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LANDMARKS OF LIBERTY

A Report on the  
American Revolution Bicentennial Development Program  
of the  
National Park Service

by

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## FOREWORD

Crowning a long and distinguished career as a National Park Service historian and administrator, Merrill J. Mattes served as chief of the Denver Service Center's Historic Preservation Team from its formation in January 1972 until his retirement in April 1975. There he was intimately involved with planning and project execution for the Service's American Revolution Bicentennial development program. Surely no one was more capable of recording its principal activities and accomplishments for posterity, as Merrill was engaged to do when he left the official rolls.

Merrill submitted his report in August 1976, hot on the heels of the climactic Independence Day celebration. Comprehensive in scope and felicitous in style, it richly deserved its planned publication. Unfortunately, a general refocusing of priorities post-Bicentennial and a decline in the Service's professional publications program left Merrill's manuscript gathering dust on the shelf.

There it might have laid indefinitely, were it not for Merrill's continued interest. A decade later, in July 1986, he wrote me about it:

During the American Revolution Bicentennial the Denver Service Center had an involvement of projects exceeding \$100,000,000. After my retirement I contracted with DSC to write up a history of its accomplishments for the event, and did complete that report; unfortunately, nothing ever came of it in the way of a history publication; not even a routine paper cover report for in-house circulation. . . . It's an important chapter in NPS administrative history, and I think you will agree with me that it was a mistake not to run off at least a hundred copies--for the regions, the areas involved, and whoever else.

Reviewing Merrill's manuscript, Bureau Historian Barry Mackintosh and I immediately saw its value and agreed that it should be published as part of our administrative history program. Because it would not be the outside-audience book originally envisioned, we elected to condense the historical background that Merrill had provided for each area in order to focus more on the Bicentennial projects themselves. The editing task fell to Barry, who filled a few gaps in the text and exercised customary editorial license while word-processing the camera copy from which this edition was reproduced. The text was not altered to reflect later developments; notwithstanding its 1989 date of publication, it retains the author's 1976 perspective throughout.

The Bicentennial development program ranks with the park-related Depression relief activity of the 1930s and MISSION 66 of 1956-66 as one of the landmark programs in NPS history. Landmarks of Liberty pays effective tribute to that monumental undertaking and to the many who made it possible.

Edwin C. Bearss  
Chief Historian

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## INTRODUCTION

If we would attain to the wisdom and to an understanding of our heritage we must understand the American Revolution. For surely an awareness of the magnitude of the sacrifices and an appreciation of the timeless quality of the ideals that brought our country into being will strengthen us as a people . . . .

Of all the approaches to history, perhaps none communicates the past more directly and universally than physical evidence. An authentic structure or historic object in its original location can convey a sense of history unmatched by books or pictures.

The above quotations from a 1970 report of the Secretary of the Interior to the chairman of the American Revolution Bicentennial Commission sets the tone of this report. The undertakings it describes are a fulfillment of certain high priority goals for the Bicentennial set forth by the Secretary that had primary application to the National Park Service: to more fully develop American Revolution sites of the National Park System; to fill gaps in our knowledge of these sites; and to expand our interpretation of them.

What is the purpose of this report?

So much energy and enthusiasm were expended in celebrating the American Revolution Bicentennial, which climaxed in 1976, that there must inevitably be a slackening of interest in the subject thereafter, if not gratitude for surcease from the relentless drumbeat of publicity and, in some quarters, shameless over-commercialism. Anything that resembles a post-mortem of the observances may not be greeted with acclaim by the jaded celebrants. Accordingly, this particular Bicentennial report is directed less to recent patriots than to posterity in the longer term. It addresses an aspect of the Bicentennial that "will long endure," it is hoped, and that represents an extraordinary achievement by one federal bureau.

Americans are justly proud that their particular form of popular self-government has survived unimpaired for 200 years, longer than that of any other nation, and they are impressed also with the amazing growth of this nation from a few million people scattered along the Atlantic seaboard to a nation of 220 million occupying much of a continent and becoming a dominant world power. Yet thoughtful Americans are also inclined to be skeptical if not apprehensive about the next hundred years. While they may not envision an apocalyptic end to it all, they may doubt an inevitable advance to higher and higher levels of material well-being, or an *ad infinitum* "peace in our time." Certainly a strong faith in America and the ideals it represents is a vital part of our spiritual equipment if we are to survive intact in a world beset by overpopulation, diminishing natural resources, and mounting international and group antagonisms. What is there to sustain faith in America and its future, other than our own visible present prosperity and freedom? Are that prosperity and freedom guaranteed forever, or even tomorrow?

There are, of course, patriotic traditions as well as a deep-seated conviction among many that this nation "shall not perish from the earth"--that it has a preordained and unswerving destiny. But sometimes this conviction wavers, and then those historic places associated with the nation's beginnings are especially valuable. These tangible evidences of our past

are shrines we can visit where our faith can be reinforced.

That's what this report is about: great historic places linked to our roots, our conception, our birth and infancy as "a new nation, under God, conceived in liberty and dedicated to the proposition that all men are created equal."

\* \* \*

This is a comprehensive narrative of all significant accomplishments of the National Park Service in the specially funded development program identified with the American Revolution Bicentennial. In this context "development" is synonymous with "capital improvement," or the enhancement of historic properties in permanent tangible ways, as distinguished from activities, however valid or inspirational, that are ephemeral in character. Special exhibits, living history demonstrations, pageants, parades, and other such events belong to history as soon as they have occurred. In contrast, the improvements described herein were designed to serve posterity, even to the Tricentennial, as well as today's public.

Included under the general heading of "development" are those functions integral to the research, planning, and design processes as well as construction drawings, contracting procedures, and actual construction work. There were some 200 "development packages" covering nearly 1,000 components in the evolving Bicentennial program, involving history, archeology, interpretive planning, preliminary design, master planning, environmental impact studies, project planning, construction, construction supervision, exhibit production, and so on. All such activity, which has to be broken down by categories for programming and funding purposes, is reduced for the benefit of the reader to the 47 consolidated projects identified by area and subtitle herein.

The Bicentennial development program of the National Park Service had a total budget of \$100 million for the period July 1, 1973, to June 30, 1976 (adjusted to \$104 million in the final reckoning), but the actual total would substantially exceed this figure if we included all the planning, research, and design work that was accomplished before the 1974 fiscal year and that contributed in meaningful ways to the Bicentennial end product. In one sense, therefore, this report is a verbal (but in no sense a mathematical) accounting for this respectable expenditure of federal funds. On the basis of magnitude alone, the Bicentennial program would deserve this kind of permanent record and recognition. But pride over sheer magnitude, whether measured in dollars, manpower, or volume of construction, is not of itself a sufficient reason. Rather, the motivation for this report is simply the logic of recording for posterity an extraordinary accomplishment that vastly enriched the historical and interpretive resources of the National Park System. Reflecting credit on offices and personnel at all levels, it is a bright chapter in the history of a federal bureau that has had more than its share of accolades.

In the excitement of the Bicentennial year 1976 scarcely anybody noticed that this was also the 60th anniversary of the National Park Service. But the roots of the National Park System go back more than 100 years. In 1872 Yellowstone National Park was carved from a thermal region of the Rocky Mountains. In 1890 the first of several Civil War battlefields were set aside to honor those who fought at them, and in 1906 Congress passed the Antiquities Act, providing for the creation of national monuments

to preserve natural and historic resources. In 1933, by executive order, the National Park Service acquired most such areas that had been administered by other federal agencies, and since then scores of new historical areas have been added to the Park System. The Historic Sites Act of 1935 and the National Historic Preservation Act of 1966 recognized the Service's leadership in historic preservation by giving it responsibility for the survey and inventory of historic properties at all levels of significance, now listed in the National Register of Historic Places.

The National Park Service is perhaps most widely known for its scenic national parks, such as Yellowstone, Yosemite, Grand Canyon, and Hawaii Volcanoes. But in fact it is equally important as the custodian and interpreter of historic sites and buildings. Of approximately 300 units of the National Park System today, nearly two-thirds are classified as historical areas, that is, areas wherein historical or archeological values are dominant. In those remaining areas classified as natural or recreational (therefore nominally nonhistoric) there are invariably historic values in some degree, often quite extensive, as is the case, for example, with Grand Teton and Great Smoky Mountains national parks. Recent attendance figures show that, in total, visitors to classified historical areas outnumber those to other areas, a condition attributable to the proximity of major historical areas to metropolitan centers.

Of course the American Revolution Bicentennial directly affected only a fraction of the historical properties of the Service, although some of these are the most widely known and heavily visited. The original list of 23 officially designated Bicentennial areas follows:

Adams National Historic Site, Massachusetts  
 Colonial National Historical Park, Virginia  
 Cowpens National Battlefield, South Carolina  
 Federal Hall National Memorial, New York  
 Fort M'Henry National Monument and Historic Shrine, Maryland  
 Fort Moultrie (Fort Sumter National Monument), South Carolina  
 Fort Necessity National Battlefield, Pennsylvania  
 Fort Stanwix National Monument, New York  
 George Rogers Clark National Historical Park, Indiana  
 George Washington Birthplace National Monument, Virginia  
 Guilford Courthouse National Military Park, North Carolina  
 Hamilton Grange National Memorial, New York  
 Hopewell Village National Historic Site, Pennsylvania  
 Independence National Historical Park, Pennsylvania  
 Kings Mountain National Military Park, South Carolina  
 Minute Man National Historical Park, Massachusetts  
 Moores Creek National Military Park, North Carolina  
 Morristown National Historical Park, New Jersey  
 Mount Rushmore National Memorial, South Dakota  
 National Capital Parks, District of Columbia-Maryland-Virginia  
 Salem Maritime National Historic Site, Massachusetts  
 Saratoga National Historical Park, New York  
 Statue of Liberty National Monument, New York-New Jersey

Four areas on this list are not included in this report. Federal Hall, Hamilton Grange, and Mount Rushmore are omitted because no actual plans or development materialized as Bicentennial projects. Cowpens is

omitted because no development occurred there within the chronological limits of the program, even though extensive plans, just short of construction, were completed. On the other hand, three areas not on the list are included: Thaddeus Kosciuszko National Memorial, Gloria Dei (Old Swedes') Church National Historic Site (both separate legal entities, although managed by the superintendent of Independence National Historical Park), and Chesapeake and Ohio Canal National Historical Park. Thus there were 22 areas receiving official Bicentennial development.

As might be expected, there was a wide disparity in the extent of benefits received by the 22 areas. In some cases, like those of Fort Necessity, Gloria Dei, Hopewell Village, and Statue of Liberty, the investment was relatively slight yet tangible and sufficient to warrant inclusion. In others, such as Independence, Colonial, National Capital Parks, Chesapeake and Ohio Canal, and Fort Stanwix, the investment was heavy and some of the results bordered on the spectacular. About 70 percent of the total that went into construction contracts went into these five major units. It is of interest to note that construction contracts constituted about 60 percent of the total \$100 million. The balance represents the costs of various stages of planning, research, design, construction drawings, contracting activity, and construction supervision to the Denver Service Center; interpretive media design and production by the Harpers Ferry Center; plus contingencies and overhead shared by DSC, the regional offices, and the Washington Office.

Of the large number of individual projects identified within the framework of 47 area headings, about 50 may be described as items of historic preservation. Most of these are classified as restoration or stabilization jobs. Only three may be regarded as reconstruction, that is, the replacement of an extinct building with one of entirely new material. The principal category of non-preservation work was the construction of new or expanded visitor centers or other major interpretive facilities, totaling 18. Miscellaneous types of improvements usually but not always in combination with one of these categories included roads, trails, parking areas, utilities, security or fire alarm systems, special illumination, recreational development, and facilities for the handicapped.

Historical, archeological, and architectural research that played a significant part in ensuring the accuracy of restoration work or other forms of interpretation is identified, and in most instances the pertinent reports were drawn upon for background historical data.

\* \* \*

The advent of a big Bicentennial development program for the National Park Service was not accidental. For years various parks and their regional offices looked forward to the time when they could march under the banner of the Bicentennial and reap the benefits of appropriations for long-overdue capital improvements. Master planning, interpretive planning, historical and archeological research, and preliminary design work were pushed to the extent that funds permitted in anticipation of the Bicentennial.

All requests for research, planning, and construction funds are coordinated by regional program officers, reviewed by the regional directors and their staffs, and then sent to the Washington Office for processing within the framework of appropriation requests allowed by the Office of Management and Budget. Specific appropriations, of course, are the sole prerogative

of Congress. The intricacies of procedure and the imponderables of internal competition, congressional adjustments, and the constraints of the Office of Management and Budget require no exploration here. Suffice it to observe that after all the smoke had cleared, the Washington Office, with the express blessing of the Secretary of the Interior, came up with an overall congressional commitment of \$100 million for implementation of the Bicentennial development program at designated areas.

It should be emphasized that this impressive sum did not constitute an addition to the normal construction budget of the National Park Service. It was largely a substitution for the normal budget, as other projects elsewhere in the nation were deferred.

The normal budget cycle to implement a construction job is three years, from preliminary design through project planning (or construction drawings) to the contracting process, and the initiation of construction work itself. Ideally, historical and archeological research and the gathering of other basic data should precede the three-year period and, also ideally, there should be an approved master plan beforehand as the sound basis for any development. The \$100 million was laid out for a three-year period beginning July 1, 1973, and spanning fiscal years 1974, 1975, and 1976. Theoretically, this meant that all construction work had to be completed by June 30, 1976, and as it turned out the finishing touches were not put on some Bicentennial jobs until that date. For good psychological reasons, however, the Director laid down the law that all work had to be completed by December 1975, leaving only two-and-a-half years to complete the mammoth program. In fact, most jobs were completed by the end of 1975 or very early in 1976.

The extraordinary challenge was accepted, and it was crowned with success. But the unique character of this achievement cannot be fully appreciated without an understanding of the problems confronting the concerned regional offices, the Denver Service Center, and the Harpers Ferry Center and the extraordinary measures taken to solve them.

At the outset in July 1973, the prospects of meeting the set deadline could only be described as poor. The prevailing mood ranged from skepticism to downright pessimism. It can be said fairly that one factor saved the day, and that was a gradual flowering of a quixotic attitude among key regional, DSC, and HFC personnel that may be formulated thus: "All right, it's ridiculous and it seems impossible, maybe it really is impossible, but on the other hand maybe it's possible if we give it an all-American try--and anyhow, what other choice do we have?" The specter of ingloriously "flubbing it" when handed the greatest crash program in the history of the National Park Service was probably the strongest motivation for those whose sagging shoulders bore the burden of responsibility.

Six specific problems had to be solved or bottlenecks cleared before the pace could be accelerated to achieve the goal:

The budget cycle was one year too late. Normally the biggest and most chronic problem confronting park administrators is the shortage or absence of money to get the job done. This time the problem was reversed. Suddenly and without too much warning the money was there, in impressive amounts, but the Denver Service Center, which bore primary responsibility for project execution, was not geared up to handle it. In a rational world the first Bicentennial budget year would have been 1972 instead of 1973, and then there would have been a good three years for program completion, with enough lead time to get better organized. But this is not a rational world, and



it was necessary to live with the fact that the belated budget and the 1976 deadline were fixed and immovable. The only thing that was adjustable, somehow, was the production rate of DSC. In a normal fiscal year, the rate of obligation of construction funds might average 60 to 75 percent. Now the rate was expected to be 100 percent, with no excuses accepted for failure. This called for a lot of "May Day" scrambling--the kind that must be generated in times of crisis when survival hangs on the outcome.

Lag time in research and planning. Again, if everything went smoothly according to script, research and other pre-planning would be completed before funds become available for design work, drawings, and construction. But it is in the nature of things that everything is not always set when it is supposed to be, and this was definitely the case now. Archeological survey and salvage work required before construction was in some cases not provided for. Historical research to authenticate a site or building would take time, and not enough time had been allotted. The master plans and associated documents required to legitimize a project lacked approval in some cases, or if approved, there were second thoughts dictating restudy and replanning. The National Environmental Policy Act of 1969 required documented analysis of the environmental impacts of all proposed actions. Certain lands needed for development had not yet been acquired, and in some cases legislation authorizing their acquisition was lacking. All such problems that in normal times could eventually be ironed out required action right away, in the form of program adjustments, funding switches, and a faster pace than professionals, who prefer to be more deliberate, are accustomed to. Unavoidably, there had to be some "telescoping" of steps normally taken in timely succession. Some planning had to be done based on certain assumptions that research had not yet verified, for example, and some construction contracts had to be negotiated before related environmental impact statements were fully cleared. As in all great enterprises, some risks had to be taken. The mandate to achieve the 1976 goal brooked no delays on account of small technicalities.

Bottlenecks in review procedures. In normal times there is a certain flow chart that is followed for review and approval of Denver Service Center reports and plans involving team captains, team managers, the Office of Quality Control, the DSC manager, the affected park superintendents, the regional offices with all of their machinery, and in some cases the Washington Office, particularly the park historic preservation divisions for projects in that category. Some of these review steps tended to be repetitive and take too long, making mincemeat out of deadlines. By the consent of all concerned, sometimes obtained grudgingly because of jeopardy to time-honored prerogatives, DSC streamlined its internal review procedures and secured prompter reviews elsewhere by setting unheard-of response deadlines--like 30 or even 10 days--beyond which approval would be assumed.

Project reports and plans are reviewed for many reasons--feasibility, aesthetics, cost factors, relationship to master plan or other plan elements, and conformity to NPS management policy. The last is a body of doctrine set forth in periodic pronouncements by the Washington Office, rooted in basic legislation as well as honorable tradition. By the time a park master plan is approved, all questions of policy application have presumably been settled, but because the creative instincts of planners and designers have a way of bumping into established policy positions, their proposals sometimes require arbitration. The regional directors have some

latitude in this area, but the resolution of policy questions is ultimately the Director's prerogative. Such questions may arise over the design or placement of a visitor center in relation to historic terrain. A common Bicentennial issue was whether the historical, architectural, and archeological data in a given instance were adequate for a proposed restoration under the policy criteria for such. Then there was the harder question of justifying expensive reconstruction of extinct buildings while extant structures were in danger of extinction.

Bicentennial projects that were actually undertaken and are reported here reflect policy and technical decisions made in the crunch of an unyielding timetable. Sometimes "popular demand" as enunciated by members of Congress swayed the decision in the affirmative. In other cases a strict interpretation of policy prevailed, and some cherished hopes and plans were discarded because of a conviction at the Director's level that standards of area integrity or historic preservation would be violated.

Personnel problems. There was a serious shortage of personnel in the Denver Service Center with the particular technical and professional skills required to tackle the Bicentennial program head-on, and this shortage was aggravated by severe manpower ceilings imposed on all federal agencies by the Chief Executive. The deficiency was particularly glaring in the case of the Historic Preservation Team, which would necessarily play a major role in a program heavily slanted toward restoration-type projects. The most serious lack was in the category of historical architects and restoration specialists (craftsmen) who would have to bear the brunt of the design work, preparing construction documents, and supervising complex and delicate restoration work in the field. The recent staffing of various regional offices with these specialists had depleted the Historic Preservation Team, but the sudden burst of Bicentennial demands was far beyond normal capacity in any event. So again, there was no money problem, but there was a personnel recruitment problem that was nothing short of staggering because of two constraints. On the one hand, how to staff up in the face of rigid personnel ceilings? On the other, where to recruit the needed specialists, who happened to be in very short supply nationwide?

Four courses were followed to surmount the manpower crisis without violating the rule book:

1. Personnel were reassigned internally, given the execution of Bicentennial projects as top priority.
2. New personnel were enlisted by imaginative means within the tight framework of existing regulations and ceilings. Because very few permanent positions could be filled, the bulk of the new employees filled a variety of "other than permanent" positions through appointments described as "700 hour," one year, career seasonal, less-than-full-time, and so forth. The most coveted of these--a "term appointment" limited to two or three years--could be made only by authority of the Secretary of the Interior on the basis of the Bicentennial emergency. One way or another, with the iron insistence of team managers and maximum flexibility by personnel officers, the job got done. The staffing expansion that resulted is exemplified by the North Atlantic/Mid-Atlantic (formerly Northeast) Team, which for Bicentennial purposes went from about 30 to more than 55 employees. More dramatic is the case of the Historic Preservation Team, which at the peak of its Bicentennial operation numbered about 80 (of whom more than half were "other than permanent") compared to about 25 in pre-Bicentennial days.

3. Recruiting of scarce specialists was accelerated. Efforts to secure the transfer of experienced historical architects and restoration specialists from the regional offices and the Washington Office to help in executing the DSC program proved futile, primarily because these offices had important obligations of their own that were not necessarily superseded by the Bicentennial. The solution to this aspect of the crisis was a fairly systematic "beating the bushes" of academia and state agencies. Word got around, and applications started coming in from younger architects and architectural students of various institutions, and from a few restoration craftsmen. A few who were in business for themselves decided to get some experience in Bicentennial architecture, even though no permanent appointments could be offered. Between the concerted recruiting efforts of the Historic Preservation Team and the latent energy and enthusiasm of young people excited by the challenge, the rolls were staffed. The few veterans among the "permanents" were able to train and guide those less experienced to achieve a quality product.

4. Contracting with architects, engineers, and other outside consultants was increased. In the Southeast Region, projects at four of the five Bicentennial areas were planned and designed by contractors.

Time-consuming contracting procedures. It was found that rigid adherence to the standard contractual methods for design and construction work, particularly those relating to historical restoration projects, would prevent meeting the 1976 deadline and in any event would not permit results of acceptable quality. It was determined, for example, that the limit for contract design costs of six percent of estimated construction costs was unrealistic in circumstances calling for overtime to meet tight deadlines; accordingly, a ruling was secured that exceptions could be made in this area. A special waiver was obtained also regarding the public notice requirement for small contracts.

The most significant breakthrough related to ways and means of expediting difficult historical restoration work. The conventional approach for construction work of any kind entails formal advertising, unlimited contract bidding, review by a selection board, acceptance of the lowest qualified bidder, a fixed price and fixed deadline contract, and construction supervision by NPS on a monitoring basis only. For Bicentennial purposes, however, a seldom-used procedure saved valuable time and ensured maximum quality control by giving NPS historical architects and restoration specialists full authority to direct details of the work. In short, a contract was achieved by negotiation with a limited number of pre-selected bidders, and the cost-plus-fixed-fee method replaced the fixed price contract. Use of this method had to be justified on several bases: (1) historic fabric required unusual preservation techniques that had to be improvised during the work; (2) the restoration work required specialized experience to achieve innovative solutions; (3) imponderables of an old structure made it impossible to draft accurate detailed plans and definite contract documents; (4) hazardous conditions resulting from the presence of old materials required flexibility in decision-making to ensure the safety of workers and the structure; (5) some degree of continuing research and experimentation, of indeterminate cost, was needed to make final selection of suitable materials and ensure structural stability; and (6) a close working relationship between the contractor and the supervising restoration specialist had to be maintained, with the supervisor having freedom to perform actual work on the job as conditions warranted.

Competition with other programs. The Director and the Denver Service Center manager issued stern notices admonishing one and all that the Bicentennial was Number One in general, and Number One at DSC in particular. Despite the fact that it really was of the highest priority, by presidential and secretarial mandate, there was no way that other interests could be exorcised completely. Of the eight NPS regions, only three--North Atlantic, Mid-Atlantic, and Southeast, plus National Capital Parks--were materially involved in the Bicentennial program. (George Rogers Clark National Historical Park in the Midwest Region was handled for Bicentennial purposes by the Mid-Atlantic Team.) The other five regions, while certainly not opposing the great patriotic effort, were not averse to proceeding with other projects that could be funded during the 1974-1976 fiscal years. Congress ultimately sets the NPS budget, of course, and there was no agreement by midwestern and western congressmen that everything else would stand still while the Bicentennial was in progress.

Throughout the period there was substantial research and planning activity among the other five regions, absorbing many DSC employees. Actual construction work "out West" was held to a minimum as far as roads, trails, and general building were concerned, but there was significant construction there for pollution abatement and historic preservation. The former imposed demands on design engineers, while the latter occupied historical architects and project supervisors. Thus, while the Historic Preservation Team was preoccupied with numerous major Bicentennial projects it had to take on several non-Bicentennial jobs elsewhere, including restoration work at Fort Larned, Kansas, and the reconstruction of Fort Vancouver, Washington, and Bent's Old Fort in Colorado. Even in the "Bicentennial regions" there were various non-Bicentennial projects that could not be postponed.

Although design work can be contracted, someone must establish design requirements and work closely with design contractors, who sometimes have difficulty getting on the NPS wavelength. The main point here is that at no time could the entire resources of DSC be thrown into the Bicentennial breach. Other things were going on, requiring the services of professionals who were then unavailable to "re-fight the American Revolution," and this circumstance alone created strains in manpower distribution that had to be overcome.

#### Bicentennial Development Organization

The NPS Director and his staff prepare the budget and go to congressional appropriations subcommittees to defend the final version of it approved by the Interior Department and the Office of Management and Budget. They also review programs underway and resolve issues that arise. Ronald H. Walker and Gary Everhardt served successively as Director during the Bicentennial period. Key people in the crucial job of centralized programming in Washington were George A. Cowans, Lowell V. Sturgill, and William C. Quick. Assistant Director Raymond L. Freeman represented the Denver Service Center in other areas. Associate Director Ernest Allen Connally and Assistant Director Robert M. Utley had significant responsibilities in historical programs and policy formulation. Chief Historical Architect Henry A. Judd and Chief Historian Harry W. Pfanz also played key roles in meeting research and restoration design standards in a period of abnormal pressures.

In October 1973 Director Walker established a Bicentennial Coordination Office, in which Julie Rowe, Jim Hunter, and Jean Henderer were principals. In January 1974 a Bicentennial Action Group (BAG) chaired by Deputy Director Russell E. Dickenson was formed to meet in Washington about every six weeks to review work progress and initiate corrective measures when projects were lagging. Such measures included shifting personnel, adjusting funding allocations, lining up supplemental funds when urgently needed, and dropping projects that could not meet the deadline. The high inflation rate of the period forced many projects to be deleted so that others could be funded.

Initially only the Northeast and Southeast regions and National Capital Parks were involved with the program. At the end of 1973 a general reorganization split the Northeast Region, resulting in the Mid-Atlantic Region headquartered in Philadelphia and the North Atlantic Region headquartered in Boston. Mid-Atlantic Regional Director Chester O. Brooks played a prime role in anticipating and programming for the Bicentennial in his region, with its heavy concentration of Revolutionary period parks. The North Atlantic Region had important Revolutionary parks in Massachusetts and New York; the Southeast Region, headquartered in Atlanta, had Revolutionary areas in the Carolinas; and National Capital Parks was heavily involved because of the Bicentennial events in Washington.

The key people at the regional level were the regional directors, programs officers, and Bicentennial coordinators. These were, respectively, for the North Atlantic Region, Jerry D. Wagers, William F. Locke, and Denis P. Galvin; for the Mid-Atlantic Region, Chester L. Brooks, Vincent N. Mauro, and Lawrence B. Coryell; for the Southeast Region, David H. Thompson, Jr., Vincent Gamon, and Benjamin H. Davis; and for National Capital Parks, Manus J. (Jack) Fish, Jr., Floyd B. Hough, and Leroy A. (Whitey) Rowell.

Once the program was in gear the Denver Service Center had the initiative for program execution. This office at the foot of the Rocky Mountains seems an unlikely place to be heavily involved in sites associated with the Bicentennial, celebrating patriotic events of 200 years ago 2,000 miles to the east. But in 1972 it was set up as the technological center for nearly all NPS research, planning, design, and construction programs nationwide. Geographically incongruous or not, Denver is where most of the high-pressure Bicentennial development activity occurred or was managed from. Glenn O. Hendrix was the DSC manager under whom most of the program was initiated and advanced until April 1975, when he retired and was replaced by John W. Henneberger. Donald F. Benson was the first DSC Bicentennial coordinator; he was succeeded in 1974 by Donald L. Bressler, who had the Herculean task of keeping track of all program elements and initiating needed corrective action. Bressler was the principal DSC representative at the BAG meetings.

Robert L. Steenhagen managed all activity of DSG's North Atlantic/Mid-Atlantic Team (formerly the Northeast Team), which served the two regions containing all the officially designated Bicentennial parks except for National Capital Parks, Chesapeake and Ohio Canal National Historical Park, five areas in the Southeast Region, and George Rogers Clark National Historical Park (shifted to the Midwest Region in the late-1973 reorganization). Steenhagen's team handled all Bicentennial projects in these two regions (and George Rogers Clark) not specifically assigned to the Historic Preservation Team, including visitor centers, roads, trails, landscaping, and general planning. Other team members who played important roles, and who are not identified in connection with specific projects, were Judson S. Ball, Edward R. Gee, Jr., William Smith, and Don Falvey.

Arthur H. Beyer was manager of the Southeast Team until July 1975 when he became chief planner for that team. Throughout the Bicentennial period he coordinated all in-house and contract planning, design, and construction work for the five Bicentennial areas in the Southeast Region. Key associates were Darrell Stiger and James G. Kiryakakis.

Edward S. Peetz was manager of the National Capital Parks Team involved in Bicentennial work until December 1975, when he was replaced by Elwood Rensch. Principal associates are identified in the body of this report.

Chesapeake and Ohio Canal National Historical Park, while managed by the Director, National Capital Parks, is viewed separately in this report because it is largely outside Washington, D.C., and because it was the object of a separate major rehabilitation project. Richard G. Huber managed the C & O Canal restoration team; team members are identified in project discussions.

The chief of DSC's Historic Preservation Team from its inception in January 1972 until his retirement in April 1975 was Merrill J. Mattes. He had responsibility for launching the program and developing the expanded staff and streamlined procedures to execute the large number of historical/archeological research and architectural restoration/reconstruction projects to meet Bicentennial deadlines. He was succeeded by John Luzader, formerly supervisory historian, who had succeeded F. Ross Holland, Jr., in the latter capacity when Holland became associate regional director of the North Atlantic Region.

A critical position in the program, for obvious reasons, was that of supervisory historical architect. Lawrence B. Coryell filled the position until June 1973, when he transferred to the Northeast Region as its Bicentennial coordinator. His replacement, Vernon Smith, shouldered an abnormally heavy program during most of the Bicentennial period, being responsible for recruitment, training, and project direction of a greatly expanded staff of architects, technicians, and restoration specialists and the coordination of voluminous contract work.

A staff of 12 Historic Preservation Team historians completed 75 documented historical research reports on designated Bicentennial areas, out of a total of some 200 since January 1972 when DSC came into existence. NPS research professionals have a deserved reputation for accuracy and thoroughness, and the body of literature they have produced, extending historical knowledge in many directions, is among the most lustrous and enduring Park Service achievements.

The bulk of the archeological field work undertaken with Bicentennial funds was performed by contract with a variety of academic institutions and professional specialists. John Cotter of the Northeast Region assisted the Historic Preservation Team manager in early stages of the archeological program. In the Southeast Region, archeological surveys were conducted mainly by personnel of the Southeast Archeological Center at Tallahassee. Wilfred Logan, formerly chief of the Midwest Archeological Center, became the staff archeologist primarily responsible for coordinating this specialized effort. The total cost of Bicentennial archeology was in the neighborhood of \$1 million (about half for Colonial National Historical Park), making it the biggest integrated archeological program in NPS history outside river basin salvage archeology. As with historical research, much archeology performed before the formal Bicentennial program contributed to the final results. It would be difficult to estimate the cost of all such research.

Restoration work itself is normally supervised in the field by experienced craftsmen or architectural technicians titled exhibit specialists or restoration specialists. During the early part of the program all such work was directly under the Historic Preservation Team. Later it came under the general coordination of DSC's Construction Division, but restoration specialists were assigned when available as field inspectors and the Preservation Team retained rights of review. This arrangement was necessary because of the sheer volume of construction/restoration work and shortages in the specialist category. James S. Askins was the senior officer in this group.

DSC's Professional Support Division (formerly the Division of Design), under the direction of Howard Haiges, Jr., provided professional expertise in design and consultation on many of the engineering systems for the unprecedented projects related to the Bicentennial. The difficult task of incorporating modern mechanical equipment into historic structures without disturbing their fabric and appearance unduly was accomplished by the mechanical, structural, electrical, and sanitary engineers of that division. Among individuals who made important contributions but who receive little mention in connection with specific projects were Dwight M. Wendell, Richard B. Case, Maurice L. Paul, D. Ray Joharmingsmeier, Ralph McFadden, and John F. Kozel.

A major factor in expediting certain design work and most construction work was the Contracts Division. Leon Thygesen, chief of the Office of Contract Administration, directed a staff that became heavily involved in work that had to meet deadlines yet remain within regulatory constraints. Those prominently involved in the contractual aspects of the Bicentennial program and not otherwise mentioned included L. Peter Meyer, Donald S. Marley, Sammie D. Guy, Ray T. Lee, Robert W. Laubenheim, and Everett Simpson. Thomas C. Dall was head of the specifications unit.

Until July 1975 all construction supervision was under the direction of Allen C. Heubner. Thereafter responsibility in this critical area was diffused among regional teams. The principal "supervisor of supervisors" in the North Atlantic and Mid-Atlantic regions, which had the bulk of Bicentennial construction, was Kramer L. Chapman. Field coordinators who should be identified are Fred Spencer at Independence, James Congrove at Colonial, and Wayland Fairchild at National Capital Parks.

The Graphics Division, which had to step up production of reports and plans for distribution, also played a vital role. Henry C. Drews has been the continuing chief of this group.

Chief of the programming section during the first half of the operation was Robert M. Luntey. Donald L. Bressler and Richard D. Falb assumed responsibilities in later phases.

The Harpers Ferry Center in West Virginia, which handles the bulk of interpretive production work for the National Park Service--museum exhibits, wayside exhibits, audiovisual programs, publications, etc.--was heavily involved in the Bicentennial effort, and its program had to be painstakingly integrated with that of the Denver Service Center. The extent of its involvement is suggested by the increase in the value of its production from \$5 million in 1974 to \$8 million in 1975 to \$12 million in 1976. As was the case with DSC, manpower ceilings prevented a radical expansion in HFC staffing, so a large proportion of interpretive output depended on extensive contracting with specialized firms throughout the East.



Marc Sagan was general manager of the Harpers Ferry Center. Special Assistant Alan Kent was the one primarily involved in coordinating the Bicentennial effort. Most of the key people on the staff involved in interpretive production are identified in connection with one or more of the individual projects, but contributions of the following are also acknowledged: Deputy Manager Ellsworth Swift, Administrative Officer Ralph T. Roan, Chief Curator Harold Peterson, Chief of Exhibits Russell J. Hendrickson, furnishings specialist David H. Wallace, and assistants William Brown, Gary Howe, Marilyn Wandrus, and Larry Tillman.

A unique undertaking of the Harpers Ferry Center not sufficiently identified in the individual project writeups was the Bicentennial Ordnance Project, fully described by Revolutionary period gun specialist William E. Meuse in a fascinating report on the subject dated July 4, 1976. In a rather elaborate research and production effort lasting several years, 98 cannon tubes of 15 different national types weighing up to 6,000 pounds were produced, along with 63 gun carriages of assorted designs. These are exhibited in 10 Revolutionary period parks, the lion's share going to Saratoga and Colonial. How these guns were made, according to an anonymous contemporary, offers a clue to the entire Bicentennial effort: "You just take a hole and put some iron around it."

In the following report sections, a highly condensed summary of the project appears at the beginning of each for the reader's convenience. The historical background and significance of the area or project is expounded upon briefly. Then are described the structure or work in question, its condition before and after treatment, and the experience of design and construction or restoration. The key people or firms responsible for research, design, construction, and related exhibit work are identified. The only cost figures used routinely are those for construction contracts, to give some concept of project scope.



## ADAMS NATIONAL HISTORIC SITE

### Preservation of Carriage House

There has been no more distinguished family in American history than the Adamses of Quincy, Massachusetts. Here is preserved the home of four generations led by John Adams, a prime mover of the Revolution, second President of the United States, and father of John Quincy, our sixth President. Preservation work on the Carriage House insured Adams representation in the Bicentennial development program.

The famous Adams ancestral estate in Quincy became a federally owned national historic site in 1946 upon its donation by the Adams Memorial Society. The principal features of the charmingly landscaped grounds are the "Old House," the residence that served successive generations, and the Library. The residence and Library were restored soon after their acquisition. The large stone Carriage House, built in 1873 by Charles Francis Adams, serves as administrative offices but has been an exhibit in its own right because of its handsome architecture. The Bicentennial project, consisting of measures to preserve this structure, provides opportunity for fresh recognition of the remarkable saga of the Adams family.

John Adams is second only to George Washington and Thomas Jefferson in the importance of his role in the Revolution and the early republic. An early supporter of the Patriot cause, he became a delegate to the Continental Congress. After the bloodshed at Lexington and Concord he is credited with masterminding the selection of Washington as chief of the Continental Army and the adoption of the Declaration of Independence. With Benjamin Franklin and John Jay he signed the 1783 peace treaty with Great Britain, thereafter becoming America's first envoy to the Court of St. James. He was Vice President during both of Washington's presidential terms. As President from 1797 to 1801, Adams steered the young republic safely through dangerous international waters. He retired to Quincy, and in 1826 he died in the home he had acquired in 1787.

John Quincy Adams deserves acclaim for a distinguished diplomatic career. As Secretary of State he negotiated the cession of Florida from Spain and an agreement with Great Britain on Oregon that paved the way for its later territorial boundary. He was also the architect of the Monroe Doctrine. After his presidency, 1825-1829, he served in the House of Representatives, the only ex-President to do so. His son Charles Francis Adams was the third Adams to represent the United States in London, serving in that critical post during the Civil War. The four sons of Charles Francis--John Quincy, Charles Francis Jr., Henry, and Brooks--had illustrious careers of their own in the military, politics, education, and literature.

Charles Francis Adams was builder of both the Library in 1870 and the Carriage House in 1873, the last major structural addition to the Adams estate. The Carriage House was precipitated by the constriction of the grounds by municipal condemnation and a new road which became present Newport Avenue, requiring a new structure to accommodate the combined functions of various obsolete outbuildings.

The Victorian romanticism of this imposing U-shaped peak-roofed structure, while popular here during the period, may have been influenced by Adams's observation of English country estates. The bargeboards on the wide eaves are decorated with Gothic quatrefoils. The half-timbered gables are English and the square tower in the court is of Norman derivation.

The foundations and walls are of rubble fieldstone, with a granite water table at the first floor level. Brick is used with stone as a color and texture contrast. The corners above grade are of red brick as are the band courses above the window sills and at the window heads. Further architectural interest is created with a quoin effect on the brick corners. The front and rear gables are filled with slapdash (a kind of stucco) between framing timbers.

The slate roof is apexed, with hipped gables. Projecting rafters are scroll cut. The extended eave on the gable has freestanding ornamental bracing and jigsaw cut fascia. The ridge is topped with pointed, turned wood finials. The central tower that projects from the west wall of the central section has a steep pyramidal roof with marked flaring at the eaves which, with the ornamental end gables, lends an aristocratic air to the whole.

The erection of the Carriage House and the demolition of the early outbuildings marked the transition of the Adamses' country seat from a farm to an estate. The functions of the building were comprehensive. The south wing was the coachman's living quarters. The central portion of the first floor was a huge carriage room with washing facilities. The north wing housed the animals. The horses had sophisticated stalls and tack room on the first floor off the carriage area. The basement of the north wing had fairly luxurious quarters for cows, calves, and goats. The second level was a hayloft. Park offices and facilities now occupy both levels of the south wing, while maintenance and boiler rooms partly fill the basement.

The generally excellent condition of this building is a tribute to its architect (Cummings and Sears of Boston), the solidity of its construction, and the quality of maintenance by the family and the National Park Service over the years. The work required was minimal. One masonry corner section was stabilized. Loose grout was removed from the exterior brick and stone, and special carbon-tinted mortar was mixed for the general repointing. Planking in the domestic animals section of the basement was removed, a concrete slab poured, and the numbered planks relaid; animal stalls were repaired and reconstructed; milking stanchions were repaired; woodwork was revarnished; missing hardware was replaced; and a drainage defect was corrected by rebuilding and waterproofing a foundation section and installing a French drain with a lead-off perforated pipe. A new fire and intrusion alarm system was also installed.

The general contractor was W. A. McLeod Company of Boston. The adjusted contract amount after six months of field work ending January 1975 was \$71,000. Norman M. Souder prepared the historic structure report. Alan C. Reynolds of DSC was architectural consultant and Joseph Godfrey was project supervisor. Outside the contract, a highly ornamental nine-foot wrought weather vane designed by Kenneth Lynch and Sons of Wilton, Connecticut, was mounted atop the steeple. The design of the new instrument, which replaced an inaccurate version, was authenticated by an illustration in The Architectural Sketchbook of August 1876 discovered by DSC architect Orville Carroll.

## CHESAPEAKE AND OHIO CANAL NATIONAL HISTORICAL PARK

### General Repair and Stabilization

The Chesapeake and Ohio Canal, grandly conceived as a water transportation system across the Alleghenies, was an engineering marvel in its day but an economic failure. Today the 184-mile route between Washington, D.C., and Cumberland, Maryland, has great historical and recreational value. Bicentennial funds have helped preserve portions of the canal for posterity.

One of the weighty problems of the young republic, accented by the Louisiana Purchase of 1803, was that of feasible access to western rivers beyond the Alleghenies, so that resources of the vast new hinterland could be shipped to eastern centers of commerce. New roads were pushed across the mountains, but these were so primitive and the traffic on them so heavy that statesmen's thoughts turned to waterways. Canal and river systems had served the Roman Empire and were still in vogue in western Europe. New York's Erie Canal, built 1817-1825, successfully followed suit, and Maryland and Virginia civic leaders sought to emulate it.

George Washington was among the first to behold the riches of the Ohio country and dream of making them accessible to the Chesapeake region. In 1785 he formed the Potomac Company to improve navigation on that river by removing obstacles in its channel and building skirting canals around falls. The enterprise proved inadequate, prompting plans for a separate canal paralleling the Potomac and extending across the mountains. The Chesapeake and Ohio Canal Company, chartered by Congress in 1825, began work on July 4, 1828, with President John Quincy Adams turning the first spade of earth. Through a fateful coincidence, on that same day at Baltimore was begun the Baltimore and Ohio Railroad.

The company began operation with subscribed capital of more than \$3 million but was in trouble from the start. Unexpected hard rock formations, labor shortages, malaria during the summers, disputes over land damages, troubles with contractors over rising costs, and a protracted legal controversy with the B&O Railroad all delayed progress. The C&O Canal was not completed to Cumberland until 1850, eight years after the much faster railroad had reached that point, and plans for its extension to Pittsburgh were abandoned. A total of \$11 million had been spent on this 184.5 miles of canal, which contained 74 lift locks raising it from sea level in Georgetown to 605 feet at Cumberland, 11 stone aqueducts over major Potomac tributaries, seven river dams to feed water, a 3,117-foot tunnel through a mountain, and numerous lockhouses, bridges, and culverts.

Already obsolescent because of its slow pace and excessive maintenance costs, the canal nevertheless enjoyed a respectable patronage for the next three decades. Coal, flour, grain, corn, lumber, building stone, and whiskey descended the canal, while ascending traffic consisted primarily of fish, salt, fertilizer, and iron ore. In 1875, the peak year, more than 900,000 tons of cargo were floated on the C&O.

The canal trade declined as coal operators shifted to the railroad. An 1889 flood devastated the canal and forced the company into receivership,

and the B&O Railroad emerged as the majority owner of the company's bonds. The canal operated in desultory fashion until 1924 when, after another damaging flood, it ceased to function. In 1938 the railroad transferred the canal property to the federal government to relieve its indebtedness, and the canal and its towpath became a historical and recreational resource under the National Park Service.

In 1971 Congress authorized the acquisition of more land along the canal and designated the enlarged area a national historical park. The next year another major flood ripped through the historic remains. Strong public support for repairing the damage prompted the NPS to incorporate a large canal rehabilitation project in its Bicentennial development program. Although the project totaled \$4,250,000, it entailed little more than the stabilization of storm-damaged structures; restoration of more of the canal to operating condition was not contemplated. It is estimated that the process of fully stabilizing the canal and all associated features would require an additional \$50 million.

The C&O Canal Restoration Team was established in September 1973 as a field unit of the National Capital Parks Team of the Denver Service Center to accomplish the Bicentennial program for the park, which falls under the jurisdiction of the director of National Capital Parks (NCP). Landscape Architect Rich Huber was the first member of the team and its designated leader. Other professional team members assembled between October 1973 and October 1974 were Supervisory Exhibit Specialist (Restoration) Jim Askins, exhibit specialists Doug Hicks, Kenneth May, and Charles Wolford, historical architect Jim Smeal, landscape architect Bruce Gregory, engineer Jose Zambrana, and survey technician Bob Leyshon.

