More Than a Building on Broad Street: A History of the Science Museum of Virginia, 1910-2017

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Table of Contents

A Note from the Author

I walked into the Science Museum of Virginia for the first time as an adult in 2015. Throughout my childhood in Newport News, my parents frequently took me to a variety of science centers in the Tidewater region. I gawked at the otters flitting through the tanks of the Virginia Living Museum; played a tune with my sneakers on the life-sized keyboard at the Virginia Air and Space Center; and touched a wriggling (and horrifying) horseshoe crab at the Virginia Aquarium. I had never, however, entered Broad Street Station to watch a movie in the Dome theater or explore the life sciences exhibit. Even at the age of 25, the Museum did not disappoint as I came to the Station just in time to catch a travelling exhibit on bicycles right before the start of my favorite sporting event, the Tour de France.

Though I learned much about the physics behind cycling and other scientific topics, it would take months of archival research and hours of in-person interviews before I started to understand the history behind the displays and the people who made them possible. The story was a long one, beginning far earlier than the 1970 legislative act that created the Museum. It was full of twists and turns, ups and downs, successes and failures. I, like many of the historical actors in the pages that follow, learned an invaluable, and less-than-obvious, lesson: legislating a state agency does not make it so. People, through countless waves of trial and error, build and operate a museum, state funding aside (if it exists in the first place). The six chapters of this text attempt to tell their story. While it is impossible to mention every individual who contributed to the SMV throughout its existence, I have tried to emphasize the human touch behind significant events, exhibits, and programs. Whether it be the idea that sparked an initiative or months of letter writing to secure donations, I characterized moments in the Museum's history as dynamic ones with, admittedly sometimes nameless, people on the ground making change happen. I hope that readers can picture even a fraction of the hard work revealed to me by thousands of archival documents.

Finally, I would like to thank several individuals who made this project possible. I feel particularly indebted to those who wrote shorter histories of the Science Museum or conducted oral history interviews in the past. To James O'Brien, thank you for recommending my name to the Virginia Academy of Science and for recording and preserving what memories remain of the Museum. Milton J. Elliott III and Thomas Driscoll also shared documents and memories with

me, including Driscoll's 1992 *A Brief History of Broad Street Station and the Science Museum of Virginia*, which is cited several times in the footnotes that follow. Thank you to the Virginia Academy of Science for funding this project and the William and Mary Department of History for allowing me to write a book while preparing for comprehensive examinations. The graduate director was right; it was very difficult. Special thanks to the staff at the Science Museum of Virginia for allowing me to explore institutional archives. Elizabeth Voelkel, Summer Pearce, and Richard Conti were particularly generous with their time. Thank you to the dozens of people who sat down with me for interviews, sometimes lasting hours longer than expected. Your words made the Museum come alive, helping me contextualize the evidence I found in physical documents. It was a privilege to speak with each of you. Special thanks to Charles D. Smith who lent me bags of relevant documents after our interview in Richmond. Lastly, I would like to thank my friends and family for supporting me throughout the project. In particular, I owe an immeasurable debt of gratitude to my partner, John N. Roach, Jr., who read every word of this manuscript and watched me despair when I feared failure. He now knows more about the Science Museum of Virginia than he ever dreamed possible.

Chapter 1

Getting Above Ground: The Humble Beginnings of the Science Museum of Virginia

The turn toward the twentieth century was a tumultuous time for the Commonwealth of Virginia. Politically, socially, and economically, the Old Dominion was in a state of flux as its citizens attempted to come to terms with events of the past while seeking a better future for their families. Virginians, searching for jobs and economic relief from the long-term effects of the panic of 1880, moved in ever-greater numbers out of rural regions and into urban centers. African Americans left the state in droves while white Virginians commemorated Confederate legacies in marble and enforced strict segregation laws.[1] Philanthropists like Lila Meade Valentine and Mary Cooke Branch Munford founded and invested in new educational organizations to boost literacy in the state and encourage the development of a more skilled workforce.[2] To top it off, Woodrow Wilson, a native of Staunton, was elected president of the United States in 1912—a college professor turned New Jersey governor who had left his home state for better professional prospects up north.[3]

With all the changes that a new century offered, few citizens would have thought to look in the basement of the Virginia State Library for yet another crucial development in the state's history: a makeshift display of natural history artifacts that would lay the groundwork for state-sponsored public science education in the Commonwealth. As specimens of minerals and timber piled up from the Jamestown Exhibition of 1907, Virginia legislators approved the use of the library's basement in 1910 to display the exhibits and any other artifacts that state agencies wished to donate.[4] When the library moved to its current location on East Broad Street, the State Finance Department made its home in the floors above what became known colloquially as the 'State Museum.'[5] However, with the passage of decades, the displays were forgotten by most Virginians until the basement was converted into office space for the Finance Department in 1964.[6]

In the intervening years between the opening and closing of the 'State Museum,' citizens of the Old Dominion witnessed two world wars, a depression, and the creation of a Museum of Science Advisory Commission in 1946 that failed to hoist the state's natural history displays out of their basement in post-war Virginia.[7] Nonetheless, the efforts of the early commission members were not made in vain—a new study commission, proposed by the Virginia Academy

of Science and approved by the General Assembly in 1968, would take up their task to create the first official state museum of science in Virginia.[8] This chapter recounts the struggles of these Virginians to offer a public educational opportunity in the sciences that other states like New York and Massachusetts had funded for years. And yet, their vision of a state museum differed greatly from the halls of dinosaur bones in the northeast and the geological specimens behind glass at the Smithsonian in Washington D.C. The 1968 commission wanted to embrace a new kind of science education that was beginning to gain traction with museum professionals: a science center with hands-on exhibits and demonstrations meant to shatter the glass of dull and dusty display cases. These hybrid museums were intended to teach, not showcase—preferably above ground.

Science Museums and World Wars: The 1946 Museum of Science Advisory Commission

It is impossible to understand the first attempt to build a state science museum in Virginia without first considering the ramifications of a conflict that shook the twentieth century: World War II. Though battles were fought largely on foreign soil, the changes this event wrought on international warfare, economic policies, and political realities were felt by Virginians as much as any other group of Americans. Virginians helped design and build the new weapons of war while their own businesses and agricultural practices were reshaped by the transformative economic and welfare policies of Franklin D. Roosevelt. U-Boat attacks in Virginia's own waters brought the war home as dead sailors washed up on Chesapeake beaches and baseball games were cancelled by Governor Colgate Darden's subsequent coastal blackouts.[9] In many ways life appeared different to Virginians who survived the nearly four years of U.S. involvement in World War II, and it would be up to state leaders like post-war Governor William M. Tuck to meet the challenges brought by these changes.

In a newspaper article printed August 16, 1946, Governor Tuck informed readers that "We are living in 'The Age of Science.'"[10] Warfare and weapons development in World War II made it clear to political leaders like himself that technological advances should not be ignored, but fostered—a decision that could bring economic prosperity to the rest of the state as it had in Hampton Roads with the wartime use of the Newport News and Norfolk Navy shipyards.[11] Even better, the promotion of scientific industries by Virginians could attract federal grants and

encourage national investments that brought capital to a job-seeking citizenry. Tuck had plenty of reasons to support the appointment of a Museum of Science Advisory Commission in 1946, and he did so with the hopes that public science education could foster "the brains" necessary to "make this Commonwealth a leader in the scientific field."[12] However much he likely wished to take political credit for the committee's creation, the real impetus behind its establishment lay in the hands of the Virginia Academy of Science, especially one of its wartime presidents, George Jeffers.

Dr. Jeffers, a native of Newfoundland, found a home in Virginia when he accepted a professorship in 1927 at Farmville State Teachers College, now Longwood University.[13] He spent his professional hours teaching biology to groups of women who wished to lead their own classrooms in Virginia's secondary schools. As much as Jeffers valued his position at the Teachers College, he did not limit the audience of his lectures to students in Farmville. Jeffers frequently spoke to groups outside the Commonwealth and was a member of organizations like the National Association of Biology Teachers.[14] In 1941, his work in the field of biology and experience teaching and advocating for the perpetuation of scientific fields in the classroom caught the attention of the Virginia Academy of Science (VAS), whose members elected him president that same year.[15]

Jeffers faced the task of leading the Academy when its membership dwindled with the outbreak of war. As he explained in his own account of the VAS in World War II, "most of the Academy members were functioning in the war effort in one way or another: of those that were left—mostly 4-Fs—were selling war bonds, serving on rationing boards, spotting airplanes, making speeches and riding in car pools."[16] Some members, including Jesse W. Beams, found themselves working at the highest levels of federal weapons design, including "the production of the atomic bomb."[17] As a result of this service, Academy membership dropped from an "all-time high of 912 in 1941 to 629 in 1945."[18] The decline in manpower, though disheartening, did not dissuade Jeffers from attempting to maintain an active role for the Academy in wartime Virginia.

In 1942, Jeffers encouraged the Academy's remaining members to continue pursuing their goals in an address at the organization's annual meeting.[19] He reminded his audience that "concern for the future of science in Virginia is one way to make the nation strong"—indeed, science was "decisive in the survival of the civilization in which we live," not just "a prime factor in fighting."[20] Even though the Academy had to cut back on their usual programs and

productions, including a temporary suspension of the *Virginia Journal of Science*, Jeffers hoped that Virginia's scientists would refrain from ceasing all of their professional endeavors for a war that, in his view, would not last forever.[21] His enthusiasm for "press[ing] forward vigorously with…normal affairs, but at an accelerated pace" made the creation of a science museum commission on the heels of peace treaties possible.[22]

Jeffers did not simply speak about moving scientific fields forward in Virginia, he acted. When Governor Tuck approved the Museum of Science Advisory Commission in 1946, he appointed Jeffers to serve as the Academy's representative on the five-person board.[23] Along with the biology professor from Farmville, the Governor singled out four more "distinguished members" of Virginia to "contribute immeasurable [sic] toward advancing this most vital type of knowledge": Dr. Ivey F. Lewis, dean of the University of Virginia; Dr. H. Rupert Hamner, a "laboratory chief for the American Tobacco Company"; Kenneth Chorley, acting president of Colonial Williamsburg; and Alice Pollard Stryker, a "prominent [individual] in civic and political affairs for many years."[24] The Commission was charged with the task of advocating for, and eventually establishing, a state science museum that would "do a great deal to encourage the interest of Virginians in scientific subjects and in making the state a leader in scientific research and development."[25] It was no small task, especially when the closest thing Virginia had to fulfilling that goal was actively being neglected in a basement under the Finance Department.

At its inaugural meeting in the "Old Senate Chamber" of the Virginia State Capitol, the Museum of Science Advisory Commission elected to work with what they had in the subterranean displays of the 'State Museum.'[26] After choosing Hamner to serve as chairman, Stryker as "corresponding secretary," and Jeffers as "recording secretary," the five members agreed that they needed to pursue two courses of action immediately: select a director for the museum and "prepare plans for putting the Financial Building into shape for museum use."[27] Unfortunately, they were unable to achieve either.

Though the state had supported the creation of a study commission, its legislators did not readily offer up financial assistance for constructing a new museum facility or providing staff salaries in the 1940s and 50s. The urbanization caused by World War II intensified in the post-war years, forcing the state to grapple with a plethora of new issues ranging from wage earnings to unionization.[28] Furthermore, the civil rights of African Americans could no longer be ignored

with the 1954 *Brown v. Board of Education* decision. When the Supreme Court ruled school segregation unconstitutional, white Virginians reacted with Massive Resistance. Senator Harry F. Byrd and his political machine, which touched every level of state government, devoted most of their time and effort to stopping desegregation. As a result, political issues seemingly unrelated to the "separate but equal" struggle—including the establishment of a state science museum—were neglected.[29]

The VAS, focused on its own post-war agenda, did not provide much assistance to the museum commission either. As Jeffers explained in his historical account, the *Virginia Journal of Science* proved more difficult than expected to revive because of funding issues caused by the war.[30] Additionally, most Academy members concentrated on Alan Gwathmey's attempt to establish a Virginia Institute for Scientific Research.[31] With these projects occupying the Academy's fundraising efforts and Massive Resistance dominating the state's attention, the Museum of Science Advisory Commission had nowhere to turn for money. The idea of a state-sponsored science museum lacked the resources and support necessary to transform it into a reality.

From Basements to Branches: Dr. Roscoe Hughes's Vision of a Statewide Network of Museums

While state politics and post-war projects in the 1950s had made the establishment of a science museum unlikely, a fortuitous convergence of events and people reignited public enthusiasm for a state museum in the 1960s. The initial spark came from one-last failed attempt by the General Assembly to enact a proposal for a "museum of science, archaeology, and natural history."[32] When that resolution died in committee, the Assembly voted to eliminate the 'State Museum' to make room for new offices in the Finance Department.[33] The 1964 closing of the neglected—and now homeless—displays caught the attention of several scientists in the VAS, particularly one past president, Dr. Roscoe D. Hughes.[34]

Hughes, a native of Dupont, Georgia, began his professional career in the U.S. Navy after graduating from the Naval Academy in 1927.[35] While on deployment, he became fascinated by literature on genetics, reading enough about the field to convince him to leave the service in 1930 and pursue a degree in zoology and genetics at Columbia University.[36] Following the acquisition of his doctorate, Hughes was drafted back into active service in 1941 and served in

World War II as a mine warfare observer.[37] When he returned to the U.S., Hughes accepted a professorship at the Medical College of Virginia in Richmond and served as Professor and Chairman of the Department of Biology.[38] It was not until 1965 that Hughes was elected president of the Virginia Academy of Science. By the 1960s, he had involved himself in enough community programs and teaching opportunities to conclude that "ideas are adventure and learning is fun."[39] It was this belief that motivated his interest in a Virginia science museum, specifically one that engaged audiences with displays far grander and more interactive than those being disassembled in the basement of the Finance Department.

