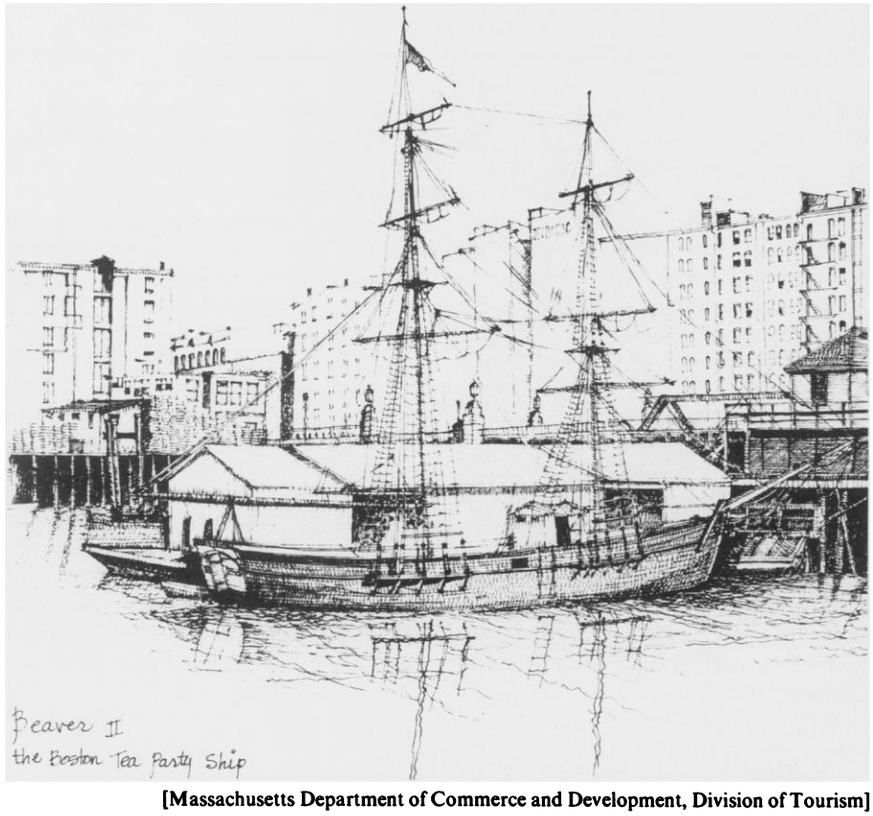
American Science—Two Hundred Years of Development

The Bicentennial has been seen by Americans as a time for retrospection and evaluation. It is in this spirit that the AAAS has included a number of sessions on the history of American science at the Boston meeting. Scholars will examine the scientific activity of Americans, consider the cultural context within which science was practiced, explore the attitudes of American society toward science, and delineate the great changes which have taken place in the American scientific community during the two centuries since the signing of the Declaration of Independence.

Perhaps the most striking change for the American scientific community in the past 200 years has been its movement from a position on the periphery of the world scientific community to that of the center. Colonial practitioners of science were but a tiny group at the edge of a wilderness. They represented an extension of European science just as the colonies represented extensions of European political and economic systems. These colonial scientists were dependent upon Europeans for books, financial support, inspiration, places to publish, and even research ideas.

The struggle for independence proved in many ways to be a setback for this fragile community. Science was primarily an activity of the urban centers, not the countryside, but it was the urban centers which were most affected by the war. Every major colonial city was occupied by the English at some point, with the result that buildings were damaged or inaccessible, and the contents of libraries, such as the one belonging to the American Philosophical Society, were scattered. Men who otherwise might be concerned with natural philosophy or natural history were preoccupied with military or political problems. The close ties with English scientists were disrupted.

American science began a rapid recovery, however, with the coming of peace. Lines of communication with Europeans were renewed and strengthened. The surge of nationalism which was part of the Confederation period also helped. Science was credited with the potential for playing a large role in completing the process of freeing the United States from control by Europe by supplying the tools needed to end this country's economic dependence upon Europe. Achievement in science was also thought useful for illustrating the glory of republicanism. The evolution toward world leadership in science had begun.