In November 1973, immediately following the failure of Catocin Creek Aqueduct, NCP asked the Restoration Team to list those structures in greatest need of repair and stabilization. Its recommendations were accepted by NCP, the C&O Canal Advisory Commission, and Edward S. Peetz, manager of DSC's National Capital Parks Team. The team engaged Robinson Engineering of Falls Church, Virginia, to design a structural solution for stabilizing Catocin Creek Aqueduct. Arrangements were made with Milton Fischer, regional bridge engineer for the Federal Highway Administration (FHWA), to provide the structural engineering needed to stabilize the Monocacy River Aqueduct and Tonoloway Creek Aqueduct. Finally, a basic agreement was negotiated with Dewberry, Nealon & Davis, engineers and architects of Fairfax, Virginia, for the structural engineering support for other repair and stabilization projects. Rich Huber and Jim Askins worked together to develop the required work directives, using Askins's expertise in historic preservation techniques. All projects under contract required a hydrological study of the Potomac River and related watercourses to determine the capability of structures to handle current runoff, analyses of soils in the vicinity of structures, alternate solutions for stabilization and restoration with cost estimates, and drawings and photographs of existing conditions if not already available.

Of the 27 projects completed by July 1976, 2 were designed by FHWA, 6 by Dewberry, Nealon & Davis, 1 by Robinson Engineering, and 18 by the Restoration Team. Fourteen were completed by contract with construction firms, while 13 were performed as "day labor" projects using park maintenance crews. All project supervision was handled by members of the Restoration Team, except that the Tonoloway Creek and Monocacy River aqueduct projects were supervised by FHWA.

In October 1973 the C&O Canal Historical Research Team was established to supplement activities of the Restoration Team. Its primary function was the preparation of historic structure reports for the Restoration Team's projects. A secondary but equally significant goal was to evaluate the research done previously and to complete research needed to meet NPS preservation standards.

Historian Harlan D. Unrau was the initial member of the research team. He was charged with reviewing previous research and surveying available documents and photographs relating to canal construction and operation. He completed 14 historic structure reports before beginning work on a comprehensive historic resource study of the entire canal. In January 1974 historical architect Thomas N. Crellin was assigned to the research team to prepare architectural studies, eight of which were completed. During the summer of 1974 a field survey team provided by the Historic American Engineering Record (HAER) worked under his direction to make measured drawings and photographs of seven canal structures. In addition, a topographic survey was made of the old Potomac Canal segment at Great Falls, Virginia, to complete earlier work undertaken by HAER. Historical architect Philip S. Romigh was assigned in November 1974 to prepare National Register documentation for more than 500 park historic structures.

Descriptions of the 27 Bicentennial projects for the C&O Canal follow, in upstream sequence. The first eight are within the first 22 miles of the canal, from the tidewater lock in Georgetown to Lock 23 (Violet's Lock) near Seneca. This section contained water and most resembled the operating canal. The 1972 flood breached the banks at several points, and the section remained dry until July 1976 when it was rewatered after completion of repairs. Because of its proximity to Washington, D.C., this is the most heavily used portion of the canal; maintenance of the towpath for hiking is especially important here.

#### 1. Wall Stabilization, Lock 3 (Mile 0.5); Day Labor

Immediately adjacent to Lock 3, Inland Steel built a five-story office structure with a subsurface three-level parking garage. Extensive blasting was required, and before completion in 1975 part of the canal dry wall and concrete repair constructed by the C&O Canal Company collapsed. A design solution was quickly developed, and plans and specifications were prepared for correct repairs at an estimated cost of \$21,000.

Lock 3 is one of the first four lift locks in close succession at Georgetown. It is now the boarding area for the NPS mule-drawn barge trip there in season.

#### 2. Towpath Restoration, Foundry Branch to Lock 5 (Miles 1.3-5.0); Contract with C. W. Stack & Associates, Newington, Virginia, for \$437,462, October 1973-June 1974

This 3.7-mile section of the canal towpath from Georgetown to Lock 5 is especially vulnerable to flood damage. It was breached in several areas and extensively damaged elsewhere. The overwash when breaching occurred caused considerable loss of towpath material. The contract provided for repairing all breaks, reestablishing the towpath at historic grade and width, and repairing the canal bed as required. Shoulders and slopes were seeded. This was the first towpath section to be restored to historic

grade along the entire canal.

Following the contract work, a pedestrian walkway was built over the 350-foot-long spillway just east of Chain Bridge. The walkway allows hikers and bikers to keep their feet dry, because water flows over the spillway when the canal is full. It brought the total construction cost to \$635,700.

### 3. Towpath Restoration, Lock 5 to Lock 10 (Miles 5.0-8.7); Day Labor

This was essentially a continuation of the towpath restoration done by contract described above. It cost \$280,000.

### 4. Little Falls Creek Culvert, Berm Bank Stabilization (Mile 4.8); Day Labor

In 1975 and the spring of 1976, the berm embankment was breached by Little Falls Creek during floods. The first repair, done under contract, consisted of placing fill over Little Falls Creek Culvert and the Dulles Interceptor Sewer, a 96-inch concrete pipe previously installed in the canal's berm bank. When damage recurred, the earth berm was reconstructed and gabions were used to construct a shield over the embankment. The gabion baskets were tied to reinforced concrete piles, then covered with soil which was seeded to provide a compatible appearance from the towpath. Stone riprap was placed along both sides of the creek to further resist erosion. The cost of construction was \$55,000.

### 5. Repairs to Breaks, Widewater Area (Miles 12.4-13.45); Day Labor

Widewater is an ancient channel of the Potomac River about 500 feet wide and up to 40 feet deep, used to form part of the canal. It has caused as much grief as any single area along the canal's entire length. The 1972 flood tore two large breaks in the towpath embankment that drained the area. One break was 80 feet long and 17 feet deep; the other was 195 feet long and 21 feet deep. To repair them, gabion baskets were wired together to form a core of rock nine feet wide at its base, three feet wide at its top, and 18 feet high. As the gabion core was constructed, the towpath embankment was laid down in 6-inch layers and compacted. Eight-inch filter pipes were laid parallel to the rock core and relieved to the river side of the fill. Because the largest break occurred at a curve, a core of gabions 80 feet long by 12 feet wide was placed on the embankment at the waterline to reduce erosion of the fill from wave action. A waste wier used to aid in controlling the water level in Widewater was found to be inoperative. Its masonry walls were repaired and stabilized and its wicket paddles completely refurbished.

Much of the towpath through the Widewater area is supported by stone masonry walls founded on bedrock. For 260 feet at the upper end of Widewater the wall and towpath are missing completely and were for many years before the 1972 flood. An elevated pedestrian walkway was planned to span the rough protruding rock, but work on it was halted after conservation-minded citizens complained of overdevelopment. The total construction cost of the Widewater work, including the as-yet-unbuilt elevated walkway, is estimated at \$325,000.

6 and 7. Repairs to Locks 15 and 16 (Miles 13.45-13.63); Day Labor

These two locks suffered extensive damage from the 1972 flood and became inoperative. The earth at both bypass flumes had scoured out to bedrock level, leaving the masonry on the berm sides of both locks completely exposed. All lock gates were missing, and the lock walls adjacent to the concrete dams had missing stones. The damage to Lock 15 in this respect was more extensive than that to Lock 16. After study it was determined that both locks were not at their proper height. They were originally built of Seneca sandstone, on bedrock. Evidently the Civilian Conservation Corps was unable to find enough replacement stone to rebuild the locks properly during the 1930s, so they just lowered their height.

Plans and specifications called for recovering as much architectural Seneca sandstone from Widewater as could be found. For Lock 16, this proved sufficient to replace all missing stones except those required to restore the lock to its historic height. Because brick had been used extensively in previous repairs, a bank of brick was substituted for the unavailable stone and capstones were laid over it. The brick band was backed up by concrete, also covered by the capstones. New lock gates and hardware were constructed for both locks.

The loss of stone from Lock 15 was more than could be recovered. Concrete had been used for previous repairs in this lock, so a band of concrete was used to raise its height. Raising the locks made it necessary to raise their dams also. Timbers lagged to the tops of both dams provided the needed height. The masonry on the back of the berm lock walls was pargeted, and the pool areas behind the dams were filled with earth and graded. Riprap was placed at the head of each berm lock wall to curb erosion during future floods. The towpath was raised to the historic grade. Both locks were repaired to function as water carrying and control devices, as during the canal's operation. The total repair cost was \$295,000.

8. Restoration of Stop Lock, Level 16 (Mile 13.77); Phase I Contract with Curtin & Johnson, Inc., of Washington, D.C., for \$29,380, August-December 1973; Phase II Contract with Chantilly Construction Company of Chantilly, Virginia, for \$128,301, January-July 1975

The rough and broken condition of the towpath alongside Widewater caused hikers and especially bikers to use a road along the berm side as a bypass, but there was no safe way to return to the towpath at the upstream end. The Phase I contract provided a suitable crossing there in the form of a bridge across the top of the stop lock at Level 16 and an earth ramp down to the towpath. The bridge was structurally similar to the winch houses over other stop locks on the canal, but without siding or roof.

Much of the stop lock was damaged from numerous floods and years of neglect, but its central portion was stable. Phase II provided for the functional restoration of the stop lock and the adjoining guard wall, which together formed a dam about 900 feet long to divert flood waters descending the canal into the Potomac, thereby protecting the canal structures in the Widewater area.

The work accomplished was a complete reconstruction of 450 feet of the guard wall and patch repairs of the remaining 450 feet using hand placed riprap. Both wing walls on the berm side as well as the guard wall were

restored. Mortared and dry-laid walls adjacent to the stop lock parapet wall that carried the towpath were also restored, and the towpath was regraded for 200 feet downstream. The earth ramp built under the previous contract would now impede the diversion of flood waters, so it was removed and replaced by a wooden stairway that would be washed clear in a flood. The only real problem during this work was in obtaining suitable dressed capstones for the wing walls.

9. Muddy Branch Culvert Repair (Mile 19.7); Construction Contract with Curtin & Johnson, Inc., for \$60,009, October 1973-June 1974

Initially, overlay was removed from approximately one-third of the culvert barrel and a waterproof cement parge coat was applied. The work progressed to nearby tree and debris removal and the reconstruction of the headwall and both wing walls on the outflow side of the culvert. Reconstruction entailed excavation to bedrock for concrete footings and the construction of concrete retaining walls faced with stone veneer. Several rises in the water level during the work necessitated stop orders until the water receded and the site dried out enough to continue.

Lesser repairs were made to the headwall and wing walls at the inflow side, and riprap was placed upstream from the wing walls for stabilization. Approximately 500 feet of towpath was repaired and the embankments restored.

10. Little Monocacy Creek Culvert Repair (Mile 41.97); Design Contract with Dewberry, Nealon & Davis for \$17,746; Construction Contract with Paul E. Lehman, Chambersburg, Pennsylvania, for \$95,642, February-August 1975

Little Monocacy Creek Culvert, above Lock 27 (Spinks Ferry), suffered complete failure of its inflow stone masonry headwall and approximately 16 lineal feet of its 20-foot-diameter masonry barrel. The related wing walls were partially intact but unstable. The portion of the culvert barrel that remained had large voids, and at the outflow there were several missing ringstones and a large cavity. (The interior of this culvert is impressive. The foundation walls rise six feet above normal water level to the spring line. The barrel stones are angled like the grooves in a rifle barrel.)

Because the culvert is elevated only three feet above the Potomac, this project was hampered by flooding. The contract called for dredging of the creek to remove a large gravel bar and numerous fallen trees, but very few architectural stones could be salvaged from the dredged area. All voids in the barrel were filled with reinforced concrete, which was also used to reconstruct the inflow headwall, foundation walls, support walls for the existing wing wall remains, and missing part of the barrel.

A large section of the downstream headwall was disassembled and re-aligned. A large void in one wing wall was repaired using stones recovered from the site. All but five ringstones were recovered, and after extensive but futile efforts to locate replacements for those missing, concrete was used to fill the gaps. All stone masonry was repointed. Upon completion of the contract work, the park's labor force reconstructed the canal bed and berm embankment over the culvert, restoring the scene.

11. Monocacy River Aqueduct Repair and Stabilization (Mile 42.2); Design by Federal Highway Administration; Construction Contract with Southern Equipment, Inc., of Washington, D.C., for \$271,000, April 1975, Terminated;



Construction Contract with Chantilly Construction Company for \$334,135, November 1975-October 1976

The Monocacy Aqueduct (Aqueduct No. 2) is the largest and most impressive of the 11 aqueducts on the canal. Its 560-foot length is supported by seven 54-foot arches.

The first contract called for the grouting of voids within the structure, but after work began it was found that the grout needed far exceeded what had been anticipated. The contract was terminated for the benefit of the government, design modifications were made, and the project was readvertised and awarded to Chantilly Construction.

The trunk of the aqueduct was excavated and regraded to drain outward, and a waterproof membrane was placed to keep water from percolating down through the structure. A layer of gravel with drainage pipes was installed on top of the membrane; it was covered with topsoil and seeded.

At each of the arches on both the upstream and downstream elevations, a series of two-inch holes was drilled through the ring stones at a slightly downward angle. Reinforcing rods were grouted in the holes, which were then plugged with salvaged pieces of stone.

To keep the walls from moving outward, they were compressed by horizontal six-by-ten-inch timbers held in place by vertical steel channels spaced 16 feet apart and tied together by 1-1/2-inch steel rods.

12. Catoctin Creek Aqueduct Stabilization (Mile 51.5); Engineering Design Contract with Robinson Engineering for \$9,000; Construction Contract with John Driggs Company, Camp Springs, Maryland, for \$351,802; Total Construction Cost including Day Labor \$556,000, August 1974-January 1975

This historic stone masonry structure contained three arches spanning 130 feet of Catoctin Creek. During canal days it was known as "crooked aqueduct" because of the sharp bend boats had to make immediately upstream. There is evidence that its center arch faulted immediately after construction when the shoring was removed, but the arch recompressed in settling and survived for 140 years. It and the west span collapsed after heavy rains on October 30, 1973, leaving the east arch and wing walls and west abutment and wing walls intact but vulnerable to future damage. By that time the aqueduct was missing its berm (upstream) parapet and much masonry from all three arches, and the westerly upstream wing wall was being weakened by the erosion of Catoctin Creek's embankment.

The contract provided for stabilization of the remaining arch, abutments, and wing walls, construction of a pedestrian bridge over the creek upstream, and stabilization of the westerly creek embankment. Stabilization of the structure included constructing concrete counterforts to relieve stresses to the walls, pumping grout into predrilled holes behind the walls to fill voids and reduce water seepage, and placing steel anchor rods. Approximately 75 percent of the masonry was repointed and several large areas where the architectural stones were missing were repaired with stones retrieved onsite. Rock-filled gabion walls were constructed to protect the remaining arch and to halt erosion of the westerly creek embankment. A flood in the spring of 1975 caused partial failure of the gabioned embankment, and by change order the entire embankment upstream of the aqueduct was riprapped with large limestone rocks.

To link the severed towpath a T-beam bridge of prestressed, precast concrete 111 feet long was installed above the aqueduct. It has fold-down handrails to minimize the likelihood of catching and being damaged by flood debris. Completion of the bridge eliminated an eight-mile detour required of towpath users after the aqueduct collapsed.

To provide access for heavy equipment used by the contractor, park labor forces raised the towpath over the Little Catoctin Creek culvert to its historic grade and built a temporary bridge over a waste weir. They also shored the remaining aqueduct arch in advance of the contract work.

13. Little Catoctin Creek Culvert Repair (Mile 52.51); Design Contract with Dewberry, Nealon & Davis for \$17,746; Construction Contract with Cobar Construction Company, Amundale, Virginia, for \$97,055; Total Construction Cost including Day Labor \$147,900, January-August 1975

Little Catoctin Creek Culvert suffered complete failure of the inflow stone masonry headwall, approximately 57 lineal feet of the 16-foot-diameter barrel, and the foundation on one side. The related wing walls showed extensive failure, and what remained was extremely unstable. Inspection of the site revealed very few architectural stones that could be recovered. The intact portion of the barrel was amazingly sound despite several large voids. The outflow headwall and wing walls, while missing many architectural stones, were repairable. The contract provided for recovering all architectural stones from the Catoctin Creek flood zone and stockpiling those not used in repairing the structure where they would be least subject to floods.

Catoctin Creek falls only one foot from the culvert outflow to the Potomac River 200 feet away. Because of the depth of water no underwater investigation of the foundation walls and footings could be made during the design phase, so the contract provided for dewatering the structure to enable inspection by the project supervisor. The missing headwall, culvert barrel, and foundation wall were reconstructed of reinforced concrete, and the wing wall remains were tied to reinforced concrete placed behind them. All voids in the existing historic barrel portion were filled with reinforced concrete. The outflow wing walls and headwall were repaired and stabilized using recovered stones. All stone masonry, including the barrel, was repointed with mortar duplicating existing mortar.

After the contract work the park's day labor forces reconstructed the berm embankment and canal bed and reseeded, thereby reestablishing the canal prism that had been missing here for many years.

14. Towpath Continuity, Level 34 (Mile 61.6); Day Labor

This site is just above Harpers Ferry and the confluence of the Potomac and Shenandoah rivers. During the 1972 flood the guard lock at Dam 3 was breached by the Potomac. The water washed out the canal and towpath to a depth of about five feet below the normal level of the canal bed. In this area of previous failure, it was decided to span the break in the towpath with a 40-foot bridge to provide a flood relief valve. The project cost \$40,000.

15, 16, and 22. Stabilization of Guard Locks 4, 5, and 6 (Miles 84.5, 106.8, and 134.1); Design Contract with Dewberry, Nealon & Davis for

\$61,947; Construction Contract with Plummer Construction, Inc., Hagerstown, Maryland, for \$310,174; Total Construction Cost \$465,250, May-October 1975

Guard locks protect the canal from the flooding of slack waters impounded by dams and allow boats to pass between the slack water and the canal. At some locations they were also used to feed water into the next lower levels of the canal, although at Guard Locks 4, 5, and 6 this was accomplished by junction feeder structures and sluiceways.

Ninety miles of canal are protected from floods by these three guard locks, and protection is still the primary concern. The original flood control gates in the upper gate pockets of each structure were long ago lost to floods and were replaced by wood bulkheads at Guard Locks 4 and 6 and a concrete bulkhead at Guard Lock 5. The wood bulkheads had deteriorated to the point of collapse and would have failed in a severe flood. The concrete bulkhead was leaking badly underneath, causing damage to the floor and walls of the guard lock, and its marginal design hampered its function. The project provided for flood controls for the long section of canal protected by these structures.

At the design stage reconstruction of the historic gates to provide this protection was considered but rejected. The guard lock structures were found to be in very poor condition, requiring major rehabilitation for gates to function properly; Dam 6 is nonexistent and unlikely to be rebuilt; and the canal below Guard Locks 4 and 5 is in disrepair and unable to be rewatered without major rehabilitation. So the decision was to let removable concrete panels replace the upper gates. During the early planning the three guard locks were considered as separate projects, but during the preliminary stage the problems of each were found to be so similar that they were combined in a single project.

Because the Potomac may flood at any time, it would have been very expensive to excavate and provide flood protection for the locks and canal while collecting field data for preparing contract documents. It was therefore decided to accomplish the construction work by negotiated contract during the months of June through September, when floods are least likely.

The work at Guard Lock 6 was started on June 1, 1975, with excavation of the site. Events here set the pattern for all three locks. First, the construction site was not as dry as hoped. Springs from the overlooking bluffs fed water through the lock floor, necessitating pumping operations throughout the duration of the job. This required redesign of the removable concrete panels to go at the upstream gate pocket recess rather than at the upstream end of the lock. Redesign was also required when the intake of the feeder culvert was found to be entirely different than conjectured. Because of these unforeseen events and the lead time necessary for procuring precast concrete panels, removable cast-in-place panels were constructed.

The foundation base was omitted because a massive stone foundation was found on level with the lock floor. The first panel was doweled into this stone foundation. The intake feeder culvert was closed by casting a reinforced concrete bulkhead in place, one foot back from the upstream headwall. Two large holes in the upstream walls were repaired with reinforced concrete patches. The upstream berm wall that forms the upper section above the lock top was dismantled and reconstructed. Deteriorated and missing stone were replaced throughout the lock structure and the entire structure was repointed. The floor of the lock was covered with plastic overlaid with eight

inches of coarse sand. Fill material was placed in the upstream end of the lock to the elevation of the top concrete panel. The towpath was repaired, and the entire area was regraded and sown with grass.

Work on Guard Lock 5 began on July 5 with removal of the trapped debris in the feeder channel. Next a dam was built to stop the water in the feeder intake channel so excavation could expose the upstream end of the lock. As with Guard Lock 6, the construction site was wet and required continuous pumping. Excavation again revealed conditions different from those expected, requiring redesign of the foundation and bottom panels.

Repairs were made to the upstream dam abutment and the mule cross-over abutment. One additional removable panel was added to the top, raising the elevation of the guard lock to the top of the dam abutment and the mule cross-over bridge and providing an extra five feet of flood protection. The intake channel was filled to the elevation of the top of the guard lock, and the upriver end was protected with machine-placed riprap. The coping stones were removed and reset, missing and deteriorated stones were replaced, and the whole lock was repointed. The lock floor was covered with plastic overlaid with six inches of crushed limestone. The area was cleaned, regraded, and sown with grass.

Work on Guard Lock 4 began August 4, 1975. The removal of fill and the deteriorated wood bulkhead again revealed unexpected site conditions. It was impossible to construct a watertight cofferdam upstream from the lock so that the removable panels could be placed at the upstream end of the lock. Instead, the cofferdam was constructed across the end of the lock and the panels were placed in the upstream gate pocket. Water leaking through the lock sides and floor required a 24-hour pumping operation for the duration of the project.

The bridge across the lock that provided towpath continuity was removed and the path was relocated to the fill across the lock intake in front of the removable panels. The coping stones and missing stones were reset, and the masonry was repointed. The area was regraded and sown with grass.

The cast-in-place concrete panels at all three guard locks could be removed and the locks made operational again without evidence of these flood control measures.

#### 17. Stabilization of Lock 48 (Mile 108.8); Day Labor

Lock 48 is one of the "four locks" where the canal cuts a mile across Prather's Neck rather than following a five-mile loop in the river. Because of failure of the foundations, the lock walls were slowly collapsing toward each other. A wood cribbing had been installed in the lock to brace it but could not withstand the force of compression. To rebuild the lock on a new foundation would cost about \$200,000. Instead, the lock was filled with earth, leaving the capstones exposed, and positive drainage was provided. The project cost \$12,000.

#### 18. Mule Barn Restoration, Four Locks Area (Mile 108.92); Day Labor

The last mule barn remaining on the canal was in such a sorry state of disrepair that between its recording by a Historic American Engineering Record team in July 1974 and the start of restoration in September, the balance of the roof and one wall collapsed. The barn was disassembled, board by board, and all reusable material was identified. The masonry

foundation was repaired, the earth floor raised to proper grade, and the grounds regraded to carry surface water away from the structure. The major problem was difficulty in obtaining materials, such as vertically sawn posts and beams and the right wood for siding, rafters, and summer beam joists. The park finally located 22 yellow pine trees, and District Maintenance Foreman George Wink, a former sawyer, obtained use of a sawmill. Historical architect Jim Smeal worked along with the day labor crew, sawing, hammering, adzing, and directing the work. Jim Askins supervised the entire operation. Its total cost was \$36,400.

19. Parkhead Level Culvert and Waste Weir Repair (Mile 119.78); Day Labor

This is one of several instances where the canal company built a waste weir immediately over a culvert so that canal water could be drained into the culvert. Although the canal has not carried water in this area for years, floods and neglect caused serious disrepair to the waste weir and the eight-foot-diameter culvert barrel, which had numerous voids throughout its length. The waste weir was dismantled, each stone being numbered for identification, and about a third of the culvert barrel was excavated. To remove the weight of the waste weir from the culvert, a reinforced concrete slab supported by concrete columns was constructed and the waste weir was rebuilt on it. The capstones on the outflow headwall were realigned, all voids in the culvert barrel were filled with concrete, and all stone masonry in the structure was repointed. The cost was \$143,000.

20. Tonoloway Creek Aqueduct Stabilization (Mile 122.9); Contract with William P. Bergan, Morrisville, Pennsylvania, for \$206,066, Overall Cost \$269,500, February 1975-April 1976

Frequent flooding and years of neglect had caused Tonoloway Creek Aqueduct to deteriorate at an alarming rate. The west abutment no longer rested on bedrock and the single arch showed signs of failure: extensive longitudinal cracks and spalled and missing soffit stones. On the upstream side extensive damage had occurred to the face and wing wall.

The contract provided for the arch to be shored by steel beams and the upstream and downstream faces to be corseted with steel and wood beams held in place by steel tie rods. It was necessary to place concrete to bedrock along the west side of the arch to form an abutment for the steel arch supports, which were then jacked to 7-1/2 tons of pressure. On the upstream elevation of the arch face and wing wall where the face stones were missing, all loose rubble material was carefully removed, drain pipe was installed, and the damaged area was shotcreted. Two reinforced concrete pilasters were cast in place for support to compensate for the original buttresses, which had collapsed. Timber bulkheads were constructed along both sides of the structure to contain the fill placed on the aqueduct. The fill covered the pipes installed to drain off surface water and loaded the structure to keep the arch in compression.

21. Stabilization of Lock 54 (Mile 134); Day Labor

As at Lock 48, a failing foundation made the walls very unstable. There were also numerous voids in the lock's walls where stones had fallen or had been pried loose. Earth fill graded to provide positive drainage

was again the solution. Because of the difficulty of access and the towpath repair needed as a result of the project, the cost was \$26,000.

23. Woodmont Culvert Repair (Mile 135); Day Labor

Woodmont Culvert, a masonry structure ten feet in diameter, was built on timbers and wood planks because bedrock was apparently too deep for the canal company to reach economically. It failed shortly after its construction and had to be rebuilt. About 35 feet of the outflow end was again failing because the soil beneath the supporting timbers had washed out. The recording crew considered it a challenge to enter the culvert because it had no visible support.

The damaged portion of the culvert was removed and stored beside the work area. The removed decking was damaged beyond reuse, but the timbers were found to be good and sound. These were later buried nearby as a means of preservation. The work provided for construction of reinforced concrete spread footings for the culvert and wing walls and a concrete floor constructed to the bottom face of the existing wood planking. The masonry thrust block, unknown until excavation, was recorded, dismantled, and reconstructed in concrete. The culvert barrel, the headwall, and one wing wall were reconstructed from stones salvaged during the dismantling operation. An extensive but futile search was made in the area for more matching stone for reconstruction of the other wing wall. A reinforced concrete wing wall was then designed and constructed in such a way that a stone veneer could be added later, and this was done at the end of the project after a source of acceptable stone was located. The intact portion of the barrel, uncovered during construction operations, was capped with four inches of reinforced concrete. The rebuilt barrel was pargeted for waterproofing. The project cost \$171,340.

24. Sideling Hill Creek Aqueduct Stabilization (Mile 136.6); Design Contract with Dewberry, Nealon & Davis for \$18,930; Construction Contract with C. W. Stack & Associates for \$32,490; Total Cost including Day Labor, \$68,050, May-October 1975

Like most of the canal's single-span aqueducts, Sideling Hill Creek Aqueduct had suffered extensive damage to its upstream parapet, wing walls, and arch. Stabilization was accomplished with steel and timber beams on both faces tied together with prestressed steel rods. Exterior plywood up to the water table on the upstream side allowed placement of compacted fill to reestablish the level of the canal bed and provide surface drainage. The steel beams on the downstream side were extended up to support a handrail where the historic wrought iron railing was missing.

Following completion of the contract work, park day labor forces built earth dikes across the canal just upstream and downstream of the aqueduct to prevent canal water from saturating the structure's rubble fill. Drainage pipes extending beyond the earth dikes prevent water from ponding in the canal during wet periods. All areas where the interior rubble remained exposed to the elements were pargeted.

25. Fifteen Mile Creek Aqueduct Stabilization (Mile 140.8); Design Contract with Dewberry, Nealon & Davis for \$21,048; Construction Contract with Paul E. Lehman, Inc., for \$147,787; Total Cost \$203,400, April 1975-May 1976

Fifteen Mile Creek Aqueduct, while bulging here and there and missing a few cap stones on the berm parapet, was still in one piece. Its condition is generally attributed to the twin barrel railroad culvert immediately upstream, which restricts the flow of water below it. The contract provided for temporary shoring of the arch so that equipment could safely be placed on the aqueduct, excavating the fill over the arch, shotcreting the exposed masonry for waterproofing, and installing internal drains to carry off water seeping through the aqueduct trunk. During excavation it was found that the canal company had repaired the aqueduct with a slab of concrete over the arch. The slab was sound but rather porous. The contractor was directed to shotcrete the slab, extending this work down over the ends to ensure a good watertight surface, and the internal drainage system was then modified to function properly under the changed conditions.

The earth fill behind the interior retaining walls on each end of the structure was excavated, the walls dismantled and reconstructed, and the excavated areas backfilled with granular fill material. (The original clayey loam was tested and found to possess unusual expansion qualities when wet, contributing to the bulging of the structure.) Holes were drilled through the arch support walls and into bedrock and steel dowel rods were grouted in place. Steel dowel rods were also grouted into predrilled holes in the arch stones as a stabilizing measure aimed at reducing longitudinal fractures and separations. After the rods were grouted in place a core plug of the ringstone was also grouted in the hole to reduce the visual impact. Following this, the temporary arch shoring was removed and all the undisturbed masonry was repointed.

Missing capstones were replaced along the berm parapet. The fill in the aqueduct trunk was graded so that surface water would be relieved through the waste weir. An earth dike was constructed across the canal above the aqueduct to keep flowing water out of the structure; it was carried off through a 31-by-51-inch arched corrugated metal pipe beneath the towpath. All disturbed areas were seeded.

#### 26. Town Creek Aqueduct Dewatering (Mile 162.3); Day Labor

Stabilization of this single-span structure was not proposed as part of the Bicentennial program even though it was in such a serious state of disrepair that the upstream side seemed to defy gravity. A section of the canal immediately west of the aqueduct was watered, the water being kept from the aqueduct by an earth dike with an overflow structure that was easily vandalized. Leaks through the dike were letting a great deal of water flow onto the aqueduct and causing damage through freezing. A new dike was constructed and the historic waste weir, which had been blocked by earth fill, was reactivated. The construction cost was \$43,000.

#### 27. Evitts Creek Aqueduct Stabilization (Mile 180.7); Design Contract with Dewberry, Nealon & Davis for \$21,057; Construction Contract with C.W. Stack & Associates for \$58,097; Total Cost \$91,200, May 1975-January 1976

Evitts Creek Aqueduct, the most westerly aqueduct on the C & O Canal, suffered the ravages of numerous floods and years of neglect. The berm parapet had failed and the arch was severely distressed with the outermost soffit stones fractured and separated in a wide longitudinal crack. The upstream wall and wing walls were failing rapidly. Surface water draining

onto the aqueduct was seeping into the structure, keeping it continually saturated. During winter months the freezing action was accelerating the damage. Oddly enough, the downstream side of the structure, including the headwall, towpath parapet, and wing walls, was in a very fair state of repair.

The contract provided for the recovery of all architectural stones from Evitts Creek and its embankments and their storage on the berm canal bank on either side of the aqueduct. As at Sideling Hill Creek Aqueduct, stabilization entailed using an exterior bracing system of wood and steel beams held together in compression by prestressed steel tie-rods. Because of the large areas of face stone missing on the upstream wall, one-inch exterior grade plywood was bolted to the beams to protect the sizeable area of exposed rubble inside the structure. One wing wall and pilaster were so badly damaged that the remains were dismantled and reconstructed, using stones recovered from the site. The earth over the structure was regraded to drain off surface water in both directions.

Following the contract work, the park's day labor forces constructed earth dikes across the canal at each end of the aqueduct and installed drainpipes to prevent water from ponding in the canal bed.



## COLONIAL NATIONAL HISTORICAL PARK

### Jamestown Visitor Center

The American Revolution was a family fight--Englishmen versus Englishmen, colonials versus the motherland. It all started in 1607 at Jamestown, site of the first permanent English settlement in America. Here the first legislative assembly convened in 1619 to set the pattern for American self-government. Here a rebellion of 1676 anticipated independence by a hundred years. The fascinating story of Jamestown and its archeological remains is told at a remodeled visitor center complex.

Part of the site of England's first successful colony in the New World was saved for posterity when it was acquired in 1893 by the Association for the Preservation of Virginia Antiquities (APVA). In 1907 this group sponsored the granite Tercentenary Monument that looms 100 feet over the historic site. In 1930 Congress authorized the remainder of Jamestown Island to be included in a new Colonial National Monument (renamed Colonial National Historical Park in 1936). In 1956 the National Park Service and the APVA combined their archeological collections in a new visitor center, completed in time for Jamestown's 350th anniversary in 1957. This structure and the nearby Tercentenary Monument logically became the focus of expanded development inspired by the American Revolution Bicentennial in 1976.

The founding of Jamestown in 1607, 13 years before the Pilgrims landed in New England, has been called "one of the greatest events in the history of the world." It must not have seemed so to the 114 persons who landed here on May 14 in three tiny vessels and began to construct a fort and town at this watery edge of a wilderness too vast for them to comprehend. Indian attack, semi-starvation, disease, and factional quarrels plaguing the colony in its early years threatened the same tragic fate of extinction that overtook the Roanoke colony of North Carolina in 1587. Gradually, however, by virtue of timely new arrivals with supplies, the development of agriculture and industry, and the improvisation of effective law and order inspired by a strong council, Jamestown became the capital and cultural center of the Virginia colony, a distinction it would hold until 1698 when the capital was moved to Williamsburg.

Historical and archeological research on Jamestown, begun by the APVA, was pushed vigorously by the NPS, yielding astonishing results in terms of artifacts and structural remains. But there has been no thought of restoring Jamestown to any past period. The community evolved. Building materials varied from timber and thatch to wattle and daub to solid brick. The spectrum of artifacts, from clay pipes to cannon balls, reflects an entire culture. The site is interpreted through two basic media: a self-guiding tour of the partially excavated community and exhibits in the visitor center.

Primary emphasis is on presentation of the townsite itself and the island surrounding it. There are streets and winding paths, exposed and marked foundations, remnant walls, onsite paintings of buildings and scenes, and recorded messages. The expanded visitor center complex exhibits the precious Jamestown artifacts and provides orientation for those who here

cross a time barrier of four centuries. It includes the visitor center itself, pedestrian approaches, the Tercentenary Monument, and a tour staging area.

The original visitor center was a simple flat-roofed rectangle of about 1,000 square feet with brick, aluminum, and glass curtain walls and marble fascia. The design directive called for its recycling and an addition that would double the floor space. The remodeled building would contain an orientation area, two theaters, and an enlarged exhibit space and concession sales facility in addition to the usual amenities. The design contract awarded to Vosbeck, Vosbeck, Kendrick and Redinger (VVKR) of Alexandria, Virginia, led to an addition divided roughly into three triangular spaces: a theme orientation lobby, a theater, and a sales area. The old unit was redesigned to accommodate an interior exhibit lobby, a large open exhibit room, a second theater, restrooms, office, and an employees' lounge. The approach from the parking area is by walkway and plank footbridge to a new ramp leading to a redesigned terrace or plaza. Visitors can enter the orientation lobby and exit from the main exhibit room or detour around the building directly to the staging area and Tercentenary Monument. The latter were upgraded by new paving and landscaping.

The brick finish and built-up roofing of the original structure have been extended, but the striking feature of the new building is the orientation lobby. This central triangle is accented by a roof rising to a bold expansive front constructed of plate glass panels 28 feet high and weighing some 900 pounds each, with structural aluminum mullions and fascia. This impressive feature encourages the visitor to enter the building and from inside permits an unimpeded view of the historic ground.

The overall design with its improved circulation and atmosphere presents a sequence of concentrated learning experiences communicating the significance of Jamestown. The approaches and new structural elements overcome the mental resistance engendered by the prospect of an orthodox museum, and the visitor now follows a congenial flow pattern. In the lobby he finds an information station, an arresting theme sculpture, and a semi-circular pit for orientation. Then he may visit one of the two alternating audiovisual productions featuring original artwork outlining the story of Jamestown settlement. Various categories of Jamestown artifacts, including household utensils, building materials, weapons, and armor, are exhibited in a series of suspended transparent triangular cases with silkscreened images on layered glass. There are also exhibits of furniture, models of the three original ships, and an intriguing model of the original fort with its flimsy interior structures of bark, thatch, and mud.

The expanded basement area contains artifact storage and curatorial areas and new heating and air conditioning equipment.

Wintz Brothers, Inc., of Philadelphia had the construction contract for \$1,390,000, which also included a new comfort station near the parking area and a new park entrance and ranger station. James S. Congrove was project supervisor, assisted by Lee Jordan as contract inspector. The project began in August 1974 and was completed in March 1976. Harpers Ferry Center installations, coordinated by Grant Cadwallader and Bruce Geyman for exhibits and Rick Krepela for audiovisual, were completed in May 1976. The project was dedicated just 369 years after the Virginia "pre-pilgrims" stepped ashore.

An incidental project at Jamestown, also under design contract with VVKR, was the enclosure of an existing "glasshouse ruins" exhibit relating

to 17th-century industry. Construction of the 2,000-square-foot shelter and related site work was handled by G. E. Gaynor of Hampton, Virginia, for \$56,400.

### Yorktown Visitor Center

In 1781 Yorktown, Virginia, became the setting for one of the most decisive battles in world history, insuring the military success of the American Revolution. It is difficult to interpret on today's terrain the events of two centuries ago. An enlarged visitor center offers focal point orientation and an exciting introduction to this climactic event.

Colonial National Historical Park comprises three units: Jamestown Island, site of the first permanent English settlement; Yorktown, scene of the culminating battle of the American Revolution; and a 23-mile parkway connecting these and other colonial-period sites with Williamsburg, restored by John D. Rockefeller, Jr., to its appearance when it was the 18th-century capital of Virginia. While Yorktown Battlefield is part of a larger historical complex, geographically and for interpretive purposes it is discrete. Because of its rather sprawling topography, with the historic scene somewhat obscured by modern highways, motels, and the York River Bridge, a "first stop" information station is vitally important if the confused stranger is not to lose his bearings and his curiosity.

Authorized as Colonial National Monument in 1930 and redesignated a national historical park in 1936, the area has always attracted the patriotic or the merely curious. During the Depression portions of the battlefield were restored as public works. In 1956 a visitor center was built on high ground within the defensive British earthworks, with commanding views of the battlefield and the York River. Its exhibits served the public well for more than two decades. But with increasing tourism the inevitable space crunch occurred--not enough room for visiting throngs and the park staff. The upcoming Bicentennial served as an incentive to plan and seek funds for a facility at least double the original size. The optimum location of the old museum-headquarters as well as economy dictated enlargement of the existing building rather than construction of an entirely new one.

The firm of Vosbeck, Vosbeck, Kendrick and Redinger, Inc. (VVKR), of Alexandria, Virginia, was awarded the design contract. NPS directives were for an amply enlarged building that would not dominate the battlefield scene yet would be compelling enough to prompt the visitor to stop there first for orientation. The building must provide exhibit space, two theaters, a sales area, ample entrance and lobby space, and expanded facilities for park management. These requirements recognized two major inadequacies of the old arrangement, apart from the space problem; the existing building was not architecturally compelling, and the museum exhibits needed overhaul.

Within a very limited site the expansion would be least damaging to historic and environmental values by using the gently sloping terrain in front of the old structure and closer to the battlefield. Here VVKR designed a new building with an axis 45 degrees from the original, the overall effect being that of a giant triangle offset from a rectangle. The west point of the triangle is directed at the parking and bus loading areas. The south angle points directly to the battlefield, making a dramatic

entrance to the new exhibit area as well as an exit to view the battlefield earthworks. The triangle motif with its military connotations, suggesting a spear point or a fort's bastion, is cleverly echoed in other development details. Yet a harmonious blend with the old structure is achieved by use of the same exterior materials: warm-toned brick walls and aluminum window and door frames. The flat roofs of both sections are relieved by an elongated skylight of triangular profile over the new central corridor connecting the two sections, plus an arresting pyramidal skylight at the western tip.

Complementary triangle forms are also found in the shape of the open entryway with projecting roof, the enclosure of a new staircase to the battlefield roof observatory, a landscaped garden and pool with water sculpture of conjoined and sloped triangular columns, and a triangular planting behind the tour bus shelter.

Aside from its military connotations, the dominant triangle aided the desired circulation pattern. The natural line of sight for a pedestrian starting from the parking area is toward the enticements of the battlefield. To reduce the psychological conflict between battlefield and visitor center, the building was extended invitingly toward the arriving visitors with one wall parallel to the natural line of sight, so that the visitor finds himself converging on both battlefield and visitor center. The flag-lined plaza adjoining the theme sculpture and pool is intended to induce a mental transition from the quiet expanse of the battlefield to the colorful and arresting interior of the exhibit building.

The visitor enters the theme orientation space, a grand corridor or promenade identified as the Hall of Flags, with the "Lafayette cannon" at the far end. Here a feeling of spaciousness and exaltation derives from the open clerestory roof section with insulating double-pane glass panels. To the left, in the new triangle, is an exhibit room with a rising ceiling, providing flexible space for future display rotation, but which now includes a lifesize two-tier section of a British frigate with gun decks and quarters, George Washington's actual tent used for field headquarters, and a children's museum with dioramas depicting the siege of Yorktown.

Opposite an information station is the old section with a remodeled floor plan. Right from the lobby is a refurbished auditorium featuring the film "Victory at Yorktown." A "multi-purpose room" can also be used for showing the same film during peak crowds. Other rooms on the main floor include sales, historians' offices, and library. A stairway leads down to administrative offices and spaces for drafting, conference, storage, and utilities.

The new structural system is a unique concrete space frame providing maximum clear span within minimum depth. The triangular pan forms of the space frame mirror the module of the buildings and the exhibits. The structural system is left exposed, accenting the exhibit area. This was essential to better relate the scale of the structure and finish to the space and exhibits. The structural, mechanical, lighting, and exhibit systems have been integrated to increase the flexibility of the exhibit space. The resultant building, a singular and strong design, solves the pedestrian flow in relation to the battlefield and satisfies the expanded operational requirements.

The construction contract awarded to Wintz Brothers, Inc., of Philadelphia for combined projects at Yorktown and Jamestown included \$1,425,000 for the Yorktown Visitor Center. James S. Congrove was project supervisor.

The work period extended from August 1974 to March 1976. Coordinators for the film and audiovisual elements were Rick Krepela and Fred Jessen of the Harpers Ferry Center. Exhibit responsibility rested with Grant Cadwallader and Rick Strand.

### Surrender Field Interpretive Facility

If the military victory at Yorktown was truly the climax of the American Revolution, then Lord Cornwallis's surrender of his forces to the American and French allies under Washington and Rochambeau, on October 19, 1781, may be considered the culmination of that victory. An interpretive facility, featuring a structure of imaginative design, enables visitors to obtain a commanding view of the local of the colorful and emotional surrender ceremony that marked the end of America's long, painful struggle for independence.

While it would be difficult to lavish too much rhetoric on the significance of Yorktown in American history, one cannot comprehend the jolting impact of the surrender upon its participants without an understanding of the circumstances of this climactic event of October 19, 1781.

On October 16 Gen. Charles, Lord Cornwallis, deafened by cannonade and on the brink of disastrous defeat, sent a messenger to Gen. George Washington offering his terms of surrender. After protracted negotiations by subordinates at the Moore house, the British commander was compelled to accept Washington's unrelenting terms: total surrender, without the ceremonial honors of war. At 2 p.m. on the 19th the allied army, about 15,000 strong, was led into "a broad field" two miles from Yorktown by Washington, Comte de Rochambeau, and Admiral de Barras, representing the ailing Admiral de Grasse whose fleet had blocked the sea escape route. With Cornwallis likewise absent on a plea of illness, the British force of only 3,500 men (an equal number being ill or wounded in Yorktown) arrived slowly, led by Gen. Charles O'Hara, with flags furled and their band playing the dismal tune "The World Turned Upside Down." In humiliation, the British commander was required to surrender his sword to the subordinate American general Benjamin Lincoln. Then "a universal silence hung over the field as the defeated troops lay down their arms." It is said that the British displayed signs of poorly controlled rage. Who can describe the feelings that surged in the breasts of Washington, his faithful officers, and his battle-worn troops after their many years of hardship and sacrifice?

In time the "open field" of 1781 was reduced in size by encroaching trees and farmsteads, the latter being scheduled for park land acquisition. The portion owned by the government has long been accessible via the Surrender Road, a small parking area, and an earthen viewing stand. The Bicentennial program made it possible to radically upgrade the interpretive development here. The result has been obliteration of the old layout and a new facility more worthy of this "sacred ground."

As part of a comprehensive master plan, it was envisioned that Surrender Field would be the last stop on a seasonal bus tour. An initial interpretive plan for this area, involving a minimum of new construction and a maximum of symphonic sound effects, was discarded in favor of a formalized new viewing structure with low key interpretation emphasizing the solemnity of the event that symbolized the rise of a new nation from an old empire. Development of a screened approach and spacious park-like grounds would

encourage contemplation of the episode and its impact.

More specific guidelines were developed in the course of preliminary design work. The core structure would be an elevated platform overlooking the grounds, with a brief audio message to conjure up a vivid image of the historic event. Because of the roar of traffic on U.S. Highway 17 and noises from a high school athletic field, both only a few hundred yards distant, as well as the drone of heavy commercial and military air traffic overhead, sound baffling and a sophisticated speaker system would be needed. These requirements called for something more than a platform. There would be a structure with walls and a ceiling to provide both vertical and horizontal baffles as well as shade and shelter. Yet this would not be a building with doors, windows, and mechanical atmospheric controls, but an open view terrace with natural ventilation.