Hughes took advantage of the financial stability of the 1960s to convince first the VAS, and eventually the Virginia General Assembly, that establishing a state science museum was still a worthy investment. He looked for other like-minded members of the VAS to form an internal committee that would draft a resolution requesting the creation of another museum study commission at the state level.[40] Hughes found allies in Academy members James W. Midyette, and Foley D. Smith. Together, they assembled a document explaining how "the improvement of education and the need for educational resources" was a "most urgent priority in Virginia."[41] "All citizens of Virginia," they wrote, "need the opportunity to become more scientifically oriented and motivated" as "the role that science plays in technology vital to the continued economic and industrial growth of Virginia" was only expanding.[42] On May 4, 1967, Midyette read their Resolution on a Museum of Science to a conference of Academy members.[43] He requested that the VAS reaffirm "its endorsement of the establishment of a functional state museum of science" by approving their resolution and sending it to the Governor to "use his good offices to promote and further the objectives for which the Virginia Museum of Science Commission was established in 1946."[44] After Hughes moved for the resolution's adoption, the Academy members present passed it with enthusiasm.[45] Now that the VAS was brought back on board, Hughes and his supporters had to convince Governor Mills E. Godwin, Jr. and the Virginia General Assembly.

In his first term as governor, Mills Godwin was a proponent of advancing Virginia's educational opportunities throughout the state. Only one year before the VAS adopted Hughes's museum resolution, Godwin had helped secure state funds for the newly-established Junior Nature Museum and Planetarium in Newport News; a joint effort by the Junior League of Hampton Roads and the Warwick Rotary Club to bring localized public science education to the

Tidewater region.[46] With the state's economy on stable footing and the Governor's proven interest in education, Hughes and the VAS were optimistic when they brought their resolution before the Virginia government. In 1968, the General Assembly approved the creation of a new State Museum of Science Study Commission and Governor Godwin appointed its members shortly thereafter.[47]

The new five-person study commission consisted of a mixture of state legislators and representatives from the Virginia Academy of Science, including Dr. Hughes.[48] The first objective of the Commission was to hold a series of public hearings to determine exactly what kind of museum Virginians wanted in their state. Beginning in 1968, the Commission held a total of five hearings in different cities across the Commonwealth, including Richmond, Norfolk, Fairfax, and Roanoke.[49] They attracted attendance from a variety of community organizations, including "hobby groups, boy scouts, garden clubs, PTA, AAUW, and the Virginia Academy of Science."[50] The Commission recorded "no opposition whatever to the museum" in their *Resume of Public Hearings*; the only "possible opposition" came in the form of two letters submitted to the Commission "on the grounds of possible competition for State funds."[51] Indeed, scores of business representatives and scientists wrote letters supporting a state-sponsored science museum, often offering suggestions for content or organization.[52] For example, Edwin Cox, III from the American Institute of Chemists recommended that the museum include "a display showing the importance of chemistry and chemicals to the Virginia economy."[53] Cox did admit "it is always dangerous in such things that too many people want too much done, and there always are too many 'pet projects,'" but his observation did not prevent him from submitting several other exhibit ideas to the Commission.[54] From the outpourings of approval at hearings to the encouraging words in letters, the new Commission had managed to secure what the 1946 Commission crucially lacked: public support.

Armed with suggestions and input from a wide-range of Virginians, the Commission proceeded to craft their vision for a state-sponsored science museum. Before the hearings, Dr. Hughes hoped to oversee the creation of a fun and interactive museum for all ages. Luckily for him, Virginians agreed with his proposal, advocating for a "dynamic and modern" facility that made use of "the innumerable technological advances in recent years—film, plastic models, TV, computers—to mention a few."[55] Furthermore, the public reacted positively to a specific two-pronged institutional mission: "education and motivation in science."[56] Virginians wanted to

visit a museum that would teach them and their children about scientific concepts in a way that could inspire a new generation of professionals. Finally, the public hearings revealed that one museum would not be enough to service the Commonwealth; Virginians were interested in "an effective state-wide museum complex" with a "museum center supplemented by local satellites, mobile units and moveable exhibits."[57] Gone were the days when a basement worth of natural history displays could service a state—Virginia's cities were evolving into robust population centers with a plethora of communities that could benefit from institutionalized public science education.

In 1969, the State Museum of Science Study Commission published a report to showcase their vision for a modernized state-wide complex of science museums.[58] That complex, they argued, would "be one of quality as befits the status and traditions of Virginia" and "be so organized and administered that it will serve all regions of Virginia…to complement science education at all levels of learning from the elementary school through the university."[59] In order to serve these purposes, the system would be managed from a centrally-located hub, referred to as "The Science Museum Center," and be responsible for "coordinat[ing], on the basis of mutualism and upon invitation, science museum activities throughout the State."[60] The Commission conceived of this Center as a hybrid institution that engaged in the "collecting, preserving, and exhibiting [of] Virginia artifacts and natural objects" while "making use of modern technology and special educational programs to show the dynamism of science."[61] In contrast, the content of each regional branch would center around a specific theme, such as natural history, technology and industry, limnology, and physical science.[62]

Though the report implied that Richmond would be the best location for the Science Center, it did not specify which cities the individual branches would call home. A group of science museum enthusiasts in Roanoke became acutely aware of this omission and sought to bring the Western Division to their front doors. In 1969, several participants from the Roanoke public hearings came together to form the Science Museum Association of Roanoke Valley (SMARV).[63] The organization was composed of a wide cross-section of Roanokers including members of the "Junior League, educators, Garden Clubs, science-related hobby groups" and more.[64] SMARV depended entirely upon the voluntary participation of its members; it lacked a physical place of operation and had "no paid staff."[65] Members simply paid dues to support any projects the Association approved. SMARV was committed to seeing the network of science

museums become a reality—especially if the success of their efforts resulted in the installation of an educational facility in Roanoke.

Once the study commission published its report, the next step in creating a system of state science museums was to introduce legislation in the General Assembly. Both SMARV and the VAS played crucial roles in this process. Members of SMARV garnered local support through a series of public meetings and contacted legislators to encourage them to sponsor a bill.[66] Likewise, the VAS created the VAS Museum of Science Fund to lend financial legitimacy to the planning phase of the science museum network, pending legislative approval from the state.[67] In a public release announcing the fund, the Academy explained that it "believes such a museum would be an asset of continuing value to Virginia's secondary schools, its colleges and its adult population and is proud to be of service in helping to fund the Commission's work."[68] The VAS also made an initial donation to the fund of $1000 to be "made available to the Commission for unrestricted use as it sees fit."[69] Through a combination of the overwhelmingly positive public support reported at the Commission's hearings and the official commitments of SMARV and the VAS, Dr. Hughes had a plethora of tools at his disposal to pressure the Virginia legislature to pass a bill creating the state's first system of science museums.

In January of 1970, local press outlets began to report heavily on the Commission's attempt to pass a bill through the General Assembly. In the process, more details about the science museum network were fleshed out and the text of the bill was formalized. For example, the *Virginia Outdoors* magazine broadcast the official list of divisions to be included in the Commission's bill.[70] Six regional museums were to be located around the Science Center, each representing one of the following fields: "physical sciences, botanical sciences, natural history, industry and technology, oceanography and limnology and the zoological gardens division."[71] Additionally, the museum would be "financed primarily by the State in the initial stages and increasingly in later stages by private citizens, private foundations, admission charges, local and federal sources."[72] As a result, the bill would include an appropriations request for funds from the state—an addition that, in a more prosperous economic climate, would not pose a threat to its passage.

Regardless of the seemingly optimistic climate that the study commissioners found themselves in, Dr. Hughes, SMARV, and the VAS coordinated an outreach campaign to local legislators immediately before the bill was set to hit the Assembly floor. Milton J. Elliott, III—

the first official employee of the Science Museum of Virginia—recounted this moment in a 1983 article for the *Richmond News Leader*. He explained, "One by one Hughes cornered Delegates and Senators. He opened with 'I'm just an old, broken-down college professor…,' but he didn't let the legislators off the hook until they were converted."[73] Meanwhile, leaders of SMARV reminded their members to "make their views and wishes known to their duly elected representatives" in presentations given at public and private meetings throughout the state.[74] "This is an Excellent Example of the Democratic Process In Virginia," a transcript of one presentation reads in all capital letters.[75] The Science Museum of Virginia was to be "Established: Of the People, By the People, For the People."[76] Vera B. Remsburg, a biology instructor and VAS member, testified to the success of these efforts in a letter dated February 3, 1970. She explained to D. Rae Carpenter, Jr., another VAS member and soon-to-be trustee of the Science Museum of Virginia, that "in recent weeks I have been in contact with several senators from various parts of the state, all of whom assured me that they will support the bill."[77] Dr. Hughes knew all too well the history of struggle and failure that plagued the first study commission's efforts to establish a state-sponsored science museum. He, and other allies of the project, would not let the Assembly forget the enthusiasm that so many constituents harbored for the Science Museum of Virginia.

On April 30, 1970, Senate Bill No. 8—as the Science Museum of Virginia (SMV) legislation came to be known—was considered and voted on by the Virginia General Assembly.[78] The bill passed "in the waning hours of the 1970 Assembly" and the SMV was officially "created and funded in the amount requested by the Study Commission": $66,500.[79] This feat was achieved in no small part by Delegate Roy Smith from western Virginia who, with the aid of "his House Appropriation Committee," "gave life to Senate Bill #8 by appropriating requested funds."[80] The bill outlined the six-division concept floated in the press months before and dictated the process by which the Governor would appoint a board of trustees. More importantly, Senate Bill No. 8 laid out the official goals of the SMV which were taken verbatim from the Commission's 1969 report. These included:

> To deepen our understanding of man and his environment; to promote a knowledge of the scientific method and thus encourage objectivity in the everyday affairs of man; to educate citizens of all ages in the concepts and principles of science and how these concepts and principles form the foundation upon which rests our technological society and its economy; to motivate and stimulate young people to seek careers in science; to encourage an understanding of the history of scientific endeavor; to provide special

> facilities and collections for the study of Virginia's natural resources; and to foster a love of nature and concern for its preservation.[81]

The SMV legislation outlined the very institution that Virginians advocated for in the Commission's public hearings: a state-wide museum system that educated visitors of all ages and motivated them to pursue scientific knowledge in their daily lives.

The passage of Senate Bill No. 8 was a clear victory for all those involved in the 1968 study commission's attempt to bring state-sponsored public science education to Virginia. Their success was no small achievement and required countless hours of public outreach and advocacy. As Dr. Hughes explained in a letter to museum supporters, "after 27 years of effort by many dedicated people, it appears that we are in business at long last."[82] And yet, in many ways, the most difficult job was still to come: planning, funding, and building each of the Museum's regional divisions and the central hub.

Planning the SMV: Assembling a Team and Identifying Regional Locations

The time between the legislative creation of the SMV and its first official planning report was a busy one filled with meetings, interviews, and a copious amount of letter writing. Those charged with bringing the Museum to life had no shortage of tasks to complete. From January 1971 to February 1972, the Museum needed to assemble its first staff, welcome a newly-appointed board of trustees, and maintain local support across the state. All the while, different localities petitioned the SMV board to house regional divisions, hoping to bring a part of the Museum to their hometowns.

Per Senate Bill No. 8, the Governor was required to appoint the SMV Board of Trustees. Though Mills Godwin oversaw the drafting of the bill, his term ended shortly thereafter, leaving newly-elected Governor A. Linwood Holton Jr. to sign and carry out the legislation.[83] Thankfully, Hughes and other members of the study commission had approached Holton before he took office to secure his approval of the SMV project. Governor Holton was a self-proclaimed moderate who attempted to balance his advocacy for conservative fiscal strategies with the promotion of more progressive social policies.[84] A pillar of his 1969 gubernatorial campaign centered on the importance of state-sponsored education initiatives; a position that he adopted in no small part because of Senator Harry Byrd's racially-motivated opposition to new

busing regulations aimed at integrating Virginia's public schools.[85] Holton, known nationally for complying with supreme court rulings on busing and allowing his daughter to attend a majority-black high school, welcomed opportunities to improve the state's educational resources.[86] In January 1971, he appointed nine members to the SMV Board, including Roscoe Hughes as chairman.[87]

While the SMV now had an official group of individuals to make decisions for the Museum, it still lacked an operational staff and headquarters. In April 1971, the Board filled both disparities. On April 11th, Dr. Hughes hired the Museum's first contractual employee, Milton J. Elliott, III.[88] Elliott worked for an ad agency shortly before accepting his position with the SMV. He had a background in journalism and public relations, making him an asset for the budding institution that needed to maintain a positive image with Virginia's citizenry.[89] The next day, the SMV brought on a secretary, Martha Ann Ellis, to aid Elliott in any clerical duties associated with the carrying out of "day-to-day planning and logistics."[90] Dr. Hughes managed to secure office space for the two new employees in the Virginia Institute for Scientific Research located on the University of Richmond campus.[91] On the second floor of the Institute, the small Museum staff was surrounded by "rows of bubbling beakers, gurgling test tubes, and ominous brown-tinted jugs of assorted chemicals, tended by very official individuals in very official white coats."[92] According to Elliott, the "Science Museum listed as equipment (all borrowed): two desks (fractures and scarred), two chairs (one a little twisted, with a recalcitrant roller), one typewriter (manual), some rubber bands and paper clips, and the Museum pencil."[93] Regardless of whether or not the "equipment may have been distressed and the environment less than admirable," Elliott believed "the dream was alive and well."[94] The Science Museum of Virginia now had a base of operation—complete with a Bunsen burner to heat cups of coffee.[95]

Once the office was up and running, the Board of Trustees began its search for the best locations to house each of the SMV's regional branches. Early on, the Board agreed that the central hub should be located in Richmond—the exact site in the city was still up for debate. In May 1971, the Trustees adopted a policy to accept regional locations only if land was donated to the Museum by public or private entities—purchasing plots would be far too expensive and defeat the charitable purpose behind a statewide effort to educate the public.[96] The Board also agreed that population centers, such as Lynchburg, Norfolk, and Roanoke, should be given

priority when choosing regional sites.[97] Little did the Trustees know that organizations within each of these cities and more were already interested in hosting one of the SMV's divisions.