[Massachusetts Department of Commerce and Development, Division of Tourism]

The antebellum years were the ones in which the basis for this leadership was established, especially regarding institutional development. Journals, organizations, and other institutions so essential to a scientific community began to appear and proliferate. Among these institutions were academies of science, scientific schools, observatories, surveys, and the AAAS. As early as 1830 science began to play an increasingly significant role in the curriculum of American colleges. The federal government started the long process of defining its relationship to scientific activity, a process which ultimately resulted in ever-increasing (until recently) financial support for research.

Paralleling this institutional development were qualitative changes in the activity itself. Scientists in the Federalist period always seemed to be about 15 years behind their counterparts in Europe. Within a half century, however, American researchers could be depended upon to be familiar with contemporary work in Europe and able to exchange ideas and data on a peer level.

One particularly important phenome-

Science Film Festival

The tradition of AAAS showing short films of an educational and entertaining nature at its Annual Meeting will continue and be even better this year in Boston. Some 50 short films will be featured at the *Science Film Festival*, running from 10:00 a.m. to 3:00 p.m. on Thursday, Friday, Sunday, and Monday, with Saturday afternoon devoted to the showing of three feature films in conjunction with the symposium "Science as Drama," scheduled for that morning.

Thursday, 19 February

10:00 a.m. Adolescence and Learning Disabilities
10:25 a.m. Attraction of Gravity
10:34 a.m. Jupiter Odyssey
11:02 a.m. Nails
11:06 a.m. The Wizard Who Spat on the Floor
11:47 a.m. Nature's Ever-Changing Communities
12:01 p.m. Planning for Floods
12:29 p.m. Guided by the Nene
12:56 p.m. Crystals and Their Structures
1:18 p.m. Rhythmetic
1:27 p.m. Charles Darwin
1:51 p.m. The Right to Die
2:47 p.m. Bate's Car: Sweet as a Nut

Friday, 20 February

10:00 a.m. Computer-Aided Design and Manufacturing of Forging Dies
10:14 a.m. The Big Pickup
10:42 a.m. Platypus—*Ornithorhynchus anatinus*
11:04 a.m. Nature's Colors: The Craft of Dyeing with Plants
11:15 a.m. Antarctica
12:12 p.m. Forces Make Forms
12:25 p.m. The Fable of He and She
12:37 p.m. Fire in the Sea: The Origin of Pillow Lava
12:57 p.m. Prenatal Development
1:20 p.m. The Weird Number
1:33 p.m. The Gold Dredge
1:50 p.m. Lobster Country
2:16 p.m. Hunger (*La Faim*)
2:28 p.m. Butterfly: Life Cycle of the Monarch
2:39 p.m. Time Line
2:49 p.m. Tops

Saturday, 21 February

"Science as Drama" (feature films)
1:00 p.m. Dr. Ehrlich's Magic Bullet
2:43 p.m. Beginning or the End
4:33 p.m. Star Trek

Sunday, 22 February

10:00 a.m. At the Time of Whaling
10:38 a.m. The Tribe That Hides from Man
11:40 a.m. Women in a Changing World
12:28 p.m. Ratopolis
1:25 p.m. The Lost World of the Maya
2:01 p.m. The Early Americans
2:42 p.m. A Man Called Bee: Studying the Yanomamo

Monday, 23 February

10:00 a.m. Regular Homotopies in the Plane: Part I
10:14 a.m. Prairie Spring
10:44 a.m. Pavlov: The Conditioned Reflex
11:09 a.m. Computer Color Generation
11:32 a.m. Carnivorous Plants
11:44 a.m. Acupuncture
12:11 p.m. Dinosaurs' Dilemma: The Meaning of the Variable
12:23 p.m. Tragedy or Triumph?
12:51 p.m. Girls at 12
1:21 p.m. Classifying Animals: And Our Place in the Animal Kingdom
1:33 p.m. Assault on the Unknown
2:01 p.m. Who Stole the Quiet Day?
2:17 p.m. Eternal Change: The Story of a Mountain
2:31 p.m. Ecology and Behavior of the Patas Monkey
2:49 p.m. Anti-Matter

* * *

non of the years just prior to the Civil War was the development of the role of professional researcher within American society. American scientists had filled many roles in the first half of the 19th century. They had been teachers, artists, explorers, military men, physicians, and the well-to-do occupying their free time with investigations of natural phenomena. But by 1850 there was clearly a corps of men in the United States who were being paid to engage in scientific activities. Their employers included the federal government (Coast Survey, Naval Observatory, Nautical Almanac), state governments (geological and natural history surveys), and even institutions of higher education (Harvard College Observatory and the University of Michigan).