Other design requirements of the structure were that it have an unobtrusive profile, best achieved by placing it at the edge of a natural woodland; that it be built of materials requiring minimal maintenance; and that it present low security risk in the absence of staffing. The plan also called for a turnaround parking area, a bridge ramp at wheelchair gradient, and an alternate exit with passage along an exhibit row of bronze cannon, relics of the battle that could finally be liberated from decades of dead storage. The entrance gate, walkways, benches, and plantings were designed to create a contemplative atmosphere merging history and nature.

The development of Surrender Field, one of the last Bicentennial projects to be completed, fulfills the designer's expectations and gives visitors a refreshingly new interpretive experience. The facility is properly blended into the wooded background, yet its innovative architecture, with graceful flowing lines, silently informs the visitor that he should approach with something akin to reverence. The core structure is turret-shaped, with brick walls and a 110-degree opening to the vista of Surrender Field. The waffled ceiling with acoustical tile accommodates a battery of five speakers to convey an inspirational message capable of reaching a group of 50 at low volume.

The approach to the upper or viewing level is via a ramp of bridge design with three piers. The alternate return is an encircling ramp that passes under the bridge to open space. At ground level on the exit passage are 11 captured British cannon, displayed in a series of coves with granite block floors, separated from visitors by a dry moat and rail. The walls of the bridge, baffle enclosures, and descending walk are sand-blasted concrete. The observatory is 30 feet wide; the maximum diameter of the structure, including down ramp, is 75 feet. The ground plan of the structure somewhat resembles a chambered nautilus, or seashell.

A Surrender Field sign and gate, bracketed by split rail fencing, marks the entrance to the approach road, which enters a circle where tour buses load and unload passengers. Off the circle is a small parking area for passenger car use out of season. The passenger loading area and the park walkways are bituminous with a surfacing of tan or buff pea gravel. Plank benches are integrated with plank railing along the triangular loading area. Walkways to the observatory and leading from it to the park-like open space are provided with benches for rest and contemplation.

Landscaping includes both native and exotic trees from the Williamsburg botanical list, among them redbud, flowering dogwood, hawthorn, holly, red gum, magnolia, loblolly pine, and scarlet oak. The perimeter of the developed area along Surrender Road and Surrender Field is defined by split rail

fencing. Some reconstructed sections are made of aged chestnut rails from the West Virginia hills.

The utility system is limited to a water line to flush down walking surfaces and supply drinking fountains and possible future restrooms, and an underground electric line to power and dehumidify the audio equipment, which is hidden in a ground-level vault.

Robert L. Steenhagen developed the concept for this project. R. Merrick Smith was design coordinator. Other contributors were Robert Campisi, who did the construction drawings; Jack Lovell, structural engineer; Seibert Chapman, project supervisor; Russell Hendrickson and Ray Price, Harpers Ferry Center exhibit planners; and Rick Krepela and Fred Jessen, audiovisual specialists. Jim Haskett, chief park historian, made significant contributions to the basic concept. Apex Building Contractors of Newport News, Virginia, built the facility for \$314,852.

### Yorktown Battlefield Restoration

The integrity of the Yorktown setting offered high potential to vividly portray the chessboard moves of the opposing forces leading to the British surrender. Restoration of the American and French siege lines and batteries to fulfill this interpretive potential was a major Bicentennial project.

If one counts Lexington and Concord as the beginning, in the summer of 1781 the Revolutionary War was dragging into its seventh year, and despite some notable American successes, the British were still ensconced in New York and Charleston and still had armies in the field. Independence had been declared but not achieved.

The early campaigns were mainly fought in New England and the mid-Atlantic states, but after 1778 most activity was in the South. The British plan to stage a triumphal procession through the supposedly loyal southern colonies failed, despite their conquest of Charleston in 1780, because of losses to American defenders at Kings Mountain and Cowpens and their too-costly victory at Guilford Court House. In consequence Lord Cornwallis decided to move north to Virginia, joining other British forces there and taking charge of a new campaign to subdue that rebellious colony.

The new British concentration in the Virginia peninsula and the prospect of support by a French fleet under Admiral de Grasse presented Washington and his French counterpart, Rochambeau, with a priceless opportunity for a military breakthrough. They were stationed in New York and Connecticut, planning a siege against New York City held by forces under Gen. Henry Clinton, when the inspiration was born. Rather than batter themselves against that stronghold, they would fool Clinton into thinking he was still under siege as they stealthily shifted troops, cannon, and supplies to Virginia. There, with the help of de Grasse, they would trap Cornwallis into a surrender that could end the war.

While his lieutenants Marquis de Lafayette, Baron Von Steuben, and Anthony Wayne skillfully maneuvered their Virginians and Pennsylvanians to keep Cornwallis preoccupied and confined to his corner, Washington and Rochambeau started their Continentals and French regulars southward, and Virginia's Governor Thomas Nelson, Jr., assembled his militia. De Grasse landed French marines under St. Simon at Jamestown and then engaged the British fleet at Virginia Capes. The French naval victory, coupled with



the arrival of another French fleet under Admiral de Barras from Rhode Island with more troops and siege guns, sealed Cornwallis in Yorktown. In September the allied forces, totaling some 16,000 troops, gradually assembled at Williamsburg.

Yorktown with about 300 houses was on a sandy bench above the York River. The British strength there, including German units, was 7,500--less than half the allied force, but all seasoned veterans. Cornwallis established a line of fortifications, close in, supported by small enclosed redoubts and batteries. He constructed two positions, Redoubts 9 and 10, to command high ground at his left near the river; a large star-shaped work called the Fusiliers' Redoubt on his right wing toward Williamsburg; and a wedge-shaped "hornwork" in between. These, together with ravines, constituted his outer line. On September 30 Cornwallis betrayed his anxiety by evacuating his exterior line, giving the allies an initial advantage.

After surveying the British works, Washington ordered the manufacture of siege material: gabions (woven baskets to be filled with earth to support embankments), fascines (long bundles of sticks bound together for use in strengthening ramparts), fraises or pickets (pointed stakes driven into embankments or ditches to impede infantry assault), and saucissons (large fascines). After sending attackers against Gloucester Point across the river to close a possible escape route, Washington directed the construction of the First Allied Siege Line, a rough semicircle around the British works. The line was about 2,000 yards long and was supported by four redoubts and five batteries.

On October 9 the allied bombardment of Yorktown began. The effect of this bombardment prompted Washington to begin the Second Allied Siege Line on October 11, within storming distance of the enemy. British Redoubts 9 and 10 had to be taken to complete this advanced line, and Col. Alexander Hamilton led the American party in the assault on Redoubt 9. By the 17th Cornwallis realized that his position was hopeless and opened surrender negotiations. When the fighting stopped Washington ordered the leveling of the allies' earthen fortifications, thereby complicating the task of later historians and archeologists.

The battlefield became part of Colonial National Monument in 1930, and during the 1930s the National Park Service conducted historical and archeological research and reconstructed certain features. These included Redoubt 9, an American battery of the Second Line, part of the Grand French Battery, the Fusiliers' Redoubt, and about 2,000 yards of siege lines and connecting trenches.

Bicentennial planners recommended more earthwork reconstruction. Achievement of this goal was aided by the interest and availability of Southside Historical Sites, Inc., a nonprofit research organization headed by Dr. Norman Barka of the Department of Anthropology at the College of William and Mary. A professional services contract with Southside enabled the organization to conduct an intensive historical and archeological survey and comprehensive archeological excavations, prepare construction plans and specifications, and work with a separate construction contractor, Moore Golf of Culpeper, Virginia.

Archeological excavations at Yorktown were conducted at four sites from 1972 through 1975. Work began at the Grand French Battery of the First Allied Siege Line and later expanded to include the second American redoubt of that line, the middle portion of the Second Allied Siege Line, and a trench connecting the American first and second parallels near the



York River. Five batteries, three redoubts, and nearly 4,000 feet of trench lines were excavated within these four sites. Tangible subsurface evidence included earth profiles of batteries, redoubts, powder magazines, trenches, and pickets; sleeper (oak beam) impressions at gun platform locations; and an assortment of battle artifacts including buttons and live mortar bombs.

Reconstruction efforts concentrated on completion of the Grand French Battery anchoring the left end of the First Allied Siege Line, including Cannon Battery 2 with four platforms and four embrasures, Mortar Battery 5 with six platforms, and a redoubt with palisades; the mid-portion of the Second Allied Siege Line, including a fraised French battery with six embrasures, a common palisaded infantry redoubt, and an American battery with four embrasures and dummy powder magazines; and a connecting trench on the right near the York River. (Archeological excavation of an American battery and redoubt on the right of the First Allied Siege Line was completed, but no funds were available to reconstruct.) In summary, a total of four batteries, two redoubts, and nearly 4,000 feet of siege and connecting trench lines were constructed. All of this required the excavation of approximately 200,000 cubic feet of earth used as fill plus an additional 65,000 cubic feet for construction fill from other sources. Notable aspects of the design and construction were as follows:

1. It was necessary to make some compromise with historical accuracy in reconstructing earthworks originally sloping up to 70 degrees. Experiment determined that a 53-degree angle was the maximum for stability. This necessitated dimensional adjustments to the glacis and the berm of the outer parapet. Because the steep side slopes of the gun embrasures could not be modified without unacceptable distortion, a system of chain link fencing overlaid with a mud slurry was devised to ensure their permanence.

2. Fascines and gabions were not employed, because experience of the 1930s demonstrated that they would soon rot and collapse. To help ensure stabilization, more than 36,000 square yards of an improved strain of Bermuda grass sod, secured with long wire staples, was installed on the steeper slopes. Chicken wire was also used in more critical situations. The lesser slopes were hydroseeded.

3. Artillery platforms were designed for permanence by the use of buried concrete foundations. Treated red oak sleepers, decking, stringers, and hurters (carriage wheel stops) were secured to them as a stable matrix by bolt anchors camouflaged as wooden pegs. Red oak was also used for doors for dummy magazines. Cedar was used for fraises and palisades, in contrast to the cast concrete fraises resorted to in the 1930s.

4. All soil used on construction features was machine-compacted.

5. Although archeology at the batteries and redoubts preceded their reconstruction, in most of the trenches archeology and reconstruction proceeded almost simultaneously. As archeologists worked to identify the irregular trench alignment and determine variable profiles, the earth was piled up to be shaped as a parapet on the British side. The controlled use of machinery in developing trenches was justified by the magnitude of the work. The excavated material from battery and redoubt areas was screened 100 percent, while that from the trenches was screened only on a spot check basis. Except at the Grand French Battery, there was not a high incidence of non-structural artifacts.

Arnold H. Gustavson of the Historic Preservation Team, Denver Service Center, was the project landscape architect and liaison man with Southside,

and Dr. Wilfred Logan served as archeological advisor. Dr. Barka coordinated the entire contract project research, design, planning, and execution. His principal field assistant was Arthur Barnes, and Jimmy Smith was archeology crew chief.

David O'Kane, Denver Service Center, served as project inspector, and Ray T. Lee and William Siney were the contract administrators.

Edward S. Ayres of Dr. Barka's organization was the field historian on the project. DSC historians Jerome A. Greene and Erwin N. Thompson completed exhaustive research reports on details of the battle, particularly along the British and allied siege lines.

Harpers Ferry Center spent \$30,000 on wayside exhibits in the siege area but was most heavily involved in the manufacture of cannon, mortar, and howitzer tubes. At a cost of \$250,000, 40 field pieces were delivered to the area. Because of funding problems, all bronze tubes were delivered as rough castings, and carriage construction was deferred. Bill Meuse supervised production of the cannon and Joseph Rockwell developed the wayside exhibits for HFC.

The tentative figures for Southside and Moore Golf were \$300,000 and \$400,000 respectively. DSC costs for historical research, planning, preliminary design, and all supervision came to \$220,000, for a total investment in Yorktown Battlefield of \$1.2 million.

#### Nelson House Restoration

Few men played a more significant role in the American Revolution than Thomas Nelson, Jr. He was a delegate to the Continental Congress, governor of Virginia, signer of the Declaration of Independence, general of volunteer brigades, and owner of a Yorktown residence damaged by cannonballs during the siege. Miraculously, the 250-year old structure still stands, important for its architecture as well as its historical associations. Restoring it to its 1781 appearance was a major Bicentennial project.

The handsome two-story brick mansion of Thomas Nelson, Jr., prominently located on Yorktown's main street overlooking the waterfront, was purchased by the United States in October 1968 to further the park master plan objective of preserving Yorktown buildings dating from the Revolution. It is regarded by some as the most significant building in Yorktown because of its strong expression of classic Georgian style and its Nelson connection. Its restoration was a challenge to the ingenuity, design skills, and craftsmanship of National Park Service preservationists.

The history of the Nelson family was admirably presented in a 1969 monograph by park historian Charles E. Hatch, Jr. It appears that the original Thomas Nelson, an emigrant from Cumberland, England, in 1705, was sufficiently prosperous to acquire large tracts of land and become prominent in local and colony affairs. William Nelson, his son and the father of Thomas Jr., was a tobacco planter and Yorktown's leading merchant, president of the Virginia Council, and an interim governor before his death in 1772.

Thomas Jr., born in 1738, was like his forebears a merchant and landowner and became deeply involved in events leading to the Revolution. He served regularly as a delegate to the Virginia Assembly, first at Williamsburg and after 1780 at Richmond. As a member of the Continental Congress he was in the forefront of those urging independence and was among the first

to sign the Declaration. He succeeded Patrick Henry and Thomas Jefferson to become the third governor of the new Commonwealth of Virginia, at the same time serving as general of militia skirmishing with British troops on the Peninsula. Although mainly an organizer, supplier, and fund raiser for the allied forces rather than a combat strategist, Nelson was on hand for the siege of Yorktown. He is reputed to have urged Lafayette to direct artillery fire at his residence, where "you will be almost certain to find Lord Cornwallis and the British headquarters." This tradition is supported by the indentations in the walls made by "iron hail," the logic of the British commander's requisitioning the most imposing house in town, and Lafayette's testimony when he revisited Yorktown on his triumphal tour of 1824. But even if the story is apocryphal, it is a treasured legend that has made the Nelson House a shrine.

The house continued in the ownership of Nelson's descendants for almost 120 years after his death. During the Civil War Yorktown was again the pawn of contending armies, and the Nelson House was used as a field hospital by both Confederate and Union forces. It was a focal point during the Yorktown Centennial of 1881 and at the dedication of the Yorktown Victory monument in 1885. Sporadic efforts to acquire it for preservation and public exhibit failed, although in 1914 the house and adjoining property was purchased by Capt. George Preston Blow for private restoration. Unfortunately, liberties were taken with the original fabric in remodeling the house to suit the Blow family's personal tastes and conveniences, complicating the later task of restoring it to its 1781 appearance.

Historical Architect Robert V. Simmonds was given the formidable assignment of designing the restoration. Assisting him in investigating the structure was Gordie Whittington, one of the Service's most respected restoration craftsmen. Phase I of the project, begun in December 1972, consisted of architectural research and measurements to aid the completion of working drawings.

Much of the mansion was substantially unchanged, including the walls of oversize brick in Flemish bond, the quoins and keyed window arches, the pedimented gables and strongly accented cornices, and the superb chimney stacks with richly molded caps and step weatherings. On the other side of the ledger, the circa 1920 Blow project had altered entryways, added nine dormers, and drastically reworked the interior. The central stairway had been altered in details, marble fireplace mantels and hearths had been replaced, and the cellar storage space had been converted to a kitchen. A secondary winding stairway had been obliterated. Most of the wide floor boards and the paneling of Virginia pine heartwood had been preserved, but the walls and ceilings had been relathed and replastered.

After verifying the nature and extent of this work, Whittington's skilled crew removed all late materials, even stripping paint layers, so that historic fabric could be examined in detail. The design report did not receive final approval until October 1973, primarily because the simple climate control plan recommended by the architects was rejected by management in favor of a sophisticated system, requiring restudy and redesign. This system, which added substantially to the project cost and involved some compromise of historic material, was justified on the grounds of furnishings preservation and the comfort of visitors and employees.

Following preparation of construction drawings and specifications in Denver, a construction contract for \$969,000 was awarded to Apex Building Contractors. The long work span of July 1974 to May 1976 was necessary in

large part because of the painstaking effort needed to install elaborate electrical, mechanical, security, and fire detection-suppression systems without undue damage to the 18th-century fabric. Other major elements in the contract were foundation repair, pointing of masonry, replacing roof, floor, and wall framing, reroofing, reflooring, doorway restoration, replastering, stair reconstruction, and general refinishing.

Concurrent with the contract construction work, a day labor crew under Whittington did jobs requiring specialized craftsmanship, such as rehabilitation of paneling and doors and reconstruction of doors, window trim, and interior cornices. Some of these projects could not be completed until there was further detective work by Simmonds and Whittington--work postponed because of the redesign forced by the climate control system change and the need to produce drawings for the contractor in time to meet the 1976 deadline. This further investigation led to the solution of some architectural puzzles.

The Nelson House brick was confirmed to be a true 18th-century English import, and the contractor could find no American source to exactly match the original for repairs. Finally, Whittington took samples to Victor Cushwa and Sons of Williamsport, Maryland, and came up with a brick of the right size and texture. The color was not exactly right, but it was close enough to permit completion of the contract work.

One redeeming feature of the Blow project was that photographs were taken of some details before changes. Among them were pictures of the original fireplaces, now missing. When working on the nearby Edmund Smith House, Thomas M. Armstrong, a restorationist under Whittington, noticed marble fragments below the rear steps that were being removed. He found that they could be assembled to match the photographs. This enabled reconstruction of the marble fireplaces with their original profiles, graining, and color patterns. The architects also discovered in the garden area of the Nelson House remnants of the original limestone entrance stairs, thereby ensuring accurate placement of the original doorway.

The Blow work had lowered room ceilings and displaced cornices. By analyzing the original paint lines and nail positioning on joists, as well as the photographs, the restorationists were able to replace the cornices at their correct height.

Samples of original fish-tailed cypress shingles were discovered in the eaves, permitting accurate replication of the roof. Another exterior feature of interest was the wrought-nailed eave and pediment cornices, found to be in remarkably good condition after two centuries. Oddly, while the pediment cornice crown molding had a double ogee (S-shaped) profile, the corresponding molding on the eave cornice had a combined ogee and flat profile. Indicative of the sophistication of the design, the modillions (ornamental brackets) on the pediment cornice were found to decrease in width and spacing as they approach the apex.

Probably the most difficult problem confronting the team was that of reconstructing the original winding secondary staircase. To all appearances the configuration of newel posts, bannisters, balustrade, treads, risers, quadrant landings, and degrees of inclination had been irretrievably lost. Only random clues discovered by systematic search, such as original studs with tell-tale nail holes and lath and plaster stains relocated elsewhere in the building, permitted the gradual and finally triumphant solution to the puzzle.

Aberrations in the original construction suggested to Whittington and

Simmonds that the original Nelson ("Scotch Tom") used an intermittent succession of his ship carpenters to build his home while the ships were being unloaded and cargo placed aboard. There are several variations of framing techniques and at least five different door patterns. Cornice moldings are of basically the same profile yet vary considerably in size. There are variations in door and window trim from room to room. Some H-L hinges are placed on door and jamb surfaces, while others are mortised into the doors and behind or under door casings. It is improbable that the same builder would have been responsible for such differences.

Architectural analysis, design, and construction drawings for the restoration of the Nelson House, as well as all other Bicentennial restoration projects at Colonial, were all performed by personnel of the Denver Service Center's Historic Preservation Team. This was in contrast to the extensive contracting for some of the design work and most of the construction drawings for restorations at Independence National Historical Park and elsewhere.

Here too, for the first time, the National Park Service provided total atmospheric control, security, and fire detection-suppression systems in the initial design process. The atmospheric control system, the result of considerable in-house research and discussion, is probably the most modern and comprehensive in any NPS historic structure. To minimize noise and reduce mechanical equipment intrusion, the compressors, condensers, and boilers were placed in the nearby Fire House basement, and hot and chilled water was piped underground to the Nelson House (and the neighboring Ballard and Edmund Smith houses). Two air handling units, with hot and chilled water coils, were installed on separate pads in the Nelson House basement to handle a total of 6,000 cubic feet of air per minute, sufficient for a visitation load of 100 people. An ingenious system of concealed ductwork was devised to distribute the air with minimum intrusion on the historic fabric.

The Nelson House is as fire- and vandal-proof as modern systems can devise. Any tampering with doors or windows triggers alarms at park security stations. The fire detection system employs the ionization method and then triggers Halon gas suppressant selectively and directly to the point or points of incipient fire.

A portion of the basement was adapted for use as an exhibit area and dressing rooms for the actors and actresses in interpretive "playlets" staged in the house during the Bicentennial years.

Besides Simmonds and Whittington, others contributing significantly to the project included Richard Case, mechanical engineer; John Kozel, electrical engineer, Donald Hovland and Sherry Stevens, architects; and Tom Armstrong, restorationist. Project inspectors Robert Hollenan and Siebert Chapman worked under project supervisor James Congrove. Architect Lee H. Nelson is credited with preliminary design work in 1971. The total Bicentennial investment in the Nelson House came to about \$1,200,000.

### Yorktown Historic Structures

Almost obliterated by the ravages of war, fire, and flood, as well as economic decline, Yorktown lives on today thanks primarily to tourism. A few historic buildings survive to strengthen the nation's "mystic chords of memory."

Yorktown resulted from a British act of 1691 requiring the establishment of inland ports to accommodate the booming tobacco trade. The York River, actually a deep-water estuary, was an ideal shipping route, and Benjamin Read's plantation at the Gloucester ferry was the ideal port, so Read yielded 50 acres to accommodate a new town named for the Duke of York. The site on the bluff was surveyed into 85 half-acre lots arranged along a "Main Street" and several intersecting streets. More lots were created later along the waterfront to legalize the ownership of burgeoning docks and warehouses.

During the first three-quarters of the 18th century, Yorktown was in the forefront of Virginia communities enjoying great prosperity from the sale and export of the magical weed. This prosperity gave rise to a tightly knit Tidewater aristocracy of merchants, planters, and shippers who became prime motivators of the Revolution. They were supported by a class of yeomen, farmers, and shopkeepers and a labor substructure of indentured servants, runaway seamen, transported convicts, and African slaves.

When Lord Cornwallis backed into Yorktown in 1781, nervously awaiting reinforcements from New York, the local economy was declining as the center of population moved toward the Piedmont, but this was still a sizeable town of perhaps 1,800 people. Some slaves and a few Loyalists remained, but most of the population fled before the British troops, abandoning houses and possessions that were quickly appropriated for military purposes. Of an estimated 200 structures in Yorktown on the eve of battle, more than half were totally destroyed and most of the remainder were damaged. Only a handful of the survivors still stand. In addition to the Nelson House, they include the Grace Episcopal Church, the Thomas Sessions and Thomas Pate houses, and the Custom House. Certain others received limited treatment as part of the Bicentennial program.

The Dudley Digges House in Lot 77, used as a park residence, was architecturally studied and restored in 1959-60. Bicentennial improvements consisted of the installation of a fire detection system and the conjectural reconstruction of four archeologically identified outbuildings or dependencies of the colonial period: smokehouse, granary, kitchen, and wellhouse. Reconstruction of the stable was omitted from the program because it could not be confirmed by archeology. The Dudley Digges dependencies were the only Bicentennial reconstructions attempted at Yorktown beyond elements of the 1781 battlefield.

Dudley Digges, c. 1728-1790, built his Yorktown house sometime after 1755 and lived there until he moved to Williamsburg about 1780. He was a fourth-generation Virginian with a distinguished record of public service as justice of the peace, member of the House of Burgesses, rector of the College of William and Mary, and Revolutionary patriot. During the hostilities of 1781, while serving in the legislature, he was captured by the British at Charlottesville. The role of his house in the 1781 siege is unknown, but it achieved distinction during the Civil War as a field headquarters for Maj. Gen. George B. McClellan.

The reconstructed dependencies illustrate the importance of these satellite structures in the economy of a colonial household. Usually harmonious in design with the parent structure, outbuildings were detached to maximize air circulation in a humid climate and minimize fire hazards and spaced for orderly use and convenience. In genteel homes such as this, there would be a setting of pathways and work areas paved with brick or marl, hedges, and formal gardens. Here the kitchen, granary, and smokehouse

were aligned in a courtyard, each being 34 feet from the house. The well was between the kitchen and the residence, and 44 feet beyond the kitchen was the stable. All were in Lot 79 adjoining Yorktown's main street.

Reconstruction work meticulously followed earlier architectural design work by Lee H. Nelson, which was based on the archival findings of Park Historian Charles S. Hatch, Jr., and archeological data uncovered by John L. Cotter and John W. Griffiths. The kitchen is the largest and most important structure in the group. It is a frame building 18 feet by 22 feet facing toward the house. Its T-shaped chimney has a base width of nearly nine feet and a depth of nearly five feet, accommodating a cooking fireplace of generous proportions.

The frame granary, 10 feet by 12 feet, is patterned after a Williamsburg model. The smokehouse, where pork was smoked and stored, was the most common outbuilding on the colonial scene. Here it is a small building sided with yellow pine and topped by a fantail hipped roof. The wellhouse is interpreted as a structure six feet square, with pine siding and lattice-work on three sides, open toward the house.

The Ballard House, facing Nelson Street on Lot 54, was among the historic properties included in the government purchase of the Blow estate in 1968. Capt. John Ballard acquired the lot by marriage in 1727 and built upon it. After his death in 1745, his heirs sold the property to Capt. John Thompson, who sold it in 1773 to Thomas Powell, a surgeon practicing in Yorktown until 1777. The property was then acquired by William Cary, a Yorktown councilman, who owned it during the siege. A record of continuous use plus the lack of evidence of any basic change in construction indicate true colonial origin of the present house, according to Yorktown architectural historian Clyde F. Trudell. Although it escaped the disastrous Yorktown fire of March 3, 1814, extensive repairs and adjustments to modern living were made over the years.

The Ballard House, a frame structure like the Dudley Digges House but on a smaller scale, has now been restored externally to its 18th-century appearance and modernized internally as an employee residence. It adjoins extant ruins of the Civil War defense line, and its outbuildings fell within the British defense line of 1781. The 1-1/2-story house was built in two segments. The first, 27 feet by 36 feet, had a typical central hall plan with a reversed staircase and chimneys at each end. A pre-Revolutionary addition, 17 feet by 21 feet, enclosed the chimney at the east end; its upper half-story was reached by a winding stair. This addition was probably used as a medical office by Thomas Powell. The original interior paneling and plaster were covered over in the 1820s. Insect damage and foundation settlement was arrested by the Blows in the 1920s, and the house and its chimneys were further reinforced according to recommendations of engineers on the Bicentennial rehabilitation project. Original paint colors were discovered on hidden siding, and the building was repainted in iron oxide Spanish brown with cream trim. Artifacts and architectural elements uncovered during the work could provide an interesting architectural exhibit in the future.

The Edmund Smith House is the most precisely dated 18th-century survival in Yorktown because it was under construction in 1751 when Smith died and passed it to his daughter Mildred. A 1-1/2-story brick house of modest proportions, it is sandwiched between the imposing brick Nelson House and the frame Ballard House. Like the Ballard House, it has been restored on the outside to provide an appropriate period setting for the Nelson House



and is adapted inside as a park employee residence.

Edmund Smith, a merchant, inherited Lot 53 from his father in 1734. Mildred's husband, David Jameson, was also a merchant and served as lieutenant governor under Thomas Nelson, Jr. The house he and his wife occupied sustained artillery damage during the 1781 siege and sheltered French troops during the winter of 1781-82. Upon Jameson's death in 1793, his nephew, John Jameson, occupied the house. In the 19th century the place had a checkered career as a tavern, schoolhouse, and residence for less prominent citizens as it slowly deteriorated. In the 1920s it became part of Blow's "York Hall Estate," being renovated as a guest house.

The Smith House was not radically altered from its 18th-century design except for changes in fenestration by the Blow architect. Its brick is laid in Flemish bond, and the gabled ends feature massive triple-flue chimneys. The interior plan has a typical central hall with one large room to the east and two opposite on both floors. Rehabilitation entailed repair or replacement of the roof, foundation, doors, and windows; repainting of brick walls, interior refinishing, and new mechanical systems.

The Burcher Building materialized on Lot 37, Main Street, sometime after the Civil War. It was acquired by Mrs. A. Y. Burcher in the 1930s and received a new roof and underpinnings. From then until 1965 it housed her Spinning Wheel Antique Shop. A rear wing was added in the 1950s, somewhat detracting from its harmonious appearance. It was in poor condition as a result of poor design, foundation faults, and insect damage. Rehabilitation measures included new footings and roofing, stud repair, structural diaphragm reinforcement, insulation, and whitewash. The building was in the Bicentennial program because of its compatibility with the older Yorktown buildings. It now houses a concession selling colonial houseware reproductions.

Certain other historic structures of Yorktown and vicinity that had been restored or reconstructed previously were given new security and utility systems. Fire detection systems employed were ionization type except in kitchen and active fireplace areas, where thermal units were used. In major structures full panels with automatic dialing were installed. Intrusion alarms were tied to magnetized connections on all doors and windows. All units were fitted for fire alarms, but improved heating and air conditioning was limited to Swan Tavern, the Moore House, and the Somerwell House. Only the Swan Tavern and the Moore House are open to the public.

All historical research required on the structures reviewed here was accomplished by Charles E. Hatch, Jr. The principal historical architect was Robert V. Simmonds, assisted by Rebecca Rogers, Sherry Stevens, Gerald Karr, and Richard E. Wolfe. James S. Congrove was general project supervisor for the contract work, while Gordie Whittington supervised supplemental day labor crews. Other essential contributors were Richard G. Case and Dwight M. Wendell, mechanical engineers, and Donald E. Hovland, architect. Architect Harold LaFleur and John F. Kozel, electrical engineer, collaborated in developing security systems.

The Anderson Construction Company of Richmond was contractor on the Dudley Digges dependencies for \$67,000 and on the security and utility systems for \$290,000. Piland Construction Company of Newport News was contractor on the Ballard House for \$132,000. Apex Construction Company was contractor on the Edmund Smith House and Burcher Building for \$220,000. The total for construction was \$710,000 which, combined with approximately \$290,000 for Denver Service Center research, design, construction drawings,



engineering, project supervision, and other costs, brought the total for all work on these miscellaneous structures to \$1 million, exclusive of archeology and landscaping.

### Yorktown Roads, Trails, and Landscaping

Revisions and additions to roads and trails in the Yorktown Battlefield area were proposed in the park master plan in the late 1960s. They anticipated a formal tour road that could be followed according to the chronology of the 1781 siege and surrender. But necessary lands were not acquired in time for Bicentennial development planning, so the proposed circulation pattern had to be modified.

Some new road sections could be created, and parking areas at various tour stops could be redesigned. The existing tour road was surfaced with marl, a local product from geological deposits of seashells, and the plan was to continue its use. When the required quantity could not be obtained, a select base with bituminous seal and stone surface treatment was substituted.

The contract also entailed the reconstruction of several tour road bridges, one of which received design notice in engineering journals. An overflow parking area of stabilized turf was provided at the expanded visitor center. A new parking area was built on the Colonial Parkway at the historic Bellfield Plantation site with interpretation of the plantation ruins and history.

To connect the Yorktown visitor center more directly with the town, a 220-foot-long footbridge designed by Vosbeck, Vosbeck, Kendrick, and Redinger of Alexandria was built across the Tobacco Road ravine. Its construction followed much discussion and revision of its siting and aesthetic appearance. The historic Tobacco Road was restored as a walking trace from the visitor center parking area down to the waterfront recreational area.

Within Yorktown itself numerous trails were constructed for visitor convenience. The so-called Great Valley Road was reconstructed from Main Street to the waterfront. Visitor access to Yorktown sites was improved from a new central town parking area.

All the foregoing work was handled for the National Park Service by the Federal Highway Administration except for the initial design. The tour road contract came to \$1,114,000 and all other work totaled about \$200,000.

The only work done along the Colonial Parkway between Yorktown and Williamsburg, other than the Bellfield stop, was a landscape improvement project involving the planting of additional trees, shrubs, bulbs, and ground cover at selected locations. This work was planned and supervised by William Witmer and executed by Greenbrier Farms, Ltd., of Chesapeake, Virginia, for \$36,000.

A more extensive landscaping job was grounds development for the Nelson, Smith, and Ballard houses, occupying contiguous lots 48, 49, 52, 53, and 54. The work was planned and supervised by Arnold H. Gustavson, and Moore Golf of Culpeper carried it out under a \$1,118,000 contract.

The landscaping of these residential parcels was required in part because of the extensive ground disturbance from other construction work. The intent was to provide a proper historical atmosphere in the spirit of the restored buildings, inasmuch as historical and archeological data were insufficient to permit restoration of the grounds to 18th-century conditions.

Contractual arrangements involving Southside Historical Sites (Dr. Norman Barka and associates) and the landscape firm were identical to those for the battlefield restoration. After performing archeological work, Barka provided technical supervision of the landscape construction contract to ensure protection of identified archeological remains.

The Nelson House grounds, Lot 48, had some reputation as a notable American garden, although unrelated to the colonial period. The garden was designed for the Blows in the 1920s to resemble a portion of the c. 1620 garden at Groombridge Place, Kent, England. It was decided to refurbish this garden, which had a certain validity of its own, in view of the absence of other data. The plan also provided for retention of the 1920s stone wall along Main Street and along Nelson Street back to the northwest corner of the house. From there back to the corner of the Smith lot the wall was removed, and the high wall between the Smith and Ballard houses was lowered. The wall separating the garden and the Nelson House lawn was lowered to conform to the lowered grade of the lawn. The 1920s stable, Wisteria Cottage, and carriage house were unchanged. The walls along Read Street remain.

It was agreed that no effort would be made to reconstruct 18th-century dependencies on any of these lots, in the absence of definitive data, but two storage buildings in period style, each 10 feet square, were built behind the Smith and Ballard houses. Other improvements included 1,260 feet of colonial-style fence, in four varieties revealed in historian Jerome Greene's report on the subject. Also installed were about 9,000 square yards of fescue sod, 5,300 square feet of brick walkways and terraces, and 1,100 square feet of marl pathways.

Among incidental projects at Yorktown were new park entrance signs designed by Gerhard R. Tegeder and installed by Piland Construction Company, and remodeling of a small brick building near the Nelson House into a fire station on the ground level and a ranger office on the upper level. The building also accommodates atmospheric control devices for the Nelson House. The \$38,900 contract was handled by G. E. Gaynor Building Contractor, Inc., of Hampton.

### Yorktown Archeology

Because of its antiquity as well as its celebrated role in American history, Yorktown is a coveted hunting ground for archeologists. Intermittently since the 1930s they have been searching for underground answers to historical questions. In addition to work on the 1781 siege lines, they were able to use Bicentennial funds to unlock fascinating secrets of civilian Yorktown.

Because the professional ranks of the National Park Service were stretched thin during the Bicentennial, all archeology at Yorktown was performed under contract by Southside Historical Sites, with Dr. Norman Barka as principal investigator and James L. Ingraham and Ray Sasser as field supervisors.

At the Nelson House grounds, excavations conducted in 1973-74 had three purposes: to locate the original basement entrance to the house, to establish the 18th-century grade around the house, and to locate and study all dependencies, walkways, and features that may have existed west of the house before final landscaping of the premises.

The basement entrance was located on the south side of the house, just

east of the first floor entrance. The 18th-century grade was found to be markedly different than the present level grade, especially west of the house where a definite downslope once existed. Excavations of the northwest yard exposed evidence of each of the dependencies shown in a 1796 insurance policy. The 12-foot-square "spinning house" with its four brick foundation walls in English bond and shell mortar was the most visible of the six structures. The big "kitchen/wash house," 19 by 39 feet with a 12-by-20-foot wing, and the "dairy/smokehouse" were both badly disturbed and lacked extant foundations, except for the marl of the wash house, but good data were obtained on the basis of soil stains. Very little was found of the "smoke house," "poultry house," and "servants quarters," each of these structures having been obliterated in the early 20th century by terracing. Evidence of an 18th-century arched brick drain was located in the north corner of the site. The six structures had stood on either side of a courtyard about 22 feet wide, with marl paths, in the usual Georgian symmetry.

The 1973-74 excavations at the Smith House, Lot 53, adjoining the Nelson House grounds, unearthed three 10-foot-square dependencies southwest of the residence, two with brick foundations and one with marl foundations and a brick floor. The first two were only one brick wide, indicating light one-story frame structures. Post holes, stains, and other features found elsewhere indicated the probable existence of other structures, but no confirming patterns could be found.

Investigations were conducted intermittently at the Ballard House, Lot 54, between October 1973 and June 1975 to locate any dependencies, shed light on architectural aspects of the house, and collect other historical data. Evidence of four structures was found, including a kitchen, a smokehouse, and a 12-by-14-foot structure with a fireplace and bake oven. The last, apparently of early 18th-century origin and possibly gone when the Ballard House was built, seemed to correspond with a 1706 bakery of record owned by Edward Fuller. Evidence of British activity in 1781 is extensive, and most of the outbuildings may have been razed at that time. A gun battery 23 to 25 feet wide and at least 53 feet long was found. The kitchen, being built over the fill of the battery ditch, had to be post-1781. It and the smokehouse are identified in a 1796 policy issued by the Mutual Assurance Society.

The Great Valley Road is a rather overblown term for an ancient passageway down a ravine, 660 feet long, from Yorktown's Main Street to the York River waterfront, situated between Lots 46 and 84 on the northwest and Lots 77 and 76 on the southeast. The Dudley Digges House is at the head and the Archer Cottage at the foot of this declivity. In the 18th century the lower end of this road was crowded with docks, warehouses, and tenement houses. The archeological search for the original roadbed was negative, but a significant discovery was made at the lower end. Two well preserved warehouse structures were found to one side of the "valley." The warehouses, parallel to one another with a narrow alleyway in between, each measured 36 by 18 feet, and walls were intact to a height of nine feet. Test excavations inside one building revealed charred floor joists and joist niches in the brick walls. Only limited portions of each structure were excavated; they were then backfilled for protection.

Tobacco Road is the intriguing name for another road from Yorktown proper down to the waterfront, this one located southeast of the Yorktown Victory monument where Main Street ends. The ravine here is called Tobacco Road Valley. The search for the colonial road was unsuccessful, for erosion,

deposition, and disturbances during 20th-century construction activity on the bluffs left no component predating the late 19th century in the areas tested. The archeologists concluded that early strata were also much disturbed from Civil War activity.

Interest in Yorktown structures contemporary with the siege of 1781 led to the discovery of copious evidence of an extensive early 18th-century pottery manufacture--a significant archeological find in its own right. For the first time, much information is available on the colonial pottery industry. Indications are that skilled potters operated a substantial business here from about 1720 to 1745, producing a large variety of earthenwares as well as the earliest stoneware made in North America.

Archeological investigation of Lot 51 began with the accidental discovery of a waster heap in 1967. A pit five feet in diameter and three feet deep was found to contain thousands of pottery fragments and 50 complete or nearly complete vessels. From this evidence it was deduced that a kiln had been located in the vicinity. In July 1970 the kiln was found partly beneath a modern garage, about 60 feet from the waster heap. During the next year the kiln was completely excavated.

William Gooch, Virginia's royal governor, mentions an anonymous "poor potter" of Yorktown in his annual reports on manufactures during the 1730s. "Poor" is to be taken with a grain of salt, for this potter was no pauper, nor were his products inferior. Probably the reference was intended to minimize the enterprise, for colonial manufactures were contrary to British policy. William Rogers, a fairly wealthy brewer, surveyor, and merchant, acquired Lots 51 and 55 in 1711; he probably owned but did not operate the pottery. Rogers died in 1739, and the pottery may not have long survived him.

Plans for a proper shelter for the pottery ruins were drawn up, but it could not be accommodated in the Bicentennial budget.

## FORT McHENRY NATIONAL MONUMENT AND HISTORIC SHRINE

### Rehabilitation of Star Fort and Seawall

In 1776 Marylanders hastily erected an earthen battery on Whetstone Point to defend the water approaches to Baltimore from British warships. On the same site, between 1794 and 1802, a massive masonry fort called Fort McHenry was constructed to guard the port. It survived a British bombardment during the War of 1812, inspiring Francis Scott Key to write "The Star-Spangled Banner." As a Bicentennial project, vital rehabilitation work was undertaken on time-ravaged masonry walls.

The historical data section of the historic structure report on Fort McHenry by Erwin N. Thompson is a definitive account of the fort's military and architectural history. The fort that suffered the British bombardment of 1814 was altered and strengthened periodically to 1894. Thereafter it was judged obsolete for defense, and during World War I the post became a military hospital. In 1925 it was designated a national park, and in 1933 it was transferred from the War Department to the National Park Service. Army records describe its appearance at the time:

Physically, the old fort is a fine example of the military architecture of the end of the 18th century, being laid out on the plan of a regular pentagon with a bastion at each angle. . . . It is a barbette work with brick masonry, scarp capped with a heavy projecting granite coping, the corners of the bastions being of sandstone. Each front measures about 290 feet between the points of the bastions. The parade is a regular pentagon of about 150 feet on each side surrounded by a well-laid granite wall about 5 feet high supporting the [terreplein] in front of which a brick masonry wall about three feet high, with sandstone coping over sheet zinc, acts as a retaining wall for the curtain of sodded earth extending to the top of the scarped interior walls.

The basic architectural study of the fort is a 1961 report by Lee H. Nelson. For Bicentennial purposes this was supplemented by the architectural data section of a 1974 historic structure report by Robert D. Newcomb and Phil Paulin, with Dean Robinson as engineer consultant. The guiding principle was not restoration but simple rehabilitation of deteriorated sections, emphasizing exterior work. Between November 1974 and May 1975 the walls of the fort and selected buildings were repointed, stone retaining walls, brick parapets, and brickwork under stone caps on scarp walls were rebuilt, brick walkways were replaced, exterior wood on buildings was repainted, weepholes were installed in stone walls, and stone quoins in rampart walls were realigned. An architectural recommendation to reduce the earth and sod profile on ramparts was rejected out of fidelity to the historic plan.

The second Fort McHenry project was rehabilitation of the seawall on

the Patapsco River. Principal features of this work included repointing the masonry wall, resetting displaced wall and capstones and replacing missing stones, reconstructing failed or unstable sections, placing riprap at the base of the wall, and restoring topsoil and turf. Limited funds prevented the completion of all recommended work.

The contract for work in the fort in the sequential amount of \$111,200 went to Duall Maintenance Company, Mt. Laurel, New Jersey. The contract for work on the seawall in the aggregate sum of \$174,600 was awarded to Martin G. Imbach, Inc., of Baltimore with Rummel, Klepper and Kohl of Baltimore as consulting engineers. Wayland P. Fairchild was general project supervisor, assisted by Robert M. Dinterman.

## FORT NECESSITY NATIONAL BATTLEFIELD

### Planning and Development

At Fort Necessity in the western Pennsylvania wilderness, on July 3, 1754, occurred the first clash of the final war fought by Britain and France for imperial control of North America. Although Britain was the victor in this global contest, the seeds were planted for colonial union and independence, and here young George Washington of the Virginia militia had his baptism of fire. Fort Necessity is an official Bicentennial area.

France and Great Britain dueled sporadically over territorial rights for a century until 1754, when a full-scale collision occurred in this region where the Alleghany and Monongahela rivers join to form the Ohio River. After the French built a series of forts that impeded British settlement of the Ohio Valley and refused a warning to withdraw, Governor Robert Dinwiddie of Virginia set a militia force to construct a fort at the forks of the Ohio. The French expelled the Virginians and built Fort Duquesne on the site. Dinwiddie retaliated with a stronger force led by an advance party under Col. George Washington.

In late May Washington arrived at a swampy vale near the Monongahela called the Great Meadows. After a successful skirmish with a French reconnaissance party, he built a stockade at the Great Meadows in anticipation of reprisal. On July 3 a force of 600 Frenchmen and 100 Indians led by Coulon de Villiers descended on the hastily built "Fort Necessity," manned by half that number of colonials. After an exchange of fire in a rainstorm, Washington recognized his situation as hopeless, signed articles of capitulation, and was allowed to withdraw. The fort was promptly demolished by the French.

In 1931 Congress authorized the War Department to acquire and mark the fort site. Two years later the site was transferred to the National Park Service, which ultimately acquired more land and reconstructed the stockade. A 1974 master plan for Fort Necessity National Battlefield recommends upgraded orientation and additional land acquisition, but exigencies of the Bicentennial program limited improvements to rehabilitation of visitor center exhibits by the Harpers Ferry Center and development of a new park water system. A contract for \$120,000 awarded to the Fairchance Lumber Company of Fairchance, Pennsylvania, was supervised by Jacob E. Tothero. Leslie Fugedy of the Service's Mid-Atlantic Regional Office was design engineer.

## FORT STANWIX NATIONAL MONUMENT

### Fort Reconstruction

Reconstructed Fort Stanwix, an example of classic 18th-century military engineering adapted to pioneer conditions, vividly interprets the role of a key frontier post and its defenders in blocking British invasion from the northwest, a significant prelude to the great American victory at Saratoga.