As early as May 1971, representatives from different Virginia cities reached out directly to the SMV Trustees for a moment of their consideration. The Norfolk Chamber of Commerce was one of the first institutions in Tidewater to "strongly endorse the development of a Virginia Museum of Science and Natural History," currying favor with the Museum's Board.[98] A month later, representatives from SMARV and the city of Roanoke met with the Trustees to offer them access to three possible sites for a Western division of the Museum: Glenvar School (60 acres), a tract off Interstate 81 on the side of Mill Mountain (roughly 100 acres), and a site adjacent to the Veteran's Hospital (roughly 40 acres).[99] Roanoke and the SMV Board alike preferred the Mill Mountain site—a promising commercial work-in-progress that currently housed the iconic Roanoke star.[100] However, no site could be officially chosen without a comprehensive evaluation of the land and its resources—especially one that sat atop a mountain. In January 1972, Lynchburg City Council passed a resolution requesting the SMV to consider the Blackwater Creek area as the potential location for a Piedmont division. Shortly thereafter, the SMV received word from the newly-created Portsmouth Science Museum Advisory Commission that they had space for a Tidewater division on Frederick Campus, a 750-acre tract of land previously associated with Tidewater Community College.[101] In the midst of all these suggestions, the Board decided to formally capitalize on the regional attention it was receiving and passed a resolution approving the creation of semi-formal museum commissions across the state. Though the Trustees could not officially endorse any site until further planning was carried out, they could buoy the support they received by acknowledging the efforts of local associations and encouraging the formation of more commissions devoted to the statewide construction of the SMV.

In the midst of meeting with organizations about regional divisions, the Trustees set their sights on a possible location for the Science Center in Richmond: Byrd Park. After a visit to the park in August 1971, Dr. Hughes believed that the site "presented a real opportunity for local interest to be demonstrated."[102] He saw potential for cooperation between the SMV and other park associations, such as the Maymont Wildlife group, to transform the science museum into a reality.[103] Hughes also hoped that the central hub of the SMV would include a botanical garden; few places in the city were as amenable to these plans as the natural landscape of Byrd Park.

The Richmond City Council agreed that the area would be suitable for a museum. In September 1971, the council passed a resolution "urg[ing] the Board of Trustees…to 'Give consideration to establishing facilities of the Science Museum of Virginia in the Williams Island-James River-Byrd/Maymont Park area of the City.'"[104] The site appealed to them because it was "centrally located in the most densely populated part of the Richmond area"; "easily accessible by public bus transportation"; in "close proximity to a large number of public schools"; and "possess[ed] an inherent visual interest and natural beauty."[105] After receiving such strong words of approval from the Richmond City Council, the SMV Board voted to approve the use of Byrd Park for what would become known as their Capital Division.[106]

A little over a year after Senate Bill No. 8 became law, the Science Museum of Virginia had a board of trustees, staff, and base of operations. To top it off, private associations and city governments across the state continued to offer land for the construction of regional divisions. The next step in building the SMV was to procure a planning report from a reputable architectural firm. Only then would the Board and its backers get an informed glimpse at the costs associated with their project. Once the SMV secured this information, fundraising could begin in earnest.

First Planning Report and Creation of the Science Museum of Virginia Foundation

In 1972, the SMV Board hired a Lynchburg-based firm to assemble preliminary planning reports for the multi-division museum network. Wiley & Wilson, Engineers, Architects, and Planners published five reports in total: one outlining the entire SMV system and four more detailing the Capital, Tidewater, Western, and Piedmont divisions.[107] Due to the anticipated costs associated with each regional site, Wiley & Wilson suggested limiting the SMV to four divisions as opposed to the originally-conceived six.[108] In lieu of this change, the Capital Division would now serve as a physical sciences facility instead of a general science center.[109] Additionally, certain branches—such as the botanical and zoological gardens—could be combined with existent divisions, including the Capital Division (if located in Byrd Park) and the Tidewater Division.[110] While the firm's proposals were made primarily with cost in mind, Wiley & Wilson believed that limiting the system to four divisions would also allow the SMV to focus

its resources more efficiently, ensuring that all facilities "inspire civic pride in each of the communities where they are located" and "be the best of their kind."[111]

Once the public digested the findings of Wiley & Wilson's reports, some people were happier with the firm's conclusions than others. Residents of Richmond would now have access to the largest branch of the Museum—a 3 million-dollar facility devoted to the physical sciences *and* the operation of all other divisions.[112] If Dr. Hughes's plan for a botanical garden succeeded, Richmonders would disproportionately benefit from Wiley & Wilson's decision to reduce the number of regional divisions. Members of SMARV were taken aback by the report which advised the Board of Trustees to build the Western Division on the summit of Mill Mountain as opposed to the eastern slope agreed upon a year earlier.[113] The firm argued that the side of the mountain was "rough and the view is not especially attractive."[114] While construction on the summit would require relocating the Roanoke Star, Wiley & Wilson assured potential objectors that "another location for this star on Mill Mountain could be found in the master planning stage."[115] Jack Goodykoontz, the president of SMARV, told local newspaper outlets that the Association was "fully willing to cooperate and to entertain reasonable proposals as to where the museum shall be located, but we feel that conferences should be had with all responsible agencies and parties."[116] The *Roanoke Times* reported that Dr. Hughes "changed the [SMV's official] press release to refer to the proposed location of the Roanoke regional museum as Mill Mountain, not the 'summit' of Mill Mountain" after a "meeting with the advisory committee."[117] He had no intention to insult SMARV by keeping them out of negotiations and stressed "this report…is a very preliminary phase of our total planning program, and is intended for study purposes only"—final decisions would not be made until the Museum drafted a master plan to submit to the state.[118]

Despite the mixed reviews that Wiley & Wilson's report received, the Board of Trustees voted to accept the firm's findings in May 1972.[119] Regional locations—though largely identified—could be negotiated in future meetings with science museum associations across the state. The inherent value of the report was supplied by its professional affirmation and evaluation of a multi-site museum.[120] Now that the Board had a realistic estimate of the costs associated with such a plan, they could take concrete steps to raise the money necessary to construct each of the regional divisions.

After a series of meetings with legislators in the spring of 1972, Dr. Hughes quickly realized that funding all four divisions of the SMV simultaneously would be impossible.[121] The Board did not have the necessary level of financial support from the General Assembly nor the internal infrastructure required to accept large donations from private citizens. As a result, the Trustees voted to pursue the construction of one division at a time, beginning with the Capital Division.[122] The SMV could oversee the planning of other regional branches in the meantime, but the funding for these activities would come from a combination of state and locally-raised dollars.[123] In addition, the Board created the "non-profit, non-private" Science Museum of Virginia Foundation to manage individual and corporate donations.[124] Chartered July 12, 1972, the Foundation included directors "elected by Trustees" and "officers elected by Directors of the Foundation."[125] The SMV now had an independent fundraising arm to help the Board solicit, record, and collect donations. With this financial infrastructure in place, the Trustees focused their attention on a new task: choosing an associate director for the Capital Division.

Hiring an Associate Director and Crafting a Master Plan

Shortly after the Board chartered the Science Museum of Virginia Foundation, the SMV attracted a high-profile donor: Governor Holton. In August 1972, Holton gave $5,000 to the Museum from his discretionary fund in the hopes that "the seed continues to grow!"[126] This signal from the Governor was a positive one; Roscoe Hughes viewed the gift as "a strong indication of [his] confidence in the Museum program."[127] Indeed, the Governor's confidence was contagious. Private donors from across the state pledged gifts amounting to roughly $30,000 once word of Holton's financial contribution hit the local air waves.[128] But Hughes and the SMV Board knew that the initial success of the Foundation would not continue without further progress. Two immediate steps were necessary: find an associate director to attach a public face to the budding Capital Division and craft at least one divisional master plan to convince the General Assembly that the Museum remained a viable investment.

The SMV began its search for an associate director in July 1972.[129] Whoever held the position would be "primarily responsible for operation and administration of the Physical Sciences unit of the Capital Division facility."[130] In addition, the associate director "would also serve as Acting Director of the Science Museum and Acting Director of the Capital Division

until these positions are filled."[131] The Museum needed a charismatic and qualified individual to represent the regional divisions in public, making them that much more of a reality to Virginians.

In October 1972, the SMV Board found their associate director after a series of interviews: Dr. Paul H. Knappenberger, Jr.[132] With a doctorate in astronomy and leadership experience in the museum field, he was a perfect fit for the SMV. Before taking his new position in Virginia, Knappenberger served as "director of the astronomy program and observatory" at the Fernbank Science Center in Atlanta.[133] He was also no stranger to the limelight. Knappenberger had "participated in NBC's coverage of the Apollo missions to the moon, supplying professional comment on the various aspects of the mission, conducting classrooms on the air, and supplying the nation their first view of the Apollo spacecraft in trans-lunar and trans-earth coast."[134] On March 7, 1970, Knappenberger attracted positive press for the Fernbank Science Center by leading "a team of scientists, teachers, and students into the area of totality" for a solar eclipse "where experiments in astronomy, meteorology, and biology were conducted."[135] He knew how to work with visitors face-to-face and communicate scientific concepts in easy-to-understand ways—two indispensable skills for the operation of a state science museum. The Trustees expected Knappenberger to excel on camera and in the classroom, attracting public interest in museum activities and dollars from private donors.

While the SMV's search for an associate director was successful, the Board's attempt to craft master plans for regional divisions encountered resistance from state and local sources. In early 1972, the SMV submitted a capital outlay request to the General Assembly for $165,000 to fund "schematic, preliminary and working drawings for the Capital Division (Richmond Region) Museum facility, and master plans for three other regions under study."[136] The Foundation had raised enough private funds to cover the remaining cost of a master plan for the Capital Division, but without support from the state, those plans would be left undeveloped, unable to progress to the design stage. Fundraising efforts for regional plans would also be hindered if the state refused to offer some amount of money for private donors to match. Initially, the Board was optimistic that their request would be granted; the Governor included the funds in his biannual budget.[137] However, the General Assembly "deleted" the capital outlay request, leaving the Museum with potentially no state funding to support their planning initiatives for two years.[138] Though the Governor was willing to financially back the SMV in its entirety, the General

Assembly grew progressively uneasy with the amount of money needed to construct a state-wide museum network.

As Dr. Hughes attempted to petition Virginia legislators to amend their budget, the Board of Trustees met with representatives from all the proposed regional sites to coordinate a plan of action. Of the cities being considered for the Tidewater Division, the Board identified Norfolk as the only area that could immediately offer funds for a master plan; this capability edged Portsmouth out of the running for a branch of the SMV.[139] Meetings between SMV officials and residents of Roanoke and Lynchburg put pressure on local governments to find money that the state refused to give. By December 1972, the city seats of Roanoke and Lynchburg had each appropriated funds to underwrite master planning in their areas; with Roanoke offering $8,750 and Lynchburg $10,000.[140] Though essential, these funds were not delivered in time to publish regional master plans in conjunction with the Capital Division report released in December 1972.

The SMV Board hired a Baltimore firm to prepare and release the Capital Division master plan. RTKL, Inc. produced a report that fleshed out the Richmond facility's thematic focus on the physical sciences, including space for anticipated exhibits related to physics, chemistry, and astronomy.[141] The plan satisfied the Board of Trustees by reaffirming the viability of a multi-site museum. However, the details in RTKL's report ignited public criticism from a prominent member of Virginia's intellectual community: Howard A. MacCord.

Col. H. A. MacCord was chairman of the Museum Advisory Committee for the Archaeological Society of Virginia; an organization that sought to establish a museum of history *and* science in the state.[142] In some of the earliest discussions between the Virginia Academy of Science and the 1967 Science Museum Study Commission, MacCord had expressed dissatisfaction with the idea of a science-only museum.[143] As Carpenter later explained in a letter to local political leaders, "the Virginia Academy of Science was not in favor of placing a heavy emphasis on history (of man) except insofar as there was a peripheral interest in the history of science."[144] MacCord's objections were overruled by the Academy, but the 1972 master plan rekindled his dissatisfaction with the SMV concept, especially the formal planning of a Richmond-based museum devoted solely to the physical sciences.[145] MacCord outlined his displeasure with the "so-called Masterplan" in a series of letters to members of the SMV board and the Virginia General Assembly.[146] He argued that the study of science could not be divorced from examinations of civil and political history.[147] Furthermore, he criticized the master plan for

describing the Capital Division as a wholly educational institution. "Education," he wrote, "while of primary importance, it is not the sole purpose. Collections and their care and study are essential."[148] MacCord envisioned a museum that served scholars as much as the public, with extensive research labs in addition to exhibit space.[149] His criticisms of the SMV went beyond the Capital Division—MacCord wanted the state to reevaluate the entire science museum system.

In December 1972, MacCord asked his local delegate in the Virginia General Assembly to introduce a "clarifying resolution in the 1973 session" that "Virginia should no longer be one of the few states without a decent State Museum for historical and scientific specimen ."[150] He called for the SMV to incorporate "the many-facetted science of Anthropology—the Science of Man" and other more history-oriented fields.[151] While MacCord's request represented legitimate concerns from the Archaeological Society of Virginia, it came at a time that threatened the viability of the SMV which was already facing mounting suspicion from state government. Shortly after MacCord submitted his resolution to the General Assembly, D. Rae Carpenter, Jr., a new member of the SMV Board, sent several appeals to delegates throughout the state requesting that they defeat the resolution and leave the SMV as it was originally designed in Senate Bill No. 8: a system of science museums.[152] Meanwhile, Paul Knappenbeger reached out to other museum professionals and asked their opinion about museums that attempted to present scientific and historical information to the public.[153] Victor J. Danilov, treasurer and secretary of the newly-established Association of Science-Technology Centers, explained to Knappenberger that "it is possible to combine history and science, as the Smithsonian does in Washington, but such institutions usually do not have the same scientific and visitor-participation emphasis found at most science/technology centers."[154] In fact, such institutions "frequently fail to communicate a real understanding and appreciation of science and its role in society and industry."[155] For the sake of the SMV's organization, funding, and potential effectiveness, the SMV Board, Foundation, and staff needed to defeat MacCord's resolution in opposition to the Capital Division's master plan.

