on the library problems arising from the federation of Case and Western Reserve), that you have lost much weight and that you look very young and fit. How do you do it? Do I have to have a heart attack in order to undergo a similar metamorphosis?

One final comment. I congratulate you on getting the services of Marty Klein. His departure is a very great loss to our Department of Physics and to our program in History of Science and Technology. Not only is he a top-notch scholar, but he is an extremely wonderful person. He is a very thoughtful, wise man, and he has been one of the stalwarts on our faculty for many years. He is a marvelous colleague and a fine friend. I shall really miss him--this is a personal as well as an institutional loss. However, as a friend, I am very happy for him, because I know that he will be quite happy at Yale, just as you will be very happy with him.

Again, my thanks for your kind words.

Sincerely yours,

Melvin Kranzberg

MK/mh

COPY

YALE UNIVERSITY
Department of History of Science and Medicine
BOX 2036 · YALE STATION · NEW HAVEN · CONN. 06520

May 25, 1967

Dr. Anthony Michaelis
18 Park Place Villas
London, W. 2, England

My dear Anthony,

I send you two enclosures: one which you probably have already for your moon collection; a second being the review by Mel Kranzberg of The Integration of Technologies, Edited by Leslie Holliday. I send you the latter because this is an uncommonly fine and outspoken review on something that I think needs to be said and has needed to be said for a long time. I have often wanted to say it myself, but don't think I could have done so so well. I suggest to you that the things that Kranzberg says about British engineering and technology are a newsworthy castigation of the dangerously outmoded British attitude. Kranzberg, by the way, is Editor-in-Chief of TECHNOLOGY AND CULTURE, and Secretary for the Society of History of Technology.

Yours cordially,

DJdeSP:evw
Enclosures

Derek J. de Solla Price
Avalon Professor of the
History of Science

cc: Dr. Melvin Kranzberg

Dear Mel,

I really do congratulate you on the superb review.

D.P.

Yale University *New Haven, Connecticut*

DEPARTMENT OF
HISTORY OF SCIENCE AND MEDICINE

Box 2036, Yale Station

May 29, 1967

Dr. Melvin Kranzberg
Secretary
Society for the History of Technology
Case Institute of Technology
Cleveland, Ohio 44106

Dear Dr. Kranzberg,

Thank you for your letter of May 22, and all your advice in connection with the Guide. We will contact the institutions you mention, and try to have the details inserted in the Guide when proofs are received from Isis.

With many thanks.

Yours sincerely,

Christine M. Tattersall.

Derek J. de Solla Price,
Avalon Professor of the
History of Science.

May 22, 1967

Professor Derek J. DeSolla Price
Department of the History of Science and Medicine
Yale University
New Haven, Conn.

Dear Derek:

You ask for additions, deletions, and corrections to your 1967 "Guide to Graduate Study and Research in the History of Science and Medicine," and I have a couple of items which might well be added to your list of institutions where there are opportunities for graduate studies and research in the history of science (and technology) and medicine.

Iowa State University (Ames) inaugurated a graduate program in the history of science in the academic year 1966-67. This graduate program is for the master's degree only, not for the Ph.D. I suggest that you write to Harold Sharlin or Gene Ferguson for further information regarding this program.

Kansas State University (Manhattan) has brought together a group of faculty who are active in research in the history of science and technology, although I am not certain that they have a degree program which is specifically in the history of science and technology. I suggest that you write to Robin Higham or tb Briggs, and they can provide you with the details.

Finally, I think that the Master's program, operated jointly by the Hagley Museum and the University of Delaware has been expanded to a Ph.D. program at Delaware. You might write John Beer for details. I am not certain that this qualifies as a graduate program in the history of science and technology; it might simply be a Ph.D. program in history where one can take some work in the history of science.