There were two waterways between Canada and the colonies to the south that became historic invasion routes during the long struggle between France and Britain for empire and the later American Revolution. These were the north-south route via Lake Champlain and the Hudson River, and the east-west route from the Great Lakes to the Hudson via the Oswego and Mohawk rivers. The portage between the Oswego and Mohawk headwaters became known as the Oneida Carrying Place, named for one of the Six Nations of the Iroquois, the dominant tribe of the region. Whoever controlled this portage controlled access to the western wilderness and its lucrative fur trade and the passage of armies. Fort Stanwix was the last and largest of a succession of strategic military posts erected here by the British in the mid-1700s to resist French invasion.

Construction of the fort, named for its builder and first commander, Gen. John Stanwix, began in 1758. It was alternately abandoned and reoccupied thereafter according to the vicissitudes of relations among the French, the British, the colonists, and the unpredictable Iroquois. Following the Indian Treaty of Fort Stanwix in 1768, it was abandoned for the last time as an outpost of the British empire.

With the outbreak of the Revolution, Fort Stanwix was rehabilitated as an American stronghold, being occupied in 1776 by troops of the Continental Line by order of Gen. Philip Schuyler. In the spring of 1777, in accordance with grand strategy concocted in London, a sizable force of British and Indians under Col. Barry St. Leger advanced eastward from Oswego to join at Albany Gen. John Burgoyne's forces descending the Champlain-Hudson route. This plan was disrupted by the cool tactics of Col. Peter Gansevoort, whose men obstructed the British advance by felling timber and then stayed resolutely within Fort Stanwix, which the British guns could not breach. Gen. Benedict Arnold, advancing with a relief column from the east, succeeded in panicking the Indian allies of the British with a false report of his troop strength. St. Leger retreated, and Burgoyne met disaster at Saratoga by American forces undistracted by a flank attack.

In 1781 Fort Stanwix was abandoned, having been ruined by fire and erosion. Within 50 years, with the advent of the Erie Canal and the growth of the city of Rome, the ruins disappeared. The fort site was understood to be within the city block defined by James, Dominick, Spring, and Liberry streets; and despite the occupancy of the block by substantial residences for many decades, local citizens secured the designation of 15 acres as Fort Stanwix National Monument on August 21, 1935. Thirty years later an opportunity to "do something" about Fort Stanwix came with an urban renewal project for a section of Rome including the historic site. After a 1965



excavation by Col. J. Duncan Campbell of Harrisburg revealed substantial remains of the fort, the city purchased the site and donated it to the federal government. Land acquisition and the clearance of 19th-century structures were completed in 1973, when the National Park Service made the final decision to reconstruct the fort as a major Bicentennial project.

The decision followed extensive historical and archeological research by the Service. Historian John F. Luzader completed a report on the structural and military history of Fort Stanwix in 1969. From manuscripts and maps, notably the Crown Collection in the British Museum, he marshaled evidence of the original structure, begun on September 26, 1758, with the hope of providing "tolerable cover for 400 men this winter." According to the documents, the fort proper, comprising ramparts, log quarters, and a parade, measured 220 feet square; bastions at each corner extended its overall dimensions to 330 feet square. Extending beyond were the outer defensive works, consisting of ditch, pickets, parapet, and glacis or downslope.

Archeologists Lee Hanson and Dick Ping Hsu began a comprehensive excavation of the site in 1970 while demolition of late-period intrusions was just getting underway. Most of the field work was performed during the next two seasons, followed by intensive laboratory work. It was quickly demonstrated that the fort remains conformed well to the plans. Although the outer works to the east were compressed because of terrain, the fort proper was found to be a near-perfect square. As to damage by later intrusions, principally cellars and utilities, the archeologists found that of the 33 percent of the main floor excavated only 15 percent had been destroyed. Structural details and a classified inventory of artifacts unearthed are contained in Casemates and Cannonballs, the official report by Hanson and Hsu published in 1975.

The architect assigned to research and design work on the project was Orville Carroll of the Denver Service Center, stationed at Concord, Massachusetts. His architectural data section of the historic structure report was described by NPS Chief Historical Architect Henry A. Judd as "the best report of its kind I have seen." The reconstruction architect's job was formidable, for he was required to identify and describe all structural features in detail, including elements that had vanished and could not be accounted for either by documents or archeological evidence. The voids were filled in part by a comparative study of other period forts of similar design (such as Forts Niagara, Ligonier, and William Henry) and partly by creative imagination based on intimate knowledge of 18th-century construction. The combined research of the archeologists, architect, and historian at Fort Stanwix will long stand as a model of interdisciplinary cooperation in historical restoration/reconstruction.

Fortified by an imposing body of evidence, the architect recommended the complete reconstruction of a square fort with earth-filled log bastions, ramparts, and parapets, flanked on three sides by a sodded ditch, "covered way" with picket line, and glacis. Other features would include a ravelin (a protected work before the gate), a timbered bridge with draw span, a sally port with redoubt, five free-standing plank buildings on the parade, log casemates or shelters at the curtain walls (sections between bastions), and an elevated latrine or "necessary" outside the fort with connecting bridge. The bastions would have three bombproofs (underground spaces to withstand bombardment) and a bakehouse. The terreplein or surface of the

bastions would have ramps, gun platforms, banquettes (stands for riflemen), and embrasures (openings in the parapet for cannon fire). Such standard period accessories as sentry boxes, flagstaff, and whipping post to enforce discipline would complete the structural inventory.

The historically accurate exterior would mask modern structural features and utilities intended to facilitate preservation and maintenance. Uses would conform to the interpretive plan evolved by Nan V. Rickey and others. The headquarters, guardhouse, one barracks, one casemate, two bombproofs, and the bakery would be historically furnished, while other areas would be adapted for purposes of management and auxiliary interpretation.

The principal contractor for preparation of construction drawings was Duryea and Wilhelmi, Landscape Architects, of Syracuse, New York. This firm planned all landscape work, exterior walkways, and the perimeter earth forms. Detailed plans for reconstruction of the fort itself required historic structure expertise, and the subcontract went to Day and Zimmerman, Architects and Engineers, of Philadelphia, with George P. Willman as project director. According to contract supervisor Frank Huntsman, Bicentennial deadline pressures dictated completion of the complex working drawings, comprising 78 pages, in less than two months. This "mission impossible" succeeded, thanks to the thoroughness of Orville Carroll's design work and the technical competence of the construction architects. The American Society of Landscape Architects gave Duryea and Wilhelmi an award for their contribution to the Fort Stanwix project.

Construction cost estimates based on the detailed plans exceeded \$6 million. Funds actually available for the construction contract came to \$4.3 million, requiring the deletion of certain units, including the sally port, ravelin, northeast and northwest bombproofs, bake oven, storehouse, headquarters, sentry boxes, north and south casemates, and necessary. Construction drawings were completed for all units for future reference, however. Cost for the total project, including research, design, plans, exhibits, project supervision, overhead, and contingencies, approximated \$6.5 million, making Fort Stanwix the biggest Bicentennial project after Franklin Court at Independence National Historical Park. Doubtless Colonels St. Leger and Ganesvoort, who confronted each other in 1777 in a wilderness ringing with the shrieks of Indian warriors, would be amazed!

B. S. McCarey Company of Rome was low bidder on the construction contract. Actual work was begun on September 9, 1974, and was completed on December 26, 1975, a remarkable achievement in little over 15 months. Ed Bleyhl was the project supervisor, and Orville Carroll was available to help fight the gremlins that always crop up on a historical project, especially one of this magnitude.

The two most significant features of the reconstruction are the earth forms and log structures. Seventy carloads of yellow pine from North Carolina supplied the logs for the bastions, ramparts, casemates, and parade structures, all pressure treated. Exterior walls are composed of half logs bolted to hidden and well drained concrete core structures to avoid the decay that plagued the original works. The ramparts and outerworks, based on medieval concepts of defense, doubtless have a more finished symmetry than existed in 1777 but will fascinate visitors accustomed to the idea of intercontinental atomic missiles.

In the course of leveling for construction, standby archeologists found cellar pits and fireplace foundations not previously identified; they will

be preserved and exhibited in situ where possible. Using data in Louis Torres's report on historic furnishings, technicians of the Harpers Ferry Center have refurbished portions of barracks, casemates, and one bombproof with replica specimens. An assortment of items excavated at the site is displayed in the east casemate. Period cannon are also on display.

Part of the south casemate serves as park headquarters. The west barracks serves as a visitor center and theater featuring an action film about the events of August 1777. The Harpers Ferry Center film, "Siege," was produced by J. Strider Moller II. There is a maintenance building separate and screened from the fort. Parking space west of the monument grounds is being provided by the city; visitors will approach by walks and a passageway to the main gate. In the reconstruction process the old city streets and alleys that impinged on the site were obliterated, permitting a gracefully landscaped setting.

The incongruity of a 1777 wilderness fortification as an exhibit surrounded by a modern city is offset by the visitors' sharpened awareness of the role played by Fort Stanwix in helping to win the Revolutionary War.

## FORT SUMTER NATIONAL MONUMENT

### Fort Moultrie Visitor Center and Bicentennial Exhibit

On June 28, 1776, British warships bombarded a hastily erected palmetto log fort on Sullivan's Island, Charleston Harbor, South Carolina, in an effort to subdue the southern colonies. Despite intensive fire, defenders under Col. William Moultrie held the fort and compelled the fleet to withdraw. The first Fort Moultrie and successive Charleston harbor defenses are reviewed at a new visitor center. A hypothetical reconstruction of a portion of the palmetto fort constitutes a special Bicentennial exhibit.

Charleston, South Carolina, is one of the great historic places on the Atlantic coast. Traditionally it has had two prime attractions for tourists: its own well preserved historic district and famous Fort Sumter in Charleston Harbor. Fort Sumter National Monument, established in 1948, preserves the remains of the brick fort built after the War of 1812 to protect the main ship channel at the harbor entrance. It gained immortality on April 12, 1861, when it was fired upon by Confederate batteries ringing the harbor, launching the Civil War.

One of the forts that shelled Sumter was the third Fort Moultrie, a low brick fortification built in 1808-09 on Sullivan's Island, on the right flank of the harbor entrance. It saw further action when attacked by federal ironclads in April 1863, and it continued in military service with drastic modifications and additions until 1947. This fort and its environs were added to Fort Sumter National Monument in 1960. Its two predecessors, Fort Moultrie I of the Revolution and an intermediate Fort Moultrie II, were both destroyed--the first by pillage and erosion, the second by a hurricane. Intensive archeology could find no evidence of the precise location or orientation of the 1776 fort; and in any event, its total reconstruction coexistent with the third fort would create an awkward anachronism.

Bicentennial program planners of the Denver Service Center responded to this interpretive challenge by proposing a new visitor center near the surviving Fort Moultrie where the lengthy history of the entire series of fortifications could be told. The Southeast Region then came up with the idea of a special Bicentennial exhibit in the form of a temporary reconstructed cross-section of the 1776 fort on the shoreline nearby.

The first fort was a square with a bastion at each angle, large enough to contain 1,000 men. It was built of palmetto logs laid one upon the other, in two rows 24 feet apart at the base, 16 feet apart at the top, bound together at intervals with timber dovetailed and bolted into the logs. The space between the two lines of logs was filled with sand. The merlons (sections between the embrasures or gun openings) were composed of palmetto logs notched into one another at angles; they were 16 feet thick, filled with sand, and rose 10 feet above the brick-supported gun platforms. At the time of the British attack the fort was finished only on the two seaward bastions and curtains. The fort contained 31 cannon and was garrisoned by 364 men of South Carolina infantry and artillery regiments.

The British squadron crossed the harbor bar and landed Gen. Henry

Clinton's redcoats on nearby Long Island (Isle of Palms). On June 21 the Americans opened fire on two British ships making soundings, and the British infantry replied with small arms. On the 28th Adm. Peter Parker's frigates were repulsed as they sought to reduce the fort with crashing broadsides, and the British landing force, unable to gain Sullivan's Island, had to watch impotently. The fleet withdrew with heavy casualties, leaving one frigate stranded and burning. In July the South Carolina Assembly passed a resolution naming the fort on Sullivan's Island for its doughty commander.

In 1780 the table was turned: the British captured Charleston together with American Gen. Benjamin Lincoln and his force of 5,000. Fort Moultrie was held by the British until they evacuated Charleston in December 1782. President George Washington toured the site in 1791.

By the time the Denver Service Center was funded to initiate plans for Fort Sumter/Fort Moultrie, it was clear that only a crash program effort by its Southeast Team could accomplish the work in time. Approximately two years were available to start and complete a master plan for the entire park, a development concept plan for Fort Moultrie, supporting environmental impact statements, comprehensive designs, and construction drawings. That all of this was accomplished was a remarkable achievement.

The plans and environmental statements were prepared under contract by Comprehensive Land Planning Consultants of Hilton Head, South Carolina. In addition to restoring portions of the third fort and searching for archeological remains of the first and second, planners proposed acquiring additional adjacent land including remnants of Spanish-American War and World War II emplacements. They also proposed acquisition of a four-acre tract directly north of Fort Moultrie for development of a visitor facility and headquarters, a 150-car parking area, a dock for Fort Sumter tour boats with required channel dredging, a rain shelter, and landscaping. The Bicentennial program was able to accomplish only the third fort restoration, the visitor center, a reduced parking area, and an interpretive trail with wayside exhibits. Next to the visitor center a 1902 cable tank shed was removed, but a torpedo storage shed of the same period was retained for adaptive public use under permit. Construction drawings for the remaining work were completed for future use.

The new 7,800-square-foot visitor center, oblong in plan, is directly across Middle Street from the restored Fort Moultrie. Intended to echo but not imitate the low and rather menacing appearance of the fort, the building has a massive brick facade broken by a series of angular projections. The projections accommodate entrances and exits and auditorium and projection room walls. On the east a series of tapered columns or buttresses lend structural and aesthetic support. Between columns and wings are vertical glass windows. Over the main door are heavy horizontal precast concrete panels. All walls including the roof parapet are coped with ceramic tile. More than half the roof is an observatory platform accessible by stairs outside the building.

The main entrance plaza of 2,000 square feet is accessible by a 15-foot-wide staircase with two iron handrails. The plaza has brick pavers and a continuous bench around a low brick fronting wall. A 40-foot flagstaff is at the head of the staircase, while opposite is a narrower downramp to the parking area and exterior public restrooms. The plaza entrance to the visitor center consists of four glass panel doors with two big square panels above. Similar exit doors south lead to a downramp and walkway to the fort.

Inside is a generously spaced lobby extending the 66-foot width of the building with a large central skylight, an information/sales facility, and exhibit space opposite featuring a series of scale figures in military uniforms of the past 200 years. Adjoining the exhibit space, lobby wings provide entrance to and exit from a wedge-shaped auditorium seating 150 people in eight expanding rows. The featured attraction here is a film with an actor narrating episodes in Fort Moultrie's long history. Office space for the park interpretive division is secluded behind the east wall of the lobby.

The grounds have been landscaped with live oak, cabbage palm, savannah holly, pink Indian hawthorn, and Carolina jessamine. Construction included 10,000 square feet of brick pavers, 45,000 square feet of asphalt parking with concrete curb to accommodate 75 cars, and 1,500 linear feet of oyster shell and soil cement trail with brick edging. The trail leads from the west postern of the restored Fort Moultrie to the vicinity of the first fort along the shoreline, around Battery Jasper, and back to the visitor center parking area.

Comprehensive Land Planning Consultants and Lucas and Stubbs, Ltd., of Charleston jointly designed the visitor center and related features under a \$56,482 design contract. The construction contract went to Threatt-Maxwell, Contractors, of Georgetown, South Carolina, for a final settlement of \$943,600, of which \$774,500 represented the visitor center proper. The Harpers Ferry Center budget for interpretive design and production was \$115,000. At DSC, Darrel Stiger managed the design contract, James Kiryakakis reviewed architectural drawings, and Paul Gidlund was the construction supervisor. At HFC, Saul Shiffman planned the museum exhibits and Carl Degen produced the film. Historian Edwin C. Bearss of DSC's Historic Preservation Team did the basic research, presented in two reports: "The First Two Fort Moultries" and "The Battle of Sullivan's Island."

The replication of a section of the first fort as a special Bicentennial exhibit was a project of the Southeast Regional Office using DSC funds. Historical Architect John Garner did the design work and Kenneth L. May supervised construction. The Dawson Engineering Company of Charleston built the exhibit under contract for \$50,000. The section, intended to represent the south curtain near the southeast bastion, is 120 feet long, 48 feet wide, and 18 feet high, containing space for three artillery emplacements. The ramparts consist of battered palmetto cribbing with plank ties and sand fill. The parapet is formed of vertical palmetto cribbing with sand fill and is broken by embrasures for the cannon. Three replica iron 18-pounders on garrison carriages are mounted on gun platforms.\*

With all DSC costs computed at \$200,000, the total cost of the project came to \$1.3 million.

#### Fort Moultrie III Restoration

The present Fort Moultrie, the third one here so named, served military needs from 1809 to 1947 and exemplifies the evolution of seacoast fortifications. The American Revolution Bicentennial program funded extensive restoration work at the site.

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\*The exhibit was removed in 1983--ed.

Fort Moultrie III was built in 1808-09 and continued in military use, with modifications, until it was deactivated after World War II. In the 1950s the General Services Administration conveyed the property to state and local governments. Between 1960 and 1967 South Carolina conveyed to the National Park Service about 30 acres in fee simple and 30 in easement for addition to Fort Sumter National Monument.

The third fort was planned by Alexander Macomb, an Army engineer captain. It consisted of fortified works, in outline resembling the head of a medieval battle axe, defended by two pointed landward bastions and three seaside barbette batteries between salient angles. Its 15-foot-high ramparts, enclosing 1-1/2 acres, were built of sand faced with a battered brick wall or scarp. Three brick barracks within the courtyard could house 350 men, and a powder magazine with traverse shielding its entrance held up to 500 barrels of gunpowder. There was also a furnace to heat solid shot cherry red.

The British did not seriously molest Charleston Harbor during the War of 1812. Afterward there were only minor changes to the works until the Civil War, when the fort was occupied alternately by Federal, Confederate, and again Federal forces. To ready it for anticipated hostilities, Chief Engineer Col. Joseph G. Totten ordered the construction of outerworks, a ditch, and caponnières with posterns (passageways to the outerworks). In 1861 Confederate troops continued raising earthworks. In 1863 sand was banked against the scarp walls to protect them from the fire of rifled guns, and numerous traverses and bombproof shelters were constructed. Following an engagement with Union gunboats that September, the heavily damaged quarters and barracks were razed.

After the Civil War, the destructive power of heavier rifled guns dictated more drastic changes. Everything within the scarp walls was razed except for the 1809 storage magazine in the northwest bastion. The original sallyport, parapets, and inner walls and the earthworks and bombproofs of the Civil War period were replaced by a new sally port with lateral bombproof galleries, six new concrete magazines, and a concrete principal magazine, all under sodded earth mounds; and a rebuilt terreplein, gun positions, and parapets. The old storage magazine received a concrete and sand bombproof covering and an anteroom, and the scarp walls were repointed and raised with a brick coping.

Even greater modifications resulted from the Endicott Board's report on seacoast fortifications in 1886 and the crisis of the Spanish-American War. Between 1898 and 1903 three massive concrete gun emplacements, Batteries Bingham, McCorkle, and Lord, replaced the wood and earthen gun positions of the 1870s. The last significant addition was a combined Harbor Entrance Control Post and Harbor Defense Command Post (HCEP/HDCP) just outside the scarp, between the old northeast bastion and southeast seafront, during World War II. This permanent three-story structure, replacing temporary quarters in a World War I frame signal station, was built with concrete walls two feet thick and a concrete roof three feet thick; it was covered entirely by a sand embankment except for a protruding observation post and signal tower of eight-inch concrete.

By the time of the Bicentennial, the original Fort Moultrie III was nearly obliterated except for the brick perimeter, and general deterioration and the disappearance of armament weakened the case for restoring the post to any one later period. Was the only course to simply preserve the scrambled remains? An inspired alternative was conceived in 1973 by an

interpretive planning team composed of planner Clifford Soubier, historian Edwin C. Bearss, and Superintendent William Harris. They proposed to restore the fort, section by section, so as to depict in one locale the evolution of an American seacoast fortification.

The Bicentennial enabled funding of this project, and two highly competent historical architects were available to address themselves to the research and design problem. John Garner of the Southeast Regional Office prepared a preliminary design report. Harold LaFleur of the Denver Service Center was assigned to complete the design work, prepare construction drawings and specifications, and monitor construction work. Ed Bearss abstracted the bulk of historical-architectural data from the military records of the National Archives.

The general plan was segmental restoration to five historic periods. Going counterclockwise, the northwest bastion vicinity was restored to the early period circa 1841, the southwest seafront was restored to the Civil War period, the south seafront was returned to its appearance circa 1876, two of the circa 1900 Endicott batteries were preserved, and the World War II defense facility was rehabilitated.

The following is a summary of the project directives:

Northwest bastion and western parade area, 1841: Restore the old storage magazine, including removal of concrete roof and anteroom. Restore the gable brickwork and clay tile roofing over wood framing, wood lining, flooring, door, window, and shutters. Restore the brick traverse to the original vaulted configuration. Reconstruct parade wall, cellars, and magazines using concrete core with brick veneer. Reconstruct brick vaulted postern or entryway with heavy wood double doors. On the parade ground, excavate and expose original barracks foundations and brick paving and reconstruct missing paving sections. Restore breast-high wall or cover line in front of guns with brick veneer over concrete core and shingle top. Restore five granite-base gun positions and mount two 32-pounders.

Civil War period, 1865: On the southwest seafront, reconstruct blue-stone terreplein, rounded traverse walls of granite Belgian block, simulating sod, and brick parapet. Earth fill to level of original brick scarp. Reconstruct gun positions, with timber platforms, mounting two 10-inch Columbiads, one adapted for eight-inch rifled and banded Columbiad. Period open brickwork sentry box in the northwest bastion.

Post-Civil War period, 1870s: On the west half of the south seafront, demolish Battery Lord concrete mass with ramhoe. Restore two gun positions with platform of original timbers, pintles, and traverse rings recovered by archeology, and mount two 15-inch Rodmans. Preserve three concrete service magazines and the principal magazine, vaulted sallyport, and lateral bomb-proof shelters with necessary patching and whitewash. Preserve east parade ground turf, and pave non-brick section of west parade with crushed oyster shell. Reconstruct 62-foot period flagstaff of 1865, of spliced-pole nautical design, on reconstructed timber cribbed base as discovered by archeology, to fly a 15-foot period flag.

Endicott period batteries, circa 1900: Preserve existing concrete terraces and platforms, and mount one three-inch rapid-fire period gun.

HECP/HDCP World War II facility: Preserve, patch, repair, and paint as required. The ground level, used as Fort Sumter administrative offices until construction of the visitor center, will serve as storage facility for the park.

All research and design work was done by the Historic Preservation



Team, Denver Service Center. A construction contract for \$907,500 was awarded to the Dawson Engineering Company of Charleston. Kenneth May of DSC was construction supervisor. Two change orders, which brought the total construction cost to \$1,123,104, included the following additional work: fabrication and installation of gun carriages, masonry repair work on the exterior scarp wall, repairs on sallyport, bombproofs, and other underground structures, restoration of the HECF facility, installation of an irrigation system, and construction of the temporary Fort Moultrie I Bicentennial exhibit nearby. The Harpers Ferry Center in conjunction with the park staff developed trailside exhibits and audio messages and arranged for procurement of battery guns and carriages with a budget of \$142,000. The construction project, initiated in January 1975, was completed in June 1976, the 200th anniversary of the first battle of Sullivan's Island.

## GEORGE ROGERS CLARK NATIONAL HISTORICAL PARK

### Visitor Center and Grounds

George Rogers Clark National Historical Park, on the east bank of the Wabash River in Vincennes, Indiana, commemorates the epic wilderness march in 1779 of the iron-willed Virginia colonel and his band of rugged frontiersmen to this place, where they captured Fort Sackville from the British and secured the Old Northwest for the United States. A new visitor center provides interpretation of Clark's campaign, old Vincennes, and territorial expansion.

At the outset of the Revolution, the Old Northwest (comprising the present states of Ohio, Indiana, Illinois, Michigan, and Wisconsin) was controlled by the British headquartered at Detroit. Harassment of frontier American settlements by Britain's Indian allies led George Rogers Clark to seek and obtain support from Virginia Governor Patrick Henry for an expedition to seize enemy outposts. With 175 volunteers he descended the Ohio and easily captured the small garrison at Kaskaskia and Cahokia on the Mississippi. He then sent a detachment eastward to occupy Vincennes, but that strategic site was soon recaptured and reinforced by a British force under Col. Henry Hamilton.

Aware that his small band could be destroyed by the numerically superior British and Indians if he waited, Clark staked all on a mid-winter march on Vincennes that would give him the advantage of surprise. With 127 men, he crossed the 180 miles of flooded marshlands from Kaskaskia and besieged the astonished Hamilton, who surrendered his garrison on February 25, 1779. The Old Northwest was confirmed as American by the Treaty of Paris in 1783, and the Northwest Ordinance of 1787 provided the framework for establishing future states there. In 1800 the territory of Indiana was organized with Vincennes as its capital and William Henry Harrison as its governor.

These events and a description of Fort Sackville, the British fort at Vincennes, are presented in elaborate detail in an official history by Edwin C. Bearss, George Rogers Clark and the Winning of the Old Northwest. Bearss is also the author of a historic structure report on the George Rogers Clark Memorial. This classical circular structure with grand staircase, huge Doric columns, and massive dome was built in 1931-33 with federal funds, dedicated by President Franklin D. Roosevelt, and turned over to the Indiana Department of Conservation in 1936. Thirty years later Congress authorized the addition of the memorial and 24 riverfront acres to the National Park System as George Rogers Clark National Historical Park.

The concept of a separate visitor center was given impetus by the approach of the Bicentennial. Some opposed a new building here as an intrusion, but others successfully argued that a visitor center was needed to provide in-depth interpretation and that it could be designed and placed to be subordinate to the dominant memorial.

The result is a structure in a setting that can rightfully claim to achieve these requirements. The parking area and visitor center are located diagonally south of the memorial, on the town side, with a walkway circulation plan that compels visitors arriving by car or bus to stop first at the

visitor center for orientation, then proceed to the memorial. The visitor center echoes the classical lines of the memorial with a square colonnade of 20 precast concrete columns and connecting panels enclosing a core structure of concrete block faced with red brick. The scale of the building, 78 feet square and 15 feet high, is modest in relation to the memorial, more than 80 feet high. The brick walls of the core relate visually to nearby historic structures of Vincennes, particularly the St. Francis Xavier Cathedral and its library.

The main level components of the visitor center are the vestibule, auditorium, and park office. The live action film shown in the auditorium dramatizes Clark's campaign, the westernmost of the American Revolution. The lobby contains exhibits on American frontiersmen, British soldiers, Fort Sackville, Indians, French settlement, and the transition of the Old Northwest to statehood. The lower level houses park maintenance and storage.

The construction work required a new planting plan for the affected area. Varieties of oak, pine, maple, dogwood, yew, hawthorn, honeylocust, and crabapple help to blend the new unit into the riverfront memorial complex.

A delayed second phase of the George Rogers Clark project addressed the rehabilitation of the memorial grounds and the approaches from the Lincoln Memorial Bridge, built at the time of the Clark Memorial. This last authorized Bicentennial project did not get underway until March 1976, but all work was completed by midyear. The bridge approach, which includes the grand entrance to the memorial mall from First Street in Vincennes and features a flagpole terrace and inscription, was repaired and cleaned. Other corrective work on the mall, the Francis Vigo statue on the park grounds, and the terrace was also undertaken.

The visitor center design is the result of collaboration among James Associates, Architects, of Vincennes; Gerhard Tegeder and William Witmer, landscape architects at the Denver Service Center; Ben Miller, Harpers Ferry Center exhibit planner; James Symons, contract exhibit planner of Washington, D.C.; and Brian C. Jones, HFC filmmaker. Design work for the bridge area restoration was coordinated by DSC landscape architect John Ronscavage, assisted by Al Reynolds. Stanley Fretwell, Lothar Schipanski, and Tom Armstrong of DSC were project supervisors for various phases of the work, which had a Bicentennial deadline of May 1, 1976.

Chris Nix of Evansville, Indiana, was contractor for both the visitor center and the delayed grounds work, with awards of \$620,000 and \$150,000 respectively. The Poe Electric Company of Linton, Indiana, did the landscaping and renovation of street lighting at the visitor center for \$65,000. Harpers Ferry Center costs for exhibits totaled \$145,000 and DSC costs for all research, design, and construction supervision came to \$170,000, for a grand total of \$1,150,000.

## GEORGE WASHINGTON BIRTHPLACE NATIONAL MONUMENT

### General Redevelopment

A tidewater plantation in Westmoreland County, Virginia, where Popes Creek enters the Potomac River, was the birthplace of George Washington, destined to become the military leader of the American Revolution and the country's first president. We have only a blurred image of the actual birthplace structure and its early 18th-century setting. A new visitor center and other improvements enhance our understanding of the origins of this colossus in America's pantheon of heroes.

George Washington Birthplace National Monument is 38 miles east of Fredericksburg, two miles from Virginia Route 3. The immediate birthplace site and family burial ground were conveyed to the United States by the state of Virginia in 1882 but did not become a national monument until 1930. Additional land purchased by the government or donated by the Wakefield Memorial Association and John D. Rockefeller, Jr., has brought the monument to a total of 456 acres, encompassing an irregular area between Bridges and Popes creeks.

In 1718 Augustine Washington bought 150 acres along Popes Creek and later built a substantial brick dwelling, probably finished in 1726. Here George was born in 1732, the son of Augustine and his second wife, Mary Ball. In 1735 Augustine took his family 50 miles up the Potomac to his Hunting Creek Farm, later Mount Vernon. Four years later he moved again to Ferry Farm, near Fredericksburg. When he died there in 1743, the Popes Creek property, Wakefield, passed to Augustine, Jr., George's older half-brother. George returned to Popes Creek as a boy for occasional extended visits.

In 1779, while Washington was leading the Continental Army, his birthplace home accidentally caught fire and burned. George Washington Parke Custis, his adopted son, marked the spot with a stone tablet in 1815. Over time all visible vestiges disappeared, as did the tablet, but the site was rescued from oblivion by an owner who deeded it to Virginia in 1859. In 1896 a shaft of Vermont granite was erected on the site by congressional authority. Patriotic Virginia ladies formed the Wakefield National Memorial Association in 1923 with the object of reconstructing the birthplace by 1932, the bicentennial of Washington's birth. In 1930-31 the association, by authority of Congress, built a conjectural "memorial mansion" where the granite shaft had stood on the supposed site of the original house; the shaft was moved to the park entrance. But even the site proved inaccurate: a U-shaped foundation discovered nearby in 1930 was confirmed to be that of the true birthplace.

For purposes of the Bicentennial, further archeological investigations were conducted from January 1974 to August 1975. The primary area of study was the "Colonial Garden" in the vicinity of the memorial mansion. Excavations revealed a possible wing of the birth house, a colonial period trash pit yielding some 8,000 artifacts, evidence of previously unknown colonial outbuildings, and indications of prehistoric occupation. Salvage archeology at the visitor center site and other new development areas yielded mainly

prehistoric artifacts.

The picture prior to the Bicentennial was one of a fairly good park land base but development that was too cramped and intrusive. Except for the granite obelisk at the entrance, a side road to the cemetery, and another road to a separate picnic area, development was concentrated in the tight birthplace area at the mouth of Popes Creek. A parking area flanked by a superintendent's office and a post office was only a short distance from the birthplace site. Here too were a conjecturally reconstructed period kitchen and smokehouse, the Colonial Garden, and a demonstration colonial farm that made use of a horse barn and a four-stall garage built in the 1930s.

The Bicentennial redevelopment was intended to relieve the nonhistoric congestion around the birthplace site. A new visitor center was well removed from the site but connected to it by a new interpretive trail, and the old parking lot, nonhistoric buildings, and entrance road were obliterated. Now, instead of proceeding straight to the birthplace by car, the visitor parks in a new 100-car parking area by the visitor center, both of which are located and designed to be unobtrusive from the birthplace area.

The visitor center has a background of woods on the bank of Popes Creek and is further screened by new plantings and a mound created from structural excavations. Its design is distinctly contemporary without conflicting with the historic mood. It has plain red brick walls and a low-pitched roof of brown asphalt shingles. The ridgeline is broken by two intersecting vertical skylights over the central lobby.

The 5,675-square-foot building has an entrance plaza nearly double its size directly off the parking area, designed to handle busloads of visitors. Both the plaza and the building lobby are paved with brick in a modified herringbone pattern. The expanse of the plaza is relieved by raised planting beds and wood planter tubs, an aluminum flagpole set in a square of granite blocks, and benches of rough-sawn cypress slats, walnut stained. At the left corner of the plaza is the small (755-square-foot) concession and post office building, complementary in design to the visitor center, with opposed entrance. An arcade supported by evenly spaced brick columns connects the two structures. Azaleas, daffodils, viburnum, thyme, ivy, English box, crape myrtle, witch hazel, and mountain laurel are set in the planters and the surrounding terrain.

The topography permitted a trilevel floor plan. The visitor enters a lobby on the main or upper level, finding restrooms to the left and an information counter to the right. The administrative offices are behind the counter. A lower lobby is reached by a reversing downramp. Here five freestanding cases display items excavated around the birthplace and related graphics. The visitor can then exit to a deck overlooking the Popes Creek estuary and follow a downramp to the trailhead, or can enter a 110-seat sloped auditorium featuring a live action film, "A Childhood Place," exploring environmental and cultural influences on Washington's character. Viewers may exit from the lower end of the auditorium to the foot of the exterior downramp and the trail to the birth site. In a semi-basement below the office and lobby are a workshop, mechanical equipment, artifact storage, and employee lockers and restrooms.

The new six-foot-wide interpretive trail has 1,800 linear feet of crushed oyster shell surface and several hundred feet of old brick and stabilized turf walkway at the birthplace area. The new portion starting at the visitor center is benched into the wooded hillside above Popes Creek,

making generous use of timber cribbing to avoid slope disturbance. Here under a canopy of trees the visitor glimpses the estuary and marshlands. Arriving at the historic ground, the visitor first views the outline of the birthplace structure traced in oyster shell. In addition to the memorial mansion and kitchen building where tours are conducted, the visitor may also visit the garden, demonstration farm, and craft shops. From the farm, the new trail returns to the visitor center and parking area. Appropriate signs and wayside exhibits are placed at intervals along the loop trail.

Other Bicentennial improvements included a complete new water and sewer system, upgraded fire protection, and at the picnic area, a new comfort station and rehabilitation of the log house used by the Wakefield Memorial Association for gatherings. Other improvements recommended by planners, including a small boat wharf, a floating bridge over Dancing Marsh to the picnic area, and a trail around the red cedar grove at Burnt House Point, were deferred. Plans to expand the demonstration farm were canceled for policy reasons.

The basic area history is the official report of 1968, Chapters in the History of Popes Creek Plantation, by Charles E. Hatch, Jr. Early archeology at the birthplace was reported on by Bruce Powell in his 1968 report, Archeology of the Popes Creek Area. Recent archeology was performed by Southside, Inc., of Williamsburg for \$90,000 under the general direction of Norman Barka, with field work by Jonathan Kent. The Harpers Ferry Center film was produced by Rick Krepela, the exhibits were designed by Ike Ingram and Ben Miller, and the waysides were designed by Ray Price at a total cost of \$84,000.

Denver Service Center personnel responsible for preliminary design work were architects Jud Ball and George Hoffman and landscape architect Merrick Smith. Architect Robert Campisi and landscape architect Don Fox handled the final design and working drawings. Daniel Pearson doubled as design engineer and overall project supervisor.

The visitor center construction contract went to Boyer and Henderson, Inc., of Williamsburg for \$721,480. The contract for roads, utilities, and parking went to W. C. Spratt, Inc., of Fredericksburg for \$691,951. The G. Elvin Grinder Construction Company of Indian Head, Maryland, took the trail and planting contract for \$59,553. Minor contracts relating to the picnic area totaled \$63,000, bringing the overall contract construction cost to \$1,536,000. The construction work occurred between December 1975 and April 1976.

## GLORIA DEI (OLD SWEDES') CHURCH NATIONAL HISTORIC SITE

### Grounds Improvement

Gloria Dei (Old Swedes') Church in Philadelphia was designated a national historic site because of its long history and significance as a reminder of early Swedish settlement in America. A landscaping project commemorates its association with the American Revolution.

Gloria Dei (Old Swedes') Church is a precious "island of history" in a noisy industrial complex. Here, squeezed between the Delaware River and the elevated Delaware Expressway (Interstate 95) is a building that was three-quarters of a century old at the outbreak of the American Revolution. More remarkable is the fact that the church organization represented here has served congregations continuously for more than three centuries. This example of European-American cultural continuity has few equals on the North American continent.

The church was designated a national historic site by the Secretary of the Interior in 1942 while remaining in private ownership. In 1958 Congress authorized federal acquisition of 2.61 acres to protect its immediate setting. Now comprising 3.43 acres, including 0.82 owned by the church corporation, the national historic site occupies a full block in the Southwark-Queen Village area of Philadelphia. It is 10 blocks south of Independence National Historical Park, whose superintendent represents National Park Service interests here.

In 1637 the Swedish government chartered the New Sweden Company to participate in the American fur trade. The following year Peter Minuit founded a colony at the site of later Wilmington, and it was extended as far as the Schuylkill River at present Philadelphia in 1642. In 1654 this New Sweden capitulated to a Dutch expeditionary force and became part of New Netherlands (which in turn became part of the English New York in 1664). But Swedish emigrants remained to leave their mark on the land. A group of them at Wicaco, now South Philadelphia, had begun to use a small blockhouse as a mission of Sweden's state church in 1646. After the arrival of William Penn and his Quakers in 1700, they built the present church on the same site. It is one of the oldest churches in Philadelphia if not in Pennsylvania, although some elements date from the later 18th and 19th centuries.

Gloria Dei is an ivy-covered building of red brick laid in Flemish bond with glazed headers. It shows both Swedish and English architectural influences. The exterior of the steep-roofed building is distinguished by a peaked gable, square belfry, and small spire. There is an entrance porch on the south side and a small vestry on the north. The small vestibule in the tower provides access to the central aisle and the galleries.

The church contains many relics, documents, and plaques pertaining to the colonial and revolutionary periods. Among the personalities here associated with the nation's emergence were John Morton, signer of the Declaration of Independence, and John Hanson, president of the Continental Congress under the Articles of Confederation. Betsy Ross was married here, and five of General Washington's officers are buried in the churchyard.

In addition to the historic church and cemetery, there are the church

rectory, parish hall, sexton's house, newly constructed guild house, and open space created by the demolition of old structures unrelated to the church. The open space provided opportunity to begin development of the "dignified open setting" called for in the 1958 legislation.

The NPS acreage is in two sections flanking the church property, the south section being the largest and most fully developed. The landscaping objective was to obtain maximum screening from visual and aural traffic impacts. In the south section, the east and south perimeters were defined by a new brick wall, averaging 10 feet in height, with soapstone coping and offset brick piers with spherical soapstone capitals at 20-foot intervals. A new main entrance gate on Water Street has wrought iron grillwork flanked by double piers of brick with soapstone capitals. Three 30-foot aluminum flagpoles for Swedish, Dutch, and English colonial flags were placed across Water Street from the main gate. There is new brick paving in herringbone patterns and a circular brick plaza with redwood slat seats, a row of "Franklin lampposts," and a bronze interpretive plaque. General landscaping is a judicious mixture of evergreen and deciduous trees and hedges, complementing mature plantings on the church grounds. Work in the north section included new granite curbing, removal of power poles, and renovation of a rose garden. Deferred for budgetary reasons were completion of the brick walls and an iron picket fence, public parking beneath the expressway, some general landscaping, and pedestrian access from Shot Tower Park and the Southwark residential area.

Landscape design work was by Gerhard R. Tegeder and William Witmer of the Denver Service Center. The construction work, by W. Agnes, Inc., of Philadelphia, cost \$180,600. Fred A. Spencer was the project supervisor, and Ray Lee was the contract administrator. A wayside exhibit was prepared by the Harpers Ferry Center under the direction of Ray Price.



## GUILFORD COURTHOUSE NATIONAL MILITARY PARK

### General Redevelopment

After patriot victories at Kings Mountain and Cowpens, Gen. Nathanael Greene outfoxed Lord Cornwallis in a chess game of maneuver, climaxed by a bloody confrontation at Guilford Courthouse, North Carolina, on March 15, 1781. Here the British held the field but were so weakened by casualties that their southern strategy collapsed, leading to later surrender at Yorktown. The Bicentennial program restructured visitor orientation and circulation patterns and reduced intrusions on the historic scene.

In 1778, with the war in the north stalemated, the British adopted a new policy of first conquering the southern colonies, rallying loyalists to their support, then marching northward to crush the prolonged rebellion. At first, success crowned their efforts. An expeditionary force captured Savannah, then combined with Florida-based troops to subdue most of Georgia. In May 1780 Charleston fell under seige; then Lord Cornwallis secured control of South Carolina after a victory at Camden. But the British grand plan was disrupted by the stubbornness of the colonials and the brilliance of their leadership. Backwoodsmen rallied to destroy an upcountry expedition under Maj. Patrick Ferguson at Kings Mountain. Then Washington's new hand-picked southern commander, Nathanael Greene, devised a strategy of dividing and wearing down the British invaders before seeking a pitched battle. The first payoff was a diversion by Gen. Daniel Morgan, of Saratoga fame, which lured and then roundly defeated a British cavalry column under Col. Banastre Tarleton at Cowpens.

Conserving his ragged army until it could be reinforced from the north, Greene marched and countermarched, eluding the main British force under Cornwallis. After reinforcements arrived, Greene took a stand with some 4,000 militia and continentals at Guilford Courthouse. Stationing his men in three parallel lines, he ordered the first two--mostly untrained militia--to fire on the British regulars and then fall back behind the trained continental troops of the third line. Cornwallis penetrated the first two lines as expected and drove off one regiment at the third line. The veteran First Maryland mounted a bayonet charge, supported by Col. William Washington's cavalry. With the battle going against him, Cornwallis ordered his cannon to fire "a whiff of grape-shot" into the struggling mass, halting the continental counterattack at the cost of some of his own men. Greene withdrew, but the British had sustained such grave losses that the British statesman James Fox declared, "Another such victory will ruin the British Army."

In 1808 Guilford Courthouse was abandoned for a new county seat six miles away that became the present city of Greensboro. The Guilford Battle Ground Company was formed in 1887 to purchase land and commemorate the battle. Its activities led to the establishment of the national military park in 1917.

Before the Bicentennial, development consisted principally of two intersecting thoroughfares, Old Battleground Road north and south, and New

Garden Road east and west; about one mile of park tour road and one mile of foot trails; an antiquated and undersized visitor center at the American second line; a railroad crossing; and 28 monuments and graves memorializing those who played major roles in the battle or the struggle for independence. Planners recommended a complete overhaul of the layout to eliminate visitor confusion and restore a measure of historical integrity to the park. The principal features of the 1966 master plan and 1972 development concept plan were realized in construction work carried out from August 1974 to October 1975.

A new visitor center located on the crest of a knoll east of the American first line remedied the major defects of the old visitor center. The structure houses 8,200 square feet of visitor facilities, including a spacious lobby, museum, and 120-seat auditorium, and 1,500 square feet of administrative area. The exterior is of insulated brick and glass, topped by a slate roof. Paved terrace areas of exposed aggregate with brick dividers are at front and rear. There is a 40-car parking area. Harmonizing building materials and landscaping minimize the obtrusiveness of the structure.

Development of a one-way loop tour road included the construction of 7,900 feet of new road and the widening and resurfacing of 4,900 feet of old road. At the same time, 2,400 feet of old road was obliterated. This new 20-foot road, of bituminous asphalt plant-mix with a matte finish, is designed to enable the visitor to reach all the historic features and interpretive devices with minimal impact on the terrain and specimen trees. There are five interpretive stops, each with turn-off parking: at the first line, second line, Winston Monument, third line, and Guilford Courthouse site.

Existing foot trails were abandoned and 1,250 feet of new trails was constructed, being six feet wide of bituminous surface with a brown crushed-stone course. The trail system offers a total pedestrian alternative to the roads. An eight-foot-wide section on the left side of the tour road along 11,000 feet of its length is reserved for cycling. The only new bike path is one 1,500 feet long approaching the visitor center. An additional 1,600 feet for bicycles will be provided from abandoned auto road sections entering the park from adjacent city streets.

New Garden Road is now closed to commuter traffic, having been restored to a historic road or trace. About 3,800 feet of old pavement and ditches were removed and the roadbed scarified, graded, and stabilized by an admixture of gravel and salt. Approximately 700 feet of Reedy Fork Road has been restored in like manner. All historic traces are 10 feet wide with grassy ditches to accommodate runoff.

A new comfort station has been provided at the east end of the park. Other improvements include 2,500 feet of split-rail locust and cedar fences, four rails high, at the first line and around the historic field at the courthouse; wooden bollards to keep out auto traffic; wooden benches along the trails; and underground utility lines. One monument, the Hooper-Penn, was relocated for aesthetic and security reasons.