Conclusion: Divisional Concept in Jeopardy

Thanks to the relentless letter writing of Carpenter, Hughes, and other SMV supporters, the 1973 General Assembly opted not to adopt MacCord's suggestions. However, the doubt that his resolution sowed in the minds of Virginian delegates and senators contributed to an unforeseen and significant change to the SMV's legislation. In an appropriations bill, the General Assembly "limited the system to one site" by "authorizing construction plans for 'not more than one science museum facility.'"[156] Since the Capital Division was the only regional facility with a complete set of master plans, the Board had no choice but to move ahead with its construction before the Western, Piedmont, or Tidewater divisions.

The Assembly's bill was an emotional blow to all who were involved in the SMV project. Members of SMARV were particularly offended by the legislative change which appeared to serve the capital region at the expense of western Virginia.[157] Most of all, the government's actions ran contrary to the success and support that the Science Museum of Virginia experienced since its 1967 revival. The SMV had come a long way from the neglected and forgotten exhibit space in the basement of the Finance Building. The statewide system of museums was backed by associations throughout Virginia, committed to the expansion of public science education in the Commonwealth. The Museum had a board, a foundation, and a small but growing staff to nurture the budding project into existence. It had even managed to capture the full support of two governors who prioritized educational reform in the state. And yet, the General Assembly became progressively uneasy about funding such an extensive project, even though it had been significantly scaled back to four regional divisions, from the six proposed Senate Bill #8. If the Science Museum of Virginia was to service the entire state as originally conceived, those in support of the system would have to rally together and pressure the legislature to loosen its purse strings. Persistence was primarily responsible for exhuming the 'State Museum' in 1970; Hughes, Knappenberger, and others were determined to keep the SMV—with all of its regional divisions—above ground.

Chapter 2

Persistence, Compromise, and Mobile Science Units: Saving the Science Museum of Virginia

After the General Assembly refused to fund the construction of more than one division of the Science Museum of Virginia, time transformed shock into action. In an interview with the *Roanoke Times*, Paul H. Knappenberger, Jr., the new associate director of the Capital Division, explained that the Assembly's decision "does not mean abandonment of plans for a statewide science museum system."[158] Indeed, Knappenberger understood the state's actions to be "a blinking light that tells us to slow down," not stop.[159] The SMV Board planned to press forward with the construction of a facility in Richmond and advocate for funding more regional divisions when the legislature was once again willing to support the project in its entirety.

Meanwhile, members of the Science Museum Association of Roanoke Valley were willing to "go it alone if necessary," as a local newspaper put it, and use their year without state funding to mobilize support for a science museum in Western Virginia.[160] By January 1974, SMARV had assembled a pamphlet outlining a two-pronged plan of action for its members: "make efforts to seek modification of legislation to allow more than one division of the State Museum in accordance with the original intent and plan" and "continue on the local level with planning for a science center in Mill Mountain Park regardless of the outcome of efforts to become a part of the State Museum."[161] In order to achieve their goals, SMARV would need to obtain "a substantial portion of the construction costs" from private "gifts and subscriptions even if the center becomes a unit of the State Science Museum."[162] The hope of bringing an SMV division to Roanoke was not dead. The unwillingness of the state to fund such projects in their entirety, however, was evident and expected.

Though Knappenberger and members of SMARV were ready to move forward with the SMV in some capacity, not all Museum affiliates were optimistic. The Board of Trustees experienced a wave of resignations following the General Assembly's appropriations bill. Each Trustee had their own personal reasons for leaving the Board, but all expressed dissatisfaction with the lack of commitment from the Virginia Legislature in their resignation letters to the Governor. As Harold Soldinger explained in March 1973,

> In all candor, I feel that the legislature did not afford the Trustees the apposite support needed. The Science Museum was to be a reality when it passed the legislative process

> in 1970. Realizing the plight of the cities, the state and the need for cost controls, the Board of Trustees requested a minimal amount of money needed for master planning in order for the Science Foundation to raise building funds. Needless to say, the money was not forthcoming.[163]

Like others taken aback by the Assembly's actions, Soldinger expected the state to support an institution it created. In his eyes, "Dr. Roscoe Hughes and the other Board members have done an outstanding job and made much progress in spite of the money obstacles"—a feat that he believed should be rewarded by the legislature.[164]

Despite the losses that the Museum experienced immediately after the cut in state funding, there was still much work to be done to construct the Capital Division. The SMV had to persuade the public that it could recover from significant financial blows. Indeed, the Museum would only face more obstacles in the near future, necessitating persistence and compromise to survive. The SMV Board still had the site at Byrd Park to look forward to—for now.

Moving Forward with the Capital Division: Planning to Build a Physical Science Center

1973 was an eventful year for the Science Museum of Virginia. In addition to losing funding for its regional divisions, the SMV acquired new office space, sponsored investigatory trips to science museums abroad, and attracted significant donations to continue designing the Capital Division facility. The Governor appointed a series of new Trustees and the Board experienced a change in leadership when D. Rae Carpenter, Jr. was elected chairman. The circumstances surrounding the SMV may have changed, but the goal of the project remained the same: deliver interactive and meaningful public science education to as many Virginians as possible.

From the SMV's inception, the Museum staff had shared office space with the Virginia Institute for Scientific Research. While topical, the location did not provide the SMV with the legitimacy it needed to boost the confidence of donors and legislators alike. The Museum was a state agency after all; its headquarters needed a new home. On February 1, 1973, the SMV moved its office to 217 Governor Street, "just behind the Governor's mansion," as Knappenberger stressed in his memorandum to the Board of Trustees.[165] Hughes informed the Trustees that "we will occupy some 1,200 square feet of office space; while another 2,000 square

feet will be set aside in the same building for storage of collections and exhibits having significant quality for future use."[166] If the Capital Division was going to become a reality, the Museum would need space to store donations of all kinds, including those intended for exhibits. The staff's equipment was also scheduled to be upgraded; Hughes authorized the ordering of "furniture and storage cabinets" along with "stationary reflecting the address change and new Trustees."[167] The Assembly's budget cuts may have set the Museum back in its plans for a statewide system of museums, but the new office space on Governor Street offered a fresh start to the Capital Division project.

Knappenberger and the SMV Board spent the remainder of spring 1973 identifying more specifics to aid in the design process of the Richmond facility. They scheduled several trips to successful science centers and museums across the United States to observe effective (and ineffective) exhibit themes, teaching techniques, and building layouts.[168] The most influential institution on the Board's evolving vision for the SMV was the Exploratorium in San Francisco, California.[169] A recently opened center, the Exploratorium was designed by physicist Frank Oppenheimer, brother of J. Robert Oppenheimer, both of whom participated in the Manhattan Project to design the atomic bomb.[170] Though known best for his work on the Project, Oppenheimer desired to improve science education in the United States later in his life, preferring hands-on learning to the more traditional memorization techniques that characterized his own childhood instruction.[171] In keeping with his vision, the center included different exhibits and stations that allowed guests to learn first-hand how the laws of science governed the natural world.[172] The Board concluded that whatever the Capital Division would be, it needed to provide guests with a similar, immersive educational experience.

Shortly after their return, Mary Ross Scott Reed, a member of the Board of Trustees, pledged a significant gift to the Museum in the hopes of pressuring the legislature to offer more funding.[173] Her trips with the SMV staff revealed the potential that such a project possessed; it would take commitment from the state to build a center with enough resources to adequately serve the Commonwealth. Reed had quite a history with the SMV by the time she made her gift in April 1973. She began her work on the Museum in 1968 as a member of the Science Museum Study Commission and was "appointed to the original Board of Trustees of the Museum in 1970."[174] Reed knew all-too-well the ups and downs that the project had experienced thus far, and crafted her donation accordingly. In a letter to Hughes, Reed explained that she wanted to

"give the Science Museum of Virginia…a sum of $500,000.00," but she would only do so if "the State of Virginia contributes and funds an equal or greater amount."[175] Reed hoped that the terms of her donation would force the General Assembly to offer the Museum a hefty amount of money to construct the Capital Division, but it remained to be seen how the state would respond.

As the SMV Board waited for word from the legislature to match Reed's $500,000, the Trustees elected a new chairman to spearhead the Richmond project. When Dr. Hughes opted to take a less visible, though ever-enthusiastic, role on the Board, D. Rae Carpenter, Jr. stepped up to lead the Trustees. Born in Salem, Virginia, Carpenter attended both Cornell University and the University of Virginia to complete his graduate work in physics.[176] After earning his doctorate, he became a professor at the Virginia Military Institute and served a term as president of the Virginia Academy of Science.[177] Like Hughes, he believed that learning should be accessible and enjoyable to the public; a philosophy that helped him successfully serve as chairman of the Research and Development Committee of the state Council of Higher Education.[178] With new leadership at the helm, the Board of Trustees embarked upon a busy month of tasks to advance the Capital Division project.

First, the SMV needed to identify an appropriate and experienced architectural firm to complete the working drawings for the Richmond facility in Byrd Park. Beginning in July, the Board solicited proposals from firms around the country, including Glave, Newman and Anderson Architects; a Richmond-based group that impressed the Museum early in the process.[179] While their search continued, the Trustees examined funding opportunities that could underwrite the "cost of hiring a solar energy consultant for preliminary planning."[180] The facility in Byrd Park was going to accomplish more than simply being the first state-sponsored science museum in the Commonwealth; it was slated to become the first significant Virginia building heated and cooled by solar energy. The Museum coordinated a Solar Energy Planning Team to establish "a methodology that will assist architects and engineers in planning buildings to effectively utilize solar energy for heating and cooling."[181] In order to avoid a situation where "solar energy technology" was "added to buildings in an isolated and/or wholesale manner," the team wanted to hire professionals to ensure the design of an efficient and state-of-the-art HVAC system.[182] As a result, the Museum applied to several design competitions and grants geared toward furthering the capabilities and applicability of solar energy in the United States. Since the Trustees had learned, like SMARV, that money for any project would not flow readily from

state coffers, the Museum needed to secure outside means of funding, especially for more expensive investments like solar energy planning.

Though July 1973 was characterized more by the beginnings of planning rather than end results, Carpenter's first month as chairman of the Board of Trustees moved the SMV in the right direction following the General Assembly's devastating blow. The Museum was left with no choice by the state government but to move forward with the Capital Division and put its remaining divisions on hold. These efforts paid off when the Richmond Regional Planning Commission adopted a resolution "endorsing the SMV establishment" in the summer of 1973.[183] It was crucial for the Board to support activities that garnered positive attention for the Museum and demonstrated its continuing viability. In the months to come, the SMV built good publicity throughout the state in the hopes that the Richmond facility would progress further toward completion and the Virginia Legislature would bring its regional divisions back online.

Promoting the Capital Division and Keeping the Network of Museums Alive

While newspaper articles and press releases adequately put the purpose of the SMV into words, keeping the Museum on paper made it a distant reality in the minds of Virginians, especially politicians. The Board needed a tangible marketing tool to showcase its staff in action and offer the public a taste of the experiential learning the SMV would offer. Trans-Science 1, a 50-foot trailer with hands-on exhibits, became that tool.[184] From 1973 to 1976, the Museum's mobile science unit "logged more than 4,000 miles, toured some 45 locations around the State, and attracted over 225,000 visitors."[185] For years, the Board promised to supply Virginians throughout the Commonwealth with public science education. Trans-Science 1 allowed them to start delivering on that promise.

The mobile unit was made possible by one of the earliest corporate relationships the Museum forged. United Virginia Bankshares, Inc. donated $75,000 to "design, fabricate and install exhibits and related items" in Trans-Science 1.[186] The donation was also used to "cover the salary and related expenses of a science mobile coordinator" and the costs "associated with the unit's on-the-road operation."[187] K. A. Randall, the Chief Executive Officer of United Virginia Bankshares, explained that the corporation was "in a unique position to contribute to Virginia's economy as well as to demonstrate unique interest in the citizens of our state."[188] He

also hoped that "other corporate citizens" would see Virginia Bankshares's gift and "assist in building a Science Museum of Virginia to foster appreciation of and education in both the physical and natural sciences"—a desire that the SMV Board shared.[189]

Once the SMV secured funding for the unit, the next decisions to be made were the kinds of exhibits Trans-Science 1 would tour throughout the state. Ultimately, the Museum narrowed the possibilities down to two: "exhibits related to astronomy, with emphasis on man-made satellites and their benefits, characteristics and flight paths" or "exhibits related to the proposed headquarters and physical science facility, as examples of the types of programs to be presented there."[190] The final design included a few displays of both kinds, "some…operated by push button, while others [were] continuous with set recycling periods."[191] Visitors to Trans-Science 1 could learn more about "the Museum's plans for the future" which included "a Western Division facility, to be concerned initially with the natural sciences, in the Roanoke area."[192] Likewise, they could peruse exhibits about "the space sciences, including models of Skylab and Viking (the Mars landing vehicle)." Finally, the unit was equipped with "a dome projection area for viewing satellites."[193] All of Trans-Science 1's exhibits were supervised by Dr. Charles D. Smith, a new Museum staff member "who received a PhD in astronomy from the University of Virginia."[194] Financial support for his position came from United Virginia Bankshares's initial gift. Smith would "be available for discussion and commentary on the unit, as well as the Museum's planned programs" as Trans-Science 1 travelled throughout the Commonwealth.[195]

The SMV's mobile education unit became operational in November 1973.[196] Its inaugural trip began with a welcoming and dedication ceremony that offered guests "an advance tour of" Trans-Science 1 at the State Capitol.[197] According to a Museum press release, the unit's "first tour" was "designed to familiarize citizens throughout the State with 'Trans-Science 1' and its value as a source for education."[198] In its lifetime, Trans-Science 1 traveled to several cities in Virginia, including Norfolk, Fredericksburg, Williamsburg, Hampton, and Lexington.[199] With the unit operational, the SMV had an effective marketing tool touring the state; a valuable asset that visited state legislators' home districts and showed them first-hand the capabilities of the Museum's staff.