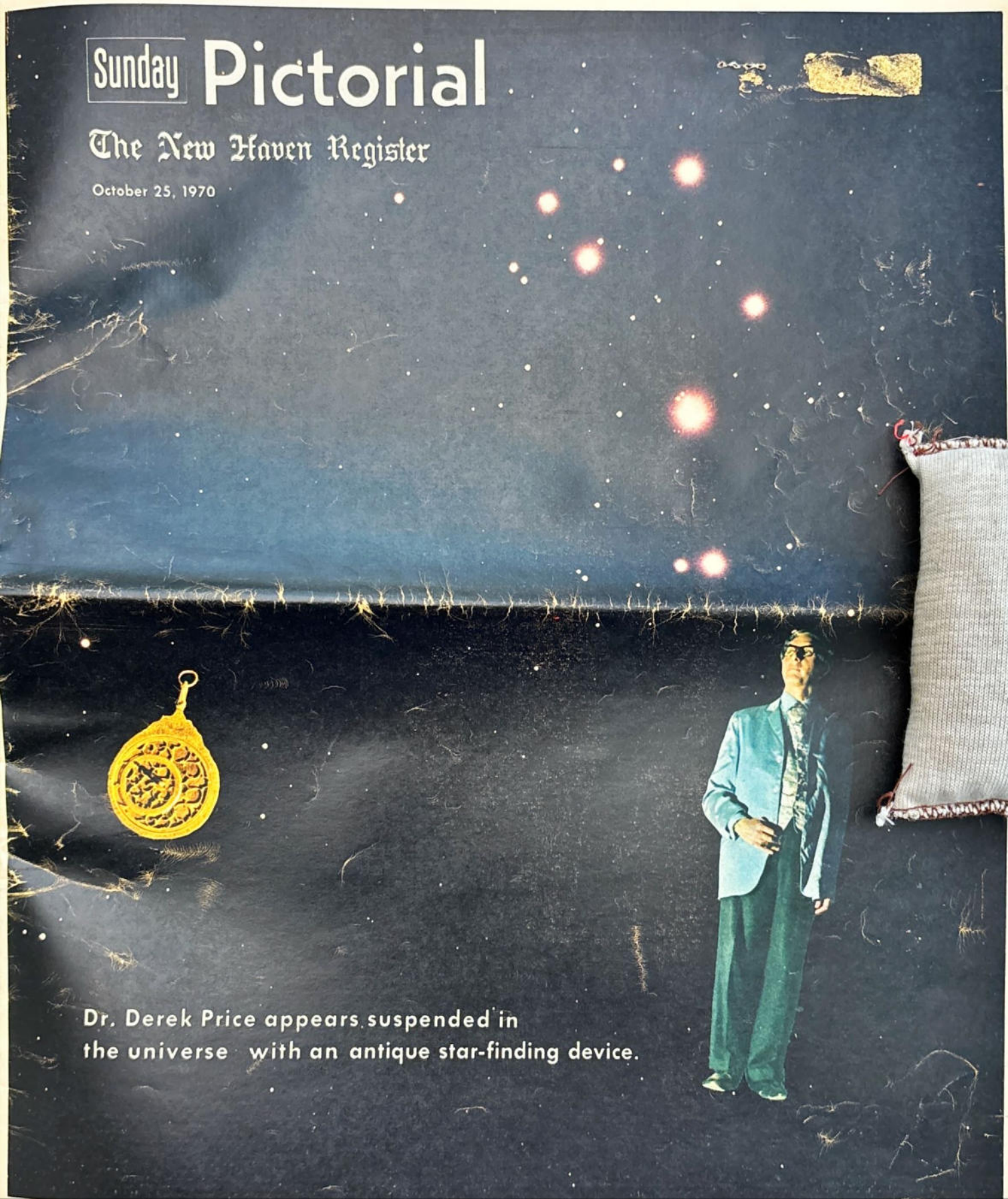
You are performing a valuable service in compiling this list, for it contains information which should be useful to a large audience.