Interpretation of the battle is facilitated by new wayside markers and audio messages at key points. Cannon mark troop positions. At the visitor center an artwork film tells the story of the campaign through letters supposedly written by an American soldier to his family. The museum features weapons and accoutrements of the opposing forces, including a period drum and a British cannon. A rear-screen film presentation nearby shows how the

cannon fired.

The contract planner and designer for the Guilford Courthouse redevelopment was John B. Townsend and Associates of Greensboro. Thomas P. Heritage Associates subcontracted as architect. The total design cost came to \$143,504. The Thompson-Arthur Paving Company of Greensboro was the construction contractor, receiving a final settlement of \$1,558,662. Edward Boggs was the construction supervisor, Darrel Stiger was contract manager, and James Kiryakakis reviewed design and drawing preparation. Grant Cadwallader, Walter D. Stowell, and Ray Price of Harpers Ferry Center were the key persons on museum and outdoor exhibitry, and Philip Ford Young produced the film. The Harpers Ferry budget totaled \$199,000. Historian Charles E. Hatch, Jr., was the prime source of historical data, having written several authoritative reports on the subject. The Southeast Archeological Center conducted limited excavations in an effort to confirm the locations of old traces and the courthouse.

## HOPEWELL VILLAGE NATIONAL HISTORIC SITE\*

### Blacksmith Shop Restoration

Hopewell Village in southeastern Pennsylvania, an ironmaking community active for more than a hundred years beginning before the Revolution, represents a primitive colonial art that mushroomed into a gigantic industry. Restoration of the blacksmith shop continued the process of village restoration underway intermittently since the 1930s.

In the early days of colonial America, iron tools, horseshoes, and household items were imported at high cost. Recognizing the need to manufacture their own iron, the colonists established a number of ironworks. By the end of the 1700s, southeastern Pennsylvania had become the industry's center. Hopewell Village (originally Hopewell Furnace), founded by Mark Bird in 1771 in time to supply cannonballs for the Continental Army, is a rare surviving example of a primitive ironmaking community.

Hopewell Village National Historic Site, designated in 1938 and now comprising 840 acres, is located amid rolling hills about 12 miles from the Morgantown exit of the Pennsylvania Turnpike. The charcoal furnace operation at the company town here employed up to 65 men at its peak. Charcoal was produced from the hardwood forests surrounding the furnace, and ore and limestone (used as a flux or agent) were brought by wagon from nearby mines and quarries. Bars of the resulting pig iron were sent to nearby forges (such as Valley Forge) for conversion to wrought iron. Stove plates cast at Hopewell were assembled in nearby towns. The furnace produced iron until 1883.

Among features here are the coaling shed and charcoal house, charcoal hearths, water wheel and blast machinery, office store, casting house, manager's house, tenant houses, and blacksmith shop. Much of the village was restored or reconstructed in the years preceding the Bicentennial. The blacksmith shop, which played a minor but essential role in its economy, was selected as a Bicentennial restoration project because various alterations between 1849 and 1950 had impaired its authenticity for the village restoration period of 1820-40.

The fieldstone building, about 20 by 25 feet, is stuccoed on the outside and has some plaster on the inside. The walls vary in thickness from 18 inches to two feet. The roof is of red clay tile placed on oak lath resting on log pole rafters. The floor is dirt. The chimney and the blacksmith's forge are of fieldstone. Basic materials of the building have not changed since its construction sometime before 1800, but alterations resulted from a combination of accumulating slag and the rechanneling of French Creek which raised the adjacent ground level.

The floor of the Revolutionary period was approximately four feet lower, evidenced by window and door heads in the stone walls. As the slag and groundwater levels rose, the side walls were raised and the end walls

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\*The name was changed to Hopewell Furnace National Historic Site in 1985--ed.

were retapered from a fixed apex, resulting in a flattening of the roof from its original steep pitch. Doors were converted to windows, original windows were filled in, and new doors were cut. Major changes of this sort occurred about 1800 and 1849.

The 1849 renovation was particularly extensive, prompted by production of a new anthracite furnace as well as the slag-moisture buildup. The floor level was raised, a new forge (the present one) was built, old doors and windows were filled, new ones were opened, and the walls were elevated two feet. In 1879 the tile roof was replaced with wood shingles. In 1936 the old forge saw service again when a blacksmith manufactured hardware for restoration work in the village. In 1949-50 the National Park Service removed the top two feet of wall added in 1849 and erected a 13-pole rafter system to bear the load of salvaged red clay Dutch tile.

The purpose of the Bicentennial restoration was to correct substandard 1950 work and treat or replace wood in poor condition. After removal of tile, oak lath, pole rafters, and roof ties, the rafters and ties were pressure-treated with preservative and reinstalled. New oak lath was added and the old tiles relaid, rectifying an improper random pattern by employing the "stacked joint" method of Pennsylvania Dutch practice whereby the tiles are set in neat parallel rows. The ridge was surmounted with new handmade red tiles of larger scale. There are a new roof ventilator and new tapered rake boards on the gable end. Replacement windows in the east and south elevations conform to those in other Hopewell buildings. The upper portion of the south wall was repaired with new stonework at the apex, removal of old pargeting, and repointing.

The blacksmith shop is furnished and is the scene of living history demonstrations in season. A concealed electrical cable and panel enable a taped audio message to be heard when the building is unattended.

Norman Souder and John Albright were co-authors of the basic historic structure report. Project architect Alan C. Reynolds, assisted by student architect Ralph Pederson, did the drainage. The restoration contract went to Richard H. Lawrence of Pottstown, Pennsylvania. Jacob E. Tothoro supervised the work, completed in May 1975.

Harpers Ferry Center Bicentennial projects included a special exhibit, financed by Eastern National Park and Monument Association, on Hopewell's role in the Revolutionary era. Two replica cannons of the type supposedly cast at the furnace in the 1770s were provided for test firing demonstrations. Audiovisual equipment was upgraded throughout the park, and a new audiovisual program was installed in the visitor center auditorium. Other work at the park consisted of improvements to the water system.

The total cost of Bicentennial work at Hopewell was \$122,000.

## INDEPENDENCE NATIONAL HISTORICAL PARK

### Visitor Center

Independence National Historical Park in Philadelphia is number one on any list of historic sites because it is, literally, the birthplace of the United States of America. In addition to Independence Hall, there is a rich concentration of historic buildings associated with the Revolution and the formative years of the republic. A new visitor center provides welcome orientation for new arrivals and rest for the footsore.

Independence Hall and the Liberty Bell have long been patriotic shrines, but recently the number of their visitors, in the millions, has been crushing. The advent of the American Revolution Bicentennial with the prospect of more millions demanded a solution for this critical situation. Because it was neither possible nor desirable to limit the number of pilgrims here, the idea of a visitor center to attract and accommodate large crowds--thereby reducing their concentrated impact on the historic buildings--was advanced. Visitors would be drawn here for rest, sanitary facilities, and general interpretation, but mostly by the park's single greatest magnet, the Liberty Bell.

The congenial task of designing this largest of all national park visitor centers (40,000 square feet) was awarded by contract to Cambridge Seven Associates, Inc., of Cambridge, Massachusetts. Their concept contained three primary elements. First, a group of low reticent brick masses to house theaters and offices would reflect the three-story scale of nearby historic buildings. Next, within the brick masses, would be a grand transparent exhibition space. Finally, on the side facing the historic district would be an attention-arresting vertical campanile or bell tower, somehow compatible with both old and new architectural motifs, which would be the permanent new home of the Liberty Bell.

Only one thing went wrong with the plan. After construction started there arose a public clamor against the idea of moving the sacred bell so far (three blocks) from its historic home in Independence Hall. Bowing to popular will, National Park Service planners shifted the bell to a new pavilion on Independence Mall within comfortable sight distance of the hall. This left Cambridge Seven in a serious dilemma. They would be without the bell that--suspended at ground level--was to be the main attraction, and they might have to revise their entire concept.

Some pondering elicited an inspired idea. It would be suggested to the British government, through its embassy in Washington, that a nice gesture of reconciliation by our 1776 enemy would be the gift of a new and uncracked Bicentennial Bell. Much larger and capable of ringing loudly, it would be made by the same firm that cast the Liberty Bell, the Whitechapel Bell Foundry. Hung high in the tower, it would be sounded on July 4, 1976, and later patriotic occasions. After some pondering on its own the British government accepted the honor. Only the bell tower had to be redesigned, to accommodate a large new working bell in the loft instead of a silent sacred object on exhibit at ground level. The Bicentennial Bell was in-

stalled in the tower in time for its dedication by Queen Elizabeth II on July 6, 1976.

The visitor center site at Third and Chestnut streets was selected by virtue of its being respectfully on the edge rather than at the center of the historic complex. Behind it to the east stands the 20-story art deco U.S. Custom House of 1933, representing Philadelphia's ongoing role as a port. On two other sides there are historically important and architecturally superb neighbors: the stately Merchant's Exchange (1832) to the south and the First Bank of the United States (1797) to the west. To the north, 19th-century commercial structures reflect the active mercantile history of Philadelphia. Taking advantage of these fortunate facades, the architects designed the south wall at an angle to respect the diagonal direction of old Dock Street and placed the pedestrian entrance plaza here. They then made an exit plaza on the west or bell tower side, facing the dignified First Bank and the historic area. (In practice, visitors may enter or exit either way.)

Inside is an expansively open pavilion naturally illuminated in daytime by skylighting and glass curtain walls. Here are floor and hanging exhibits featuring flags of the Revolutionary period and displaying artifacts and supergraphics representing life in Philadelphia during the last quarter of the 18th century. A two-stage ramp leads to an upper level where there are twin theaters showing "Independence," a 30-minute live action film dramatizing the history of the park's buildings and grounds. Anticipating heavy traffic, the designers provided a 15-foot-wide bridge of exposed aggregate concrete on the upper level, 118 feet long between the brick units with cushioned benches along its sides, to accommodate those waiting in line for the film. From the theaters visitors descend by stairway to ground level.

A separate tour staging area with information and sales space is provided in the triangular southwest unit. The comfort station unobtrusively occupies the southwest corner. There is a profusion of benches inside and out. Above are the security and visitor services staff offices. In the west plaza there is also a tiered gathering place for groups and three relief maps of the park for both sighted and blind.

To achieve the clear, unobstructed pavilion, a structural steel pipe truss system was designed to span the masonry walls. A series of 19th-century-style barrel vault skylights shaded by slanted fabric forms the roof plane. The exposed structural steel and the detailing of the two glass curtain walls enhance the pavilion's light appearance. The brick walls and the east wall of porcelain enamel are surmounted by clerestory glass panels. All walls have porcelain enamel fascia. The massive exterior walls are of flat red brick laid in Flemish bond. A common Philadelphia basket-weave brick paving pattern was used for the interior ground floor and the plazas.

The freestanding campanile is a square tower 100 feet high, appearing somewhat like a giant box kite. The brick walls are broken by apertures to visually relieve the massive brick facade of the main structure and allow free reverberation of the Bicentennial Bell.

There is an integrated atmospheric control system. Use of the sail-like sunshades at the ceiling and vertical louvered blinds on the west wall reduce summer heat penetration. Night illumination of the pavilion space is provided by strip fluorescent fixtures running the length of the top chord of each truss and incandescent canister fixtures attached to the bottom chords for focused exhibit lighting. Neon lighting is used in parallel

along the soffit of the bridge and within theater corridors.

Denver Service Center senior architect Donald F. Benson, consultant Joe Merz, and Hobart G. Cawood, park superintendent, defined National Park Service requirements. The contract for all design work, including exhibits, was awarded to Cambridge Seven Associates, for which Peter Chermayeff was principal, Charles A. Russell was associate, and John W. Stebbins was project architect. The building construction contract went to Wintz Brothers, Inc., of Philadelphia for \$3,340,000. Fred Spencer was project supervisor.

The Harpers Ferry Center budget for pavilion exhibits was \$252,000. The film, directed by John Huston, was produced for \$436,000. Grant Cadwallader and Carl Degen were the respective coordinators of these interpretive media for HFC.

Visitor center use by those with limited time in the park will inevitably be less without the presence of the Liberty Bell. The Bicentennial Bell lacks the aura of its predecessor, is barely visible, and is audible only on special occasions, so it is not the same kind of magnet. But it is anticipated that the other amenities offered here will still attract most visitors and help relieve congestion elsewhere. Only time and experience will enable us to judge whether this major modern addition to the park's assemblage of historic buildings has been successful in achieving its mission.

#### Liberty Bell Pavilion

The Liberty Bell, a ponderous and badly flawed relic of 18th-century metallurgy, is probably the most venerated historic object in the United States. Acquired originally to summon the legislators of colonial Pennsylvania, it pealed to signal American independence in 1776. From its new home on Independence Mall it will continue to "proclaim liberty throughout all the land."

Independence Hall is the native habitat of the Liberty Bell. It was originally installed in 1753 in the belfry of a new tower addition, where its ringing tones rallied the patriots of the Revolution. After it was silenced by cracking in 1835, it was shunted about the building for display purposes and resided at the foot of the tower staircase after 1897. The prospect of intolerable visitor congestion at this point during the Bicentennial prompted plans to relocate the bell to a nearby site that could accommodate the crowds. Many alternatives were considered before the decision was made to place it in a new and exclusive exhibition building on Independence Mall, the landscaped open space extending north from Independence Hall.

No understanding of structural or interpretive design requirements for relocation of the Liberty Bell would be possible without some knowledge of its history, a blend of fact and fabrication that created a powerful symbol. Big bells of brass or bronze were important communication signals in the 18th century, and in 1751 Assemblyman Isaac Norris ordered a one-ton model from the Whitechapel Bell Foundry in London to adorn the new State House (the future Independence Hall). It arrived the next year but became strangely mute after its first trial, and two Philadelphia brass founders melted it down and recast it twice before obtaining a satisfactory tone. In June 1753 this recasting was hoisted to the belfry. The prophetic language of the bell's inscription--"Proclaim liberty throughout all the



land unto the inhabitants thereof," a quotation from the Book of Leviticus--was stipulated by Norris, but some historians credit the inspiration to Benjamin Franklin.

Although the zenith of the bell's active career was undoubtedly its triumphant celebration of independence (actually on July 8, four days after adoption of the Declaration), it pealed forth to hail every landmark event of the Revolution and its aftermath. Chief Justice John Marshall's death in 1835 was allegedly the occasion of the cracking that led to its retirement.

The bell was often in jeopardy. When the British occupied Philadelphia in 1777, it was carted to Allentown and hidden in a church basement to prevent its conversion to enemy cannon. When the state capital was moved to Lancaster in 1800, demolition of Independence Hall and the bell were forestalled by their purchase by the city--still the legal owner today. The bell did not become the "Liberty Bell" and a sacred object to be revered and protected until the antislavery crusade of the 1840s. Thereafter it was threatened by well-intentioned efforts to repair it and jostled on display trips to cities as distant as New Orleans and San Francisco. The crack became part of the bell's mystique; according to one interpreter, it symbolizes the imperfections of democracy.

The firm of Mitchell/Giurgola Associates of Philadelphia was chosen to design the pavilion on the selected mall site--the northern half of the block north of Independence Hall, adjoining Market Street. The design goal was to make the pavilion harmonious with the linear progression of features --fountains, pools, steps, gardens--that combine to make the mall an interesting urban space as well as a handsome setting and viewing terrace for Independence Hall. The firm's concept of a long, low structure narrow on the Independence Hall axis was intended to minimize obstruction of the view of Independence Hall from Market Street and allow a vestibule at the north end where groups may assemble under cover and view a Liberty Bell exhibit. A narrow chamber separates this area from the bell chamber itself, where visitors may hear an oral presentation, touch the bell, and take photographs. An unobstructed view of Independence Hall from the chamber is maintained by a small formal garden outside on the axis; visitors exit the chamber through side doors to flanking paved plazas.

The pavilion has a low roof, the underside of which is a sloping soffit. The roof inflects upward over the bell, creating a strong gesture toward Independence Hall. The roof surface is subdued aesthetically in deference to viewers from neighboring high-rise buildings. The exterior walls are scaled to human size and direct the circulation flow. Above the walls glass clerestories allow natural light to flood the interior. Locations for hearing the recorded message of the bell, translated in several languages, are in front of large viewing windows north of the bell chamber. Glass walls on north and south sides allow unobstructed views of the bell from a distance.

Brick paving is used on the plaza to continue the color and texture of the surrounding buildings and paved plazas. A white granite facing is used on exterior walls, echoing the white stone of the Second Bank of the United States and other 19th-century buildings nearby. The oak floor and wall panels of the interior and the leaded copper roof were chosen for historical associations and durability. At night the underside of the roof is lit from fixtures located atop the granite walls, and direct accent lighting is placed on the Liberty Bell itself.

Mitchell/Giurgola received special recognition from the American Institute of Architects for recent designs of several Philadelphia structures, including the Liberty Bell Pavilion.

The building contractor was J. J. White, Inc., of Philadelphia. Solomon Myzel was the project supervisor. The work was completed in December 1975 at a cost of \$917,414. The exhibits and audio messages were provided by the Harpers Ferry Center for \$30,000. Walton Stowell, James Mulcahy, Lee Allen, and Fred Jessen participated. Historian John D. R. Platt, Denver Service Center, is the National Park Service authority on historical aspects of the bell.

At the stroke of midnight on December 31, 1975, the National Park Service, with security reinforcements from the city, moved the immortal 2,080-pound bell from Independence Hall to the pavilion amid the cheers of some 40,000 rain-soaked latter-day patriots.

### Franklin Court Memorialization

Benjamin Franklin is universally admired as "the first American," one who exemplified all the best qualities of the new democratic citizen emerging from the Revolution. Inventor, statesman, diplomat, philosopher, and signer of the Declaration, this towering genius now receives due honor at the site of his Philadelphia home. The Franklin Court development is a unique concept described as "the Bicentennial's most memorable architectural image."

Franklin Court, acquired by the National Park Service in 1950 as an addition to Independence National Historical Park, is a rectangular parcel of five lots, measuring 99 by 306 feet overall, running south from Market Street along a mid-block alley called Oriana Street. The complex of grounds and structures referred to as the court comprises real estate intimately associated with Benjamin Franklin during his 67 years as a Philadelphia citizen.

When the 17-year-old Franklin arrived in Philadelphia from Boston to seek his fortune in 1723, he walked up from the riverfront with three rolls of bread, one under each arm and eating the third. "Thus," he later wrote, "I went up Market Street, passing by the door of Mr. Read, my future wife's father; when she, standing at the door, saw me, and thought I made, as I certainly did, a most awkward and ridiculous appearance." Franklin lived with and worked for Samuel Keimer as a journeyman printer in one of two small houses on the Market Street end of the property and boarded with carpenter John Read's family in the other one. In the natural course of events he won the heart of Deborah Read, who became Mrs. Franklin.

Through his wife's inheritance and profits from his printing business, Franklin later acquired title to contiguous properties here and in 1763 commenced the construction of a fine 3-1/2-story brick house to the rear of the Market Street houses. Not yet complete when he began a historic mission to Britain as Pennsylvania provincial agent in 1764, it was given the final touches under Deborah's supervision and was occupied by her and their daughter Sarah the following year. Deborah walled the courtyard and put in vegetable and flower gardens.

During Franklin's 10-year mission to Britain the house was more hers than his. It was the scene of son-in-law Richard Bache's courtship of Sarah and the childhood home of their seven children. Deborah died there

in 1774, and Franklin did not spend his first night in the house until May 1775, upon his return from England. Now the colonies were actively at war with Great Britain, and Franklin played a leading role in the Continental Congress and the drafting of the Declaration of Independence. Before November 1776 when he departed for his critical diplomatic mission to France, he entertained virtually every principal patriot leader at his home and doubtless had conversations crucial to the affairs of the embattled colonies. During the subsequent British occupation of Philadelphia, his house quartered Lord Grey, whose aide, Capt. John Andre, was later hanged as the spy in Benedict Arnold's conspiracy.

Franklin reappeared in Philadelphia amid scenes of wild public rejoicing upon his return from the court of France in September 1785. The "First Citizen of the World," now in his 80th year and ailing, found it impossible to leave public life and was soon installed as the president of Pennsylvania, while visitors flocked to his side from every quarter of the globe. Finding his house too small for the Bache family and his guests, library, and scientific apparatus, he built an addition half again as big. During this period he also pulled down the three old houses on Market Street and built in their place three stately townhouses, two of them spanning an arched passageway for courtyard access. Finally, when his beloved grandson Benjamin Franklin Bache began a press of his own, Franklin built him a two-story printing office in the courtyard. With a new "bathing-house" adjacent to the house and an underground icehouse, the complex stood complete.

For the last two years of his life Franklin enjoyed the comforts of his establishment, suiting the requirements of a leader second only to George Washington in public esteem. Here members of the Constitutional Convention found him, adding the weight of his wisdom and prestige to bring together fractious delegates in a bold new experiment in republican government. He died on April 17, 1790, in his second floor bedroom.

In 1812 Franklin's heirs divided the court, demolished the mansion and dependencies, drove an alleyway through the center, and erected a double row of rental houses where Franklin and his guests had once strolled on garden paths. Subsequently the Market Street townhouses were remodeled again and again beyond recognition. When the National Park Service arrived on the scene in 1950, nothing about the dingy alleyway and its surrounding commercial structures suggested Franklin's Olympian presence.

The first order of business after clearing the lot of nonhistoric debris was to launch a campaign of historical and archeological research. The principal investigator of archival data was John Platt, whose unpublished reports on the Franklin and Bache establishments are definitive. Martin Yoelson of the park staff contributed significant findings on the Market Street houses.

The archeological inquiry here was pursued intermittently from 1952 and reached a crescendo in the early 1970s when plans for Bicentennial construction required the wrap-up of all excavations. Unmistakable evidence of the Franklin home cellar flooring, foundation walls, and necessary pits under the 1812 street was found in 1953, followed by the discovery of more evidence of the house addition, the print shop, the original Market Street house foundations, and an incredible number of wells and privies. The latter yielded a magnificent collection of artifacts, mainly ceramics, which has enabled researchers to refine their cultural calendar of Philadelphia. Archeologists Paul Schumacher, Bruce Powell, and Jackson W. Moore handled early work for the NPS. Bicentennial money permitted resumption

of the excavations in the early 1970s under a University of Pennsylvania contract with John Cotter as administrator and advisor and Barbara Liggett as principal investigator. Later investigation and recording of features uncovered during the construction contract was handled by Mary Mish of the Philadelphia Field Office, Denver Service Center.

Architectural research and design studies were under the direction of Lee H. Nelson and Penelope H. Batcheler, restoration architects with the Philadelphia Field Office. In addition to studying subsurface archeological data, they painstakingly analyzed telltale marks on the five old brick party walls of the Market Street houses, the only above-ground elements surviving from Franklin's day.

To do something worthy of the immortal Ben Franklin for the Bicentennial, what could be done with the bare ground around the home site and the scarred brick walls on Market Street, in the shadow of 19th- and 20th-century commercial buildings? One possibility was to reconstruct the home itself as a historic shrine. Two factors canceled this idea: a reconstruction would stand amid incongruous surroundings, and not enough was known about the appearance of the original. Another possibility was to construct a stylish modern museum on the site, probably demolishing the Market Street ruins to provide for some kind of grand entrance. To explore these and other ideas DSC contracted with the respected Philadelphia architectural and planning firm of Venturi and Rauch. The team it assigned to the task included Whitfield Bell as historian, John Milner of National Heritage Corporation as architect, and landscape architects Robert L. DeSilets, Stuart McDonald, and Wilson Edwards. The plan that evolved was a tour de force of creative imagination that has managed to please preservationists, management, and the public alike and would probably make the genial Franklin beam with approval.

Thomas Hine, architectural writer for the Philadelphia Inquirer, points out a fascinating parallel. Franklin figured out a way to have his cake and eat it too by developing rowhouse income property on Market Street and building a generous house and garden for himself in what normally would have been back yards. Venturi and Rauch showed similar ingenuity in figuring out a way to provide a combination shrine and museum "at the same time giving Philadelphia a superb small park that will be a civic asset long after the Bicentennial year." In contrast to Philadelphia's classic extrovert buildings of the Centennial in 1876, Franklin Court seems appropriately introspective for a nation embarking on its third century under the same Constitution that Franklin helped to devise and sell to a skeptical populace. The emphasis is not so much on world-shaking events as on Franklin's personality, home, family, and pragmatic democracy, reflecting the inner human resources that made the American dream possible.

Two "ghost structures" outlined in square-sectioned steel represent Franklin's home and the adjacent print shop on their exact archeological sites. The house is further defined by granite steps and the first floor plan traced in marble. Concrete hoods permit glimpses of such below-grade features as foundations, a brick floor, and a privy pit. Quotations describing aspects of the house, derived from correspondence between Franklin and his wife while he was in England, are inscribed on slate paving. Outlying features such as pits and wells are also marked on the surface by inscribed marble circles.

Franklin's garden is represented by symbolic features on an exaggerated scale befitting a memorial subject to the impact of millions of visitors.

The features include tulip planters, a variety of paving materials (slate, pebble stone, granite), a stylized arbor, Quaker-type benches, semicircular trellises, picket fences, and bollards. Wooden elements are finished in shades of pink and rose evoking an earlier era. Brick walls delineate the historic garden area. An awning shelters a series of panels interpreting features of the original courtyard.

The exteriors of the Market Street houses have been restored with shuttered 18-pane windows, attic dormers, and transomed doors. The new front and rear facades are tied into the surviving original party walls. The three Franklin rowhouses are flanked by two additional rebuilt houses of similar style in which space has been allocated for restrooms, park management, Eastern National Park and Monument Association offices, utilities, and exhibits, including a printing press exhibit, restoration of the Aurora newspaper office, and a working "B. Free Franklin" U. S. post office.

The house at 318 Market Street represents an interesting departure in historic house museums, for it presents the archeological and architectural story in a new and exciting way. "To Let, Enquire Within, B. Franklin," reads the inviting entrance sign at the reborn 1786 tenant house. The focus of the unusual display is the pair of 190-year-old brick interior walls. The evidence left there of the original construction and the many alterations, combined with fire insurance survey data, facilitated reconstruction of the facades and provided rare opportunity for visitor insight into the unraveling of an architectural puzzle. The building has been left open from cellar to roof, and a system of stainless steel stairways and platforms with explanatory panels designed by National Heritage Corporation enables visitors to clamber about on a unique interpretive adventure. At the basement and ground levels are fascinating displays of 18th-century artifacts uncovered by archeologists on the premises. The innovative exhibit, supported financially by the Friends of Independence, was designed by Penelope Batcheler and Mary Mish.

While 318 Market Street offers a specialized experience, the main museum is a Franklin feast of both traditional lore and updated interpretation. Where is this extraordinary museum if it is nowhere visible from Market Street or the open court? Underground, of course, in a reinforced concrete structure of approximately 22,000 square feet. Its entrance is via ramps sheltered by an unobtrusive brick structure to one side of the garden area. Like Franklin himself, the exhibitry in the underground museum at Franklin Court has many facets. There is a great counterpoint of techniques, a mix of traditional and modern, a pacing of individual discovery and group participation, Franklin revealed in historic art and artifacts and electronic computer wizardry. There is something for the young, the old, the uninformed, and the Franklin scholar.

The Gallery, which exhibits Franklin artifacts and portraits, satisfies the desire to experience the old and precious from Franklin's own time. The visitor then enters a space that attempts to summarize the many facets of this remarkable man. Flanking mirror walls expand space to infinity. At the end to which the visitor is drawn, brilliantly pulsating neon titles flash: Scientist, Inventor, Publisher, Author, Humorist, Philosopher, Statesman, Citizen.

The visitor next approaches the Franklin Exchange. Here he can dial a message of his choice to learn what George Washington and more than 45 other Americans and Europeans thought about Franklin. Upon dialing, the telephone instruments access a battery of tape decks. Each message is heard from the

beginning by the visitor dialing the number.

Graphics, artifacts, and models support exhibits on Franklin/Citizen and Franklin/Scientist-Inventor. The section on Franklin/Printer, Publisher, Author features a bank of computer-type printouts providing excerpts from Franklin's writings. A phenomenal range of subjects is open to visitor selection. The device employed here is actually a magnetic tape typewriter (the IBM MTST). The visitor watches as the printout of his selection takes place at high speed. Personal involvement is again the keynote of this exhibit.

The many facets of Franklin establish him as an incredible personality, but it was as Statesman for America that he rose to heroic proportions, earning a significant place in history. An intricate, dramatic presentation entitled "Franklin on the World Stage" deals with him as a figure of international importance. A small theater stages three events at which he was a leading actor: he is seen in Britain's House of Commons arguing for repeal of the hated Stamp Act; he appears at the French court in Versailles, stating the American cause with conviction and finesse; he is seen at the deliberations of the Constitutional Convention at the State House in Philadelphia in 1787. The actors are fine miniatures. The events are enacted in lively dramatic fashion with sophisticated use of sound and light, each taking about three minutes.

The interpretive presentation in the underground museum is capped by a 20-minute, 35-millimeter Cinemascope motion picture titled "Ben Franklin: Portrait of a Family," which highlights Franklin's relationship to his wife, children, and grandchildren. The film is shown in a theater seating 200.

Exhibits were designed for Venturi and Rauch by the firm of de Martin-Marana-Cranstoun-Downs, Inc., of New York. The film is the work of Helen Jean Secondari of John H. Secondari Productions, Ltd., New York. The exhibits were constructed for the National Park Service by Charles M. Maltbie Associates, Inc., Moorestown, New Jersey; Presentations South, Inc., Orlando, Florida; and Bergen Expo Systems, Inc., Clifton, New Jersey. Martin Y. Yoelson was in charge of interpretive content for the park. Penelope Batcheler provided valuable data and ideas for the presentation. The entire interpretive effort was coordinated by Alan Kent of the Harpers Ferry Center.

Interpretive development costs incurred by Harpers Ferry totaled \$775,000. The final cost of all design and supervision by Venturi and Rauch came to \$565,000. The construction contractor, R. N. Shoemaker Company of Philadelphia, received \$5,208,000. Howard Glifort and Harold Wilson were the project inspectors and Penelope Batcheler handled quality control; their work and other research, planning, and project supervision by NPS personnel cost approximately \$250,000. The grand total cost of approximately \$6.8 million made Franklin Court the single most expensive Bicentennial project.

### Graff House Reconstruction

At Philadelphia in the summer of 1776, delegates to the Continental Congress courageously signed the Declaration of Independence of the Thirteen American Colonies from Great Britain. The first official paper of the American republic and one of the most influential in human history, the Declaration affirms man's universal rights. The

Graff House where Thomas Jefferson composed this immortal document has been reconstructed in recognition of his supreme achievement.

The original Declaration with its signatures of 56 men pledging "our Lives, our Fortunes, and our Sacred Honor" is enshrined today in the National Archives in Washington, D.C. Independence Hall is the famous setting of its debate and adoption. These are the temples where citizens may contemplate the majesty of this testimony to their birthright of freedom. The Graff House offers a more personal experience, focusing attention on the author whose flaming concepts and ringing phrases inspired his countrymen to accept the perilous challenge of armed rebellion to secure their liberties.

Reconstruction of a vanished building, as distinct from restoration of an existing building, is resorted to rarely, both because of the difficulty of insuring accuracy and because the preservation of surviving buildings deserves priority. In this case it was felt that the scene could be captured accurately from Jefferson's own writings to Philadelphia friends and that the interpretive and inspirational values of a reconstruction transcended other considerations.

The marriage of Jacob Graff, Jr., to Maria Schinkel on September 21, 1774, prompted the young bricklayer to give thought to proper housing, preferably at the edge of town, at a discreet distance from in-laws. On June 1, 1775, he bought a lot at the corner of Seventh and High (later Market) streets from Edmund Physick, Esq., who had the impressive title of Keeper of the Great Seal and Receiver General of Pennsylvania. Soon Graff and his father, also a bricklayer, began construction of a three-story brick dwelling, completing it in April 1776. The Graffs moved in and let it be known that rooms were available for a qualified gentleman.

Along came Thomas Jefferson, delegate to the Continental Congress from Virginia, apprehensive over the "excessive heats of the city" and seeking "lodgings in the skirts of the town" where he might "have the benefit of a freely circulating air." Graff's new house met this specification and by May 23 Jefferson had moved in. There he remained for a hundred days, at a rate of 35 shillings per week, before departing for home early in September. He had use of the entire second floor, consisting of a front parlor facing Market Street and a bedroom to the rear separated by a stair hall. It was in the parlor that Jefferson, as he later phrased it, "wrote habitually and in it wrote this paper particularly."

Jefferson was chosen a member of the Committee of Five (with John Adams, Benjamin Franklin, Roger Sherman, and Robert R. Livingston) to draft and report a declaration because of his well known felicity of expression that had already found application in several state papers. Deeply caught up in the gravity of the undertaking, he caught the spirit of an ideal--those "certain unalienable rights" claimed for all men everywhere--that would "bring hope to the world for all future time." Between the appointment of the committee on June 11 and its report to the Congress on June 28, Jefferson prepared three drafts of the document, somehow finding time also to contribute to Virginia's constitution and perform other literary chores.

After Jefferson's departure, the Graffs themselves resided here less than a year longer, selling in July 1777 to Jacob Hiltzheimer, who operated a livery across the street and later became a prominent supplier of transport for the Continental Army. During his ownership of the property he appears to have had other tenants of quality, among them Dr. William Jones, Georgia delegate to the Continental Congress; John Dunlap, public printer



of the Declaration and the Constitution; and James Wilson, a signer of the Constitution and Supreme Court justice. Hiltzheimer perished in the yellow fever epidemic of 1798. Upon division of his estate among the heirs in 1801, a daughter received the Graff House and promptly sold it to the firm of Simon and Hyman Gratz. Six years later, as proprietors of a booming business, the brothers remodeled the house for offices and warehouse space and added a fourth story. Encountering business difficulties in 1826, they thereafter rented it to various businesses for shops and storage.

The Pennsylvania National Bank purchased the property in 1882 and demolished the building to make way for a stone bank. The demolition did not occur without protest. A Harper's Weekly article of April 14, 1883, conceded that there was nothing distinguished about the appearance of "the Declaration House," that indeed it was rickety and rat-haunted, "a favorite corner for circus posters." Nevertheless, "the interest attached to it is not of local but of national character," and "the necessity for pulling it down is to be regretted." A heroic effort to save the pieces was made by an unsung pioneer preservationist, Thomas Donaldson, a Philadelphia lawyer and agent for the Smithsonian Institution. Thwarted in his effort to have the house dismantled and reconstructed elsewhere, he personally spent \$75 and two weeks at the demolition site furiously making notes and salvaging quantities of building materials and bric-a-brac, which he stored on an empty lot next to his West Philadelphia home. Most of the salvaged material disappeared, and all but a few copies of his book on the subject were burned in an 1899 fire. But Donaldson's notes and a few items--stone window lintels, a rim knob lock, a firemark--survived.

The bank that replaced the house fell in turn to the wrecker's bar in 1932, to be followed by a succession of fast-food emporiums. But the Graff House was still recalled by some in Philadelphia, including National Park Service historians and planners after the establishment of Independence National Historical Park in 1948. Public Law 477 of August 21, 1964, authorized the federal government to acquire the site for not more than \$200,000 and erect a replica with donated funds. Under an October 17, 1970, agreement with the NPS, the Independence Hall Association raised \$500,000. This money, together with matching funds subsequently appropriated by Congress, made it possible to purchase the site and reconstruct the house as part of the Bicentennial program.

The first step toward reconstruction was exhaustive historical research, inaugurated by Marty Yoelson of the park staff. Conclusive findings are presented in a 1972 historic structure report by Denver Service Center historian John D. R. Platt. The authenticity of the site is firmly documented by real estate records as well as testimony given to one James Mease by Jefferson himself shortly before his death in 1826, recorded in writings of Nicholas Biddle (1827), Thomas Donaldson's The House in which Thomas Jefferson Wrote the Declaration of Independence (1897), and John H. Hazleton's The Declaration of Independence and Its History (1906). Platt was nevertheless at some pains to disprove contrary allegations of others "motivated by commercial interest or misplaced zeal."

Descriptions of the original Graff House in greater or lesser degree were derived from Jefferson's 1826 letter to Mease, antiquarian John McAllister's description of 1855, Thomas Donaldson's 1883 notes, a reconstruction design by the Brick-Layers Company of the City and County of Philadelphia circa 1900, early fire insurance surveys, and early photographs taken before demolition. Reconstruction plans were based on exhaustive analyses



of all such data and study of comparable Philadelphia houses of the period. The Dilworth-Todd-Moylan House, a park structure at Fourth and Walnut streets, was found to be the best guide for filling in details necessary to complete the design.

The contract for the preliminary design and final construction documents for the reconstruction was awarded to Harbeson Hough Livingston and Larson of Philadelphia. Their principal architect and historical consultant was John D. Milner of the National Heritage Corporation, assisted by Robert L. DeSilets. A. E. D'Ambly and Arnold Associates provided engineering and landscaping services respectively. Penelope Batcheler of the Denver Service Center exercised quality control throughout the design and construction processes.

It was planned that a modern extension to the side of the Graff House reconstruction would accommodate auxiliary public and mechanical functions while the house itself would be confined to exhibits and historical furnishings. This composite, together with landscaping that would recapture something of the 1776 suburban milieu in modern downtown Philadelphia, would be an extraordinary challenge. How the challenge was met can best be explained first by describing the reconstructed house, second by describing the auxiliary wing and landscaping, and finally by protracting a visitor walk-through.

The Graff House was fairly typical of those constructed by the 18th-century Philadelphia building trades, being a large, well-appointed brick structure with wood and stone trim. The lot is about 45 feet along Market Street and 124 feet along Seventh Street, with the house in the northeast corner flush with the sidewalk. Exterior dimensions of the structure were 16-1/2 feet by 51 feet. The plan was the same on all floors: two rooms each 20 feet, 8 inches deep separated by a stair hall 6 feet, 10 inches deep.

Facade refinements included brick laid in Flemish bond with glazed headers, a double molded brick water table, belt courses, the roof pitched to the north and south with a long gable with pent return on Seventh Street, tooled window lintels, and a pedimented entrance door. There were two bays on the Market Street facade; the Seventh Street facade, containing the main entrance, had five bays.

Windows were "plank front" with keyed stone lintels on the street elevations. The glass lights, 24 per window on the streets, measured 8 by 10 inches. (Surviving stone lintels bearing shadow evidence of adjoining brickwork were crucial in determining dimensions.) All shutters were exterior and on the first two levels.

In addition to the principal entrance, there was a utility access to the kitchen from the south; this became the visitor entrance in the reconstruction. The main door was reconstructed north of center on the Seventh Street facade, entering the parlor area. Although Georgian builders normally favored symmetry, the off-center location was determined from Donaldson's fabric analysis and evidence that the stairways occupied the east wall of the center bay, precluding a door there.

McAllister confirmed the gable roof. Cedar shingles, a plain cornice, and twin central dormers were inferred. Chimney locations were determined by reverse perspective, and chimneys were designed according to historical precedent. It was assumed that the northern chimney included four flues, serving a fireplace for each northern chamber and the garret. The southern chimney was assumed to have a large kitchen flue and two fireplace flues.

Interior details of the reconstruction are conjectural but based on common carpentry practices of the period. The stairway, patterned after that in the Todd House and described as "a board or box, newel stair," cuts across windows, a practice with precedent in the case of Carpenter's Hall. Floors are random width, common yellow pine. Except as noted below, walls are unpainted plaster. There is dentil cornice molding in the north rooms, plain in the south. All rooms in the first and second floors have baseboards and chair rails. Doors are typical six-panel. There are iron rim locks, "HL" hinges and brass knobs on principal doors, and built-in linen and room closets with shelves and peg boards. All mantels are wood.

The yard, 60 by 90 feet, relates only symbolically to the original. Containing a simple grove of trees shading benches, it functions as an entry court and provides visual relief from the urban environment.

The modern wing is a plain three-story parallelogram with overall dimensions of 23 feet by 86 feet, 5 inches. Though larger in bulk than the house reconstruction, it appears subordinate. The 45-degree angle of the wing's north wall allows the house to be partially viewed from the west along Market Street, like the freestanding original. The exterior is of exposed concrete poured in place, contrasting clearly with the reconstruction. The wing helps buffer the high mass of a department store to the west.

The typical visitor experience begins on Seventh Street at the garden entrance, a pleasant assembly area. Inside the Graff House at ground level are two exhibition spaces. The first, which acts as a holding area, interprets the physical history of the building. The second is devoted to the Declaration of Independence and the historic documents that preceded it. From these rooms visitors are led to a mini-auditorium in the interpretive wing where there is a six-minute film about circumstances and ideas leading to the Declaration. At the end of the film visitors move up a glass-enclosed staircase to the second floor of the Graff House.

Jefferson's two rooms are viewed from the hallway separating the parlor from the bedroom. The stair has been omitted to allow adequate standing room; its presumed location is indicated on the wall and floor. The partitions dividing the hallway from the rooms have door frames and the above-mentioned moldings, but plate glass in lieu of the original plaster enables a clear view. The rooms have been furnished by the park curators befitting the time and circumstances. There are antique counterparts of everything research has disclosed about Jefferson's lodgings, including traveling desks and a swivel chair of his own design, manuscript drafts and quill pens, a Chippendale bedroom set, and piles of assorted items from Philadelphia shops to satisfy want lists from his wife and plantation neighbors.

From this viewpoint visitors proceed along a balcony corridor in the modern wing to another exhibition area dwelling on the theme of the traditional Independence Day celebration. They then descend a stair to a sales area and exit to the garden.

The basement of the complex includes restrooms for staff and public and storage and mechanical space. There is a small service elevator. Mechanical, electrical, fire protection, and security systems are comprehensive. The perimeter of the complex is protected by walls and an iron picket fence supported by brick piers. The only public access is via the controlled Seventh Street entrance.

Construction was accomplished from July 1974 to October 1975 by the John S. McQuade Company of Philadelphia for \$861,000. Fred Spencer was project supervisor and John MacIntyre was project inspector. The design

contract came to \$117,000. The various Harpers Ferry Center projects totaled \$247,000 and DSC costs were \$175,000, for a grand total project cost of \$1.4 million. Charles Dorman and others of the park staff performed curatorial work with operating funds. Interpretive presentations were directed by Grant Cadwallader, Lee Allen, and Fred Jessen of HFC and Marty Yoelson of the park.

### First Bank of the United States Restoration

Opposite the new visitor center on Third Street is the historic first Bank of the United States, an important architectural monument and the oldest bank building standing in the nation. Bicentennial funds were used to restore the exterior of this stately but deteriorating edifice.

The first Bank of the United States was the brainchild of the famous first secretary of the treasury, Alexander Hamilton. Modeled after the Bank of England and authorized by the first Congress under the Constitution, it gave the new nation a central banking system. In Hamilton's plan, it was an important tool for strengthening the central government and fostering the fledgling nation's economic development.

Commercial banks had already been chartered in Philadelphia, Boston, New York, and Providence before the act chartering "The President, Directors and Company of the Bank of the United States" was signed into law on February 25, 1791. By October 1 of that year the capital had been subscribed and the first stockholders' meeting convened to elect officers. The doors opened in Carpenters' Hall under a leasing arrangement on December 12. By 1794, having weathered financial crises, a yellow fever epidemic, and much hostile criticism while giving complete satisfaction as an engine of commerce, in regulating the currency, and in providing the government needed services, the bank was ready for a permanent home. That February the directors bought a strategically located lot in the same block as Carpenters' Hall and only a few doors down Third Street from the secretary of the treasury's offices at the corner of Chestnut Street. According to an advertisement for builders' bids in June 1794, plans were already drawn. Work probably began that summer; by 1795 the cornerstone had been laid and in November of that year arrangements for purchase of the roof's sheet copper were being made. Yet execution of the highly ornate Pennsylvania blue marble work of the facade by C. F. LeGrand and Sons and completion of the interior dragged on through 1797. Unwilling to wait longer, bank officials took possession and opened the doors on July 24 of that year.

The building's architect was Samuel Blodget, Jr., a veteran of the Revolution and something of a promoter. His design was hardly original, for the facade is a near-replica of Dublin's old exchange building. An 1811 guidebook succinctly describes this new symbol of the country's struggle for financial independence:

[This] was the first public building ever erected in Philadelphia with portico and pillars. It is a square structure 96 feet in front and 72 deep. The east front on Third Street consists of six columns, the angle pairs being coupled. The front wall extends beyond the portico, on each side, in two wings, and is ornamented with pilasters. The columns, which are of the Corinthian order, are of marble. The cornice and pediment are of wood work, highly enriched. The tympanum is decorated

with the American eagle. The sides and rear walls are of brick. The roof is covered with copper.

This noble pile exuded the air of confidence that then pervaded the bank's management. It was greeted with encomiums of "superb," "majestic," "magnificent," and "elegant" and was called "the first important building of the classic example erected in this country." Benjamin Latrobe, the first professional architect to express an opinion, proclaimed it to be "a bold proof of the spirit of the citizens who erected it."