The SMV was not the only organization in the state offering public science education as a marketing device. In November 1973, SMARV opened a 'Mini-Museum' to service the Roanoke Valley region.[200] Like Trans-Science 1, the Mini-Museum included hands-on exhibits;

"only the butterflies and moths are encased to protect them," Don C. Junze, president of SMARV, explained.[201] Housed in a center operated by the Junior League of Roanoke Valley, the museum showcased "a cave replete with bats, limestone formations and cave onyx, a sink-turned-wishing-well with turtles and an odor bar [that] stress[ed] sense experiences."[202] The enterprise was the brainchild of Carole Massart and Nomeka Sours, "who planned and engineered the whole project."[203] Besides offering children in Roanoke an opportunity to learn more about the natural sciences, the Mini-Museum demonstrated SMARV's commitment to bringing a division of the SMV, or any science center for that matter, to western Virginia.

Back in Richmond, Paul Knappenberger coordinated several public meetings and events to reach out to the local community. Though effective at courting support, Trans-Science 1 was not enough to solicit all the help the Capital Division needed to get on its feet. In November 1973, Knappenberger initiated a critical relationship with the Junior League of Richmond.[204] After a series of meetings, the Junior League approved a proposal to back the SMV project in February 1974.[205] The proposal was broken up into three chronological phases, the first slated to begin immediately. During this time, the League would "research with the Science Museum staff into anticipated volunteer needs and the volunteer structures used by other museums."[206] In addition, it pledged "3-4 volunteers and up to $350.00 for mailing and consultation necessary to the research."[207] After the first phase, members of the League would help recruit volunteers for the SMV and "follow-though with the [volunteer] structure organization to assure its self-sustainment."[208] The League offered an additional $1,000 to develop "guidelines, mailings, and recruitment needs."[209] With the Junior League's help and resources, the SMV could counter any funding cut from the state that affected staffing the Capital Division.

In addition to solidifying a relationship with the Richmond Junior League, Dr. Knappenberger recorded a TV spot with a local news outlet that reached national audiences. In December 1973, the associate director and Dr. Smith participated in a museum-sponsored viewing of the partial eclipse.[210] They "set up [special equipment] on the State Capitol grounds" and "were also on hand to answer questions" from the public.[211] In conjunction with the event, Knappenberger recorded a segment with WRVA, the local Richmond NBC affiliate, which was "then 'fed' to the [national] network."[212] As a result, "the story was aired on NBC's hourly newscasts twice during the evening of December 12, and at least four times during the morning of December 13, while the eclipse was in progress."[213] The new Museum's newsletter, which

began circulation a year earlier, boasted that "more than half of the State's 30 daily and 85 weekly newspapers used the information originated by the Museum, as did many of the radio and television stations."[214] The eclipse viewing also coincided with an SMV mailing distributed to Richmond households outlining "A Few Facts You Ought to Know About the Science Museum of Virginia."[215] These successful public outreach techniques introduced the SMV as an active resource for scientific information in the city. Though the Museum was still in the process of building a base facility, the citizens of Richmond could interact with the staff and reap some immediate educational benefits from the project.

While the SMV staff engaged in public outreach, the Board continued their efforts to further the design process behind the scenes. In November 1973, the Museum published the *Headquarters and Physical Sciences Facility Project Criteria*.[216] This document outlined more specifics about the "exciting, advanced new facility" planned for Byrd Park. Most importantly, it fleshed out details related to the building's proposed "solar energy augmented heating and cooling system."[217] In addition to "functioning as a heat source for the mechanical systems" and "saving conventional fuels and reducing operating costs," the new environmentally friendly HVAC unit would be "designed as an exhibit and a tool for ongoing research."[218] In other words, using solar energy to heat and cool the Capital Division facility was as much of a teaching tool as it was a technological innovation. In a letter to State Senator Edward E. Willey, Knappenberger explained that the "impact of this facility on the research, development, application and public demonstration of the practical use of solar energy (a free, non-polluting energy source) will have far reaching consequences on the energy problems and associated economic problems now facing Virginia."[219] With the publication of the project criteria, the Museum took another step forward toward construction of the Richmond facility while offering the state a new reason to fund the SMV: energy conservation.

Despite all the publicity and progress the Museum achieved in 1973, the 1974 General Assembly provided only mixed results. Since the Virginia government was engaged in "an austerity movement" from 1974 to 1976, any funds the Museum could wrench from state coffers would be a bittersweet victory.[220] Nevertheless, the legislators unexpectedly reversed their decision to fund only one branch of the SMV and appropriated "$25,000 for planning a division of the state museum in Roanoke."[221] While crucial for developing the Western Division, the funds came at a cost. The General Assembly allocated only "$240,000 for operating expenses,

and $225,000 for capital outlay planning" for "Museum use in the 1974-76 biennium"—far less than the SMV had requested.[222] The amount did not even break $500,000—the threshold Mary Ross Scott Reed set for the state with her contingent donation to the Foundation.

The $25,000 offered a breath of fresh air to SMARV whose members expected little from state government. However, according to an article in the *Roanoke Times*, the SMV Board became "fearful of doing too much for local branches" after the 74-76 appropriations bill "lest it jeopardize state funds for the main museum, planned for Richmond."[223] For example, the Trustees "authorized planning and the hiring of a director" for the Western Division "provided the Science Museum Association of Roanoke Valley [could] raise another $32,500 on its own."[224] The newspaper's evaluation was accurate—the Board could not afford to divvy up what little the state provided in operational costs. The Assembly's "lack of commitment" to the Capital Division had already "eliminated [the Museum] from consideration as an NSF solar energy Proof-of-Concept project" and threatened the Foundation's ability to raise private donations.[225] As Museum staff explained in their alternate funding request for 1974, "it is not feasible to continue to build non-State financial support without a firm State commitment to the project."[226] While the new state budget offered hope for the divisional concept of the SMV, it put more stress on the Museum to foster non-state support in an unfavorable financial environment.

Solidifying Community Support and Planning the Western Division

On the heels of the 1974 General Assembly, the SMV renewed its efforts to foster the growing network of resources that the Board, Foundation, and staff built around the Capital Division. For example, Dr. Knappenberger reached out to Mary Ross Scott Reed immediately after the state's budget cut and requested aid to cover the financial disparity it created. He explained, "The General Assembly appropriated 200,000 for planning of the Capital Division, rather than 300,000 that was requested and is needed. It is necessary to seek 100,000 of non-State funds immediately."[227] Without Reed's help, the Museum would not be able to complete its "solar energy research" or pay "for professional consultants necessary to properly plan the various systems within the building."[228] The SMV also solidified its relationship with the Junior League of Richmond. Per their proposal, the League continued to "research anticipated

volunteer needs for the Science Museum."[229] As a part of this effort, they created a museum advisory board which included members of the Junior League, SMV staff, Board of Trustees, and other individuals from the local Richmond area.[230] By renewing the support of community networks around the Capital Division, the SMV secured enough funds to continue working on the branch's design following the General Assembly's disappointing appropriations bill.

After stabilizing the Capital Division's design phase, the Trustees turned their attention to reviving planning for the Western Division. In April 1974, the Board voted to authorize "employment of a department chairman for the Western Division in Roanoke to be paid with local, nonstate funds."[231] This stipulation required SMARV to raise $17,500 for the annual salary of their division's director.[232] By tapping into the enthusiastic communal networks the Association rallied together after the 1973 budget, SMARV raised the funds necessary to hire a director in July 1974.[233] Dr. Thomas H. Krakauer, a member of SMARV and "former assistant professor of biology at Hollins College," was an appropriate fit for the position.[234] In 1970, he helped found the "Spring Wild Flower Pilgrimage," an annual nature walk sponsored by SMARV aimed at getting locals excited about the services a science center could offer their region.[235] Krakauer accepted the directorship with the hopes of "mak[ing] the Roanoke Valley the center for a first rate and very exciting science museum that will serve the entire western area of Virginia."[236] With the appointment of a Western Division director, the Board changed Paul Knappenberger's title from associate director of the SMV to director of the Capital Division.[237] The Museum now had two capable and eager leaders to represent regional divisions in public; an equally difficult task deserving of the same title.

In addition to creating a new staff position in April 1974, the Board "also authorized that planning of a Western Division of the state museum be carried through the preliminary drawing stage, and that $57,500 be spent for such planning."[238] The cost for planning reports exceeded the $25,000 allocated by the General Assembly; this discrepancy required SMARV to raise an extra $32,500.[239] While the Association reached out to its donors to fulfill their fundraising goal, the SMV Board met with several architectural firms to determine if one could adequately plan the Western Division without exceeding budgetary constraints.[240] In August 1974, the Trustees settled on Venturi and Rauch, an architectural firm based in Philadelphia.[241] Venturi and Rauch charged a fee of $30,000, which came in under the $57,500 benchmark the Board set for SMARV.[242] Besides the relatively low cost, the Board chose the firm because of "the

imaginative qualities of past work…their record for achieving excellent results with limited budgets, their understanding of economical construction methods and their experience in designing facilities for exhibits."[243] Thankfully, by the time the Trustees chose Venturi and Rauch, SMARV had raised $20,000. Coupled with the $25,000 from the state, the Association's swift acquisition of non-state funds allowed the SMV to sign a contract with the architectural firm on August 13th.[244]

In September 1974, the Museum made more progress in the planning of the Western Division by settling on a specific site for the center. The Trustees chose "a 59-acre tract along Yellow Mountain Road, SE, near its intersection with the Blue Ridge Parkway spur to Mill Mountain."[245] The Board rejected the site on top of Mill Mountain, which members of SMARV had criticized years before, in favor of a flatter and easier to develop area that still allowed for the construction of a modern facility with a planetarium.[246] The City of Roanoke approved the Board's choice with Resolution No. 21806, offering "that certain 59 acre tract of land situate [sic] west of Yellow Mountain Road and south of the Mill Mountain Spur Road and presently designed for public park purposes for the construction thereon of a science museum."[247] The President of the Blue Ridge Parkway Association likewise permitted the Museum to build on the proposed location, eliminating the final legal obstacle the SMV faced to secure a site for the Western Division facility.[248]

By September 1974, the SMV's Capital and Western Divisions were making relatively good progress. However, the advances made by the Museum in the design and planning stages of both branches put in stark relief the limited work done to raise a Tidewater facility. As a result, the Board initiated an "invitational meeting of the Tidewater board members of the Science Museum of Virginia" on September 12, 1974.[249] At the gathering, Paul Knappenberger "suggested a study be done for Tidewater to define needs, examine existing programs and suggest a comprehensive Tidewater program."[250] Most attendees expressed complete agreement with the Capital Division's director; however, John Pugh, representative of the Peninsula Nature and Science Center, recommended caution. He explained that the Peninsula Center was "eager to explore ways of cooperating in the broader Tidewater Science Museum concept development," but "consideration must be given to direct state support of existing facilities as well as new ones proposed."[251] The Newport News museum was rightly troubled that funding for a state system of science centers with a facility located so close to their own could threaten

their ability to receive any funds from the Virginia Legislature. Representatives from the Tidewater region still had quite a bit to discuss before moving into the planning stages of a local SMV division.

Though the meeting did not result in the selection of a site or the outlining of an explicit relationship between the Tidewater Division and existing public science institutions, the attendees did form "a Committee to be called the Steering Committee for the Tidewater Chapter of the Science Museum of Virginia Association."[252] Like SMARV, the Steering Committee would focus on eliciting input from a broad range of Tidewater residents and soliciting financial backing from local donors. If Coastal Virginia hoped to bring a division of the SMV to their region, they needed to foster the same level of support that flourished in the Roanoke Valley. In the meantime, the SMV Board had to direct their attention back to the Capital and Western Divisions; the General Assembly was in the process of further limiting the funds available to state agencies.

Good publicity, Bad Economic Climate, and Renewed Opposition to a Science-Only Museum

September 1974 began as a relatively productive and positive month for the Science Museum of Virginia. In addition to the progress made on the Capital and Western Divisions, the Museum received a significant donation from Reynolds Aluminum company and good press for the mobile education unit, Trans-Science 1. Reynolds Aluminum gifted the SMV a 50 KV RCA Electron Microscope for use in educational programming.[253] The microscope was "fully operational" and "removed from the Metallurgical Research Division Laboratories" of the company.[254] Since the Museum still lacked a physical base in Richmond, they lent the "unit to Randolph Macon College for their use until" the microscope was "needed following the completion of [the] facility in Byrd Park."[255] Though the gift may seem small to readers, Carpenter and the Museum's Donations Committee believed that the acquisition was "an important one" that could "contribute greatly to the [SMV's] physical science program" and forge a lasting corporate relationship with Reynolds Aluminum.[256]

After the Foundation accepted the company's gift, Trans-Science 1 recorded its 100,000th visitor at the Virginia State Fair.[257] After "just 10 months of operation," the unit logged the noteworthy event using "a pressure sensitive device located just inside the front door" of the

trailer.[258] The lucky visitor, "nine-year-old Stuart V. King of Richmond," received a "60-millimeter refracting telescope on behalf of the Museum and United Virginia Bankshares."[259] Newly re-elected Governor Mills Godwin presented the telescope to the young boy, a "specially inscribed" and particularly appropriate award since the exhibits on display "deal[t] mainly with space science."[260] The event garnered positive press for the Museum and offered the SMV an opportunity to show the Governor—in person—the tangible difference a state science museum could make in the life of a Virginian youth.