The years after the Civil War have been, in many ways, more of the same. While the number of practitioners and the quality of their work has grown tremendously, the precedents for the institutional structure within which this expanding community has operated all predate the Civil War. Governmental support for science, research-supportive institutions of higher learning, even the concept of specialization, was not new in 1865, let alone 1900.

Looking back over the last 200 years, American science has had at least two characteristics. The first has been the desire to take the best that Europe has had to offer in ideas and institutions, although these ideas and institutions were often modified to American conditions. Our universities, laboratories, and observatories have all borne witness to this. The second characteristic has been the intertwining of the quantitative and qualitative growth of American science with the development of supportive scientific institutions. Genius can go only so far without the support of society and the presence of the institutions and organizations within which scientific activity takes place.

It is this second characteristic which we must keep in mind as we prepare for our third century. The historians can show us how difficult was the move from the edge of the international scientific community to its center, but only society can decide if we stay at the center.

—MARC ROTHENBERG

The author is assistant editor, Joseph Henry Papers, Smithsonian Institution.

Grants for Foreign Graduate Students

AAAS has available ten grants at $200 each to assist foreign graduate students at U.S. universities in attending the AAAS Annual Meeting in Boston, 18–24 February 1976.

Interested students should apply directly to Dr. Irene Tinker, Office of International Science, AAAS, 1776 Massachusetts Ave., NW, Washington, D.C. 20036.

Call for Nominations

AAAS-Newcomb Cleveland Prize

The AAAS-Newcomb Cleveland Prize of $2000 and a bronze medal is awarded at the Annual Meeting, on the occasion of the Retiring President's Public Lecture, to the author or authors of an outstanding scientific paper delivered at the previous Annual Meeting. The Prize paper will also be published in *Science*.

The Committee of Judges for the 1976 Prize invites nominations of papers presented at the Boston Meeting which report for the first time the results of the author(s) original research. Not eligible are ceremonial addresses, review papers, and previously published or reported work.

Nominations should be sent to the AAAS Executive Office, 1776 Massachusetts Ave., NW, Washington, D.C. 20036.

Third NOVA Season Announced

WGBH, Boston, in cooperation with the AAAS, is pleased to present the first half of NOVA's third season. The second half will be announced in a later issue of *Science*.

Since the beginning of the NOVA series in 1974, the AAAS, through its Communications Department and now the Public Sector Programs Division, has worked in a variety of ways to publicize the program and its follow-up activities. For example, the division distributed NOVA bibliographies compiled by the Boston Public Library and established a network of experts to answer viewers' inquiries about the NOVA programs.

Last spring, the AAAS solicited suggestions from individuals who had expressed an interest in science programming on television. Many of their suggestions were incorporated in the new NOVA season by executive producer Michael Ambrosino. In the fall, AAAS and the Boston Public Library cosponsored a weekly "Best of NOVA" series at the library.

BETSY S. KWAKO
Public Sector Programs

Please consult local television listings for air times of the following programs:

4 January: Predictable Disaster *(WGBH):* Why earthquakes occur, how predictions are made, the threat they pose to cities at risk, and the advantages—and disadvantages—of making an earthquake a predictable disaster.

11 January: Joey *(BBC):* A re-creation of the life of Joey Deacon, 54, and a spastic since birth. Joey told his story to Ernie, an imbecile who nonetheless understood Joey's speech. Remarkable performances by two spastic actors.

18 January: Meditation and the Mind *(BBC/WGBH):* Transcendental meditation has recently had phenomenal success in America. This film looks critically at evidence of its beneficial effects and casts doubt on some of its more extreme claims.

25 January: The Planets *(BBC):* This film looks at the 14-year era of manned and unmanned exploration of the solar system. The revolution in our understanding of our place in the stars and solar system is explored.

1 February: A Desert Place *(WGBH):* This film explores desert ecology and captures some remarkable natural phenomena: a desert snowstorm and a lashing summer monsoon. Filmed near Tucson, Arizona, it shows a rich variety of desert life-forms.