In 1797 the bank was at its zenith as a catalytic agent for business. In 1800 the Federalists were unseated by the Jeffersonians, less sympathetic to its purpose. The bank lived out its 20-year charter, but Congress refused to renew it in 1811. In the liquidation that followed, Stephen Girard, a Philadelphia merchant, acquired the building and established his own private bank there in time to rescue a desperate U.S. Treasury during the War of 1812. On his death in 1831, the building and grounds passed to the city of Philadelphia as one property of the Girard Estate. While under the commissioners of the Girard Estate and later the Board of City Trusts, the building was rented first to a new Girard Bank, and later the Girard National Bank, which vacated the premises in 1926. It was an American Legion hall from 1930 to 1944. The National Park Service acquired title in 1955 and converted the building to offices and exhibits.

The original plan of the first floor was centered on an east-west axis connecting front and rear entrances. The first floor was open except for space required for offices and depositories and was surmounted by a large barrel vault supported by eight columns. This ceiling and the upper floors were gutted by the Girard Bank in 1902. To better illuminate the main banking room, a rotunda was created with a glass dome and skylight 35 feet in diameter, 44 feet above the floor. Less drastic interior alterations over the decades included some window enlargements, interior shutters, a west circular staircase, an open-cage elevator, and Victorian wood trim. The original stone and brick bank vaults in the cellar and wrought iron doors and gates were left largely intact.

Because of the magnitude of the 1902 work, obliterating original evidence, it was decided to preserve the 1902 interior, although certain problems of reconciling this interior with restored 18th-century doors and windows had to be solved. The 1902 skylight had to be lit with artificial light when the 18th-century roof was reconstructed overhead. The 1902 paint colors were found and largely reproduced; gold metallic paint was used at the rotunda dome in lieu of the original gold leaf. Plans to fully reproduce the open-cage elevator of 1902 proved too costly, and a later closed elevator was modernized. A late carbonized steel vault and partitions were removed from the first floor and the floor was recarpeted. The second floor was renovated for offices, the third floor was renovated for a library, and new security and fire protection systems were installed. A new heating and cooling system of fan coil units and piped hot and cold water caused minimal intrusion on the historic fabric and spaces, including the cellar vaults.

The exterior was relatively unaltered, but badly scarred by time. On the Third Street facade, all deteriorated stone elements were consolidated with a penetrating polymer to strengthen details. Damaged stone was built up and waterproofed with a mixture of epoxy and ground stone composite. The facade was cleaned and coated with water repellent and ultraviolet

shield. Stone stairstep foundations were rebuilt and steps reset. Rusting iron anchors were replaced with hand-forged wrought iron anchor reproductions. The pediment wood cornice, the tympanum, and the mahogany eagle were found to be in remarkably sound condition, requiring only preservative treatment.

The north and south exterior brick walls were repointed and double-coated with water repellent to counteract earlier damage from the mistaken use of acidic wash to remove late-period gray paint. On the west, 1912 and later additions were obliterated and the original entrance, marble steps, iron railing, and extensive portions of the wall were reconstructed.

The original standing seam copper roof on the portico survived and was retained. A new roof of the same details was added over the main block; its new gutters empty into reconstructed downspouts. The original roof balustrade was reconstructed in fiberglass.

Upper level window frames, trim, and wainscot material were largely original and were left intact, but new sash were installed. First floor window frames and trim on all but the east facade had been altered in 1869-1876. The windows were restored to their original smaller size, requiring new frames and sash. Storm sash were added unobtrusively on the interior.

Those playing primary roles in this major restoration were historian John D. R. Platt and historical architects Penelope H. Batcheler and Sally Sweetser, Denver Service Center employees stationed in Philadelphia; Day and Zimmerman Associates of Philadelphia as contract designers, with George Willman as principal architect; P. Agnes, Inc., of Philadelphia as principal contractor; and Bill Wilkinson, DSC, as construction supervisor. Design and construction costs were \$214,817 and \$1,841,540 respectively. The project extended from August 1974 to January 1976.

The First Bank is not merely an architectural museum piece, lending historical atmosphere to the scene as counterpoint to the stark new visitor center across the street. It has utility for both visitors and park personnel. The first floor with its airy rotunda was the setting during the Bicentennial year for a historical drama, "Spirit of '76," enacted three times a week during the peak visitor season. For future use "Opposites in Harmony," a film showing the workings of the Executive Branch during the government's Philadelphia years, was prepared by the Harpers Ferry Center under Carl Degen's supervision. The first floor is also used for receptions or "levees" on special occasions. The second floor contains park offices for curatorial and interpretive personnel, and the third floor now houses the park's valuable research and reference library.

### Second Bank of the United States

One of the most distinctive buildings in the historic district around Independence Square is the Second Bank of the United States. Historically, it symbolizes a bitter political controversy of the Jacksonian Era. Architecturally, it is among America's finest examples of the Greek Revival. In decline following service as a customhouse, it has been restored adaptively as a gallery of portraits of notable figures of the Revolution and early republic.

At 420 Chestnut Street, one block east of Independence Square, is an imposing structure resembling a Greek temple. Its identity as the Second Bank of the United States reflects only its first two decades, for like the

first Bank of the United States, the Second Bank was not rechartered at the end of its initial term (1816-1836).

It was born of hard lessons learned when a partisan Congress and an indifferent administration scuttled the first bank, only to regret it during the War of 1812 and the ensuing economic upheaval. Ironically, the national bank was revived at a time and place not calculated to insure its continuance. During the second decade of the 19th century the country's economic fulcrum shifted from Philadelphia to New York. Entrepreneurial methods and business ethics had taken on a different cast since the heyday of the first bank. The Second Bank became involved in a titanic struggle between two powerful figures, President Andrew Jackson and President Nicholas Biddle of the bank, who championed opposing philosophies. Jackson represented the still-dominant agrarian interests who were deeply suspicious of strong central management in any form, especially by bankers. Other opposition to the bank came from a new class of businessmen who in the 1830s sought a freer and more flexible system of money management.

The Second Bank had scarcely one good decade of operation. Under Speaker of the House Henry Clay's urgings, Rep. John C. Calhoun undertook the fight for its chartering, achieved by a law approved April 10, 1816. It was capitalized at \$35 million, one-fifth subscribed by the federal government. The bank was to be the principal place of deposit for the government and to have whatever branches it should choose to establish. Its role as a quasi-public institution was somewhat akin to that of the Federal Reserve banks today. It issued currency, which was printed in the basement. President William Jones ran it rather carelessly before being succeeded by the more capable Langdon Cheeves, who was followed in 1823 by Biddle, a pioneer industrialist and patron of the arts. Under Biddle's leadership the institution reached the zenith of its power and prestige, operating effectively as "the balance wheel of the banking system," but then fell victim to a political tug-of-war culminating in Jackson's veto of its charter renewal and removal of the federal deposits in 1832-33.

It was during the presidency of Cheeves that the movement to put the institution in suitably imposing quarters got underway. In 1817 the bank acquired three pieces of land on the south side of Chestnut Street. The plans for the new building doomed the Charles Norris mansion, which had witnessed the first reading of the Declaration of Independence across the way on Independence Square. In taking down this notable home, the bank's agents salvaged 300,000 bricks for the new building's vaults.

The bank officials responsible for the project did it in style. They held a design competition for the building, won by William Strickland, a 28-year-old architect with a great future. They were not averse to spending large sums of money: before they were finished they had disbursed more than \$500,000, an immense amount in that day. Construction proceeded from the laying of the cornerstone in 1819 to the completion of the south facade in 1824. Altogether it involved three million bricks, 41,500 cubic feet of marble, 3,000 perches of stone, and 1,485 copper sheets for the roof weighing 17-1/2 tons.

With the completion of the building, Philadelphia had a genuine masterpiece inspiring universal acclaim and much emulation. It was not the first Greek Revival building in the country, but it was certainly the most influential. It had more than any other American building to do with putting churches and banks into Greek temples, nowhere as much as in Philadelphia, soon to be known as the Athens of America. Later it lost some of its luster.

Charles Dickens thought it handsome but mournful: "The tomb of many fortunes, the Great Catacomb of Investment."

Strickland's own description of the building is available:

In the design and proportions of this edifice we recognize the leading features of that celebrated work of antiquity, the Parthenon at Athens. . . . The design before us is of the Grecian Doric . . . having eight fluted columns 4 feet 6 inches in diameter, embracing the whole front. . . . The columns rise from a basement six feet in elevation supporting a plain entablature, extending along the sides of a parallelogram 86 by 160 feet including the body of the building and porticos that project ten feet six inches from each of the fronts. The vertical angle of the pediment is 152 degrees.

Its length including the portico is 161 feet, and breadth in front 87 feet. The floor of the principal or ground story is elevated nine feet, surrounded on all sides by a terrace 14 feet wide, rising three feet, and paved with large flag stones. . . .

The [south] door opens into a large vestibule with circular ends embracing the Transfer and Loan offices. . . . The vestibule ceiling is a prolonged paneled dome divided into three compartments, by bands enriched with Guilloches springing from a projecting impost containing a sunken frette. The pavement is tessellated with American and Italian marble throughout.

The Banking Room occupies the center of the building, being 48 feet wide, having its length 81 feet. . . . Its leading features present a double range of six fluted marble columns 22 inches in diameter at a distance of ten feet from the side walls. . . . The columns are of the Greek Ionic Order. . . .

The whole body of the building is arched in a bomb-proof manner from the cellar to the roof. . . . All the groin arches are girdled at the springing line with iron straps, passing round within the body of the division walls.

With the discontinuance of the Bank of the United States in 1836, the building was taken over by the United States Bank of Pennsylvania, a state-chartered institution that remained afloat only briefly. In 1845 the federal government acquired the building, and for 90 years it served as the Philadelphia Custom House. During this period the exterior was little changed, but the interior was greatly altered to suit the needs of customs. The changes radically affected all rooms but the central banking chamber and destroyed much of the ornamental plaster by William Thackara, who had previously worked on the U.S. Capitol.

In 1939 the Treasury Department transferred the building to the Department of the Interior, whose secretary designated it a national historic site. The Carl Schurz Memorial Foundation became its tenant under a cooperative agreement with the National Park Service. In 1940-41 the Works Progress Administration funded some rehabilitation work, including an abortive effort to restore the north vestibule area. The building was incorporated in Independence National Historical Park after the park was authorized by Congress in 1948. In the 1960s Joseph Petrak and Norman Souder of the NPS Eastern Office of Design and Construction planned and supervised restoration work on the copper roof, exterior walls, terrace coping, and cast iron fencing.



The Second Bank was something of a white elephant for park management because of its size and awkward interior plan, and because it is outside the park's 1774-1800 focal period. What to do with it? The Bicentennial planners came up with an answer: rehabilitation, limited restoration, and adaptive use as an art gallery, primarily for the park's magnificent collection of portraits by Charles Willson Peale. Architectural research and design work was entrusted to the Philadelphia branch of the Denver Service Center and involved historical architects Lee H. Nelson, A. Craig Morrison, and Penelope H. Batcheler.

Cleaning and brightening up the rather forbidding old mausoleum for exhibit purposes was done under two contracts. In 1971, the A. Raymond Raff Company of Philadelphia was awarded \$923,378 for general structural rehabilitation, including removal of late-period fabric and installation of conduit, new plumbing, electrical and atmospheric controls, a fire detection system, and a service elevator. During the demolition phase the architects obtained data on the original layout and decor from extensive study of long-concealed areas. This preparatory work, supervised by Gordie Whittington, was completed in 1972.

The second contract, awarded to J. S. Cornell & Son, Inc., of Philadelphia for \$489,000, consisted mainly of finish work and refinements, including repair and restoration of exterior masonry, restoration of brownstone terrace paving, and restoration of the north vestibule and all marble fireplaces, iron and mahogany doors, interior paint colors, and interior shutters. Other work included repairs to or restoration of stairwork, ornamental plaster, ceramic tile, and marble floors. Specialists in molding plaster were employed in the decoration of the restored north vestibule. Among modern additions were a security system, lighting fixtures, double-glazed sash, carpeting, and exhibit stands. Howard Glifort served as project supervisor and Sam Guy as contract administrator on this project, completed in March 1974.

The Harpers Ferry Center handled the final task of designing, assembling, and installing the art exhibit under the direction of Walton D. Stowell. The 185 paintings that now occupy the gallery illustrate the human side of the tumultuous period that saw the attainment of national independence. William Rush's masterpiece wood sculpture of George Washington and Peale's portraits of noted men of his day form the nucleus of the impressive collection owned by Philadelphia after 1876, turned over to the NPS in 1951, and now finally displayed in a worthy setting.

The opening of the gallery on October 14, 1974, was timed to fall on the anniversary of the First Continental Congress's Declaration of Rights and Grievances, which served notice of the colonies' discontent to King George III. The paintings range over an 86-year period, beginning with a 1750 likeness of portly William Allen, first mayor of Philadelphia. They include Thomas Sully's flamboyant "Lafayette," Henry Inman's "William Penn," Ralph Earl's "William Floyd," James Sharples's "James and Dolley Madison," and 95 works by the Peale family.

The portraits are grouped on the first and second floors by subject: signers of the Declaration and the Constitution, officers of the Continental Army, foreign dignitaries, American statesmen, War of 1812, artists and scientists, and Pennsylvanians not otherwise classified. The focal works are by Rush and Charles W. Peale. Rush's forceful life-size statue of Washington is a landmark work by the father of American sculpture. The fine Peale portraits honor the artist himself as well as his subjects, for he



originated the idea of such an art gallery and displayed his handiwork at one time on the second floor of Independence Hall. Martha Washington, Robert Fulton, "Baron" Johann de Kalb, John Adams, John Paul Jones, "Light Horse" Harry Lee, and "Mad" Anthony Wayne are among the luminaries represented. Unfortunately missing are contemporary portraits of Andrew Jackson and Nicholas Biddle, the titans who locked horns over the fate of the Second Bank of the United States.

The Harpers Ferry Center spent \$160,000 on the installation. A similar amount spent by DSC for research and design plus construction costs brought the total price tag for this Bicentennial project to about \$1.7 million.

A beautiful portrait gallery guidebook in color, Faces of Independence, was prepared by John C. Milley, park curator.

### City Tavern Reconstruction

The Bicentennial reconstruction of City Tavern on Second Street has brought back to life a building that had vital associations with the American Revolution. Here was the meeting that led directly to the formation of a colonial union to oppose the British and to grope toward independent nationhood. Here gathered the immortals who presided over the birth of the republic.

Philadelphia in 1772 was the "Queen City of the Continent." Its population of 30,000 made the capital of the Province of Pennsylvania the largest city in North America. Its harbor launched cargoes for the world, and its pebblestone streets, brick sidewalks, and public street lighting made it a model of civic planning. The situation was ripe for the erection of a "large commodious tavern" where dining and sleeping accommodations would be incidental to social and cultural purposes, a kind of informal civic center for the leading city of the colonies. More than 50 of "the principal gentlemen of the city" banded to subscribe funds for the tavern, appointing seven of their number as trustees to supervise its construction and management.

The chosen lot, the northeast corner of the block bounded by Walnut, Second, Moravian, and Dock streets, was an ideal location near quality shops, markets, and the elegant homes of prominent citizens and a short walk from the busy waterfront. The land was leased from Samuel Powel, and master carpenter Thomas Proctor, who would become a major general in the Revolution, was evidently engaged as designer and general contractor. By September 1773 the building was completed and available for a tenant-manager whom the trustees might designate to move in the needed furnishings and start business. In advertising for a qualified tenant, the proprietors boasted that "this is the most convenient and elegant structure of its kind in America" built "without view of profit, but merely for the convenience and credit of the city." "Little" Daniel Smith, who as the first of a long line of busy tavernkeepers became associated with Revolutionary events, later turned Tory and returned to England.

There are no surviving plans of the building. The only available clues beyond insurance surveys are renderings in watercolor, engraving, and lithography. From them it appears that City Tavern dominated the 18th-century neighborhood. The 3-1/2-story structure occupied two normal house lots, permitting a grand central entrance with staircase on Second Street. It was set back eight feet from the normal building line, lending a plaza

effect. Its overall height enabled lofty ceilings. On the first floor it had a central hall and four rooms, one a "coffee room" and three for overnight guests. On the second floor a "long room" occupied the entire front. The cellar contained the kitchen and a storeroom. A stairway at the rear of the hallway adjoined a piazza. The large lot included a rear yard with the standard washhouse and privy and a driveway to deliver supplies.

The choice of the name is significant because it indicates that the proprietors intended to have the finest tavern in the city. This would be no ordinary public house or tap room inhabited by neighborhood gossips or idlers, but an important center for economic, political, and intellectual exchange. According to NPS historian John D. R. Platt, City Tavern soon became the place "where was enacted the single most important event of the Revolutionary movement in Pennsylvania," on May 20, 1774. This was precipitated by the arrival of Paul Revere the day before with news that the British had closed Boston Harbor in retaliation for the Boston Tea Party. Since the Pennsylvania Assembly had pussy-footed on the issue of resistance, the cause was taken up extralegally by John Dickinson, Joseph Reed, Thomas Mifflin, and others who assembled in the long room in City Tavern and resolved to support Massachusetts in its struggle with the Crown. "By act and deed of a truly revolutionary character," writes Platt, "Pennsylvania was embarked on the road that put this essentially moderate colony in the forefront of the movement that led irresistibly to the meetings of the First Continental Congress at Carpenters Hall and the Second Continental Congress at Independence Hall."

While this act was perhaps the most fateful, there was a succession of historic happenings at City Tavern that elevate it into the class of great patriotic shrines. Virtually all the prominent figures of the Revolution met, ate, slept, or conspired here, among them Washington, Franklin, Randolph, Hancock, and John Adams, the latter with his diaries being a particularly valuable chronicler of happenings at the "New City Tavern." It was this building, and not the State House, to which an express rider from Boston rode to deliver the electrifying news of Lexington and Concord in April 1775. Washington and his officers were feted here en route to and from the theaters of war. Here Washington first met the young Marquis de Lafayette. Fallen heroes of the battle of Princeton were accorded full dress honors here before burial. Here in 1777 was the focus of the first Fourth of July anniversary celebration, including parades, fireworks, and oratory that set an American tradition. A month later, just before the British occupation of Philadelphia, City Tavern became briefly the field headquarters of Washington, who here issued the orders that led to the American triumph at Saratoga.

During the occupation the British took over this patriot den for their purposes, including court-martials in the coffee room, balls on the second floor with Tory belles, and assignations above with anonymous young women attracted by advertisements reading "Extravagant wages will be paid, no character required." The British departed in June 1778, and that July 4 Congress celebrated its return from exile with a grand festival at City Tavern. Later "an elegant entertainment" was given to those young ladies who, in contrast to the above, "had manifested their attachment to the cause of virtue and freedom by sacrificing every convenience to the love of their country."

City Tavern's further involvement in affairs of the young republic while Philadelphia was the nation's capital is also remarkable. Here were

feted foreign ministers and the first president of Pennsylvania when dinner was served to 270 and "a numbing quantity of alcohol" to all including artillerymen, bell-ringers, and crowds assembled on the street. George Washington presided here over the first meeting of the Society of the Cincinnati, composed of veteran officers of the Revolution. Washington was entertained here while president of the Constitutional Convention in 1787 and while en route to New York to become the first president under the Constitution in 1789. Yet this extraordinary building was torn down in 1852 and was all but forgotten for more than a century.

With the approach of the Bicentennial, interest in City Tavern was reawakened among NPS historians, architects, and managers, leading to plans for its reconstruction and refurnishing as a functioning establishment for 18th-century-style wining and dining. Excavations for later construction on the site had destroyed all archeological traces of the building, but research in archival and iconographic sources proved fruitful and resulted in four full-scale reports that enabled an accurate reproduction. The fascinating details of City Tavern's human history are presented in a 1973 historic resource study by John Platt. Park historian Miriam Blimm had gathered basic data for a preliminary historic structure report in 1963; this was used by Penelope H. Batcheler to develop the final historic structure report with architectural solutions in 1973. Park historian Constance V. Hershey produced a furnishing report and plan in 1974.

The final construction drawings, executed by contract architect John M. Dickey of Media, Pennsylvania, provided for an accurate reconstruction of what the visitor sees with design and engineering features necessary for permanence and heavy loads. Thus there are a steel framework and reinforced or cast concrete core walls and flooring. The third floor is finished for management purposes, and mechanical equipment is lodged in the garret. A 2-1/2-story annex that appeared in early prints was also reconstructed as the kitchen for the modern restaurant.

With walls of brick laid in Flemish bond, the reconstructed tavern measures 49 by 46 feet and the kitchen annex 23 by 66 feet. The maximum height from finished grade to chimney top is 65 feet. The Second Street facade, comprising five bays with the three central ones projecting and pedimented, has long steps rising to its centered entrance, a raised basement and water table, belt courses at intermediate levels, and a dentiled cornice above the third story. The enframing of the eight-panel door is made distinctive by a fanlight below the high open pediment, which is supported by carved scroll trusses. Other entrance details include a brass knocker, iron stair railings, and matched foot scrapers at sidewalk level. The front gable over the three projecting bays is accented by a decorative round window at center. The basement windows are arched but all others are squared, with wooden frames and 9-by-12-inch panes four across. There are interior shutters only at front.

The broad roof is shingled, and four chimneys flank the gable ends. At the rear or west elevation, the fenestration is repeated except that the main level door is off-center and the windows have exterior shutters. The distinctive feature here is a balustraded piazza with columns supporting a balustraded deck above, with access door at the second level. The kitchen annex is not architecturally noteworthy except for its street facade, with a paned glass door and transom, bowfront shop windows, and attic dormers.

The floor plan of the tavern and annex is as follows. First floor: entrance hall and stair hall, visitor waiting room, one bar room, two dining

rooms, kitchen area. Second floor: long room, two smaller dining rooms, kitchen area. Third floor: manager's office, employee lockers and restrooms, mechanical space, storage. Cellar: kitchen area, colonial demonstration kitchen, school lunchrooms, public restrooms. Interior details of historical interest include hall center archways; central stairway with squared landings, newels, and balustrades; active fireplaces on north wall, dummy fireplaces on south, all with marble surround and styled cornice, breast, and mantel; painted plaster walls with baseboards and chair rails; wood millwork and glass paneling in bar room. The modern kitchen areas are effectively screened from the historical atmosphere of the tavern.

In the brick and flagstone rear courtyard, accessible to visitors from the piazza, are a reconstructed wood fence, privy, and pump. A service yard is behind the kitchen. Brick paving at the main entrance is in a herringbone pattern. In the summer the front is shielded by a slanted awning.

The construction contract went to the John S. McQuade Company of Philadelphia. Architect Anthony Donald of the Denver Service Center served as project supervisor. The contract with John M. Dickey for final design work and drawings cost \$97,000, and the final construction cost came to \$1,350,000.

All kitchen furniture and equipment was included in the construction contract, but furniture and decorations for the tavern proper were furnished courtesy of Independence National Historical Park with some assistance from philanthropic groups. Historic furniture was reproduced, but many of the pictures, maps, and other wall exhibits are originals. The current contract operation is essentially that of a dining room, bar, and wine cellar of a sophisticated tavern of the Revolutionary period. Typical menu items are West Indies pepper pot soup, meat pies, scalloped oysters, mussels with sweet herbs, hasty pudding, and misickquatosh. Among "spirits of approved nature" are milk punch, "Cyder Royal," sangaree, Madeira, and "Haymaker's Switchel." George and Martha Washington would feel right at home!

#### Independence Square/Old City Hall

Independence Square, Philadelphia, is a mecca for American citizens and other lovers of freedom because of its vital associations with the Revolution and the new republic. The restoration of Independence Hall and related structures, begun haltingly in the 19th century, reached a crescendo in recent years. Bicentennial funds permitted adaptive restoration of Old City Hall--the first U.S. Supreme Court building--to complete the most important preservation project in America.

A campaign spearheaded by the Independence Hall Association led to congressional authorization of Independence National Historical Park in 1948 and its establishment as a unit of the National Park System in 1951. The park has since expanded to encompass the heart of colonial Philadelphia, comprising a number of historic structures now restored or reconstructed. But the great centerpiece of the park is the magnificent structural group within Independence Square. The crown jewel of this group is Independence Hall itself, where the Declaration of Independence was adopted in 1776 and the Constitutional Convention assembled in 1787. It was here, literally, that the United States of America was born.

The buildings flanking the square on the corners of Fifth and Sixth streets, known today as Old City Hall and Congress Hall respectively, would be better known if they were not outshone by Independence Hall. In these two buildings during 1790-1800, the formative years of the republic, sat the legislative and judicial branches of the United States government. Congress Hall housed both the Senate and House of Representatives, and Philadelphia's City Hall accommodated the Supreme Court. (Old City Hall was "New City Hall" in 1790, being constructed that year to replace a predecessor; it gained its present name when replaced in turn in the 19th century.) The substantial restoration of other units of the complex having been accomplished earlier, Old City Hall remained for attention as part of the Bicentennial program. Coming last, it benefited from the experience gained from the work on its neighbors.

Old City Hall is important as a "first" in the history of American jurisprudence and it is important architecturally as part of the balanced Independence Square group. But it cannot be understood without a glimpse at the history of Independence Hall. This handsome two-story brick building, more than 100 feet long with decked gable roof and big central tower, was among the most ambitious architectural undertakings of the colonial period. It was built between 1732 and 1757 as the State House of Pennsylvania. Two first-floor chambers, each 40 feet square separated by a hallway 20 feet wide, and a long gallery on the second level served provincial needs until 1774 when Philadelphia became the assembly point for delegates from the rebellious colonies. The First Continental Congress met in Carpenters Hall, but the Second Continental Congress of 1775-76 accepted Pennsylvania's offer of the State House for its momentous deliberations.

All along there were wings on both sides of the State House that were used by the province or the city. The idea of building beyond these, on the corner lots, was conceived in 1736 when the Pennsylvania Assembly resolved that ground for city and county buildings "of like Outward Form, Structure and Dimensions" be acquired to fulfill pioneer civic planner Andrew Hamilton's visionary concept of a grand integrated government center. Title was not secured until 1762, and then the Revolution intervened. Work finally began on the matched buildings in 1789, the county courthouse on the west being completed in 1790 and the city hall on the east in 1791. No sooner was the plaster dry than the reconstituted U.S. government was invited to occupy these two buildings until 1800, when by law it was required to move to its permanent location on the Potomac. Thus the county courthouse became Congress Hall, and the city hall became the seat of the Supreme Court. Before occupying the latter in August 1791, the court briefly used the west room in the State House.

The architectural history of Old City Hall is well documented. The state legislature chartered a new city government on March 11, 1789, and then passed an act to raise \$8,000 through a lottery to plan and construct the building. Henry Hill, wine merchant and trustee of Benjamin Franklin's estate, is identified as the designer of the matched buildings, and master carpenter David Evans is believed to have been the principal builder and supervisor.

As restored to its original form, Old City Hall, measuring 50 by 67 feet, is a two-story Georgian brick block on a raised stone base. A slightly projecting pedimented bay with main entrance is centered on the north facade, a five-sided bay projects on the south, and an octagonal cupola rises from the hipped roof. There are five chimneys with molded coping. A

modillion and dentil cornice and a stone belt course extend around the building. The central doorway has a stone base, pilasters, capitals, an arch with molded keystone, and wooden double doors surmounted by a fanlight. On the second floor above the main entrance is a window opening carried down to the floor, apparently intended to open on an unbuilt balcony. All windows have 24 12-by-6-inch panes. Those on the first floor have circular heads; those on the second floor are rectangular.

An eight-foot-wide north-south hallway extends about 26 feet from the entrance on Chestnut Street to the door of the Mayor's Court, which was taken over by the U.S. Supreme Court. This is the most impressive room in the building, a chamber 38 by 46 feet with balcony and a platform for the judicial bench in the large bay. To the left of the main entrance is a smaller room, the City Treasurer's Office. Just inside and to the right of the entrance is a large open newel staircase with second floor landing leading to the garret, finished with open brackets, turned bannisters, and large rails. The stairwell measures 16 feet square at bottom. On the second floor an eight-foot-wide hallway extends 45 feet from the north central window to the door of the Common Council Chamber. Here are also the Select Council Chamber and two small offices.

The original Supreme Court consisted of six justices, clerk, marshal, counsel, and juries. John Jay was the first chief justice, followed by Oliver Ellsworth. The associate justices appearing here initially were William Cushing, James Wilson, Thomas Johnson, John Blair, and James Iredell. Among those appearing before the court while it sat in Old City Hall were Edmund Randolph, Alexander Hamilton, Aaron Burr, and John Marshall, the future chief justice.

Aside from the Judiciary Act of September 29, 1789, a body of written political and judicial theory, and the body of law and practice of the mother country supplemented by colonial appellate experience, the justices had little but their minds and imaginations to work from while meeting in Old City Hall. Here began the evolution of a body of decisions that have established the meaning of the Constitution, the laws and treaties enacted under it, and the place of the court. Here were considered the first Supreme Court case to be acted on, Van Staphorst v. Maryland, and the first to be brought to decision, Chisholm v. Georgia. Here the court first heard arguments respecting the constitutionality of an act of Congress, in Hylton v. United States. In Ware v. Hylton it asserted the supremacy of federal over conflicting state laws, and in Calder v. Bull it warned that state legislation opposed to the Constitution would be declared invalid.

In 1800 the building assumed its originally intended use. After the municipal government moved to the present city hall at Broad and Market streets in the 1890s, Old City Hall housed various private organizations until 1917. The fabric was altered to accommodate changing uses: the staircase was relocated; doors were blocked up and windows were broken out to create new doors; partitions, including the brick load-bearing one on the first floor, were removed and new ones installed so that only the Council Chamber on the second floor retained its original dimensions. The roof and cupola had been replaced after an attic fire of 1823. Despite such alterations, the Philadelphia Chapter of the American Institute of Architects in a 1916 investigation found the building's shell, framing, and portions of interior decor almost intact. The AIA prepared drawings that served as the basis for the generally accurate restoration of the building under the direction of the city architect in 1921. Surviving elements of

Old City Hall served also to guide later restoration of its companion, Congress Hall.

The history of restoration efforts for the entire Independence Square complex, completed with Bicentennial work on Old City Hall, must constitute a major chapter in any history of preservation in America. The entire square narrowly escaped demolition in 1818 when the state legislature authorized sale of the obsolescent buildings to raise money for a new capitol at Harrisburg. The Philadelphia City Council decided to purchase the complex for \$70,000. The triumphal tour of the Marquis de Lafayette in 1825, including a visit to Independence Hall, seems to have been the catalyst that awakened a conscious preservation movement, of which William Strickland's rebuilding of the State House steeple in 1828 was the first visible milestone. But it was not until the advent of the Centennial in 1876, when Independence Hall was the setting for a giant celebration, that more serious thought was given to positive action, leading to the first effort to restore the Assembly Room. In 1895-1900 and again in 1912-13 patriotic groups and the city cosponsored restorations of Congress Hall and Independence Hall. These measures fell short of modern standards of accuracy and stability, leaving the National Park Service to complete the restoration of these buildings between 1951 and 1972. But the 1921-24 restoration of Old City Hall by the AIA was sufficiently thorough and accurate that only a few refinements were later needed.

NPS historians Sydney Bradford, David Kimball, and others followed the research groundwork laid by the AIA with more penetrating studies. In 1961 historical architect Lee H. Nelson sifted the data and structural evidence to complete the basic historic structure report. Between 1962 and 1967 the NPS Eastern Office, Design and Construction, directed the stabilization and restoration of the cupola and general roof structure, and the building was tied into the new power distribution system for the square. In 1970 Nelson updated his recommendations, which became the basis for construction drawings by Frank Welsh under the direction of Penelope H. Batcheler.

In 1973 contracts were awarded to Kling-Leopold, Consulting Engineers, and A. Raymond Raff Company, both of Philadelphia, for final engineering and construction work. Following are highlights of work accomplished from March through December 1974:

1. The only exterior work required consisted of new downspouts, spot-pointing and water-sealing the brickwork, and repainting all trim.
2. Updated research justified removal of partitions left by the AIA to restore the Select Council Chamber space on the second floor. Such research also permitted the accurate restoration of original fireplaces.
3. All flooring was relaid with random-width tongue-and-groove new yellow pine, width and patterning being determined by evidence of nailing on the original joists.
4. Ornamental plasterwork included restoration of a beautiful ceiling medallion in the Common Council Chamber on the second floor, originally built after the 1823 fire.
5. Doors, windows, and light fixtures were repaired and refinished with appropriate antique hardware. All interior wood trim was repainted in original colors, and simulated whitewash was applied to the plaster walls.
6. Staff restrooms, public restrooms, and mechanical equipment were installed in the basement.
7. A complete new atmospheric control system with required ductwork and electric wiring with independent circuitry for new Bicentennial exhibits



was installed.

Because of inadequate data on interior furnishings and decor, it was decided not to attempt restoration of the Supreme Court scene or the municipal offices. Instead, Old City Hall was converted to a museum with two major themes: the Supreme Court, and aspects of the city of Philadelphia from 1775 to 1800. In the large south room on the main floor is a sound and light show about the Supreme Court decade, with some stage settings. Secondary exhibits consist of broadsides (period newspapers) on the walls and an exhibit sorting out the occupancy of Independence Square buildings by city, state, and federal agencies during the 18th century. Second floor exhibits illustrate contemporary street scenes and interiors and various aspects of Philadelphia life in the 1790s.

The consulting engineers were paid \$16,000, and the construction contract came to \$395,800. The exhibits, from the Harpers Ferry Center, cost \$288,000. Denver Service Center costs came to \$150,000, for a total Bicentennial investment of \$850,000.

#### Deshler-Morris House Restoration

In the old Philadelphia suburb of Germantown stands the Deshler-Morris House, a structural complex dating from the 1750s to the 1880s, which has been restored primarily to the period of 1793-94 when it was the temporary residence of President Washington--the first "summer White House." Nineteenth-century additions depict the architectural evolution of a prosperous American country house.

The National Park Service acquired the Deshler-Morris House at 5442 Germantown Avenue in 1948 by donation from Marriott C. and Elliston P. Morris, whose family had held it for more than a century. The following year the Service entered into an agreement authorizing the Germantown Historical Society to maintain the property as a historic house museum, an arrangement continuing to this day. In 1951 the NPS undertook limited restoration, mainly some repaneling and exterior patching. The Bicentennial provided opportunity to undertake more comprehensive restoration of the property, an unusual architectural calendar.

When comprehensive research began in 1972, the structure was believed to have two components dating from 1772 and additions from the 1850s, the 1880s, and 1909. New research disclosed that the kitchen wing of the main 1772 section was in fact built about 1752. The significance of the building can best be understood from the roles of its owners and occupants in the perspective of Germantown history.

Founded in 1683 by Dutch and German Rhinelanders responding to William Penn's invitation to migrate, "German Town" emerged in the 18th century as a thriving commercial and manufacturing town. Pleasantly situated six miles northwest of Philadelphia, it also became a country retreat for prominent merchants of that metropolis who built many of the handsome stone residences of Georgian style that survive in today's Germantown.

One of these prosperous squires was David Deshler, of German extraction, who bought his two-acre tract in 1751 and built a two-story stone structure for summer use. In 1772 he built a larger house fronting the avenue, 2-1/2 stories of stone with stuccoed finish. This was a residence of elegant design that according to tax records was deemed superior to many of its neighbors.



On October 4, 1777, Germantown achieved fame as the setting for a furious battle between entrenched British troops and George Washington's Continentals. The climax of the fighting occurred at Cliveden, the Benjamin Chew mansion six blocks north of the Deshler residence. Failing to take this improvised fortress, the Americans retreated with heavy losses, and British General Sir William Howe took over the Deshler place as his headquarters. Although serving as Howe's residence only one week before he retired to Philadelphia, the Deshler House's role as a British command post promptly became the stuff of legend.

In 1792 Deshler sold the property to Col. Isaac Franks, who rented his home to the first president of the United States in 1793 and 1794. A yellow fever epidemic in Philadelphia, then the nation's capital, stimulated a flight of government officials to the more healthful countryside, and Washington found Colonel Franks's house "commodious for myself and the entertainment of Company." Several cabinet meetings took place in the house, with Jefferson, Randolph, Hamilton, Knox, and others of renown in attendance.

While residing here only two weeks in November 1793, Washington rented the house for two months during the summer of 1794 to escape the heat and fevers of the city. During this stay Martha and their two adopted grandchildren were present, and Washington had one of his famous portraits painted by a famous neighbor, Gilbert Stuart.

From 1802 to 1834 the property was owned by Elliston and John Perot. The Morrisises acquired it in 1836 and built the additions noted over three generations to accommodate growing families and add more modern refinements. The last was in 1909, when masonry extensions in matching stucco were built on the north wall to provide luxurions bathroom facilities on each of the three floors.

In preparation for the Bicentennial, historian Anna Coxie Toogood completed an impressive report on every aspect of the Deshler-Morris saga. The building sequence is traced in intricate detail, a 1793 inventory by Colonel Franks is presented as evidence for furnishings during Washington's stay, and the probable appearance of the grounds and outbuildings is documented. The principal historical architect on the project was Michael Adlerstein. In the later stages of planning, including analysis of hidden fabric and archeological evidence, Adlerstein's work was supplemented by that of Peter Snell. Snell was responsible for analyzing paint layers and determining period decorative finishes as well as for monitoring the painstaking restoration process.

Because of the pressures of the Bicentennial completion deadline, the normal sequence of architectural analysis, preliminary design work, project planning, and restoration work had to be telescoped. The situation was critical also because of philosophical differences between professionals and management over restoration objectives that had to be resolved promptly.

The architects determined that the main 1772 section, approximately 36 feet square, was relatively unchanged; modifications consisted primarily of a pair of 1839 dormers at attic level, ventilators, metal roof, chimney caps, and exterior louvered shutters. The interior room arrangement and visible fabric was essentially unchanged, with a central corridor, dining space, formal living room, and informal sitting room. Matching spaces on the second floor included the traditional bedrooms of George and Martha Washington. The original 1752 structure, 16 by 32 feet and two stories high, was made of rubble stonework covered with coursed stucco imitating cut stone. In their examination of the 18th-century units to decipher the

chronology of construction alterations, the architects used new X-ray techniques to avoid damage to historic fabric.

The 1850s and 1880s sections are both two stories high, of hybrid rubble, brick, and frame elements, with many modifications. These and the 1909 appendages, while not architecturally distinguished, reflect family needs and tastes evolving over a century. The architects felt that the post-1772 accretions did not detract essentially from the beauty and historical significance of the house. They recommended full restoration of the 1752 and 1772 units to the period of Washington's residency and exterior restoration of the 19th-century additions, with adaptive use of a kitchen. The 1839 dormers would be retained. The rear portion of the 1909 bathroom tower addition would be demolished because of its conflict with 18th-century elements, but the 1909 section adjacent to the main house would be retained because it was not visually obtrusive and would serve important auxiliary functions for visitors and staff.

The park superintendent and regional director disagreed with plans to retain the dormers and the 1909 front section, and after extensive debate including involvement of the Federal Advisory Council on Historic Preservation, their view prevailed. The rationale for the selective demolition was frontal emphasis on the period when "Washington slept here."

The final product is pleasing and inspirational. In the immediate setting of distinctively landscaped grounds and the larger setting of a neighborhood complemented by other period structures, the facade of the Deshler-Morris House gives an impression of the graceful relaxed gentility of the late 18th century. Notable exterior features are the 24-pane windows, massive main entrance, fine stucco work, shingled roof, and symmetry of the street facade. The interior is notable for its hand-grained woodwork, paneling, English transferware and Delft tile, Pennsylvania marble fireplace, comfortable staircase, broad hallway, and contemporary color scheme.

The construction contract, in the amount of \$427,000, was of the standard bid type. The contractor was R. S. Cook Associates of Philadelphia. Jacob Tothero was project supervisor, assisted by historical architect Richard Wolfe. The contract was awarded on February 25, 1975, and final inspection took place on January 24, 1976. The total project cost including research, design, drawings, and construction supervision came to \$650,000.

The restored house has been refurnished in accordance with an updated plan by Doris Farnelli, curator on the Independence National Historical Park staff. Many antiques and paintings have been donated by the Morris family or loaned by the Philadelphia Academy of Fine Arts, the Philadelphia Art Museum, and the Deshler-Morris House Women's Committee of the Germantown Historical Society.

Site integrity has been assured by park ownership of the adjoining historic Brighthurst House, donated in 1963 by the Germantown Savings Fund Society. In the future this building too will be restored and adapted for use as a facility for park personnel and visitors.

## KINGS MOUNTAIN NATIONAL MILITARY PARK

### General Redevelopment

At Kings Mountain, South Carolina, a small volunteer army of sharp-shooting frontiersmen achieved a decisive victory over British Loyalists on October 7, 1780. This was the beginning of the decline of British fortunes in the South that led to surrender at Yorktown a year later. New and expanded facilities provide vivid interpretation of this dramatic turning point in the Revolution.

"The Battle of Kings Mountain." It wasn't a real mountain and it didn't belong to the king. As battles go it was a small affair, with about a thousand men on each side. What's special about it?

It was a pitched battle, fought with great ferocity to the death, and when it was over the revolutionaries, for the first time in five years, could see light at the end of their tunnel. Despite some signal American victories like Trenton and Saratoga, the British were still in possession of New York City and much of the southern states, and there could be no independence until their forces were vanquished. Kings Mountain began the sequence of events that led to further British losses at Cowpens and Guilford Courthouse and Cornwallis's final withdrawal to Virginia.

Kings Mountain is significant also for highlighting the fact that the Revolution was a kind of civil war as well as a war against Britain. Here there was only one British soldier in the whole crowd, Maj. Patrick Ferguson of the King's Rifles. He commanded 1,100 colonials loyal to the Crown, 100 of them Provincials from New York and New Jersey and the rest Tories from the Carolinas. Their opponents were principally "over-mountain men" from eastern Tennessee and the Carolina highlands who reacted energetically to Ferguson's threat that "he would march his army over the mountains, hang their leaders, and lay their country waste with fire and sword."

Kings Mountain is a wooded ridge or hogback in the oak/hickory forest belt of the Appalachian foothills, only a short distance below the North Carolina line. Once remote, it is now readily accessible on State Route 216 three miles south of its junction with Interstate 85 between Charlotte and Spartanburg. The national military park was authorized in 1931 and became a National Park Service responsibility in 1933. Until recently development consisted primarily of a small stone visitor center and a trail around the battlefield, marked by a large obelisk, the American Victory Monument. With an eye on the Bicentennial, in 1971 planners recommended construction of a larger visitor center with ample parking in a more logical location, renovation of an old amphitheater, a new trail network, and some road realignment. It was felt that these improvements were required to accommodate increasing attendance and to do justice to the powerful theme of this crucial battle.

Kings Mountain must be understood to be appreciated. Historian Edwin C. Bearss of the Denver Service Center has set forth the facts. British victories in Georgia in 1779 and at Charleston in early 1780 led to spirited recruitment of local Tories into militia brigades to augment the Provincials. Under Ferguson they invaded the western Carolinas to camp out

Patriot resistance there. Instead the "mountain men" of the Watauga settlements, reinforced by "Whigs" from North Carolina and Virginia, resolved to stamp out the Loyalists. They had that opportunity when they learned that Ferguson was encamped on Kings Mountain. Led by Virginia Col. William Campbell, Tennessee Cols. John Sevier and Isaac Shelby, North Carolina Col. Benjamin Cleveland, South Carolina Col. James Williams, and other officers, they determined to attack him there before he could be reinforced by Cornwallis's regulars. After a forced night ride they surrounded the hogback ridge and swarmed Indian-fashion up its steep slopes, dodging behind rocks and trees and picking off Loyalists with their Kentucky rifles. Twice repulsed by bayonets, the Patriots finally secured the summit. The Loyalists surrendered, their will sapped by frightful casualties including the death of Ferguson.

The battlefield, one of the bloodiest of the Revolution, is well defined topographically. A hike around its base and over the crest to the British encampment, surrender site, and Ferguson's marked grave is a stimulating experience. The 1.4-mile trail from the new visitor center has been realigned and hard-surfaced for the better accommodation of visitors, including elderly and handicapped. In addition to older interpretive features such as the monuments and grave plaques, there are now wayside exhibits with imaginative paintings and audio stations interpreting harrowing details of the battle action and its aftermath.

While the historic terrain with its interpretive trail is the heart of the visitor experience, the new layout is designed to insure an introductory stop at the new visitor center. The old center on the west side of the mountain has been reconverted to park headquarters. The new center is on the southeast side, where a realignment of Route 216 permitted construction of a 100-car parking area.

The new building is located inconspicuously on a wooded slope beyond a meadow adjoining the parking area. It is sited back of the tree line with an entry ramp from the open space. The design is unpretentious and unobtrusive to detract as little as possible from the natural setting. An irregular plan articulates the various functional areas and assists the purpose of camouflage by allowing wooded areas to penetrate between building elements. Low elevations and the use of quarry stone, laminated wood beams bleached to a weathered tone, and a shake roof further reduce the impact of the structure and contribute to an appearance of naturalness.

The single-level floor space of 7,000 square feet was planned to be a direct representation of the visitor experience, enhancing the visitor's understanding and ease of movement through the various interpretive functions. It was conceived as a linear structure parallel to natural ground contours, a central spine to which the interpretive functions were attached. This linear path begins at the parking area and leads up a quarry stone and bluestone ramp to the building's entry where it is turned onto the building's main spine, that being echoed by an overhead wood lighting grid. In the first space of this progression, the lobby, is a freestanding information counter of pedestal design, its parts linked by a laminated wood rail. Off the lobby and opposite each other across the building spine are two alcoves, one for sales of park literature\* and one for visitor seating and staging

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\*The sales area was later expanded and moved to the back of the lobby--ed.

complemented by a battle scene diorama. Each reflects the building's unity in its common detailing of a quarry stone and bluestone bench/display case.