Unfortunately, the mobile unit's milestone was not enough to convince the Governor to offer more financial support to the Museum. Godwin's second term would be characterized by extreme fiscal restraint; a situation he made clear to state agencies on September 26, 1974. In a letter from Maurice B. Rowe, secretary of administration to the Governor, the SMV was informed that "the Governor…has concluded that there will be only limited budget revisions recommended to the 1975 General Assembly."[261] While Godwin recognized the "many important programs and capital outlay projects which merit[ed] consideration," there was simply not enough funds to satisfy every institution's request.[262] Furthermore, it was "necessary to effect reductions in expenditures as [the state] did in the previous fiscal year to assure balancing the budget."[263] According to State Senator Willey, the Virginia Legislature "expect[ed] a $16 million shortfall in our budgeted income for the first fiscal year of the biennium," leaving no room for an increase in expenditures.[264] After making the announcement, Rowe wrote to Carpenter, explaining the implications of budgetary cuts to the Science Museum project. He believed it was "very doubtful that funds will be available and in fact, we are now considering curtailing certain existing projects."[265] The news was bleak indeed. If the Science Museum did not secure adequate funds elsewhere, it may face more than a reduction in appropriated resources; the project could be cut from the state's budget entirely.

Thankfully, the SMV received several gifts, awards, and donations from non-state sources immediately after Rowe's letter. For example, in November 1974, the Museum won one of four energy conservation awards from the Owens-Corning Fiberglass Corporation.[266] Specifically, the company recognized the energy-saving designs of two firms working on the Museum's Capital Division facility: "Hankins and Anderson, Inc., consulting engineers, and Glave, Newman, Anderson Associates, Inc., architects."[267] In January 1975, the National Science Foundation awarded the SMV a grant of $623,000 to further aid in the development of a

solar-powered heating and cooling system for the Capital Division.[268] Both awards coincided with the location of Solar Lab in the Commonwealth, "the National Science Foundation/Honeywell, Inc.'s mobile solar laboratory."[269] The unit presented "a practical demonstration of solar energy collection and conversion" to "some 3,000 general public visitors, and some 500 people in special groups, including [Virginia] State legislators, science teachers, architects and engineers."[270] The Lab was parked at the Richmond Coliseum "along with Trans-Science 1," bringing more visitors to the Museum's own mobile education unit.[271]

This confluence of events did not solve all the Museum's financial problems. However, national recognition of the Capital Division's solar energy HVAC system demonstrated to the state that the SMV was worth preserving—at least in some capacity—in the state budget. In 1974, the General Assembly passed a resolution "Commending the Science Museum of Virginia for Leadership in the Field of Solar Energy Development in Virginia."[272] The text read:

> That the General Assembly commends the Board of Trustees and staff of the Science Museum of Virginia; and the individuals in Virginia's businesses, industries, and universities who are involved in the final design of the Capital Division building, for their leadership in recognizing the potential of solar energy; for their determination to demonstrate this potential in the form of a working solar energy facility; for their dedication to educating the public concerning the use of solar energy as an abundant, clean, and economical energy resource; and for endowing the Commonwealth of Virginia with perhaps the most advanced systems-designed solar energy facility in the nation, thus placing Virginia in a position of leadership in the field of solar energy technology, design, and utilization.[273]

Though the Assembly could not fund the Museum's Capital Division in full, it recognized the potential of such an institution to bring scientific innovations to the state. The SMV would not, as Rowe feared, be dissolved as a state agency if it continued attracting positive national attention to the Commonwealth.

Bringing Solar Energy to Virginia as a Means and an End

Museum leadership learned quite a bit from the General Assembly's approval of its solar energy research initiatives. Strategically, the state government would remain enthusiastic about the SMV project if the Museum put Virginia on the map as an energy conservationist state. Such optimism also relieved pressure from the SMV to drop one or more of its regional divisions. With these benefits in mind, the Board approved several actions to continue advancing the

SMV's solar energy research well into America's bicentennial. In the eyes of the Museum's Trustees, Foundation Directors, and staff members, solar energy was a means and an end: continued research allowed the SMV to develop its regional branches and successful execution of a solar powered HVAC unit would bring scientific acclaim to the state. In other words, educating Virginians about solar energy could enlighten the public and advance the construction of a statewide museum system.

On January 21, 1975, the Board of Trustees voted to adopt a resolution proposed by State Delegate George Grayson to designate the SMV as the Solar Energy Center in Virginia.[274] In addition to educating the public about the physical sciences, the SMV's Richmond facility would use its solar-powered HVAC system to promote energy conservation throughout the state and encourage research into new energy-saving technologies.[275] The Museum welcomed this distinction, hoping to capitalize on whatever positive attention it may attract from the Virginia Legislature and national grant agencies. While Grayson attempted to craft the resolution into a workable piece of state legislation, the SMV applied for and won a $174,000 solar energy research grant from the Energy Research and Development Administration (ERDA).[276] The Board announced its receipt of the grant at a meeting on May 15, 1975.[277] Rae Carpenter, Chairman of the Board, was "most pleased to accept these funds for continued development of our solar energy project, as Virginia assumes a real leadership role in the application of this important alternative energy source."[278] Furthermore, the Museum revealed plans for "a workshop in Richmond to acquaint the general public, government leaders, school administrators, and businessmen with the solar energy potential in Virginia."[279] That conference took place three months later on August 19-20 at Virginia Commonwealth University.[280]

The ERDA-sponsored event "featured talks, workshops, exhibitions, films, and addresses by public officials and noted businessmen, builders, and scholars in the solar energy field."[281] All attendees came together with the goal of "assess[ing] the promise and problems of solar energy use in Virginia."[282] The Museum reported over "1,000 registered participants" and "several thousand more" visitors to the conference's "exhibits of solar hardware."[283] Afterwards, Carpenter wrote Eugene Doering, a member of the ERDA, detailing the conference's success. He explained how the SMV had "received a number of compliments on the exhibits, speakers and panels."[284] Indeed, Carpenter believed that "conferences such as the one held recently serve a very real purpose in educating the public to the uses of solar energy and

this one brought the museum application to the attention of several key legislators in a very forceful and informative way."[285] Undoubtedly, the success of the conference bolstered support for Delegate Grayson's resolution which passed the General Assembly on February 9, 1976.[286] A mere year after the Museum embraced its role as a Solar Energy Center, the state legislature amended the Code of Virginia to reflect the SMV's new conservationist title.[287] The bill outlined the purposes of the Center as follows:

> (i) To serve the people of the Commonwealth as a clearinghouse to gather, maintain and disseminate general and technical information on solar energy and its utilization; (ii) To coordinate programs for solar energy data gathering in Virginia; (iii) To coordinate efforts and programs on solar energy with other State agencies and institutions, other states and federal agencies; (iv) To promote cooperation among and between Virginia business, industry, agriculture and the public related to the use of solar energy; (v) To develop public education programs on solar energy for use in schools and by the public; and, (vi) To provide assistance in formulating policies on the utilization of solar energy that would be in the best interest of the Commonwealth.[288]

The Science Museum's Solar Energy for Virginia conference was a positive step in the direction of achieving its new, state-authorized goals as a Solar Energy Center. By advancing Virginia's interests in energy-saving technologies and educating the public about the potential of solar energy, the Museum curried the favor it needed to continue planning the Capital and Western Divisions.

From January 1975 to February 1976, the SMV leveraged its positive press to increase its profile and make progress on the Byrd Park facility. The Museum began the year by sponsoring the Children's Science Book Fair, "a group of exhibits and programs built around a collection of over 100 outstanding children's science books published last year, and chosen for excellence in material and presentation in all areas of science."[289] The "16 different exhibits" included hands-on displays of topics "ranging from reptiles to rocks and minerals."[290] Over "7,500 (mostly first through sixth graders) visited the fair," forcing the Museum to extend the event an additional two weeks.[291] At the same time, a group of VCU seniors under the direction of assistant professor of interior design Dorothy M. Hardy "selected the Science Museum's Capital Division facility for its spring semester project."[292] The students were tasked with "coordinat[ing] the location of exhibit areas and traffic flow patterns."[293] They also constructed a "large scale model" of the facility for the Museum to use in talks and demonstrations.[294] The SMV benefitted from the

publicity of both events and received useful advice for the Capital Division's layout without tapping into their budget.

Over the next few months, the SMV sponsored two trips abroad for Museum staff members. The purpose of these excursions was twofold: gather more data for designing the Byrd Park facility and curry favor with Virginian politicians. The first was to the Ontario Science Centre in Canada.[295] In April 1975, representatives from the Museum as well as Virginian statesmen, including Governor Godwin himself, visited the establishment which, "in just six years" had "become the second most popular of the 20 science centres in North America."[296] Knappenberger explained in his letter to attendees that the SMV chose the Centre as a worthwhile destination because it "vividly display[ed]" the "'hands-on' approach to science education" that was central to "our Museum's philosophy."[297] In addition, the institution was "publicly funded by the province of Ontario," a significant detail for the local legislators present.[298] The field trip demonstrated to each of the 14 Virginians what a modern and fully-funded science center could accomplish: fun and informative educational programming along with international acclaim.

In June, Knappenberger embarked upon a solo-trip to Detroit to attend the first Tilted Dome Design Meeting.[299] This assembly of "eighteen planetarium and space theater directors, consultants and architects from across the nation" met to "coordinate their individual efforts to develop tilted dome space theaters and work out mutual problems."[300] At the time of the gathering, there was only one operational "space theater in the United States": the Reuben H. Fleet Planetarium and Space Theater in San Diego.[301] As a work in progress, the San Diego Planetarium exemplified the costly construction of technologically advanced dome theaters—a lesson worth learning for smaller institutions with limited budgets like the SMV. Indeed, an important goal of the meeting was to "develop 'compatibility and interchangeability in programming'" to reduce the cost associated with running these new and innovative theaters.[302] Knappenberger left the meeting with a bulk of information about constructing tilted-dome planetariums. He also joined "a six man [sic] committee" at the conference dedicated to "act[ing] as a professional clearing house coordinating new information, analyzing planned equipment, and answering future questions from meeting participants."[303] The SMV wanted to become a leader in the production of tilted-dome planetariums; Knappenberger's meeting was an important step in that process.

While the Richmond-based staff attended to the needs of the Capital Division, members of SMARV continued fundraising and planning initiatives for the Western Division. In May 1975, the Association "launched a campaign to raise $30,000 by July 15."[304] While "operation of the western division of the Science Museum of Virginia" was guaranteed "through Sept. 30," the Museum needed funds to continue paying staff for the entirety of "the fiscal year beginning July 1."[305] The state budget cuts left no room for the SMV to allocate money toward the operating costs of the Roanoke facility; members of SMARV had to underwrite the salaries of their two official staffers, including Director Krakauer. In June 1975, the Association received good news from the National Park Service (NPS). The NPS completed an environmental assessment report approving the construction of an access road from the Yellow Mountain site to the Blue Ridge Parkway.[306] This road, which "would be located on National Park Service land," was an essential aspect of the Western Division's design, connecting the anticipated museum to a popular scenic parkway.[307]

With advances in the design stages of two regional branches and positive accolades from media outlets and legislators alike, the Museum's Board felt comfortable developing a robust capital outlay request for the 1976 General Assembly. The Trustees drafted a request for roughly $10.5 million dollars, $7.5 of which would go toward constructing the Capital Division, $2.3 million for the Western Division, and $25,000 to plan the Tidewater Division.[308] The "operating request" was "not to exceed $1 M," Carpenter explained to Jack Ramey, acting president of SMARV.[309] The restraint exercised by the Trustees on the operating budget would necessitate further private fundraising to pay for the Western Division's employees. However, it would also make the capital outlay request more passable in the eyes of state delegates and senators.

The Capital Division also had its own new philanthropic source to supplement its expenses and assuage leery legislators. In the same month the Trustees approved the 1976 budget request, Anna Garner joined the Board, bringing her enthusiasm and pocket book to the project.[310] A "philanthropist and volunteer who devoted her time to organizations including the Science Museum of Virginia and the Virginia Opera," Garner was born in Arcadia Florida and moved to western Henrico County after marrying her husband, T. Fleetwood Garner, who ran a flight school in the state.[311] Later in life, Garner joked that her "school days in the 1930s left me largely untouched by the infinite world of science."[312] "Perhaps," she explained, "my lack of exposure to science in the past makes me even more aware of how vital it has become for people

of all ages to have a better understanding of the world that surrounds them."[313] Garner was a high-profile and well-connected addition to the Board of Trustees. Her appointment, the Museum's solar energy distinction, and continued progress on the Capital and Western Divisions should have been enough to carry the SMV's capital outlay request through the General Assembly. Unfortunately, opposition to the multi-regional museum system arose from an unforeseen source: Governor Godwin.

Unforeseen Consequences: A Governor's Opposition and an Abandoned Train Station

On October 21, 1975, Paul Knappenberger presented the SMV's capital outlay request to Governor Godwin and the Virginia Budget Advisory Committee.[314] While the Director likely expected some push back from the state (after all, the Museum had never received the entirety of its funding requests from the General Assembly), Knappenberger was taken aback by the Governor's hostility at the meeting. Shortly after he began his presentation "noting [the] overall Museum appropriation requests for 1976-78," Godwin interjected and told the Director "you are asking for funds for facilities in the Western and Tidewater divisions, before we have funded construction of the Capital Division facility."[315] He continued, "you and your Board of Trustees must be realistic, so there is no need to waste our time and yours by asking for projects that are not practical or approachable in the next biennium."[316] Godwin forbade Knappenberger from delving into the progress the Western Division had made, preferring to spend his time—and the state's money—on the Capital Division facility. Furthermore, he warned Knappenberger that "if the proposed Capital Division facility is not started or completed in the next biennium, then you will not need the operating funds you have requested."[317] The Governor was clearly frustrated by the amount of time the SMV had taken to plan and design the Capital Division—an emotional response that did not account for the very reason why the process had drawn on for several years: a lack of financial commitment from the state.