I hope that you are well. I saw Jerry Stannard in Boulder a couple of weeks ago, and he reported that you have lost weight and are looking very trim and fit. I which I could say the same, but I went on the banquet

File:—

Derek Price

Sunday Pictorial
The New Haven Register
October 25, 1970



Dr. Derek Price appears suspended in the universe with an antique star-finding device.

The Priceless Antiques Of Dr. Price

"It has been the gift and good fortune of the United States, to derive more benefit economically and in power and spirit from modern science than any nation has ever done before. Two-thirds of the qualified scientists and engineers in this country work on development, production and administration in production. This is important because it is exactly this sort of wealth, derived from our brains and fine training that is beginning to replace the natural advantages that one had first of rich food lands, then of great resources of mineral and other natural wealth.

"The richness of this land now lies ultimately in the laboratories of the academic world and the near-academics employed in industry and government. It is exactly in this area that the U.S.A. will meet during the next decade a very serious challenge from Japan and perhaps from other countries also later."

Derek J. De S. Price Aug. 19 report to the U.S. House of Representatives subcommittee on science research and development.

If your house is anything like mine, once or twice a year, this kind of domestic dispute erupts:

"Hey, what are you doing? You can't throw that away. That was grandfather's first radio. It's a valuable antique now."

"Who ever heard of a radio being an antique? This attic's too crowded and besides it doesn't work. And it has those dirty old bottles with it."

"Those old bottles were batteries. See, here, you push down this rod in the center and that dips the center plate into the acid and turns the radio on."

"You'd never get any money for that—a chair or a crock, yes—but not an old radio."

"Oh, it's worth something."

And it is.

That old radio—even its vacuum tubes and especially those flask batteries are worth something indeed to the right collector.

Just ask Dr. Derek Price, professor of the history of science at Yale, who, for recreation, pleasure and profit—when he isn't writing books—haunts the antique shops, flea markets and junk shops of the world looking for bargains.

"When I started collecting in 1945," said Dr. Price, the foremost of the dozen or so people in the world who specialize in the history of science, "things that cost tens of dollars now cost $1,000."

When he came to the United States from England, Dr. Price bought his suburban home in North Haven by selling one scientific antiquity no bigger than his hand.

The device was an astrolabe which he calls "the Rembrant of antique scientific instruments." To the medieval astronomer, Dr. Price explains, this flat hand-held teardrop-shaped device with its moving circular dials is what a slide rule is to an engineer. With it he can locate the position of a star over any place from New Haven to Constantinople in any year.

The astrolabes are worth so much today because only 1,000 were made, 500 in Europe, 500 in Arabia. The one Dr. Price sold was European and dated from the 13th Century. He has another, an Arabic one, made in the 17th Century, not as valuable as the first, but one of the top items in his collection.

Knowledge is a weighty factor in the scientific antiques field as in many others. This gives Dr. Price unusual leverage.

In England, for instance, several years ago, Dr. Price happened into a college science laboratory bristling with very old microscopes which the college unhappily could not afford to replace.

Astrolabe

"I will give you new for old," said Dr. Price like a figure from the Arabian Nights.

"Done," said the college.

In went a dozen sparkling new Zeiss microscopes, worth $400 to $500 each.

Out with Dr. Price went the old instruments. He sold them for $1,000 each on the scientific antique market in Europe.

An essential quality of the valuable scientific antique is the marriage of a now-disappearing craftsmanship with scientific utility and often a third ingredient—history.

As an example of all three, Dr. Price shows a finely engraved surveyor's compass with brass sighting bars on either side inscribed with the maker's name, place and date "Gourdin . . a Paris 1780". Similar instruments used by Washington and Jefferson to survey their estates are on display at Mount Vernon and Monticello.

A sundial made in Pittsburgh with some sophisticated mathematical notations and a great wedge-shaped marker is the only scientific instrument of antique quality which Dr. Price knows of made in that city and hence is doubly valuable.