Next on the visitor's agenda is the auditorium. Its 125 seats and sloping floor are on the down side of the building spine reflecting the natural site slope. Quarry stone walls and a sloping laminated wood ceiling channel the audience's eyes toward the projection screen. The film shown dramatizes the circumstances leading to the battle and its consequences.

Still further along the building spine are the program and program vestibule areas. The linear vestibule with exhibits down one side leads the visitor into the 2,000-square-foot program area, which concludes the visitor's path through the building. This area features a sound and light production using life-size figures to reveal the diverse cultures of the people living in the region in 1780.\* After the program the visitor exits to a large court that leads to other park features.

A secondary improvement was the upgrading of the old amphitheater, a relic of WPA days consisting of an earthen stage area with a background of trees and an open grassed area for audiences. The 20-by-40-foot stage is now enhanced by a 10-by-10-foot rear projection screen and storage space and wings to facilitate live performances. Permanent seats of heavy wood sections accommodate up to 300, and there is ample overflow space for special occasions. Paved walks with indirect lighting bollards permit access to the amphitheater from the visitor center or directly from the parking lot. The facility is used for daytime and evening interpretive programs.

Landscaping of the new visitor center/amphitheater complex is simple in design with emphasis on indigenous plant material (red maple, hickory, dogwood, holly, tuliptree, sourwood, oak, native hydrangea, mountain laurel) for a subtle transition from manmade structures to the wooded historic ground. In addition to upgrading the 1.4 miles of historic trail, the Bicentennial program added 25,000 feet of unpaved nature trail and 14,000 feet of horse trail, both of the latter connecting with the adjacent and complementary Kings Mountain State Park. New utilities include a waste water treatment plant and a water main connection to existing reservoirs.

The prime contractor for planning was CLPC (Comprehensive Land Planning Consultants) of Hilton Head, South Carolina, with Edward Pinckney as principal and Jim Tiller as project manager. The principal subcontractor for building design was Six Associates of Asheville, North Carolina, with Michael Russell as principal designer. The total cost of contract planning was \$116,000. The overall construction contract was awarded to Laxton Construction Company of Charlotte, North Carolina, for \$1,498,000. Darrell E. Stiger of the Denver Service Center was A/E manager for the entire project, while Russell Curtis served as construction supervisor. At the Harpers Ferry Center, Alan Kent provided interpretive guidance for the project, Ray Price coordinated wayside exhibits and audio messages, and Bruce Geyman, Rick Strand, and Rick Krepela handled interpretive elements in the visitor center.

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\*This program proved unsatisfactory and was removed--ed.

## MINUTE MAN NATIONAL HISTORICAL PARK

### Battle Road Visitor Center

At sunrise on April 19, 1775, British troops ordered to seize arms and ammunition stored by rebellious colonials clashed with minutemen at Lexington and Concord, Massachusetts, then retreated under fire to Boston. The bloodshed of that day marked the beginning of the shooting war that culminated in American independence. The running battle and its fateful consequences are described in a new visitor center on the historic Battle Road.

Minute Man National Historical Park, established in 1959, covers about 750 acres in three discrete units: the Battle Road Unit, a four-mile corridor along State Route 2A between Lexington and Meriam's Corner; the North Bridge Unit in North Concord; and the Wayside Unit in East Concord. The latter, although acquired primarily to preserve the home of 19th-century literary figures, has colonial and Revolutionary War associations. The North Bridge Unit is the setting of the famous bridge with the minuteman statue and several historic houses, one containing park headquarters. The Battle Road Unit includes sections of the original stone-fence-lined road, sites associated with the event, and a surprising number of buildings that were present during the battle.

In 1775 Boston was occupied by British troops and its port was closed following destruction of imported tea and other seditious acts by the colonials. Gen. Thomas Gage ordered Col. Francis Smith to proceed to Concord with 700 regulars to destroy military supplies being assembled there. Paul Revere and William Dawes brought word to Lexington of the British approach, and at dawn on April 19 a small militia company under Capt. John Parker drew up on the village green to confront the redcoats. A shot of unknown origin rang out, and the British advance unit fired their muskets and charged with bayonets, leaving 18 colonials dead or wounded.

The British proceeded on to Concord, and while some units searched for the stored arms, others advanced to North Bridge, where they found colonial militia units massing on the opposite hill. Seeing smoke and fearing the destruction of the town, the militia advanced. There was an exchange of volleys, and several regulars and minutemen were killed, including Capt. Isaac Davis, the first American officer casualty of the war.

As alerted minutemen drifted in from all points of the compass, Colonel Smith realized that he was becoming outnumbered and surrounded. Thus he began the long, slow retreat to Boston, marked by ambushes that depleted his ranks. The British suffered 73 killed, 174 wounded, and 26 missing; their assailants had 49 dead, 41 wounded, and 5 missing. Instead of going home, many of the rebels began to ring Boston with encampments that would become siege lines leading to full-scale war.

Although some of the original Battle Road has been obliterated by modern road construction, several sections remain and can be followed today. Proceeding from west to east along the British retreat route, Meriam's Corner, where the Lexington Road was joined by the Bedford Road West, is where the sustained attack began. Here, besides the remnant roads, are

Revolutionary Ridge, the Nathan Meriam and Daniel Taylor historic houses, and the Abraham Taylor house site. The Job Brooks house is at the intersection of the Old Bedford Road East. Near the Bloody Angle, where there was a pitched battle between redcoats and minutemen, are the historic road and battleground, Capt. William Smith's house, the site of Sgt. Samuel Hartwell's house, the Ephraim Hartwell tavern and farm, a school house site, and the Joseph house site.

The Paul Revere capture site is west of the intersection of Nelson Road and Massachusetts Avenue. (William Prescott relayed the news to Concord after Revere's capture.)

The Nelson Road group is north of the visitor center, permitting a walking tour from that point. Attractions include the Danforth tavern site, the Whittenmore historic house, the knoll where the Lexington Company fired its volley in revenge for the morning massacre, and the Thomas and Tabitha Nelson house sites. The Bluff-Fiske Hill area, at the east end of the Battle Road Unit, includes the historic road, the Bluff, Fiske Hill where British grenadiers panicked, and the Ebenezer Fiske farm site.

Beyond the Battle Road in both directions are places equally interesting to latter-day patriots. Not in the park but well preserved are several historic places in Lexington, including the village green, the Buckman tavern, and the Hancock house. At the Concord end of the park are the memorial bridge and statue, the John Buttrick house, the Elisha Jones house, and Wright's tavern in downtown Concord.

The park lands are central to the story but by no means tell it all. Celebration of the Bicentennial required some development that would help to integrate the story and relieve the confusion of a park area strung out and interspersed with non-park elements. Planners believed that the locale best suited for this purpose would be near Lexington, where the initial fighting took place.

The new visitor center, easily accessible from the Route 128 beltway and arterial roads, is just off Massachusetts Avenue and west of the Hanscom Field access road, near the Fiske Hill and Nelson Road groups. When fully landscaped it should achieve its purpose as an interpretive island in a restored natural setting imperfectly simulating the environment of 1775. (Imperfectly because of unavoidable proximity to a power transmission line, commuter traffic, Hanscom Field Air Force Base, and an industrial zone!) The master plan contemplates a public transit system from the visitor center to various points of interest, subject to future relocation of Route 2A. Visitors are now free to travel at random over the road, mingling with local traffic, and must rely on markers and map handouts.

From a temporary arc-shaped 120-car parking area off Route 2A, the visitor walks a 900-foot meander to the south-facing visitor entrance, set off by a brick terrace with a flagstaff on the right and a low wall on the left lined with fixed plank benches. The center itself has a square floor plan, 80 feet to a side, which with entrance space covers 6,500 square feet. Walls of vertical cedar board (1x4 T&G) with minimal fenestration and a moderately pitched cedar shake clerestory roof create a barn-like character evocative of rural colonial architecture. At the same time, use of the cedar on the interior walls and extension of the brick paving into the lobby strike a contemporary note. The exterior wood is painted a light buff color, giving a uniform tint, while a clear varnish on the interior walls emphasizes the natural contrasting cedar tones.

The main entrance is a glass expanse with two double doors and flanking

side panels of double-door width. This entrance, a rear emergency exit, and two side windows in line with the clerestory loft are deeply inset, shading the fixed glass panels and reinforcing the barn motif. The nearly symmetrical front elevation is an interesting study in block planes, with the central roof portion in line with the clerestory loft raised above the wings and the rear or auditorium roof ridge raised above that of the front section.

The visitor enters a spacious (1,870 square foot) lobby to find rest-rooms on the right and a sales-information space backed by a local staff office on the left. Forward is an exhibit area with artifacts and graphics of the period and a fiber-optics presentation illustrating the British march and retreat and the locations of key episodes. The twin auditoriums are reached by transept areas illuminated by the high windows. Each seats 100 people viewing a live-action film, "To Keep Our Liberty." The unusual auditorium decor includes scarlet seat covers and on the screen wall a broad jagged scarlet band, conceivably symbolizing the lightning-like sequence of events on April 19, 1775. Visitors may exit a rear door to a walkway returning to the parking area.

The principal designer was Denver Service Center architect Benjamin H. Bideman, assisted by architect Robert Lopenske, landscape architect Robert J. Chamberland, and engineers Jack Kozel, Mario Ramsay, and Dan Pearson. Construction, extending from August 1974 to February 1976, was contracted to Vaghini Construction Company of Sterling Junction, Massachusetts, for \$561,938. Joseph Godfrey was project supervisor and Ray Lee was contract administrator. NPS historians John Luzader, Ricardo Torres-Reyes, Robert D. Ronsheim, and Anna Coxo Toogood conducted research to support accurate interpretation of historic events and sites. Harpers Ferry Center interpretive projects, coordinated by Don Swain and Fred Jessen, totaled \$115,000.

#### Wayside Barn Rehabilitation

The 260-year-old "Wayside" outside Concord, famous for its 19th-century associations with the Alcotts, Hawthorne, Emerson, and other literary notables, also has interesting associations with the outbreak of the American Revolution. Rehabilitation of its ancient barn was a Bicentennial project.

The rambling residence known as the Wayside, so designated by one of its owners, Nathaniel Hawthorne, was thoroughly researched and restored before the Bicentennial and is a prime attraction of Concord and Minute Man National Historical Park. The barn at the property is equally interesting architecturally. Its adaptation for use as a visitor contact station insured preservation of the structure, a rare surviving example of an early 18th-century outbuilding.

It is documented that one Nathaniel Ball had a house here in 1688 and that his grandson Caleb sold this very house and its adjuncts to another party in 1716. Just when it was built is impossible to ascertain. It is also impossible to document that the house and barn were built at the same time, but analysis of both structures, revealing early colonial carpentry, has persuaded historical architects that they are contemporaries. Furthermore, the deed records that begin in 1716 place a barn as well as a house on the property.

Samuel Whitney bought the property in 1769. In 1774 he was elected as



a delegate to the First Continental Congress in Philadelphia. The following January he was appointed muster master for a company of minutemen and was elected to the Committee of Safety to deal with the emergency developing from the British military occupation of Boston. Gen. Thomas Gage was informed that Whitney was a ringleader of the rebels and had seven tons of gunpowder and a collection of firearms deposited in "a warehouse adjacent to the house." There is no evidence that the British raided his property when they occupied Concord, however, or that the warehouse was the present barn.

In 1845 the property was occupied by Amos Bronson Alcott, father of Louisa May. Nathaniel Hawthorne acquired it in 1852, and it rose as a mecca for literati and other celebrities. In 1883 Boston publisher Daniel Lathrop became its owner, and he and his descendants are due credit for its preservation.

Orville Carroll, a Denver Service Center historical architect stationed in Concord, had previously planned the restoration of the Wayside and was assigned to research the barn and design it for adaptive use. It appears that in 1845 Bronson Alcott moved it across the road from its original location, probably reducing its size in the process, and that it was shifted slightly two or three more times with various alterations until 1932, when it settled in its present location next to the road and just 16 feet from the house. The basic structure measures 27 feet by 28-1/2 feet. Its clapboard walls are nearly 13 feet high, and the maximum height to the roof peak is 23 feet 4 inches. A 12-by-17-foot lean-to of the 1890s is at rear. The original structure was built with massive hand-hewn sills, posts, rails, plates, and rafters, and much of this framing remains.

The Bicentennial project leaves the old barn simply preserved, not restored. The exterior is rehabilitated to its 1924 appearance, the late-period clapboard being retained and painted off-white with green trim. A composition roof was replaced with red cedar shingles. The double barn door on the south side is bolted shut. New exterior board and batten entrance doors (matched by new interior aluminum and glass doors) on the east and west replace originals lost through a contractor's error.

New sills replace rotted ones. A new concrete floor replaces the old one and is carpeted. Original beams are exposed overhead. Walls are covered with plywood over offset studs except for a portion of the north wall where original board and post construction is exposed. Lobby walls have pre-finished oak panels. Windows, not original, are unchanged, as is the stairway to the loft, where a plywood floor affords storage space as well as insulation. The lean-to is converted to facilities for staff convenience. There are new mechanical, electrical, and alarm systems.

Visitor accommodations consist of an information and sales counter and an exhibit case on the north side. The south half is given over to a mini-theater with two seating rows and a slide show on the Wayside. Interpretive panels flank the screen and a screen barrier wall helps to darken the area during shows. Rick Strand and Fred Jessen directed the presentation for the Harpers Ferry Center.

Donald E. Hovland of the Historic Preservation Team, Denver Service Center, was project architect and Joseph Godfrey was project supervisor. The construction contract was awarded to T. J. W. Praught Company of West Roxbury, Massachusetts, for \$37,000. Panel exhibits and the audiovisual production by the Harpers Ferry Center cost \$14,000 and \$50,000 respectively, for a total development outlay of \$102,000.

## MOORES CREEK NATIONAL MILITARY PARK\*

### Grounds Improvements

At the old plank bridge over "Widow Moore's Creek," North Carolina, on February 27, 1776, an entrenched band of Patriot militia destroyed a superior force of Loyalists seeking to rendezvous with British regulars. The brief action forestalled early British occupation of the South and helped crystalize the mood for independence. Improved facilities explain the meaning of this victory.

With news of Lexington and Concord the Southern colonists split into two opposing camps: Patriots willing to fight for independence and those remaining loyal to the Crown. Among the latter were the so-called Highlanders, refugees from Scotland after their defeat under Charles Stuart, pretender to the throne. Lured by promises of free land, they and other Loyalist elements of the Piedmont were recruited and organized into battalions, to march eastward to join a British expeditionary squadron on the coast in the conquest of Carolina rebels. The campaign became a double tragedy for the Highlanders, who soon found that they had committed themselves to another lost cause. And it would be the first half of a double defeat for the British, for Moore's Creek was soon followed by the repulse of their amphibious forces at Sullivan's Island near Charleston.

While the Loyalist force of about 1,600 men, commanded by Brig. Gen. Donald McDonald, advanced along the Cape Fear River toward Wilmington, Patriot forces under Col. James Moore moved to intercept them. After a game of countermaneuvers, Patriot contingents under Cols. Richard Caswell and Alexander Lillington numbering about 1,000 took their stand at Moore's Creek, where a narrow timber bridge afforded the only crossing of the dark, sluggish stream winding through swampy terrain. At first earthworks were thrown up on both sides of the bridge, but Caswell changed his mind and withdrew all forces to the east side, at the same time removing the bridge flooring and greasing the girders. At night the Loyalists pounced on Caswell's camp, only to find it deserted. In the dim foggy dawn Lt. Col. Donald McLeod and Capt. John Campbell led their Scots, armed with pistols and broadswords, to attack the rebels on the opposite shore. As they stormed the bridge to the tune of skirling bagpipes, they were met with withering musket and artillery fire. Nearly all the vanguard, including their leaders, were killed outright, and the main Loyalist force fled in panic. In the ensuing roundup Loyalist leaders were imprisoned or banished and recruits were paroled to their homes.

Moore's Creek National Military Park, established in 1926 and transferred from the War Department in 1933, is 20 miles northwest of Wilmington. The ragged pine forest of today probably resembles the vegetative picture of 1776, when the virgin forest had already been violated by timber cutting for bridges, corduroy roads, cabins, and firewood and the extraction of sap for naval stores.

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\*The name was changed to Moore's Creek National Battlefield in 1980--ed.

Before the Bicentennial program, improvements pertaining to historic features of the area consisted primarily of a visitor center, a road to a parking area near reconstructed Patriot breastworks above the bridge site, and short trails to monuments in that vicinity. New Bicentennial improvements involve the visitor center and foot trails.

The visitor center is unchanged structurally, but artifact and graphic exhibits have been upgraded. A new slide show dramatizes the military campaign that led to the Patriot victory. An excellent diorama depicting the violent climax of the repulse at the bridge has been refurbished.

The circulation system to and from the historic ground has been completely revised. The old spur road and parking area has been obliterated. All access to the battle area is for pedestrian (and wheelchair) traffic only. Some 2,500 linear feet of six-foot-wide soil cement trail has been constructed for historical interpretation. The trail loop first follows the historic Black River Road past the Patriot breastworks to the historic bridge site. Along the route are markers, period cannon, and audio messages. At intervals along the return leg are old battle-related monuments, three of them relocated.

Scarlet oak, American sweetgum, and white dogwood were the predominant species used in new plant clusters along the trail. A separate loop nature trail was built in the southeast corner of the park. Recreational facilities and employee residences north of State Route 210 remain unchanged.

Historian Charles Hatch's study of the campaign and historian John Albright's historical base map and grounds study were instrumental in providing basic data required by planners and interpreters. Geoffrey Swan, aided by park personnel, prepared the development concept. Robert Felker and James Kiryakakis of the Denver Service Center did the landscape design work. The construction contract was awarded to the Simon Construction Company of Wilmington for \$90,000. Robert E. Schreffler was the construction supervisor. The Harpers Ferry Center handled museum and trailside interpretation for \$50,000.

Improvements recommended in the 1969 master plan but deferred because of funding and land ownership problems include relocation of the trans-park state highway to the east and south of the area and removal of the old state highway bridge and overhead utility lines. Acquisition of additional land east, north, and west was recommended for highway relocation, enlarged parking at the visitor center, and incorporation of the bridge abutment site and battlefield terrain west of the creek. Planned reconstruction of the bridge was cancelled because research failed to disclose evidence of its design, the land west of the creek remained outside the park, and Coast Guard navigational requirements posed a problem.\* Some feel that the imaginative scale reconstruction of the bridge in the museum diorama sufficiently enables the visitor to appreciate it and its role in the climactic event here.

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\*Land west of the creek was acquired in 1982, and bridge reconstruction plans were proceeding in 1989--ed.

## MORRISTOWN NATIONAL HISTORICAL PARK

### General Redevelopment

During two critical winters of the Revolutionary War Morristown, New Jersey, served as George Washington's headquarters, and its wooded environs held the principal encampment of the Continental Army. Here, amid bitter cold, hunger, disease, and despair, was forged the iron will to achieve in reality the independence proclaimed on paper. Rehabilitated structures in Morristown and a new visitor center at Jockey Hollow assist in commemorating the heroic sacrifices made here.

Morristown National Historical Park, 30 miles west of New York City, comprises some 1,500 acres in three separate parcels: the Ford Mansion area in Morristown, the Fort Mifflin unit near town, and the Jockey Hollow encampment area five miles to the west. The park was established by Congress in 1933, and the National Park Service soon restored the Ford Mansion and built a museum-headquarters building nearby. At outlying areas it developed roads, trails, signs, and markers and reconstructed certain historic features.

Morristown was the place to which Washington retreated with his battered little army after his stunning victories at Trenton and Princeton in December 1776 and January 1777. It was selected because it was well suited for defense, because the position here might deter the British from moving from their New York-New Brunswick base toward Philadelphia, and because the local residents generally supported the Patriot cause. Among them was Col. Jacob Ford, Jr., commander of the Morris County militia, who offered the use of his handsome dwelling in Morristown just before his untimely death on January 10, 1777. The Ford Mansion was thereupon occupied by Delaware troops. Later, during the army's second occupation of Morristown in 1779-80, it became Washington's headquarters and residence. Martha Washington joined him here at that time.

In early 1777 the Continental Army suffered a multitude of plagues that threatened to reduce it to impotence, among them shortages of food and clothing, rampant diseases, desertions, and expiring enlistments of militia units. At one time Washington had barely 2,000 effectives. In the spring, however, new three-year recruitments and the timely shipment of French arms and ammunition restored hope and morale.

Two and a half years later, after Saratoga and the formal alliance with France, the Continental Army returned to Morristown, there to be exposed to the most severe winter weather ever recorded on the mid-Atlantic seaboard. The chief setting for this ordeal was a rugged forest area west of town called Jockey Hollow. Each of 11 brigades built rows of log huts for their soldiers and officers, and there were larger log structures for hospital, orderly, and guardhouse purposes. Historians estimate a total of 10,000 to 12,000 men here at the maximum, occupying 1,000 to 1,200 log buildings of all types.

Blizzard conditions almost destroyed the army once more. Misery was compounded by wretchedly inadequate clothing and provisions, pneumonia and other maladies exacerbated by exposure and malnutrition, and rampant

inflation impeding supply efforts. The crowded hospital and burial grounds testified to the cost of holding the army together between fair weather campaigns.

The primary thrust of the Bicentennial development was to increase visitors' understanding of the significance of the encampment while preserving historic sites and buildings.

At the Morristown unit there was redesign of grounds, area access, and parking; extensive remodeling of the museum building; and new plumbing, electrical, and heating and air conditioning systems in the museum and the Ford Mansion. The revised plan has resulted in a more logical circulation pattern. From a new 66-car parking area visitors now enter the ground level of the museum, converted to a new exhibit area expanding on the theme of the American soldier at Morristown. On the second level they may visit a room devoted to a collection of small arms and cannon of the period, and in an auditorium they may see a new live-action film, "George Washington's Headquarters," focusing on the leadership role of Washington and his officers. The third level is now reserved for curatorial purposes.

From a second level exit visitors move along a walkway to the Ford Mansion. The previous restoration and redecoration of this splendid example of colonial architecture was left intact; only the utility systems were renovated.

The Jockey Hollow unit, five miles from town, has two entrances: one from the east by the Jockey Hollow Road and one from the south by the Tempe Wick Road. From either the visitor may make a loop tour of the encampment area. Aside from the trails, signs, and markers, the most tangible features have been the historic Wick house and a reconstructed log hospital and row of huts at the Pennsylvania Line. Because of changes in forestation, the Revolutionary scene is difficult to visualize today, and extensive archeological work has disclosed only a few chimney remains. Plans to reconstruct additional huts and clear a forested area to restore the Grand Parade were finally discarded in favor of a new visitor center, where aspects of the 1779-80 "log city" could be better dramatized.

The visitor center is located at the junction of the Jockey Hollow and Tempe Wick roads, close to the restored Wick house and farm. From a new 100-car parking area off a new bypass road, the visitor follows a brick path to the center's lobby, receives orientation and views exhibits, exits on a wood chip trail to visit the Wick farm, and boards a shuttle bus to make the loop tour.

The visitor center plan is strikingly unconventional. The walls form a truncated parallelogram enclosing two functional circles. The smaller circle contains visitor restrooms. The other, a large kiosk, has three interpretive elements: an orientation fire pit with a mural of the historic setting, a reconstructed soldiers' hut with appropriate gear, and a small alcove with a film depicting the soldiers' lives here.

The transparency of the glass lobby creates an uninterrupted view of the walkway through the building to the Wick farm. The design concept is strengthened by the use of brick veneer, in vertical stackbond pattern, both internally and externally to define pedestrian areas and guide flow. The impact of the structure on the environment has been reduced by notching it into a natural slope and matching building and paving brick to the grayish brown of the winter woods.

Other new developments include new road and trail alignments, extensive wayside interpretation, and, at the New York Brigade site near the east

entrance, a trailhead parking area and a comfort station repeating the circular elements and brick patterns of the visitor center. Also, hut sites at the Pennsylvania and New Jersey camp sites, revealed by recent archeology, have been stabilized.

NPS historians John Luzader, George Svejda, Lenard Brown, and Ricardo Torres-Reyes contributed variously in recent years to research reports on Morristown structures and encampment sites. Bicentennial archeology was undertaken by Edward Ruetsch of Morristown under a series of contracts totaling \$66,000.

The Denver Service Center and Harpers Ferry Center were principally responsible for the design of the Jockey Hollow developments. Landscape architect Marcus Malik and architect Robert Lopenske were the key designers. HFC contracted with the nationally prominent muralist Jay Matternes for design of the fire pit orientation mural. Grant Cadwallader coordinated interior exhibits, and Ray Price supervised waysides. Jacob Strider Moler produced the films for the Morristown museum and the Jockey Hollow facility.

Architectural and engineering design work for the museum and Ford Mansion was performed under contract by A. V. Colabella, Engineers, of Bordentown, New Jersey. A construction contract in the amount of \$747,463 was awarded to A. M. Gregos of Elberon, New Jersey. The DeVenezia Construction Company of Whippany, New Jersey, provided trails, signs, and landscaping around these buildings for \$28,572. The contract for construction of the Jockey Hollow visitor center and facilities at the New York Brigade site went to Franklin House Building Corporation of Clifton, New Jersey, for \$661,459. William Smith was project supervisor and Ray Lee was contract administrator for all this work.

Contract documents and construction supervision for all road work and parking areas were handled by the Federal Highway Administration. Road work in the vicinity of the museum and Ford Mansion was performed by Mancini Brothers of Saddle River, New Jersey, for \$163,884. The more extensive work on roads, parking, and related lighting and landscaping in the Jockey Hollow area was done by Flanders Construction, Inc., of Morris Plains, New Jersey, under a \$712,343 contract.

The HFC budget for interpretive facilities at Morristown was one of the largest in the Bicentennial program. At the headquarters museum, the film cost \$71,000 and the museum exhibits and related curatorial work came to \$225,000. At Jockey Hollow the interior exhibits and mini-film totaled \$75,000 and \$25,000 was invested in new wayside exhibits. The total for new interpretation thus came to \$476,000.

## NATIONAL CAPITAL PARKS

### Constitution Gardens

Constitution Gardens is a different kind of Bicentennial project. Out-right historic and patriotic reminders abound elsewhere. Here the accent is upon the quality of life in the living present--at least as necessary to our survival as a free nation as the remembrance of our heritage. This big new park alongside the Lincoln Memorial Reflecting Pool, a peaceful glade in a forest of great public buildings and monuments, is a daring innovation in urban land use.

Not all Bicentennial development projects have to do with new buildings, restoration of old buildings, and battlefields. This is conspicuously true of Washington, D.C., already loaded with public buildings and memorials, where park planners envisioned facilities for public recreation as a suitable Bicentennial contribution. The biggest and most innovative of these projects is the new park called Constitution Gardens, 45 acres of undulating greenery and sparkling water where government workers and sight-seers can find a peaceful refuge from the overwhelming architecture as well as the summer heat and humidity. This rectangular area, in its own way a monument to "natural environment," is bounded by Constitution Avenue, the Lincoln Memorial Reflecting Pool, 17th Street, and Henry Bacon Drive.

With the return of mallards and other waterfowl to this sylvan spot, history has come full cycle, after a fashion. In its natural state the area was a tidal marsh on the Potomac River. In the late 19th century the Corps of Engineers dredged the river channel and deposited the spoil to create what would become Potomac Park. During World War I the portion of this made land along Constitution Avenue west of 17th Street was preempted for the Navy and Munitions buildings, "temporary" structures that managed to endure for more than half a century until President Richard Nixon ordered their destruction.

To plan park development of the cleared land the National Park Service engaged the national firm of Skidmore, Owings and Merrill, assisted by Arnold Associates of Princeton, New Jersey. Seeking worthy models, the planners studied some of the notable municipal parks of the world, including London's Hyde Park, the Tivoli Gardens in Copenhagen, the Tuilleries in Paris, New York's Central Park, and San Francisco's Golden Gate Park. Original concepts for something grandiose and hyperactive, with restaurants, concert stages, and underground parking, were scaled down because of cost. The result was still one of the more expensive Bicentennial projects, but the consensus of visitors and park administrators is that it was worth all the time, money, and effort.

Constitution Gardens was conceived by the planners as an informal wooded park, contrasting with the open axial formality of the Reflecting Pool to its south. The design established a floor plane of softly contoured meadows shaded by a canopy of trees and sloping gently to the shoreline of a free-form lake. A network of paths for pedestrians and cyclists meanders throughout. In this relaxed context "the ground is never flat, the paths are never straight, and the lake is continuously curving."

The design elements are reduced in scale and subtly ordered to reinforce by contrast the formalism of the Mall as extended through the Reflecting Pool to the Lincoln Memorial. To complement that axial layout, slightly undulating groupings of trees are set back from the straight rows of elms flanking the Reflecting Pool. Along Constitution Avenue, rows of trees are evenly spaced in straight columns, but the plantings become less regular toward the interior. Trees planted along the walks are columnar and regularly spaced. Interior trees were selected and arranged to encourage high-canopy, grove-like development in order to create an interplay of sun and shade and discourage low-level branching that would interfere with views of important surrounding features. Understory plantings have been used sparingly to provide a sense of scale without disturbing such views. A low mound along Constitution Avenue does screen views of traffic from lower elevations within the gardens.

The six-acre lake contrasts with other bodies of water nearby. It is asymmetrical unlike the Reflecting Pool, and its placid surface contrasts with the ebb and flow of water in the Tidal Basin. A path follows the edge of the lake, and a bridge leads to an island shaded by weeping willows.\* A black dye is used in the water to conceal thoughtlessly discarded debris. Overview terraces have been constructed at the eastern end of the lake to accommodate low-key events such as art shows, contests, and in all probability weddings and soap-box oratory. At the western edge of the lake, shaded in a copse of trees, a small kiosk serves refreshments. Further west is a low modern comfort station of a distinctive National Capital Parks style known as a Benji for its designer, Benjamin H. Bideman.

Because the park was to be "undulating," an enormous quantity of earth had to be brought in to build up the contours. Most of this came from the excavation for the Madison Building of the Library of Congress. To create from scratch nearly 40 acres of woodlands and grassy meadows by July 4, 1976, the landscape architects and engineers made massive use of a lovely mix of sewage sludge, leaf mold, and wood chips as a fertilizer base for trees and turf alike. Park developers are proud of this innovation, "ideal for urban renovation," because it helps to solve a major disposal problem and works just fine, to judge by the results. The heady compound is reported to be odor free, and it entails significant cost savings: far less topsoil is required, and grass seeding will serve in lieu of much more expensive sodding.

To accomplish the greening of this particular part of America, developers tabulated the purchase and tender transplanting of 2,650 trees, 2,950 shrubs, and 104,000 units of flowers and ivy. Among the 23 species of trees represented are dogwood, Norway maple, red maple, sweet gum, scarlet oak, crabapple, tulip tree, honey locust, poplar, and plane tree. Narcissus, azaleas, and rhododendrons are among the prominent flowers and shrubs. Because "they couldn't wait until the trees grew," officials ordered fairly sizeable ones up to eight inches in diameter, boosting the park's cost and depleting nursery stocks over a wide area.

A complete statistical review would mention 133 benches and innumerable street lamps and trash baskets, but statistics are not the real story here. The real story is that another touch of naturalness has been conferred upon

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\*A memorial to the signers of the Declaration of Independence was developed on the island in the early 1980s--ed.



Washington, D.C., where the human spirit can find a congenial dwelling place. This is exemplified by an incident that occurred near the end of the project. Despite delays from rain, truckers' strikes, and material shortages, another delay of a few days was accepted in good grace when a rare killedeer was found nesting on a critical spot, requiring peace and quiet until she could hatch four speckled green eggs.

Because of the scope of the project, there had to be a series of contracts, as follows: Hutchison Bros. Excavating Company of Beaver Heights, Maryland, for \$339,000; Rickert Nurseries of Yardley, Pennsylvania, for \$798,457; Pleasant Excavating Company of Clarksburg, Maryland, for \$765,582; Flippo Construction Company of Washington, D.C., for \$3,032,383; Rescom, Inc., of Falls Church, Virginia, for \$107,170; Minneville Nurseries of Manassas, Virginia, for \$148,362; and Hughes & Smith, Inc., of Vienna, Virginia, for \$128,204. These construction contracts totaled \$5,319,058. Work extended from July 1974 through June 1976.

Denver Service Center personnel identified with the project are Paul Lederer, landscape architect; Ben Biderman, architect; James C. Patterson, agronomist; Wayland C. Fairchild, chief of construction; Robert M. Dinterman, district project supervisor; Harry Olinger and Mike LeBorgne, project supervisors; and Ray Lee, contract administrator.

### Thomas Jefferson Memorial

The author of the Declaration of Independence, philosopher of the American Revolution, and third president of the United States is commemorated at the Thomas Jefferson Memorial in Washington, D.C. In this magnificent temple on the Tidal Basin are a heroic statue and carved quotations from his writings. Bicentennial improvements here relate to structural maintenance and visitor comfort and convenience.

Perhaps none of the founding fathers has been more thoroughly memorialized than Thomas Jefferson. He is the namesake of hundreds of towns, counties, avenues, schools, and parks as well as natural features. He is the invisible spirit at his beautiful Virginia home, Monticello, and at Independence Hall in Philadelphia where his Declaration of Independence was adopted. He is honored at two great national memorials in the West: Jefferson National Expansion Memorial in St. Louis, with its soaring arch symbolizing the gateway to the territory he acquired for the United States, and Mount Rushmore National Memorial in South Dakota, where he shares a colossal imagery with Washington, Lincoln, and Theodore Roosevelt. The Thomas Jefferson Memorial in Washington, because of its location in the nation's capital, is perhaps his preeminent national memorial.

In 1934 Congress created a commission to plan and supervise the memorial in Washington. John Russell Pope was selected as architect. The chosen site, due south of the White House, related it closely to its two great predecessors, the Washington Monument and Lincoln Memorial. Ground was broken in 1938, and the memorial was dedicated in 1943. Its design reflects Jefferson's own inclinations as illustrated by Monticello and his Rotunda at the University of Virginia. The circular domed colonnaded structure, recalling the Pantheon in Rome, is an adaptation of the classic style he promoted in America.

The entrance to the memorial via a grand flight of stairs faces north. In the pediment above is a sculptural group depicting Jefferson standing

before his fellow committeemen--Benjamin Franklin, John Adams, Roger Sherman, and Robert Livingston--appointed by the Continental Congress to draft the Declaration of Independence. The sculptor was Adolph A. Weinman. The 19-foot statue of Jefferson within is by Rudolph Evans. The memorial is 152 feet in diameter and rises 96 feet above the walkway.

Bicentennial contract work was in two phases. The first consisted of work to remedy minor structural defects: installing control joints on the dome; caulking and repointing the dome; sawing and repointing column, base, and north portico joints; and cutting out and replacing broken sections of rings at column bases. This work was performed from August 1974 to April 1975 by Roubin & Janeiro, Inc., of Fairfax, Virginia, for \$217,947.

The second phase, conducted from September 1975 to June 1976, was to benefit visitors, particularly the elderly and physically handicapped. This work included heating, ventilating, and air conditioning of enclosed portions; alterations to provide elevator and toilet facilities; plumbing and electrical installations; and modified entrance and sidewalk construction. The contractor, receiving \$594,301, was Kora & Williams Corporation of Rockville, Maryland.

Denver Service Center personnel involved in both phases were Robert Dinterman, district project supervisor; Benjamin H. Biderman, architect; and Harry Olinger, project inspector under the supervision of Wayland P. Fairchild, chief of construction. Joseph G. and Mary L. Merz of Brooklyn, New York, provided architectural/engineering design services.

### Lincoln Memorial

Abraham Lincoln, perhaps America's greatest president, is commemorated in Washington by one of America's greatest memorials, a classical temple terminating the extended axis of the Mall from the Capitol through the Washington Monument. Bicentennial improvements included preservation and public convenience measures.

The "mystic chords of memory" cited by Abraham Lincoln as binding the nation soon came to include memory of that man himself and his magnificent achievement of preserving the Union. The first organized effort to memorialize Lincoln in the capital came with an 1867 act of Congress incorporating the Lincoln Monument Association, but nothing came of this. Not until 1911 did Congress create and empower a commission to actively plan a Lincoln memorial. The commission selected the site in the recently created West Potomac Park at the west end of the extended Mall and engaged Henry Bacon as architect. Ground was broken in 1914, and the completed memorial was dedicated in 1922.

Inspired by the Parthenon in Athens, the Lincoln Memorial is 189 feet long, 118 feet wide, and 80 feet high above its foundation. Thirty-six Doric columns represent the 36 states in the Union at Lincoln's death. Within the central memorial chamber are a colossal seated statue of Lincoln by Daniel Chester French, tablets inscribed with his Gettysburg and Second Inaugural addresses, and murals by Jules Guerin. An inscription over the statue beautifully captures the mood of the place: "In this temple, as in the hearts of the people for whom he saved the Union, the memory of Abraham Lincoln is enshrined forever."

A 1973 construction contract with Roubin & Janeiro in the amount of \$793,000 involved cleaning the exterior surfaces of the memorial by high-

pressure water treatment and repointing the entire structure. Another contract, awarded to Curtin and Johnson, Inc., of Washington, D.C., for \$713,359, was fulfilled between March 1975 and May 1976. This work, designed to facilitate access by the handicapped, included construction of an elevator, toilet facilities, entrance, and sidewalk. Design work was done by Joseph G. and Mary L. Merz, architects. Among DSC personnel involved were Robert Dinterman and Benjamin Biderman.

### Washington Monument

The Washington Monument, a 555-foot obelisk built from 1848 to 1885 with funds from public subscription and federal appropriations, memorializes the man whose achievements in the service of the new American nation made him "first in war, first in peace, and first in the hearts of his countrymen." Structural repairs were made with Bicentennial funds.

Upon his death in 1799 the fame of George Washington, commanding general of the Continental Army during the American Revolution, chairman of the Constitutional Convention, and first president of the United States, was assured in the pantheon of the world's great leaders. Thereafter his reputation grew to the point that his image became more godlike than human. To some extent the towering pure form of the Washington Monument, lacking any literal representation of the man, reflects that image.

As early as 1783 the Continental Congress proposed that an equestrian statue of Washington be erected in the future national capital. Pierre Charles L'Enfant provided a site for this statue in his 1791 plan for the capital city. The equestrian statue was later placed in Washington Circle, however, leaving L'Enfant's site--west of the Capitol and south of the White House--available for the great obelisk designed by Robert Mills for the Washington National Monument Society in 1847.

The cornerstone was laid with Masonic ceremony on July 4, 1848. Political disputes and growing sectional controversy impeded fund-raising and brought construction to a halt in the mid-1850s at the 150-foot level. In 1876 construction resumed with federal appropriations under the Corps of Engineers. The capstone was installed in December 1884, and the completed monument was dedicated in February 1885 and opened to the public in October 1888.

Despite its eternal character, the Washington Monument shares with other structures vulnerability to the deteriorating forces of age and weather. Thus there is need for frequent review and correction or improvement of conditions. Bicentennial funds of \$1,100,506 permitted a general upgrading of structural, mechanical, and architectural features in a project executed by Santmyer Decorating Company of Fairfax, Virginia, between November 1974 and July 1975. Design work was handled by Robinson Engineering of Falls Church, Virginia. Robert Dinterman of the Denver Service Center was district project supervisor; other involved DSC personnel were Tom Birmingham, engineer, and Wayland P. Fairchild, chief of construction. The project entailed the following:

1. Caulking exterior walls from the top to the 70-foot level.
2. Brushing all interior stone. Minor pointing above the 150-foot level, moderate pointing below.
3. Replacing deteriorated steel beams.

4. Cleaning and painting all framing iron and steel, including screens and railings.
5. Removing surfacing materials on all treads and landings and applying new resilient surfacing with the appearance of terrazo.
6. Removing, cleaning, painting, and reinstalling carriage angles adjacent to wall, replacing all bolts and expansion shields.
7. Providing a new concrete vault structure to house a new air handler.
8. Providing a new heating and air conditioning system.
9. Installing new bullet-proof windows at the 500-foot level.
10. Installing a glass elevator shaft enclosure at the 490-foot level.
11. Installing new aluminum entrance doors.
12. Installing new marble seats in the waiting room and at the 500-foot level.
13. Installing new marble walls at the entrance.

In a second project, designed by Skidmore, Owings and Merrill and accomplished by the Troxler Asphalt Company of Washington, D.C., in early 1976 for \$56,274, new landscaping and walks were provided on the Washington Monument grounds near the Kodak building.

### National Mall

The Mall is the elongated open green strip between the grounds of the U.S. Capitol and the Washington Monument. This grand axis, visually extended to the Lincoln Memorial in the early 20th century, was a key element of L'Enfant's 1791 plan for Washington. Bicentennial funds enabled various improvements to benefit both the army of out-of-town visitors and local residents.

The history of the Mall reflects changing concepts in landscape design and the evolution of the capital city. L'Enfant's plan specified a Grand Avenue, bordered with gardens and houses of diplomats, running west from the Capitol grounds about a mile to an equestrian figure of Washington. This formal open axis was rejected in the 1850s in favor of a romantic curvilinear treatment charted by Andrew Jackson Downing and executed in the vicinity of the original Smithsonian Institution building. The long hiatus in the construction of the Washington Monument, use of its grounds for horses and cattle during the Civil War, and the laying of railroad tracks across the Mall after the war to a depot where the National Gallery of Art now stands further impeded realization of L'Enfant's vision.

That vision was revived at the turn of the century by a blue-ribbon commission sponsored by the Senate Committee on the District of Columbia under the chairmanship of Sen. James McMillan of Michigan. The so-called McMillan Commission, composed of Daniel H. Burnham, Frederick Law Olmsted, Jr., Charles F. McKim, and Augustus Saint-Gaudens, recommended an open greensward with flanking roadways lined with elms. It also called for extension of the axis on the reclaimed land west of the Washington Monument and focal structures ultimately realized as the Lincoln and Jefferson memorials.

Despite setbacks, notably from the long presence of "temporary" wartime buildings, the McMillan Commission's recommendations were largely implemented. Since 1933 responsibility for the Mall has been held by the National Park Service, with the Architect of the Capitol and the Smithsonian Institution playing major roles in the areas under their jurisdictions.

In the 1960s the NPS commissioned a master plan for the Mall area by Skidmore, Owings and Merrill, under which the Capitol Reflecting Pool and other improvements were made. Two further advances came under Bicentennial auspices, both involving additional design work by Skidmore, Owings and Merrill.

Extensive improvements under the heading "The Circulation System, The Mall," were undertaken via a \$4,394,618 contract with Corson & Gruman Company, Inc., of Washington. This work was of the unspectacular "nuts and bolts" variety to benefit landscaping objectives and serve visitor convenience. It included the obliteration of obsolete and conflicting roadways, curbing, and sidewalks; construction of new facilities for a tour bus route; new bikeways and sidewalks of clay, gravel, and sand finish; new lighting and drainage systems; concession food kiosks, drinking fountains, and benches; stone steps at the Henry Monument outside the Smithsonian Castle; planting of trees, ivy, and sod; and construction of plazas, crosswalks, terraces, and fountains.

The National Sculpture Garden was to occupy the space on the north side of the Mall between the National Gallery and the National Museum of Natural History. Phase I construction, contracted to Riddle Construction Company for \$1,025,044, provided a circular pool with refrigeration pipes for winter skating, related walks, terraces, landscaping, and the base for an adjoining rectangular pavilion. Phase II, contracted to Welch and Rushe Plumbing and Heating of Hyattsville, Maryland, for \$284,603, provided refrigeration equipment, pumps, electrical hookups, dashers, ramps, floodlights, and fencing.\*

Denver Service Center personnel associated with these projects included Elwood Rensch, landscape architect; Mario Ramsey, mechanical engineer; Wayland Fairchild, chief of construction; Robert Dinterman, district project supervisor; and Robert Smith, Harry Olinger, and George Graber, inspectors.

#### General Development

In addition to funding for developments in the foregoing prominent areas, nearly \$7 million in Bicentennial money was spent for improvements in smaller or less visible National Capital Parks areas. A list of these areas and projects follows.

River Terrace and Kenilworth, Recreation: Site preparation, basketball courts, softball field, fencing, walks, lighting systems, pavilion, kiosk, utilities, drinking fountains, benches, timber pedestrian bridge, topsoiling, seeding, sodding, and tree planting. Design work by Keyes, Lethbridge & Condon of Washington. Construction by Curtin & Johnson of Washington for \$361,536, July 1974 to April 1975. Denver Service Center personnel included Stanley Fretwell, project supervisor, and Benjamin Biderman, architect.

Comfort Stations, West Potomac Park: "Benji" comfort stations, designed by Ben Biderman, were constructed on the west side of the Tidal Basin and by the D.C. War Memorial south of the Reflecting Pool. The \$292,113 contract

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\*The National Sculpture Garden never came to fruition as such at this location, although a sculpture garden was provided as part of the Hirshhorn Museum across the Mall--ed.

with Rescom, Inc., of Falls Church, Virginia, included utilities, a sewage pumping facility, grounds development, and landscape furniture. Construction ran from July 1974 to May 1975. Harry Olinger was project supervisor.