8 February: A Small Imperfection *(BBC):* This sensitive film examines the care and treatment of spina bifida children and details recent research on prenatal diagnosis. The film asks whether heroic measures should be taken to preserve the lives of severely malformed babies.

15 February: Antarctica *(WGBH production of Franz Lazi material):* The Antarctic ice provides a perfect record of the atmosphere over the last 100,000 years. Hundreds of scientists examine its fossil records and the fascinating adaptations of its present animals to the cold.

22 February: The Race for the Double Helix *(WGBH production of VSM Co. material):* Author Isaac Asimov tells the story of the discovery of DNA's structure. Unique footage of James Watson and Francis Crick. Attention is also given to the role of the late Rosalind Franklin.

29 February: Why Do Birds Sing? *(WGBH repeat):* On a trip through woods and fields, this film shows how simple "playback" experiments have begun to unravel the role of bird song in territoriality and species recognition. Some parallels with human speech are shown.

7 March: The Renewable Tree *(WGBH):* This film examines the very different methods of farming trees used in the southeastern United States and in the Pacific Northwest. The pros and cons of controversial "clear-cutting" are examined in detail.

14 March: The Williamsburg File *(BBC/WGBH):* A tour of colonial Williamsburg by its chief archeologist, Ivor Noel Hume. Through Williamsburg's painstaking accuracy, fascinating clues about the ordinary life of colonialists are brought out.

21 March: The Overworked Miracle *(BBC):* Today antibiotics are taken for granted, and their medical value is being eroded. There is a massive overuse of antibiotics in conditions where their prescription is not justified.

28 March: What Time Is Your Body? *(WGBH repeat):* If you've ever sensed that your body reacts differently at different times, this film will tell you why. It's all about when you work best and worst, with helpful, little-known facts.

Annual Meeting Boston
18-24 February 1976

Advance Registration Form
(D)

Enclosed is:

☐ $20 Single Registration Fee
☐ $30 Double Registration Fee (attendee and spouse)
☐ $10 Single Student Registration Fee
☐ $15 Double Student Registration Fee (student and spouse)
☐ $10 One-Day Registration Fee _____
(Specify Day)

Program and badge will be mailed to each registrant in late January.
Registrations received after 30 January will be held at the AAAS Information Booth.

NAME OF REGISTRANT: _____
(Last Name) (First and Initial)

NAME OF SPOUSE: _____
(Last Name) (First and Initial)

REGISTRANT'S
MAILING ADDRESS: _____
[For receipt of program(s) and badge(s)] (Street) (City/State) (Zip Code)

ADDITIONAL REGISTRANTS: _____
(List full name and mailing address)

_____

_____

REGISTRANT'S
INSTITUTION OR COMPANY: _____

_____ | | | | | |
(City) (State) (Zip Code)

CONVENTION ADDRESS: _____ Check days attending: Wed ☐ Thu ☐ Fri ☐ Sat ☐ Sun ☐ Mon ☐ Tue ☐
(Where you can be reached) (Hotel or Street Address)

☐ **Please check here if you need special services due to handicap. We will contact you prior to the meeting.**

Mail to: American Association for the Advancement of Science, Dept. R,
1515 Massachusetts Ave., NW, Washington, D.C. 20005

SURVEY OF ATTENDEES
Annual Meeting, Boston, 18–24 February 1976

Your answers to the following questions will help us in planning future AAAS Annual Meetings. Please complete the following form and either return it with your registration form or send in separately (to the same address) if you wish to respond anonymously (in any case, the two forms will be processed separately).