The Governor also surprised Knappenberger when he expressed skepticism toward the Museum's solar energy goals. He asked the Director, "Should Virginia attempt to prove to the nation the value of solar energy? Are we able to do this, or should it be done by the Federal government and others."[318] He had, after all, "read that it will be at least 1989 before solar energy can be of any real value in helping to solve the energy crisis."[319] Knappenbeger

attempted to defend the Museum's work on alternative energy sources—the same efforts that the General Assembly would sanction and laud in its January 1976 resolution. He argued that "solar energy could be used now," allowing "Virginia to assume a leadership role in its development as a viable alternative energy source."[320] While "solar energy is not the panacea for all our energy problems," Knappenberger explained it could "provide considerable relief in the heating and cooling of buildings in the very near future."[321] Even after drawing attention to the successful ERDA conference held at VCU, Knappenberger could not assuage the Governor's doubts.

Knappenberger's meeting with the Budget Advisory Committee resulted in two unforeseen and devastating consequences: the elimination of the regional divisions from state consideration for the 1976 biennium budget and the jeopardization of the Byrd Park facility in Richmond. After all of the work conducted by SMV affiliates, members of SMARV, and community leaders throughout the state, Governor Godwin and his budgetary committee swiftly rendered the museum system defunct with his "stern, critical, and almost rude" words.[322] In a letter to A. B. Niemeyer, a science specialist for the Portsmouth Public School division, Carpenter described the Governor's "attacks upon the presentation which Paul made."[323] He explained how the Director was "disheartened as were three of our Trustees who were in attendance."[324] As a result of the meeting, "as well as of conversations with other legislators," Carpenter believed that the Board needed to "have a rather extensive review…of our future plans and goals."[325] The Trustees had to determine which aspects of the Science Museum of Virginia could be salvaged in the wake of extreme opposition from the state.

While the SMV struggled to regroup from these developments, a long-time Richmond landmark closed its doors across town. On November 15, 1975, one last train departed Broad Street Station, leaving the neo-classical building vacant.[326] Constructed in 1917, the Station was designed by John Russell Pope, the famed architect of the Jefferson Memorial and the National Gallery of Art.[327] In addition to his evocation of the "Pantheon in Rome," with his trademark domed roofs and tall, white columns, Pope designed the building with a "slope on the over 50 acre site" which "allowed trains to approach the covered platforms at the rear of the station below street level, out of view from the front."[328] With a price tag of $3,100,000, the Station was built "by the Richmond, Fredericksburg and Potomac Railroad Company [RF&P] for passenger traffic during the first quarter of" the twentieth century.[329] This period, known by historians as the "Golden Age of Railroads," was characterized by improved railway travel,

leading to an influx of passenger traffic in Richmond and other major cities across the country.[330] However, the development of better, faster, and more personalized forms of transportation, such as commuter vehicles and commercial airlines, after World War I marked the end of the Golden Age. As the number of railroad passengers decreased year-by-year, Amtrak, the new owner of the Station by 1971, opted to close the stop on Broad Street in favor of opening the new Greendale Station on Staples Mill Road to consolidate its transportation services.[331] The state purchased Broad Street Station from RF&P in 1976 with the intention of erecting an "office park."[332] Unless the state could find a use for the building, it would be demolished to make way for the new development.

When the Board of Trustees opted to pull its capital outlay request from state consideration, the Station became a potential home for the Science Museum of Virginia. The decision to scrap the request in its entirety was a difficult one, as Carpenter explained in a letter to Norma Moran, a committed member of SMARV. He argued that the Board's move was "a desperate attempt to salvage a greatly increased operating request"—if the Museum could not secure the money it needed to construct new facilities, the Trustees had to ensure the acquisition of operating costs to keep the SMV alive in some capacity.[333] Carpenter hoped the decision would also "leave a foot in the door" of the Governor's office in case the Museum needed "to justify inclusion in a bond issue, if one should materialize."[334] In the meantime, the Western Division, and any whisper of a Tidewater Division, would be left out of the state's 1976-78 budget. The Board was already certain the 1976 Assembly would not fund construction of a facility in Byrd Park, but the state had offered the Museum use of the Broad Street Station as a temporary replacement. The Trustees could not threaten the very existence of a state-sponsored science museum by balking and asking for more.

Conclusion: SMV Limited to One Location at Broad Street Station

With these new circumstances before the Museum, the Board of Trustees was forced to cut their losses and settle for space in the abandoned train station. The months surrounding the Trustees' attempt to whittle down the SMV to one site were bleak for all those involved in the process. As early as November 1975, Edward Fordyce, the chief planning officer for the SMV, sent a termination letter to James Glave, one of the chief architects working on the Capital

Division facility.[335] Though drawings of the building were nearly complete, the design was no more than a reminder of what the Richmond complex could have been in the wake of the state's budgetary cuts. When the Assembly officially voted to eliminate the Byrd Park facility from the state's budget in January 1976, the Board of Trustees was forced to remove the Western Division from the SMV project.[336] With no money to spare for operational expenses in Roanoke, and the Governor's lack of enthusiasm for a Western Division, it was no longer feasible for the SMV to advocate for the construction of a science center in the Valley.

Members of SMARV took the news particularly hard, writing numerous letters to the Board requesting an explanation for the elimination of a facility they had spent years preparing for. "Does not $85,000 raised by the public mean anything?" Jack Ramey wrote in an emotional letter to Carpenter on January 29, 1976.[337] "It is a strange situation," he continued, "when the only group that is providing science activities for the system becomes a liability to the system and must be swept aside."[338] Though Ramey was wrong in discounting the education initiatives of the SMV in Richmond, including the Children's Science Book Fair and the outfitting of Trans-Science 1, he was right to harbor frustration after SMARV had committed so much time and energy to pay for the Western Division's staff, coordinate planning initiatives with the NPS and the Blue Ridge Parkway Association, and offer Roanokers a mini-museum complete with annual activities, including the Wild Flower Pilgrimage. Carpenter understood SMARV's disbelief and tried to explain how the Trustees arrived at the decision to cut the Western Division.

He outlined how the Broad Street Station had become available and how its use as the Museum's only location necessitated a "request [of] no more than 19 new positions for a total of less than $700,000 for…two years" from the state.[339] Even that request was rejected by the Assembly, its members only willing to authorize a "7.5% per year increase in funds over present funds."[340] The Station itself was not particularly ideal since the state intended for it to be a temporary location for the Museum. Furthermore, it lacked space for a botanical garden; a condition that led the ailing Dr. Hughes to propose making the Yellow Mountain Road site the only home of the Science Museum of Virginia.[341] The Trustees overruled his suggestion because of the Roanoke Valley's remoteness; the Museum could still reach more Virginians if its base of operation remained in Richmond. Once the Station was accepted by the Board as a feasible site, Knappenberger requested an audience "before [the] House Appropriations

committee" to ask for some funds to adapt the train station.[342] On February 5, Knappenberger, Carpenter, Anna Garner and Mary Ross Scott Reed traveled to the state capital and requested "$150,000 for station connected operations of which about 1/3 could be operating funds."[343] The assembly approved their request, but only on the condition that the money be used for the Broad Street Station alone.

Looking back on the years between 1974 and 1976, the SMV experienced an extraordinary swing of successes and failures. With the launch of Trans-Science 1, the Museum delivered science education to children across the state and attracted positive press for the Capital Division. The General Assembly's 1974 appropriation of planning funds for the Western Division kept the Roanoke facility alive on paper, allowing members of SMARV to raise funds for a small staff and the construction of their own science center. The Museum's distinction as a Solar Energy Center gave the Board of Trustees hope that the state would continue funding the Byrd Park facility if it helped brand the Commonwealth as an energy-conscious state. And yet, despite all these gains, the Museum lost the ability to assemble a network of science centers due to opposition from Governor Godwin and the 1976 General Assembly. The defeat was bittersweet. On the one hand, the SMV had an immediate base of operations to offer at least some segment of the Virginia population quality, hands-on science exhibits. On the other, the Board had to cut ties with all the regional associations that had supported the project and worked to bring a part of the SMV to their hometowns. Though the Board of Trustees compromised their vision of a statewide network of museums by accepting a home at Broad Street Station, their persistence ensured the development of some form of centrally-located public science education in Virginia. Transforming the Station into a museum would take even more dedication and years of commitment.

Chapter 3: The Science Museum of Virginia at Broad Street Station

The Science Museum of Virginia's staff received decidedly mixed opinions from industry professionals and community leaders on the move to Broad Street Station. One particularly salient letter reached Paul Knappenberger's desk in April 1976. Victor J. Danilov, the director of the Museum of Science and Industry in Chicago, explained to Knappenberger that he felt conflicted about the SMV's new home. He wrote, "I don't know whether to congratulate you or feel sorry for you on the acquisition of the Broad Street Railroad Station in Richmond."[344] Danilov admitted that the location "presents a wonderful opportunity under the right conditions," but "remodeling old railroad stations can be an expensive headache."[345] Danilov's letter would prove to be all too prescient as the Museum staff confronted the challenge of preparing the Broad Street Station for exhibits.

In January 1978, a full year after the Museum's Discovery Room opened in Broad Street Station, Milton Elliott wrote an amusing, but urgent, letter to J. Stuart Barret, deputy director of Virginia's Division of Engineering and Buildings. "Mice," he exclaimed, "little grey field mice, are running rampant at the Museum." [346] The pests had made their way "in[to] the office, as well as the Discovery Room areas" after a lengthy stay in the Station: "yesterday, the day before, and many days prior."[347] Because the rodents were "unsettling for our visitors" and "disruptive in an office context," Elliott requested the state "begin immediate extermination efforts."[348] "Your assistance," he concluded his letter, "is, squeak, urgently requested."[349] Since the Museum's opening in the new building, the Trustees, Foundation Directors, and staff members had struggled to obtain state funding and services to help develop the Station into a workable exhibit space. They relied heavily on volunteers and community professionals willing to donate their time and money to see the space transformed into an operational science museum. Even in the case of the rodent infestation, the state was slow to deploy resources. Elliott joked that his staff could "domesticate and train the invading hoard for the first, and perhaps only, Mighty Mouse Museum Variety Show," but it would be much easier if the state just sent an extermination team.

This chapter details the preparation of Broad Street Station for hands-on exhibits and its first few years of operation as the Science Museum of Virginia. Like the Museum's founding years, the renovation and operation of the facility was full of ups and downs, successes and failures, and constant pleas to the state for more money. The acquisition of a physical location

did not spell the end of the SMV's struggles to bring statewide public science education to Virginia. If anything, it created a new set of challenges that a small, but growing, staff met with waves of well-intentioned trial and error.

Preparing Broad Street Station and the Death of Dr. Hughes

Once the SMV had access to a physical exhibit space, the next steps for the Board of Trustees and staff were to determine how to adapt the Station to educational programming, which programs the institution should offer, and what resources the Museum needed to develop those programs. The Board began this process immediately after the state reviewed Knappenberger's request for roughly $150,000. In March 1976, the Virginia treasury informed the Museum that the General Assembly appropriated "$97,000 for the initial move to the Broad Street Station and an additional $52,890 for operating expenses."[350] The Board intended to hire two new staff members with part of the available funds, including an Education Program Coordinator and an Exhibits Preparator.[351] The rest of the monies would be used to cover expenses associated with "occupy[ing] about 12,000 square feet on the first level of the station's east wing."[352] The lower level of the wing was designated by the staff as exhibit space while the second floor would house "museum administrative offices… until the Richmond, Fredericksburg and Potomac Railroad vacates the station."[353] Afterwards, the offices would be "moved to a permanent location on the second floor of the west wing."[354] The Museum did not receive enough funds from the state to renovate the entire Station for educational use; indeed, members of the General Assembly, including Senator Willey, expected portions of the train station to house state offices.[355] With these spatial limitations in mind, the SMV reached out to the Junior League of Richmond for help designing the Museum's first hands-on exhibits.

In April 1976, the Junior League voted to adopt a proposal to "develop and establish a Discovery Room in Broad Street Station."[356] The new exhibit space would "be an introduction to the community of the Museum's 'hands on' participatory philosophy and format," offering "a vibrant exhibit area where children and adults can interact to learn about science."[357] The League pledged an additional $20,000 and "volunteer support" to make the room a reality.[358] While planning the Discovery Room, the Museum also sought to "develop spaces for travelling exhibits, demonstrations, and a meeting room for science clubs and special events."[359] Around

the same time as the League's proposal, the Board received a significant donation from Elizabeth Talbott Gwathmey, sister of Allan Talbott Gwathmey, past president of the Virginia Academy of Science and founder of the Virginia Institute for Scientific Research.[360] Her gift was intended for the development of a permanent crystallography exhibit to be located in the rotunda of the Station. With her financial support, the Museum could restore more of the first floor for exhibit space, making room for potential travelling and permanent displays. Though the occupation of Broad Street Station came suddenly, within months the Museum had crafted a plan of action to employ new staff members, build a hands-on exhibit space, and design a permanent exhibition for the rotunda.