The most ardent buyers of scientific antiquities are scientists themselves. "People who work in science", Dr. Price explains, "know that these things of science are indispensable." Also, he points out, scientists are intelligent, knowledgeable with refined perceptions and frequently have the money to pay. To them, a fine antique instrument stands for a certain hand-in-hand advancement of knowledge with the craftsman learning from the scientist in the creation of a new instrument and the scientist using a device so excellently made that it becomes more than science and craft—a work of art in itself.

The best sources for scientific antiques are the flea markets, junk and pawn shops and even antique shops, although sometimes it is hard to explain to shopkeepers just what one is seeking, Dr. Price says.

In Europe the flea markets in Paris and London have been his favorite spots. The market on Portobello Road in London produced a spectacular find, an early Morse telegraph key.

Dr. Price only suspected, but it turned out to be true, that under the grime was a shining mahogany case with a wooden knob for a key, platinum contacts, square bus bars made of pure copper, nickle plated, all mounted on Vulcanite, the first commercial plastic. The price was small. Its value now, great.

But the best of his bargains, ironically, have come from some of the finest and costliest antique

Story and Photos by Eugene Seder

Early X-ray tube—radio tube

houses in the world. One day in Copenhagen, in a fine shop, he recognized an old Chinese sundial casually placed as a decoration on a piece of furniture. "I got it for $100," he said gleefully. "It's worth thousands."

To children, the most fascinating object in his collection is a bloodletting machine. Bloodletting was a favorite cure in older medicine; the object being to drain diseased blood to be replaced by the body with good blood.

The bloodletter is a two-inch cylinder with a dozen slits in the bottom and a razor-sharp blade behind each. The device is pressed against an arm or a leg. The button on the back is pushed and the blades slice out a quarter of an inch quicker than the eye can see. The "bad blood" spurts out to be caught in a cup.

Many instruments, well crafted and made of materials may be good buys but Dr. Price warns against two in particular, sextants and microscopes.

Sextants are used in celestial navigation to measure the angle of stars. The danger: "Everyone who ever became a midshipman in the Navy got one when he graduated."

And microscopes: "Everyone whose Uncle George was once a doctor has a microscope."

That is not to say that some microscopes are not valuable. A good 18th Century instrument would buy a car. An original Leeuwenhoek would buy a palatial country estate or hotel.

(continued on page 8)

Steam engine model

DR. PRICE, CONT'D.

Generally a good scientific antique has a certain quality about it, Dr. Price explains. "Scientists, when they get enthusiastic use terms such as 'beautiful theorem' — 'elegant equation' — 'revelation'.

Well my scientific instruments express these ideas in tangible form. "And they wouldn't have so much antique value if they didn't have so much historical value. They tell one so much about what went on."

If the instrument is marked with the name, place and date its value is significantly augmented. With a signature the value doubles or triples; a date doubles it again.

But the scientific finds Price values most have brought him no immediate profit other than the books he has written about them.

Two of the books, both out in paperback now: "Science Since Babylon" and "Little Science, Big Science," have had extensive popular sales. A shelf full of more technical works has appeared in English, Russian, Japanese, Polish, even Arabic. Dr. Price is considered the creator of "the science of science." He serves on President Nixon's Science Advisory Council.

His favorite among his works is one on the ancient scientific machines discovered by Greek sponge divers off Antikythera, Greece about 1900. Archaeologists sifting through objects in this, the first ancient Greek treasure ship ever discovered, found heavily corroded gear-toothed wheels. The archaeologists could make nothing of them. Written history contained no reference to such a machine.