Principal Professional Interest

11 ☐ Physical, mathematical
12 ☐ Biological, medical
13 ☐ Engineering
14 ☐ Social, behavioral
15 ☐ Science policy
16 ☐ . . . . . (other)

Principal Professional Activity

21 ☐ Teaching, education
22 ☐ Health practice
23 ☐ Other practice, consulting
24 ☐ Research, development
25 ☐ Administration
26 ☐ . . . . . (other)

Institutional Affiliation Type

31 ☐ University, 4-year college
32 ☐ Other educational
33 ☐ Industrial, commercial
34 ☐ Other private
35 ☐ Government
36 ☐ . . . . . (other)

Highest Educational Level

41 ☐ Doctoral Degree
42 ☐ Master's Degree
43 ☐ Other professional
44 ☐ Bachelor's Degree
45 ☐ . . . . . (other)

Age

51 ☐ Under 26 years
52 ☐ 26 to 35 years
53 ☐ 36 to 45 years
54 ☐ 46 to 55 years
55 ☐ 56 to 65 years
56 ☐ Over 65 years

Distance Traveled to Meeting

61 ☐ Under 51 miles
62 ☐ 51 to 100 miles
63 ☐ 101 to 200 miles
64 ☐ 201 to 500 miles
65 ☐ 501 to 1000 miles
66 ☐ Over 1000 miles

Membership: in AAAS ☐ 71, in Affiliate ☐ 72 . . . . . (specify) Neither ☐ 73

Reservations

Hotel Rates*

Annual Meeting
Boston
18-24 February 1976

The American Association for the Advancement of Science will hold its 1976 Annual Meeting in Boston, 18–24 February. The majority of sessions will be held in the Sheraton-Boston and in the John B. Hynes Veterans Auditorium. The exhibits (*Science International*) as well as AAAS registration and information desks will be located in the Hynes Auditorium. The following hotels will be used for housing:

Hotel	Single	Double	Twin	Suites**	Parking
SHERATON-BOSTON Prudential Center (No. of rooms held: 1200)	$25 29 31	$36 38 40	$36 38 40	$65 and up	Free 24-hour parking for registered guests; $1 valet charge.
COPLEY PLAZA Copley Square (No. of rooms held: 250)	$24 28 30	$32 36 38	$32 36 38	$60 and up	Free 24-hour parking for registered guests; $1.75 valet charge.
THE LENOX 710 Boylston Street (No. of rooms held: 125)	$24 28	$31 35	$31 35	$75	Free overnight parking (6 pm–10 am); day-time parking $3 maximum.
MIDTOWN MOTOR INN 220 Huntington Avenue (No. of rooms held: 100)	$24	$32	$32	—	Free parking for registered guests.
COPLEY SQUARE 47 Huntington Avenue (No. of rooms held: 75)	$20 22 24	$23 25 30	$26 28 30	$40 and up	Free overnight parking (5 pm–9 am); for day-time parking, inquire at hotel.
THE COLONNADE 120 Huntington Avenue (No. of rooms held: 150)	$30 34	$38 42	$38 42	$130 and up	Free parking for registered guests.

*Per day; add 5.7% for Massachusetts State Room Tax. Charges for rollaway beds and cots vary between $5 and $7, depending on hotel. Children under age 12 accommodated free in same room with parents at Midtown Motor Inn and Colonnade; under age 14 at Copley Square; age limit higher at Sheraton, Copley Plaza and Lenox.

**One-bedroom parlor suites; rates for larger suites available upon request. Deluxe accommodations available at Sheraton-Boston in all categories at higher rates.

NOTE: If room rate specified is not available, the next available higher rate will be assigned. Confirmation will come to you directly from the hotel. You should notify the hotel of any change in your reservation. Assignment is delayed if any information is omitted.

HOTEL RESERVATIONS FORM

(Reservations received after 4 February cannot be assured)

CHOICE OF HOTEL: First_____ Second_____

ROOM: ☐ Single ☐ Double ☐ Twin ☐ Suite Preferred Rate $_____

Please indicate any special accommodation needs due to a handicap _____

_____

ARRIVAL: Date _____; ____ a.m. ____ p.m.

DEPARTURE: Date _____; ____ a.m. ____ p.m.

Be sure to list definite arrival and departure date and time. Hotel reservations will be held only until 6 p.m. unless otherwise specified.

NAMES AND ADDRESSES OF ALL OCCUPANTS OF ROOM

Name _____ Name _____

Address _____ Address _____

City _____ State ____ Zip ____ City _____ State ____ Zip ____

Name _____ Name _____

Address _____ Address _____

City _____ State ____ Zip ____ City _____ State ____ Zip ____

Individual Requesting Reservations _____

Mail to: AAAS Housing Bureau,
900 Boylston Street, Boston, Mass. 02115