Comfort Station, Sylvan Theater, Washington Monument: A "Benji" comfort station was built by Sundance Construction of Fairfax, Virginia, for \$104,506 between November 1974 and June 1975. Harry Olinger was project supervisor.

Fort Stanton, Recreation: Clearing and grubbing, grading for picnic areas, installing picnic tables, fireplaces, and trash baskets, tree planting. Design by Fry & Welch Associates of Washington. Construction by C. W. Stack & Associates, Newington, Virginia, for \$82,200, October 1974 to April 1975. Lothar Shipanski was project supervisor.

Anacostia Park, Recreation: Site preparation, roller skating pavilion, ball courts, comfort station, play area, walks, parking area, road, lighting, utilities, trees, and landscaping. Design by Keyes, Condon & Florance of Washington. Construction by CSH Contractors, Inc., Beltsville, Maryland, for \$1,538,977, January 1975 to May 1976. DSC personnel were Tom Meagher, project supervisor, and Ben Biderman, architect.

Fort Dupont Skating Rink: Structure for hockey rink, football field, baseball fields, tennis courts, basketball courts, parking areas, sidewalks, lighting, landscaping with trees, shrubs, and seeding. Design by Fry & Welch. Construction by Titan Atlantic Construction Corporation, Towson, Maryland, for \$3,725,988, February 1975 to May 1976. Lloyd C. Robinson was project supervisor.

Bruce Place, Fort Stanton, Site Development: Picnic area, day camp area, pavilion and comfort station, grading, concrete sitting curbs, concrete steps, wood chip paving, stabilized aggregate paving, planting material, site furnishings and utilities. Construction by Curtin & Johnson for \$145,300, March to July 1976. Stanley Fretwell was project supervisor.

Lincoln Park, Recreation: Tot play areas, relocating light poles, sprinkler system, planting trees, shrubs, and sod. Work by Curtin & Johnson for \$179,343, October 1973 to May 1974. Robert M. Dinterman, project supervisor; Darwina Neal, National Capital Region landscape architect.

Tidal Basin Walkways: Reconstruction of 4,000 square yards of exposed aggregate bituminous sidewalks, sodding, new benches, trash containers. Work by Troxler Asphalt Company of Washington for \$95,299, April to June 1974. Stanley Fretwell was project supervisor.

Franklin Park, Recreation: Resurfacing existing walks, installation of drinking fountains, repairing benches, new sprinkler system, planting trees, and seeding. Work by Paul E. Schlosser Company, Inc., Silver Spring, Maryland, for \$150,918, September 1974 to June 1975. Robert M. Dinterman, project supervisor; Darwina Neal, landscape architect.

Lafayette Park, Recreation: Automatic sprinkler system, new shrubs and trees, electric facility for special events use by public communications.

Work by Holland Gardens Nursery & Landscape, Inc., Beltsville, Maryland, for \$195,586, September to December 1974. Robert M. Dinterman, project supervisor; Darwina Neal, landscape architect.

The total for the projects at the major monuments, Constitution Gardens, and the Mall came to \$14,498,710. The cost of the other projects totaled \$6,871,766, for a grand total of \$21,370,476 for National Capital Parks Bicentennial projects.\*

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\*This total does not include the millions spent on the National Visitor Center at Union Station or the cost of the Chesapeake and Ohio Canal projects covered earlier in this report--ed.

## SALEM MARITIME NATIONAL HISTORIC SITE

### Preservation of Central Wharf

For two centuries, circa 1650-1850, the waterfront at Salem, Massachusetts, was a significant home port for ships of sail, a capital of global commerce in peacetime, and a safe harbor for privateers preying on enemy shipping during the Revolution and the War of 1812. Central Wharf, evolving structurally since the period of the early republic, is a rare historic resource that has now been stabilized.

Salem, "the first town in Massachusetts Bay Colony," was destined for maritime greatness because of the enterprise of her citizens and her choice harborage on the South River estuary. In colonial days Salem was prominent in the triangular trade with Europe and the West Indies. Impeded by British trade restrictions after 1763, Salem merchants and ship-masters were willing sea fighters in the American Revolution, wreaking havoc on British supply lines. At the end of the war, with fortunes augmented by captured prizes, the energy displayed in privateering found outlet in a worldwide search for new markets. Salem ships voyaged beyond the Cape of Good Hope to the East Indies and China, ushering in a golden age of foreign trade. After the vicissitudes of the trade embargos of 1807 and 1812, the trade recovered and went on to prosper during the California Gold Rush at mid-century. But a new generation of large vessels, both sail and steam, could not use Salem's shallow harbor, and only light shipping continued there into the 20th century.

Salem Maritime National Historic Site, designated in 1938, embraces several historic structures, among them the Elias Hasket Derby house of 1762, the Hawkes house of 1801, the West India Goods store, the Custom House and Bonded Warehouse of 1819 where Nathaniel Hawthorne worked, and the Derby and Central wharves. Derby Wharf, the larger and more famous of the latter, extends nearly 2,000 feet into the harbor. It was begun soon after 1762 by Capt. Richard Derby and was used by his son, Elias Hasket Derby, for outfitting privateers during the Revolution. Warehouses for the storage of cargoes formerly lined it. Ideas for a Bicentennial revival program initially focused on Derby Wharf, but it was concluded that the limited funds available to the area should be spent instead on its neighbor. Whereas the stone Derby Wharf had been reconstructed by the National Park Service in the late 1930s and was still in good condition, the wooden Central Wharf was in precarious condition, and behind its 1939 bulkheads there might be evidence of earlier timber. A study of this structure might also throw light on earlier wooden versions of Derby Wharf destroyed in the Depression work project.

Aside from the imperative to preserve any threatened historic structure, two clinching arguments in favor of Central Wharf developed from programmed research. First was the disclosure in historian Charles W. Snell's "Historic Structure Report, Ingersoll/Forrester/Central Wharf," derived from the archives of Salem's Essex Institute and Peabody Museum, that Central Wharf was hardly less important than Derby Wharf in maritime history. Second was a series of discoveries by contract archeologist



Geoffrey P. Moran of Brown University that there were indeed layers of wharf fabric dating from "plus or minus 1800."

In the 1780s Samuel Ingersoll, then owner of the property abutting Derby Wharf, built a frame warehouse and the first small wharf, of "cobb timber," on the Central Wharf site. Simon Forrester, the owner from 1791 to 1817, first rebuilt and extended the wharf as a "solid wharf" to a length of 200 feet and added an imposing brick warehouse on Derby Street. He later extended the wharf to near its present length of 800 feet using cribbing or cob-type construction. John Bertram bought the property from Forrester's sons in 1840 and gave Central Wharf its name. Bertram's Eliza was the first American vessel berthed in Salem to be dispatched to California after the electric news of the gold discovery.

In 1896-97 new owners built a new timber bulkhead outside Central Wharf. A fire swept the waterfront in 1914, destroying much of the wharf and its wooden warehouses and gutting the old brick warehouse. In the late 1930s the National Park Service undertook to reconstruct new bulkheads and rebuild the marine railway, an incline for launching small boats. In 1947 the NPS gave the U.S. Navy use of the wharf for reserve training purposes, leading to construction of frame buildings on the widened portion of the wharf landward.

Those assigned to the project found evidence of at least nine structural modifications over the years. Most important was the discovery of remnants of original cobbing or cribwork (log pens filled with cobblestones or rubble) and "solid construction" (timber or masonry bulkheads filled with dredgings). This evidence is reported by Moran in "Excavations at Central Wharf," submitted July 1975, and by Stephen M. Horvath in "Salvage Archeology of Central Wharf," based on observations during construction work in 1975. Because reconstruction of the early wharf was inappropriate and impractical, the prime objective became to stabilize the existing wharf to preserve its historic fabric.

Marshall McDonald, the architect initially assigned to the project, died suddenly in December 1973 after six months of work. This void was filled with the appointment of Merrill Ann Wilson, a recent graduate of Columbia University's architectural preservation program. After intensive survey of the dilapidated structure and preparation of a historic structure report with design alternatives to fit prescribed funding levels, she recommended the rehabilitation procedure followed in the subsequent contract with the Modern Continental Construction Company of Cambridge, Massachusetts. The work was carried out from March 7, 1975, to January 30, 1976, at a total cost of \$466,000. Problems caused by abnormal tidal displacement and the sharply escalating cost of structural steel were the main factors in boosting construction costs about 25 percent above engineering estimates. Caleb Cooper was responsible for engineering design and Henry Espinoza was construction supervisor.

On the west side, approximately 500 feet of the 1939 bulkhead was removed and reusable timbers salvaged. This was replaced with a steel sheet piling bulkhead with timber fender piles at nine-foot intervals and dolphins (clusters) at the two south corners. On the east side, 115 feet of failed 1939 timber bulkhead was reconstructed and the capping was straightened and respiked. The marine railway received new timber sheeting. An interior I-beam anchorage wall was installed, and all tie rods from the east, south, and west bulkheads were replaced.

NPS policy gives high priority to the preservation of historic fabric.

But losses do occur, and the wharves at Salem are notable examples. At Central Wharf substantial remains of the old Forrester warehouse were razed in the 1950s in the interest of "cleanup." More recently, after the Navy's departure, work to demolish Navy buildings entailed the loss of circa 1812 timberwork in the absence of technical surveillance.

Today there is greater appreciation for such rare remnants of Salem's maritime infrastructure. The waterfront is enjoying a kind of revival. The wharves are devoid of the tall ships that once brought wealth to the town, but they invite visitors to walk them and conjure up ghosts of America's "ancient mariners."

#### Preservation of the Narbonne House

The Narbonne house at Salem Maritime, already 100 years old in 1776, is now privately celebrating its tricentennial. Although associated with no famous figure nor great event, its succession of owners and occupants reflects American history from early colonial times through World War II. With Bicentennial funds this precious resource, notable mainly as a rare example of 17th-century domestic architecture, has been saved for posterity.

The Narbonne house at 71 Essex Street in Salem is to the rear of the Elias Hasket Derby house and other impressive architectural gems of Salem Maritime National Historic Site. To the uninitiated there is nothing impressive about this plain and long-neglected building. But to architectural historians it is not only interesting, it is downright exciting. It is not merely old, it is ancient--one of the oldest surviving buildings in New England. While there are perhaps 60 buildings in Massachusetts dating from the 1600s, there are only a few that antedate the last quarter of that century. Three of these are in Salem. Of the three, the Narbonne house is the most nearly intact.

Its story has been presented by Abbott Lowell Cummings of the Society for the Preservation of New England Antiquities (SPNEA) in his "Historical and Architectural Survey of the Narbonne House," prepared in 1962 and a factor in National Park Service acquisition of the house that year. Exact records of its origin are lacking, but sometime between 1669 and 1672 Thomas Ives, a butcher, bought the lot "of thirty poles" and built the house to accommodate his new bride. Upon his death in 1695 it became the property of Simon Willard, a weaver, church deacon, and Indian fighter. It was probably when Simon's son Josiah acquired the place in 1729 or shortly thereafter that a major addition to the original building was made.

During the Revolution the owner was Capt. Joseph Hodges, master of the schooners Eagle and Mary and the sloop Success, who traded in Virginia and the Bahamas. According to Cummings, the owners or occupants for the next 200 years were all somehow tied by blood to this maritime merchant, although none followed the sea. After the Revolution the property was occupied by the Andrews family, tanners and merchants, and after 1800 by Matthew Vincent, a ropemaker. In 1823 daughter Sarah Vincent became Mrs. Nicholas Narbonne; she occupied the place as a widowed seamstress until 1890. Her daughter Helen remained here until 1948 when title was conveyed to the Hale family, who finally sold to the government. Cummings credits the integrity of the structure to its long occupation by widows and spinsters of limited means.

The main original section circa 1670 was a simple frame steep-roofed

two-story dwelling known as a "half house," with cellar, attic, one living room-kitchen with massive brick fireplace at ground level, and one bedroom or "chamber" above connected by a winding stair. Circa 1730 a 1-1/2-story gambrel-roofed addition doubled the north-south floor plan. Analysis revealed that this was itself an older building that was moved in one piece and fastened to the original, with a new fireplace opening being cut in the now-central chimney. Thus it is probable that all of the main structure is 17th century.

Around that same time a new lean-to addition was built on the rear or east side. NPS restorationist Bobby Flickinger has demonstrated that the central portion of the lean-to was an original brick-paved porch, also with fireplace off the central stack, suggesting a work area for Thomas Ives. Circa 1800 the lean-to was extended flush with the original gable front to provide space for a shop with Dutch door opening on Essex Street.

No radical changes obscure the basic character of the original structure. Much of the original hand-hewn frame is still exposed. The wide plank floors, the primitive staircase with splined vertical sheathing, the corner cupboards, the plastered ceilings and walls, the exposed whitewashed joists, and much of the trim and hardware are bona fide 17th century. Door frames, windows, fireplace fronts, and roof and siding are later replacements. The SPNEA people are ecstatic about "the wonderfully unspoiled character of surviving detail" in the building.

Wonderful or not, horrendous problems were evident in 1974 when SPNEA prepared a revised architectural analysis for the NPS. These were problems likely in any neglected, patched-up 300-year-old structure, making the survival of this unique cultural specimen dependent on a massive injection of Bicentennial funds for repairs and stabilization. Virtually every ill of a superannuated frame building was evident:

1. Moisture penetration of wood fabric: The roof leaked like a sieve. The flooring frame was next to the bare ground and rotten from ground moisture, exacerbated by the absence of guttering. The non-breathing felt paper roof layer increased interior humidity.

2. Insect and fungus infestation: Large areas of woodwork were infested with white fungus or dry rot. The presence of powder post beetles was widely evident.

3. Rotting of wood frame: There was extensive rotting of sills and lower portions of posts, studs, and sheathing boards, causing some settling, leaning, and bulging of walls.

4. Foundation failure: There were no genuine footings except for a late-period granite line under the north gable facade. The original foundation wall of rubble laid in earth mortar was collapsing.

5. Failure of chimney and chimney foundation: In the cellar, the chimney foundation of dry rubble masonry with sandy soil and rock infill was pocked with voids and was crumbling. The weight of the massive brick stack caused bulging of its south and west walls. The southwest corner was failing and the fireplace was slumping. The bricks, either unburned or underburned, were bound only by a sandy earth mortar and crumbled easily upon touch. The situation was worsened by removal of an original lintel when a later period fireplace was superimposed.

6. Sash and trim deterioration.

7. Decay of exterior surfaces: The entire roof cover was beyond repair. Many clapboards, especially on the east and south walls, were split, broken, or rotted. (The earliest boards on the west and north walls,

hand-sawed and beveled at the ends and fastened with cut nails, were in better shape than the later ones, circle-sawed and butt-ended.)

A tentative plan to rehabilitate the house for a park employee's residence was dropped in favor of preserving it as an architectural exhibit. There was no thought of restoring it to the original or any other given period, because doing so would destroy valuable evidence of its evolution. Neither was restoration per se of any one building element contemplated. The goal was simply preservation of the structure in its extant form.

The firm of Desmond and Larcon, Inc., of Beverly, Massachusetts, was engaged on a negotiated cost-plus-fixed-fee basis. Only \$70,000 was available initially, but later increments essential to achieve the preservation goal brought the total to \$108,000. Of particular importance to the success of this delicate endeavor, the Denver Service Center borrowed from the Southwest Region the best restoration craftsman available, Bobby Flickinger. With his participation from August 1974 to June 1975, the SPNEA, which had done an excellent job of research and planning, was finally able to relinquish its role. Frank Huntsman of DSC was SPNEA contract administrator and construction coordinator.

With funds severely limited, only the most essential work was undertaken, leaving refinements for the future. This work can be described under six headings in priority order:

1. Stabilizing chimney foundations, masonry, and fireplaces: After exploring various alternatives, SPNEA and Goldberg-Zoino, Boston engineers, devised a method of solidifying and strengthening the fireplace foundation after first cribbing the walls to prevent spread. The complex process, executed by the American Drilling Company, entailed diagonally crisscrossing numerous holes with diamond drills through the foundation mass to the adjoining unexcavated walls, inserting steel rods, treating the perforations chemically to solidify the loose soil, then grouting all voids under pressure. At ground level the later brick fireplace fronts were removed and the collapsing fireplace voids filled with perlite concrete, a mixture of air-entrained Portland cement and expanded perlite aggregate with a natural water content that combines unusual plasticity with enough strength to support unstable original elements.

2. Repairing building foundations: It was first necessary to jack up the entire building several inches, half an inch at a time, with intervals sufficient to allow the ancient frame to gently absorb stress and distortion. The supporting system added in the cellar consisted of three rows of adjustable steel columns supporting three new beams and reinforced old beams. At both first and second levels, other series of temporary support posts and beams were installed to rigidify the entire system. Then jacks around the perimeter, coupled with the cellar columns, were turned to raise the structure. Each remaining stone of the exterior foundation was numbered and removed, the soil surface was stabilized, and the stones were reassembled with formula mortar.

3. Repairing defective wooden substructure: All rotted sills, posts, studs, and sheathing were replaced with new wood where conservation of the originals was hopeless. Some of the 12-inch-square sills were saved in part by cutting rot from outer layers and lagging in new timbers. New wood was joined or spliced to useless posts and studs. In the gambrel addition the floor was removed and most joists replaced after reducing the earth level. All new framing lumber was pressure-treated to resist dry rot and insects, and all new elements were stamped "1975."

4. Rehabilitating lean-to: The east addition was in the worst shape of all. It had to be disassembled and rebuilt. All rotted members were replaced, and the frame was tied to the main structure with metal brackets.

5. Replacing roofing and drainage system: Except for the low-pitched upper portion of the gambrel roof, where asbestos roll roofing was used, the entire roof was relaid with fire-retardant red cedar shingles after needed repairs to rafters, sheathing boards, and other framing members. Galvanized gutters, downspouts, and splash blocks were added, and the surrounding terrain was regraded to improve drainage.

6. Miscellaneous work: Window sash, doors, and door frames were removed and rehabilitated. All wood elements were given preservative treatment, and the exterior received a final coating of soybean oil. Old plaster was stabilized. The crawl space was insulated. The chimney core was gunnited, and the chimney above the roof line was repointed and capped with a lead seal. Portable electric radiant heat was provided.

The Narbonne house should now last another hundred years. Geoffrey Moran of Bradford College has recently learned much about related outbuildings, paths, and ceramics from excavations in the rear yard. Historians may yet discover more about the shadowy inhabitants of the house, and architects can continue to analyze the details of this marvelous anachronism--a bit of Puritan New England that has survived to the atomic age.

## SARATOGA NATIONAL HISTORICAL PARK

### Visitor Center Addition

Saratoga is one of the decisive battles in world history because it promoted the American Revolution from a colonial rebellion against the British Empire to an international war. The unexpected triumph of American arms foreshadowed the birth of a republic destined to become a world power. Exhibits at the expanded visitor center are a prelude to the battlefield tours.

Saratoga National Historical Park, on the west bank of the Hudson River about 25 miles north of Albany, New York, was authorized by Congress in 1938 and today comprises 2,400 acres on which occurred virtually all of the hostilities of September 19 and October 7, 1777. Situated between the Green Mountains of Vermont and the Adirondacks, the park occupies rolling slopes culminating at Fraser Hill, about 300 feet above the river lowlands. This is retired farmland, rutted with ravines, with remnants of immature forest cover. The American fortification of the Hudson River palisades here where the gorge narrows and the British effort to force passage precipitated the fateful encounter.

George Washington's victories in December 1776 at Trenton and January 1777 at Princeton, after earlier defeats in and around New York City, kept American resistance alive. Recognizing the need for a massive effort to quash the rebellion once and for all in 1777, the King's ministers evolved a grand strategy whereby Gen. John Burgoyne would lead an expedition from Canada down the historic Lake Champlain-Hudson River route to join the main British army under Sir William Howe based in New York City. This would cut the colonies in two and the subdued rebels could then be "hanged separately." But the British commanders failed to coordinate their movements, leaving Burgoyne's invading force in precarious isolation and fair game for the American defenders, their ranks swelled by militiamen inflamed by the atrocities of Burgoyne's Indian allies.

Nothing went right for Burgoyne and his army of more than 7,000 British and Germans as they advanced southward. Retreating Americans under Gen. Philip Schuyler threw up roadblocks that gained them precious time. Burgoyne's manpower was badly depleted by a debacle near Bemington, where American militia destroyed a large force of his mercenaries; next came news of Col. Barry St. Leger's failure to take Fort Stanwix in a supporting British advance. The grand strategy was then shattered by a blockade of the Hudson by Americans under Gen. Horatio Gates, with their cannon at Bemis Heights.

Burgoyne retreated north to Saratoga Heights, where his army, shrunken to 3,500 effectives, was soon surrounded and threatened by fired-up Americans several times that number. Burgoyne opened negotiations with Gates, and after stalling futilely for more favorable terms in the vain hope of relief from the south, he surrendered. On October 17 his men laid down their arms. News of the victory was received by Washington and the Continental Congress with jubilation and inspired Louis XVI of France to agree to the formal alliance with the Americans that culminated in Yorktown.

In the 1930s Fraser Hill, named for a fallen British officer, had been selected personally by Franklin D. Roosevelt as the location for a visitor center. This location in the northwest corner of the battlefield enjoyed a commanding view of the field and adjoined a magnificent stand of mature trees that would screen out nonhistoric elements. The original visitor center, designed by Don Benson of the National Park Service's Eastern Office, Design and Construction in Philadelphia, was a pavilion composed of four modules in hexagonal form. The modules consisted of a flat-roofed administrative area, an open view terrace, and two units with tent-like roof peaks, one incorporating a conjoined lobby and roofed terrace and the other a conjoined theater and museum. Viewed in profile, the building had a stone base and sill, beveled wood siding, wood fascia, and shingled roof.

With an eye to the Bicentennial, a 1970 interpretive prospectus called for expansion and remodeling of the visitor center. Bicentennial planners had three principal objectives here: to redesign the information/sales area in the lobby to separate the two functions; to convert the museum area to a second auditorium or twin theater; and to create a new library-museum wing with an entirely new exhibit layout. The original administrative area, auditorium, and view terraces would be unchanged.

The addition necessary to enable the two major changes was designed to harmonize with the original architectural motif. The flat roof echoes that of the administrative section. The building outline finally achieved was not a regular hexagon, but one in the shape of a broad inverted arrowhead, which has the effect of paralleling the angular lines of the original structure without unbalancing it. The intrusion of the new wing on the landscape is negligible: surrounding trees, including a large maple on the outer terrace that stood at the time of the battle, are preserved.

The architectural solution by Denver Service Center architects was coordinated with the input of an exhibit design firm, Barry Howard Associates, Inc., of Larchmont, New York, engaged by the Harpers Ferry Center. This contract was concerned primarily with exhibit space in the new museum and transition areas, with integrated graphics and artifacts, but included also the redesign of sales and information facilities in the lobby. The contract, plus exhibit production and installation, cost \$78,000, while the production of a special film for the twin theaters cost \$77,000. The new interpretive features, intended to orient visitors to the battle and its consequences, are notable for their originality and psychological impact. The Kriegspiel technique, borrowed from Germany, involves the use of model soldiers moved about to reenact the battle in miniature. The construction contract for the addition, remodeling, and mechanical, plumbing, and electrical work was awarded to the Wade Lupe Construction Company of Schenectady for \$290,000.

A part of the new wing provides library space for the expanding park collection. Most of it is given over to imaginative exhibitry calculated to inform and excite the visitor about to take the battlefield tour. The central feature of the room is a diagonal pit, with opposing stairways and brick pavement, displaying surrender cannon and swords. A zigzag "surrender wall" of the pit area contains two complementary pictorial blowups, one of the surrender document with Burgoyne's signature, the other of two gigantic hands exchanging a sword. These slivered images become whole only when viewed from the angle of the down steps. The opposing pit wall is a series of triangular showcases displaying uniforms and battlefield artifacts.

On the largest outer wall is a series of mirror or "periscope" show-

cases using a question-and-answer technique to explain the uses of various military objects. A slanted "50% coated" or reversible mirror of laminated plate in a box lined with black formica reflects the object both alone and in a battlefield setting by the alternation of opposing electric beams. Other outer wall displays in the main room include a howitzer, a "repercussion wall" display of stamps, coins, places, and events commemorating the battle, and a "broadside wall" display of contemporary handbills and news-sheets.

Among other exhibits in the lobby, the theater entrances, and the corridor or transition area to the museum are dioramas of a British redoubt and Morgan's Riflemen, flag panels, silk-screened life-size renditions of soldiers representing various units, portraits, quotations, vertical cannon tubes, photomurals, artifact groupings, and a relief model of the battlefield. The principal flatwork medium is photo-sensitized "barn board" of antiqued rough-textured pine, exposed by a special process with superimposed lettering and graphics.

George Huffman and Judson Ball were the principal architects, and Mike Wood and Jack Kozel designed mechanical and electrical systems. William E. Meuse of the Harpers Ferry Center, a former Saratoga park historian, was a major contributor to the interpretive planning. Grant Cadwallader and Philip Ford Young of HFC were the primary coordinators of exhibit and film production respectively.

#### Battlefield Tour Stops

The battle of Saratoga was a classic infantry engagement, with no cavalry and limited artillery involvement. Superior numbers, terrain advantage, cool strategy, and aggressive tactics contributed to the American victory. Improvements at tour stops enhance appreciation of the battlefield action.

A paved tour road nine miles in length, which starts at the visitor center and winds over the battlefield with stops at key points, was constructed in the late 1950s and early 1960s. There has been only token reconstruction of earthworks, not only because of expense but also because data on their location and design have been lacking. Of the several farm buildings present in 1777, only one known to be original has survived. The vegetation has changed considerably in 200 years as a result of farming and forest migration. Accordingly, an understanding of the battle scene depends heavily on signs, markers, maps, and other devices near the strung-out parking areas. This Bicentennial project entailed comprehensive revision and upgrading of such interpretation coupled with some improvements to pedestrian circulation patterns.

A bird's-eye view of the two-phase battle is necessary to an understanding of this project.

To block Burgoyne's progress toward Albany in September 1777, Gates moved the American army of some 14,000 to a position at Bemis Heights, overlooking the Hudson near the southeast corner of the present park. These were being fortified under the direction of Col. Thaddeus Kosciuszko when Burgoyne appeared on the 19th. Knowing he would be destroyed by the American batteries if he marched down the river bottom with his force of about 6,000, Burgoyne sent two British columns on a flanking movement while German units were held in reserve. Persuaded by Gen. Benedict Arnold to



attack rather than wait for a bloody repetition of Bunker Hill, Gates sent riflemen under Col. Daniel Morgan and Maj. Henry Dearborn to skirmish with the British advance units on Freeman's Farm. Arnold's division stormed the line, the action seesawed with British artillery being captured and recaptured, and Morgan's infantry reaped a deadly harvest of British officers and gunners. The Americans withdrew when the Germans joined the fray, but they held the heights after taking only 200 casualties while Burgoyne had sacrificed 600 men without gaining an inch of ground.

Burgoyne delayed further attack, waiting for a diversionary move by Gen. Henry Clinton up the Hudson and building two strongpoints near Freeman's Farm dubbed the Balcarres and Breymann redoubts. After realizing that relief was not forthcoming and that American strength was growing, Burgoyne launched another assault on October 7 spearheaded by Gen. Simon Fraser, who deployed his troops in a clearing on Barber's Farm. The Americans attacked in three columns under Morgan, Gen. Ebenezer Learned, and Gen. Enoch Poor and broke the British line. While attempting to rally his forces, Fraser was killed by a sniper's bullet. Arnold, who had quarreled with Gates and had been relieved of command, without orders rode pell-mell into the action, seizing de facto leadership of Learned's brigade in an assault on the British center. After fierce fighting the Americans drew back. Then Morgan, charging from the west, pushed in the British right wing. After a second American attack the British withdrew into the Balcarres Redoubt.

Another stalemate in the deadly game might have ensued but for the demonic aggressiveness of Arnold. Failing to take the Balcarres Redoubt, he stormed down the British line to lead troops under Learned and Morgan in a furious assault on the Breymann Redoubt, finally storming it after having been wounded in the leg. (Had the wound been mortal, Arnold's enduring reputation would have been quite different.) With heavy losses from these encounters, Burgoyne was compelled to withdraw and, eleven days later, to surrender.

Summary descriptions of the ten tour stops and their Bicentennial improvements follow:

The visitor first comes to the Freeman Farm, where most of the September 19 action occurred. Here a new section of bituminous walkway was laid to complete a loop, and an exhibit describing the action was redesigned.

The Neilson Farm adjoins the Benis Heights fortifications. The Neilson frame dwelling is preserved as it was when American staff officers used it for quarters. Here construction of a loop trail was completed and two exhibits, supported on log uprights, were added.

The American Fortifications stop is at the crest of Benis Heights, where heavily manned fortifications commanded the road to Albany. Here there was only an exhibit modification.

At the Chatfield Farm was an American scouting position that signaled British movements. Here is a new walkway and a new exhibit in a masonry wall.

Barber's Wheatfield was the setting for the initial combat on October 7. New bituminous and stabilized turf trails here improve access to several exhibits.

The Balcarres Redoubt, now marked by stakes, was the strongest point of the British line. A portion of the old trail was obliterated and replaced by a substantially bigger loop trail around it. In addition to replicas of an old cabin and a log fortification, there are several revised exhibits relating to this "bloody knoll."

Improvements at the Breymann Redoubt, the right anchor of the British line, included relocation of the Arnold Monument and obliteration of the previous trail to it, construction of new bituminous trails, and new exhibits relating to the fortifications, the wounding of Arnold, and the role of the cabins used by Canadian sharpshooters positioned between the two redoubts.

Burgoyne's Headquarters was established after the September 19 action. Here an existing straight-line walk was obliterated and a curving walk was constructed to a view terrace with a new exhibit on a masonry wall.

An unchanged exhibit describes the fortifications of The Great Redoubt, at a strategic bluff overlooking the Hudson.

The last stop gives access to several features connected by extensive new bituminous and stabilized turf trails. First is The Second Redoubt, a system of fortifications on hills near the river to guard the staging area, including supply trains and a boat bridge across the Hudson. Other interpretive developments relate to the traditional burial site of General Fraser, the British artillery park, the British hospital area, the Taylor house, and the Champlain Canal (a historic feature of a later period).

Intensive research on the battle was undertaken by historian John Luzader, his several monographs on the subject being summarized in a 1975 NPS publication, Decision on the Hudson. The principal designer of the trail improvements was John Ronscavage of DSC. Joe Rockwell of HFC coordinated the revision of wayside exhibits and audio messages. Construction was contracted to Treeland, Inc., of Canastota, New York, for \$125,000. Robert Oppegaard was project supervisor. All trail work was completed by December 1975. Interpretive features, budgeted at \$53,000, were installed in May 1976.

### Archeological Investigations

Prior to 1970, little archeological work had been done to verify our understanding of the battle of Saratoga from documentary sources. Lines of defense, fortifications, road systems for deployment, points of contact, and routes of retreat were generally known, but their exact positions required identification for proper interpretation.

Robert Erich made a limited investigation of the Breymann and Balcarres redoubts in 1941, and John Cotter briefly reexamined the latter in 1960. With the approach of the Bicentennial, four contracts were let to the State University of New York at Albany for further archeological work at Saratoga. Dr. Dean R. Snow was principal investigator.

The first investigation, in 1972, identified and partially outlined the Balcarres and Breymann redoubts. An added dividend from the aerial photography used was location of the remains of one of the two cabins occupied by Canadian troops on the night of October 7, 1777, about halfway between the redoubts.

The second investigation, in 1973-74, was designed to increase knowledge of the physical characteristics of the American lines between the river bluffs and the Neilaon farm. From aerial photographs, Snow selected six areas for examination: three along the suspected central section of the line on the southern edge of the main ravine, two within the loop of roadway that contains the farm, and one in advance of the main lines. Few artifacts were found along the main line, but two defensive gun platforms were identified. The platforms lie on the main ravine, one at the western end or head, the other at the eastern end. A zigzag fortification ran more

than halfway between the platforms. The area at the Neilson farm was heavily disturbed by park construction.

In an effort to find the grave of Gen. Simon Fraser, Snow investigated the Great Redoubt, actually three fortifications held until the battle of October 7, 1777. He used a map drawn at the time by Lt. William Wilkinson of the British 62nd Regiment of Foot. Small areas on the map have been found to be accurately placed but larger areas, distances, and major landforms were less accurately delineated. The specific concern was to determine points on the line to guide an artistic reconstruction for a display on the tour route. By triangulation from two gullies shown on the Wilkinson map and testimony from an 1875 property owner about the great quantity of gin and wine bottles he had plowed from the site, Snow concluded that Burgoyne's headquarters was well to the north of the location marked as such in 1974. The site has been destroyed by plowing and sand mining.

On the eastern flank of the British lines approximately 500 yards southeast of Burgoyne's headquarters, the Wilkinson map indicated an artillery position on a prominent hill. An adjacent knoll was also fortified. Snow opened four trenches, two of which were sterile. The third yielded a cut deer femur and the fourth a melted lead shot in association with red stains. Snow concluded that this was an activity area, possibly a campsite.

About 1,200 feet west of Burgoyne's headquarters in a marshy area 100 by 300 yards, Snow found an undisturbed environment with trees possibly dating to the Revolution. Here he located the mounded remains of the British lines, a wall 260 feet long oriented roughly east and west. Corings along the length of the feature revealed decayed wood, charcoal, and ash.

The Wilkinson map shows three small redoubts about 960 feet west of Burgoyne's headquarters. Aerial photography revealed a severe scar in a ridged field. Snow interpreted this as possibly a strong infantry position or outwork designed to protect the rear of the camp and headquarters from attack. This feature was labeled the "potato field fortifications." Directly north are two groups of mounds that Snow did not extensively map or sample, but he suggested three interpretations: they may have been outposts guarding access to Burgoyne's headquarters, they may have served to cover the British retreat, or they may have been constructed by the Americans for bombardment of the Great Redoubt.

The fourth phase of Snow's report dealt with excavations at the south end of the Balcarres Redoubt to aid its graphic reconstruction. Snow opened nine trenches but found little evidence of the redoubt. He concluded that Erich might have found the end of the fortification about 30 feet to the north.

Examination of the Tory camp north of the Breymann Redoubt yielded period artifacts but no definitive features. Snow recommended against further investigation there.

The 1975-76 report covers an investigation of the wartime road system. It consists of 11 detailed maps using a grid system devised by Charles W. Snell in 1950. The maps are based on Snow's recent work, aerial photographs from the past 25 years, NPS reports by Snell, Luzader, and others, and Wilkinson's map.

## STATUE OF LIBERTY NATIONAL MONUMENT

### Illumination

The Statue of Liberty, one of the most colossal sculptures in history, has greeted millions from other lands who crossed the ocean in search of greater freedom and opportunity. To them and to the whole world, the statue has symbolized those ideals on which the nation was founded. Improved lighting of the statue was a Bicentennial objective.

"The Statue of Liberty Enlightening the World" was conceived to commemorate the revolutionary alliance and subsequent friendship of the French and American peoples. With the passing of the years the significance of this colossus has deepened until it has become one of the most potent symbolic structures in the world.

One cannot imagine the Bicentennial complete without some bow to the famous statue. Poetically, this took the form of improved permanent illumination--the key to the magnetic force exerted by the great lady. Other symbolism is there--the broken shackles at her feet, the tablet representing the Declaration of Independence, the reemphasized freedom of women in a free society--but the commanding symbol is the torch, a beacon of hope amid the gloom of history. This and synchronized nocturnal illumination give the statue its radiance and vibrancy.

French historian Edouard de Laboulaye's idea for a monumental French contribution to America's Centennial was given shape by the sculptor Frederic Auguste Bartholdi. Donations from the French people defrayed the cost of the statue's fabrication and shipment, and a protracted campaign in the United States finally raised enough money to build its pedestal. The chosen site was old Fort Wood on Bedloe's Island in New York Harbor. Richard Morris Hunt designed the majestic pedestal, equal in height to the statue for a combined total of 305 feet. The complex framework supporting the copper sheets of the statue was designed by Gustav Eiffel of tower fame. The assembled work was dedicated on October 28, 1886. It was proclaimed a national monument in 1924 and transferred from War Department to National Park Service administration in 1933.

Entrance to the base of the statue is through the original gateway of Fort Wood. An elevator rises to the viewing balcony near the top of the pedestal, from which one may ascend the spiral stairway to the observation platform within the head. Both elevations afford magnificent views of the harbor and the city skyline.

The lighting system has been a challenge ever since the night of the dedication when rain fell, postponing planned fireworks and dimming Liberty's light. The electrical system has been revamped several times, with experimental arrangements of incandescent floodlighting from the base and the use of cathedral glass to irradiate the torch. Recent technological advances have been such that a 1945 system designed to "paint" the statue with light "2,500 times the effect of full moonlight" was considered archaic 30 years later.

Plans for Bicentennial renovation of the lighting were contracted to A. V. Colabella, Engineers, of Bordentown, New Jersey, in August 1975. The

final construction documents were made subject to a night testing of sample lighting types. Final plans called for the use of metal halide on the copper surface of the statue illuminated at 40 candles, with lesser illumination softened with a blending of sodium vapor on the stone surface of the pedestal. Within the torch it was proposed to install high pressure sodium lamps emitting a flamelike yellowish-orange. Jewels would be simulated within the view windows at Liberty's crown by backlighting them with mercury vapor lamps emitting a cold blue-white.

Funds for these improvements were reprogrammed to other projects, but in April 1976 two lighting manufacturing firms submitted proposals for new lighting systems as corporate donations to the Bicentennial. The Denver Service Center evaluated the two proposals with the understanding that any donation must measure up to the unfunded existing plan. In May the North Atlantic Regional Office concurred in DSC's recommendation and notified Crouse-Hinds of Syracuse, New York, that its generous offer (estimated value \$200,000) was accepted. A. V. Colabella was engaged to represent the government in the installation and Larry Kotecki of DSC was made project coordinator.

The installation consists of 69 waterproof bronze fixtures projecting narrow beams that in combination focus on all surfaces of the statue, with a minimum of light wasted on open sky to cause distracting rays or halos. According to the engineers, the new system is much more efficient than the previous incandescent system, providing a markedly greater density of concentrated illumination with less wattage. No change was required in the circuitry or control systems.

The installation began immediately, and on the nights of June 22 and 23 final fixture aiming was completed. On the evening of July 3, in conjunction with opening festivities for "Operation Sail," the new lighting was ceremoniously inaugurated. Fabulous fireworks on the evening of July 4, 1976, accented the latest illumination of the Statue of Liberty, champion of the free world.

## THADDEUS KOSCIUSZKO NATIONAL MEMORIAL

### Kosciuszko House Restoration

Thaddeus Kosciuszko was a freedom fighter of international repute, first as a volunteer in America's war for independence, then as a leader in his native Poland's gallant but unsuccessful struggle against Russia. In 1797-1798 the scarred veteran revisited America to public acclaim. The boardinghouse where he stayed in Philadelphia was adaptively restored for the Bicentennial.

Thaddeus Kosciuszko National Memorial consists of the "Kosciuszko house," a corner rowhouse at 301 Pine Street, and the adjoining "twin house" at 340 South Third Street, Philadelphia. It was authorized by Congress on October 21, 1972. Two years later the property was donated by Edward J. Piszek and came under the management of Independence National Historical Park, just four blocks away. The advent of the Bicentennial provided the opportunity to restore it to its 18th-century appearance when it was briefly the residence of the great Polish patriot.

A native of East Poland and a student of military engineering at Warsaw and Paris academies, young Kosciuszko was among the first of many foreigners to aid the infant United States, arriving in Philadelphia in August 1776 and serving faithfully with the Continental Army until 1783. Because trained experts were desperately needed to offset Britain's superior corps of professionals, the Continental Congress commissioned him an engineer with the rank of colonel. He built fortifications along the Delaware River, the sea approach to Philadelphia. The breastworks he designed at Saratoga played a crucial role in that great American victory. He fortified West Point to command the Hudson River. In the South he displayed energy as a staff officer and combat commander.

In 1784 Kosciuszko returned to Poland, where he became embroiled in the cause of liberating his homeland from Russian rule. Twice victorious while commanding Polish armies, he was finally defeated by superior forces and imprisoned by Catharina the Great. After release he sailed to America in 1797 and was enthusiastically received in Philadelphia. During his stay there at the boardinghouse of Ann Relf, he received a stream of illustrious visitors and corresponded with President John Adams and George Washington. Before returning to Europe in 1798, he expressed interest in the emancipation of American slaves.

The rowhouses that compose the memorial were built in 1775 by Joseph Few, a carpenter. After the boardinghouse period they had a succession of owners who put them to other uses entailing numerous modifications. In 1967 Edward Pinkowski, a Polish-American historian and member of the Philadelphia Historical Commission, bought them with a Kosciuszko memorial in mind. A subsequent campaign by Pinkowski, Piszek, and other Polish-Americans persuaded Congress to assign the task of restoration and memorialization to the National Park Service.

Denver Service Center historian Jim Mote traced the chain of title and structural evolution of the houses and recorded pertinent facts about Kosciuszko's career with emphasis on his Philadelphia stay. Historical

architect David G. Henderson correlated architectural data with the documentary evidence, using findings of Regional Historical Architect Henry Magaziner in early stages. In later project planning Henderson enjoyed the collaboration of historical architect Gerald Karr, who also worked on construction drawings with historical architect Richard Wolfe.

Early insurance surveys describe 3-1/2-story brick buildings 15 by 31 and 15 by 26 feet respectively, with entrance hallways, winding stairways, and two rooms on each level. Except for the garrets and the party wall, the interiors had been so scrambled over the decades that no thought of their restoration was entertained. Only the exteriors would be restored.

The condition of 301 Pine Street was discouraging. Conversion of the ground-level corner to a windowed storefront had created structural weakness reflected in bowed and sagging walls. Doorways had been shifted about, and all window frames except those in the garret were missing. Brick wall surfaces had been chipped, broken, and randomly replaced. Decorative brick belt courses to articulate floor levels were fragmented and the cornice was decayed. The facade of the twin house was 20th-century pseudo-colonial. Recreating the 1798 aspect would entail restoration of the brick walls in Flemish bond with glazed headers, repair of the belt courses, restoration of windows and original entrances with marble steps and pedimented surrounds, and installation of a cedar-shingled roof.

After removing all nonhistoric interior fabric, the contractor had the delicate and dangerous job of supporting the unstable Kosciuszko house exterior walls while the interior structural elements were reinforced. The former involved complicated shoring structures. The latter involved demolition, excavation and backfilling, concrete underpinning of wall sections, a concrete footing and reinforced concrete block wall the full height of the buildings to replace the inadequate original four-inch brick party wall, extensive reinforcement of existing floor joists by new wood joists and steel beams, and roof bracing and anchoring. Throughout, the contractor had to prevent collapse of the weakened exterior walls and protect exposed historic fabric while working in extremely cramped spaces. Installation of heating, air conditioning, and electrical equipment was complicated by the reinforcing measures.

With the interior stabilized, the contractor faced another hazardous operation in rebuilding portions of the brick exterior walls while supporting the original portions above that were to be saved. This involved "needling" or piercing the walls with steel beams to support the masonry above. An original brick pier at the southeast corner had to be keyed into the new first floor brickwork, which had to be warped to meet the out-of-plumb pier. Besides extensive and tricky repairs to the upper Kosciuszko house east and south walls, the entire west wall and the entire east wall of the twin house had to be reconstructed, with attendant problems of weather protection and structural stabilization.

Although the major work of structural engineering analysis and design was accomplished by specialists in the Denver Service Center, the preliminary investigation by Nicholas Gianopoulos, principal of the Philadelphia engineering firm of Keast and Hood Company, was an indispensable contribution.

The construction contract for all work in the amount of \$376,777 was awarded to J. S. Cornell and Sons, Inc., of Philadelphia, restoration specialists whose crews demonstrated a rare pride in craftsmanship. Henry N. Apodoca served as project supervisor and Gerald Karr as architectural

adviser. Both doubled as workmen within the terms of the cost-plus-fixed-fee construction contract. This type of contract, specially designed for certain restoration jobs, allows the National Park Service close control of the restoration process and the opportunity to perform special jobs with its own personnel. This was the first such contract awarded in its Philadelphia parks and one of the first such in the National Park System.

The adaptive interior is best described from the visitor's routing: enter on Pine Street to a ground-level orientation room with introductory exhibits; upstairs to exhibit space and the "restored Kosciuszko room"; through the rebuilt party wall to an audiovisual program in the twin house reviewing Kosciuszko's career during the Revolution; downstairs to first floor exhibits of various other Kosciuszko monuments and memorials; past a sales desk and attendant before exiting to Third Street from the twin house.

The "Kosciuszko room" is a conjectural restoration based on evidence found on the remaining masonry walls, furniture of the period, and personal articles known to have been in Kosciuszko's possession when he died in 1817. There are items of clothing and a crutch. The yellow pine flooring is from original sections found on the premises. The "vine meander" wallpaper is a contemporary pattern. The exhibit is protected by a glass wall. Audio messages in English and Polish describe Kosciuszko's life here. Robert Giannini of Independence National Historical Park did the Kosciuszko room exhibit; the Harpers Ferry Center designed the other exhibits and produced the audiovisual program. James Mulcahy and Tom Kleinman coordinated for HFC.