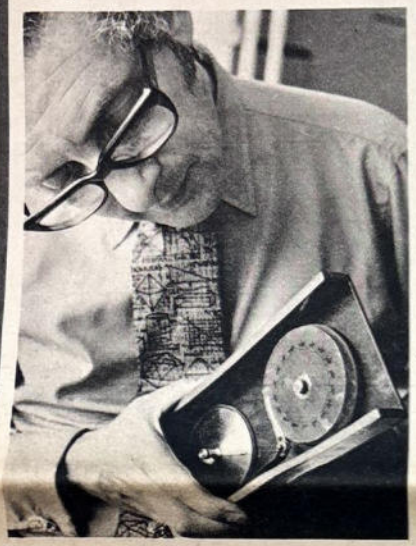
Dr. Price was summoned and after studying the gears was able to reconstruct in drawings and plans a complicated many-geared mathematical computer from 2,000 years ago, previously unknown to historians.

In another book he described a tower in Athens which he determined was a water-powered astronomical model, "The Zeiss Planetarium of the ancient world."

In another work, he analyzed the works of a Chinese water clock in K'arten, Honan, China dated 1080 and determined that it contained the first known clock escapement.

In his earlier research in Britain he turned up a manuscript by Geoffrey Chaucer on a companion instrument to the astrolabe, a planet finder. Chaucer's book on the astrolabe was well known but this newly found work was in Chaucer's own writing, and

The first movie



provided for the first time a touchstone for other Chaucer manuscripts.

Dr. Price is a man who finds joy not only in the elegance of the objects he collects but in the science which they represent. And joy he considers to be one of the essences of true science.

"The greatest scientists, like Einstein," he explained, "did it for fun because it is part of the beauty of the universe. After that, something useful may come of it.

"It is well known that to pursue the useful rather quickly results in scientific barrenness. If you treat science as the highest endeavor of civilization it helps make civilization better. But if you treat it as a slave, it can easily turn upon you. This is known as the Roman mistake or the Marxist syndrome."

With his curly silvering hair, unlined face and sometimes acid comments in a clipped British accent, Dr. Price is given to severe pronunciamentos of this sort. Other disciplines are not above his barb. Philosophy, for example, he calls "the science which did not grow." This, he admits, is not likely to make friends among philosophers.

He has two Ph.Ds, the first in physics, the second in history from London University and Cambridge, respectively. Still a British citizen, he came to this country in 1946 specifically to design and fill the scientific instrument collection at the new Smithsonian Institution in Washington. With that complete and after further work in mathematics and physics at Princeton, Dr. Price went to Singapore as professor of mathematics. There the impression struck him that science is in trouble.

"In 1950 I became terribly concerned over the future of science, the sort of thing that people think about now. So from a university professor, I became a student again, this time in history, and took my second Ph.D."

In 1959, he came to Yale, delivered a series of five lectures in five weeks on the history of science and was named the first Avalon Professor of the History of Science at the university — "a department created for me."

He does not drive a car for the same reason, he says, that he does not keep a loaded pistol. His wife, Ellen DeSolla Price, noted in craft circles for her hand-wrought gold jewelry, drives him and their three children about. When the car breaks, Dr. Price refuses to bring his mind to bear upon it. "That's gross machinery," he says.

Ivory sundial—1600

Bloodletter

His passion for scientific machinery started when he was a boy and by the time he reached the university he would say "show me the smallest significant part of any scientific instrument and I will tell you what it is."

This grew naturally into his scientific antique addiction. Now he is turning toward the future, predicting what items in use now, will become the valuable antiques of the future. He is currently collecting items from working laboratories, especially glassware, still in use but no longer manufactured.

"Some of this glassware is beautiful," he said. "Most of it will be thrown away and smashed.

"Very valuable now is the sort of thing young Tom Edison grew up with. Most of these things are lost. The first telephone switchboard in New Haven is lost. If anyone finds that, he has a fortune."

His advice on how to become a successful scientific instrument collector is: "You have to come to it with a prepared mind — like Shakespeare. You can never tell at any time what is going to be important next.

"Who would have thought that a Mickey Mouse watch would become valuable. But a Mickey Mouse watch in mint condition will fetch several hundred now."

□ □ □