Months of planning to inhabit the Station were interrupted by a disheartening loss for the Museum. On April 19th, 1976, the SMV received word that Roscoe Hughes passed away. "It was his foresight and imagination over the past decade," the Museum's newsletter explained, "that was, perhaps, the prime force in establishment of the Science Museum."[361] Without his persistence, the concept of a state-sponsored science museum would not have made it out of the General Assembly let alone into Broad Street Station. In addition to his work on the SMV, Hughes also helped establish the Department of Human Genetics at VCU and served as president for the Virginia League for Planned Parenthood.[362] Hughes was an active member of the Virginia community and an asset for the SMV, responsible for both its creation and the institution's philosophy "learning always should be fun."[363]

Before his death, Hughes had witnessed the termination of his vision for a statewide network of science museums. However, the state's lack of enthusiasm for a multi-facility establishment did not stop the SMV from attempting to serve patrons throughout Virginia. In addition to its work on the Discovery Room, the Board authorized the repurposing of Trans-Science 1. The unit was scheduled to be decommissioned in August and outfitted with a new set of exhibits to tour the state.[364] Unlike its predecessor, Trans-Science 2 would "explore the potential of solar power" with "five active, hands-on learning/exhibit stations, supplemented by cut-away displays and several models."[365] Once again, United Virginia Bankshares offered to fund the project.[366] This time, however, Virginia Polytechnic Institute and State University would also provide the Museum with much-needed services by "complet[ing] the studies, develop[ing] the educational and evaluation programs," and "design[ing], assembl[ing] and construct[ing] the mobile vehicle, enclosure and exhibit systems."[367] Representatives from the

university agreed that there was "a significant need in Virginia, as elsewhere in the country, to provide participatory motivational programs for the public."[368] The exhibit's theme could also lead to a better wide-spread "understanding of our energy future," a goal for all those involved in the Trans-Science 2 project.[369] By deploying the newly-outfitted mobile unit to different cities throughout the state, the SMV could fulfill part of Hughes's vision: to offer accessible and fun science education to as many Virginians as possible.

Back on Broad Street, the Museum continued preparing the Station's east wing for the opening of the Discovery Room: the SMV's first in-house, hands-on exhibit. Junior League volunteers helped clean and repaint the exhibit space while Rae Carpenter designed and built equipment for educational demonstrations at the Virginia Military Institute. In a newspaper article titled "Simple Items Preferred," Beverly Orndorff interviewed Carpenter about his participation in the exhibit design process.[370] He tapped into his experience as an educator to inform which contraptions the Museum needed to teach a variety of physics concepts. Before the SMV acquired space in Broad Street Station, Carpenter and VMI professor Dr. Richard B. Minix "spent…several spring vacations…touring high schools around the state, giving demonstrations and lectures for students."[371] From these travels, Carpenter learned that "the simpler and cheaper the items" used to construct exhibits were, the better those exhibits would be at "demonstrating physical laws and principles."[372] By August 1976, their hard work had paid off. At a public news conference, the Museum announced that the space would be ready for visitors toward the end of the year.[373] Lieutenant Governor John Dalton was in attendance and applauded the work of volunteers on the Discovery Room, especially those from the Junior League of Richmond.[374] He explained that the exhibit space was meant to "be a living workroom of science to be used and understood and enjoyed by young people and their families and their teachers and all who will come here."[375] Though the Museum was months away from opening the Discovery Room, the potential for such a space energized local volunteers and excited Richmond community leaders.

The enthusiasm of residents in the capital stood in stark relief to the disappointment shared by science museum associations in other parts of the state. Members of SMARV were left with no science center or museum site after the Board of Trustees was unable to transfer rights to the Yellow Mountain Road location over to the Association.[376] Jack Ramey, in a letter to all members of SMARV, lamented:

> I am not sure which Greek tragedy our group is involved in. We may be like Sisyphus continually trying to get our museum on the top of the mountain only to get knocked back. We may be traveling through the System looking for the honest man. But most of the time it feels as if we have the Herculean task of cleaning the stables. We are again out in the cold and orphaned.[377]

With the SMV limited to the Broad Street Station in Richmond, members of SMARV were forced to break their ties with the state project and work to establish their own independent science center in the Roanoke Valley. That same year, the Association relocated their mini-museum into "the abandoned Tinker Creek School, a 3,000 square foot World War I era building."[378] They were able to expand the museum's offerings and eventually secured "funding…from the Virginia Department of Education," allowing for "the Museum's first full-time director" to be hired.[379] Today, the Science Museum of Western Virginia, as the museum was renamed in 1983, is located in Roanoke's Center in the Square and offers a wide variety of hands-on exhibits, science programs, and special events.[380]

Like SMARV, the informal Tidewater association of the SMV explored ways to deliver science education to their constituents once the Discovery Room was under construction. In September 1976, members of the Steering Committee for the Tidewater Chapter of the SMV and other community leaders formed the Science Museum Association of Eastern Virginia.[381] The "non-stock, non-profit corporation" assembled to "serve public interests" by "fostering regional cooperation in support of science museum programs and facilities in Eastern Virginia."[382] Since "several jurisdictions had official or semi-official science museum committees" and "a number of unofficial groups in the area had a strong interest in one or more museum-type programs," the new Association could serve Tidewater residents best if it worked to foster "area cooperation… from each of the eight jurisdictions."[383] Unlike the Roanoke Valley, Coastal Virginia had several operational institutions that could offer science education to the public; what the region needed was an organization to synchronize their efforts and ensure the most efficient use of resources.

Though the preparation of Broad Street Station for museum use spelled the end of the SMV's regional divisions, eastern and western associations developed independent plans to deliver quality science education to their respective communities. In addition to these efforts, the SMV continued to move forward with the repurposing of Trans-Science 1; another means of providing hands-on instruction to students across Virginia. As the city of Richmond awaited the

opening of the Discovery Room, citizens throughout the state could look forward to new or renewed access to fun and informative public science education in some form.

Opening and Staffing the Discovery Room

Dedication of the SMV's Discovery Room took place on a frosty day in January 1977.[384] Governor Godwin attended as the guest of honor and led the ceremony by "pass[ing] his hand through a laser beam tripping a switch which set a 'Rube Goldberg' apparatus into motion."[385] When the gadget struck a ribbon cordoned across the entry to the exhibit space, attendees applauded the opening of the Museum's physical location. Later in life, Rae Carpenter recalled that the Governor shivered as he set the event in motion.[386] The "old boiler house" had broken down before the ceremony, leaving the train station at a frigid temperature.[387] Milton Elliott also handed Carpenter a pair of scissors just in case the laser contraption failed to slice the ribbon.[388] Thankfully, the dedication commenced without disruption, readying the Discovery Room for its first public open house the following Sunday.[389]

The first visitors to the Discovery Room interacted with a variety of different exhibits and demonstrations. In addition to "aquariums and terrariums," the space included "logic games, a pendulum that pours a small stream of sand to trace varying curves as it is made to swing in different positions, and a visual demonstration of vibrating bodies."[390] A set of Chladni plates "made at the Virginia Military Institute physics department" concluded the room of over 40 stations, exposing visitors to a wide range of physics concepts in fun and interactive ways. Volunteers from the Junior League of Richmond helped staff the room which cost a quarter for admission.

To keep the Discovery Room operating smoothly, the SMV engaged in publicity events and staff hires in January and February 1977. For example, the Museum hosted its first reception in the Broad Street Station for members of the General Assembly.[391] Staff members, Trustees, and Foundation Directors needed to bolster their relationships with Virginia legislators, especially after the disappointing 1976 budget appropriation. The SMV also added new members to its staff including Mary Randolph Spencer who began her career with the Museum developing educational programming.[392] Before coming to Richmond, Spencer earned her Bachelor of Arts degree in political science at the University of California at Berkeley.[393] She

gained experience in museum education by working with "children of elementary school age to coordinate an active science study program" at the Cora Hartshorn Arboretum in Short Hills, New Jersey.[394] Spencer also had a knack for artistic design, having made "many models, exhibits, murals and creative learning devices" at the Arboretum.[395] Her experience proved useful for the SMV's mission of providing hands-on learning.

In February 1977, the Junior League designed a travelling ambassadors program for the Museum in conjunction with the SMV's staff.[396] According to their proposal, one or two volunteers would take trips to cities and counties throughout Virginia, giving presentations on the SMV's exhibits, events, and future plans.[397] While most trips were destined for "counties within 75 miles of Richmond," some longer, overnight stays could be authorized by the SMV to reach more distant areas of the state.[398] The program primarily sought to "encourage schools to include the Discovery Room in any visit they might make to the Richmond area" and "provide Statewide exposure to the long-range…financial needs for further development of the Science Museum."[399] Like the SMV's reception for Virginia legislators, trips made by the travelling ambassadors were intended to advertise the museum's offerings while securing financial support for operating expenses. With the help of traveling ambassadors, the Museum brought out-of-town visitors to the newly opened Discovery Room. It was the first step in transforming one wing of an abandoned train station into a destination museum.

The Beginnings of a Multi-Exhibit Museum Destination

Soon after Broad Street Station opened its doors to visitors, the SMV continued planning and building exhibits and programs. While the Discovery Room was an excellent introduction to the hands-on educational experience the SMV intended to offer, an institution of its kind needed to develop new content to encourage guests to return to the Museum—or visit for the first time. Such an endeavor required maintenance on the remaining unfinished space in the Station's east wing. To begin the necessary cleanup and renovation processes, the SMV consulted experts in historical preservation. The dedication of the Discovery Room only marked the beginning of the staff's efforts to repurpose the Station.

In April 1977, the Museum welcomed two travelling exhibits to Broad Street. The first, "Indo-Pacific Seashells," was a collection of "about 400 shells…rang[ing] in size from the very

small to some a foot long."[400] Mary A. Dunham, the owner of the collection, acquired the shells "when she was stationed in Saigon with the U.S. Agency of International Development."[401] Before arriving in Richmond, the specimen had "been on display in Saigon as well as in the Washington area," "supplemented with illustrations on shell life and a collection of colorful stamps featuring shells."[402] The second exhibit was titled "The Future of the Oceans" and offered "an illustrated and documented presentation" to guests "reflecting Canada's approach to the management and conservation of world marine resources."[403] It was "a three-dimensional, illuminated exhibit, comprise[d of] four free-standing modules" that explored "the need to preserve the oceans" on the "Atlantic, Pacific and Arctic coasts."[404] The SMV housed the displays in "the main entrance corridor to the Discovery Room…and in the two small 'travelling exhibit' rooms" that were "carpeted, wired and painted by Buildings and Grounds" in March 1977.[405] Press coverage of their opening brought visitors back to the Museum after the Station opened in January.

In addition to new exhibits, the SMV forged relationships with local schools and Richmond residents through a series of participatory programs. William Fox Elementary School partnered with the Museum to allow gifted students to serve "as exhibit 'explainers' for other school groups who visit[ed]" the SMV.[406] When the Station opened, six of these students "selected one exhibit he was most interested in, wrote a paper on it and made up a list of thought questions that he believed other children visiting the exhibit might ask."[407] They volunteered at the Museum until the end of the academic year in May, 1977.[408] In July, the SMV launched its Sky Watch program in conjunction with the Richmond Astronomical Society.[409] Museum visitors could spend evenings gazing at the stars through telescopes set up in front of Broad Street Station.[410] By partnering with local schools and organizations early on, the SMV attempted to brand itself as a resource available to the entire Richmond community.

To accomplish all its new programming, the Museum staff engaged in a number of administrative meetings and activities during the first few months of the Station's operation. On "four occasions in late 1976 and early 1977," historic preservation consultants from Mitch, Young, and Abramson, Inc. "met with the staff of the Museum and its architect, surveyed the building and took several hundred photographs."[411] The SMV chose the firm to evaluate the work that needed to be done to adapt the east wing and the remainder of the Station for museum use. Because the building was a historically significant structure, the Museum could only

conduct maintenance and renovations consistent with the original architectural design. The SMV was also interested in the firm's evaluation of the amount of time it would take to improve the entirety of the Station if permission could be ascertained from state government. The consultants published a report for the Trustees in April 1977. In its pages, they detailed eight recommendations to restore the Station without compromising Pope's vision, including "alterations to the mass, color and texture of the concourse" and "top[ping] off" the "courtyards flanking the main waiting room" with "skylights at or above roof level."[412] The SMV also crafted an acquisitions policy approved by the Board in October 1977.[413] The Museum could not accept every donation from the public and designed the policy to evaluate the "present and future utilization" of gifted or purchased collections.[414] It was also important for the SMV to establish protocols for loaning or exhibiting loaned materials to and from outside institutions. The professional operation of a state science center required staff, Trustees, and Foundation Directors to investigate and determine the logistics necessary to run a long-term museum out of Broad Street Station. Their task would only become more daunting when the Virginia Public Buildings Commission voted to finally allow the SMV to occupy the entirety of Broad Street Station in addition to some land surrounding the building.

Living with Broad Street Station—and All the Renovations that Came with It

On November 10, 1977, Carpenter wrote a letter to Maurice Rowe asking if the Virginia Public Buildings Commission could "clarify at its November 15 meeting its intent regarding the assignment of the entire Broad Street Station building to the Museum."[415] Up until that point, the state had not conclusively decided whether the SMV could occupy the entirety of the Station or remain relegated to its east wing, reserving the remaining space for government use.[416] On December 20th, Carpenter and Director Knappenberger attended the delayed Commission's meeting. Carpenter outlined "the three main objectives of the Museum" to the commissioners: "Direct maintenance and operational control by the Science Museum of Virginia of the total Station Building and the sheds; Preservation of train sheds as they exist; [and] Preservation of right-of-way for spur track entering property."[417] In addition to explicit permission to construct exhibits and locate offices throughout the Station, the SMV sought approval for exterior renovations to the historic butterfly train sheds; a defining characteristic of the building that

Mitch, Young, and Abramson, Inc. had designated as an essential restoration project. The firm identified the sheds as "perhaps the largest single complex still extant in the U.S.A.," possessing "quite unusual beauty and technological significance."[418] If the Museum was going to fully make use of Broad Street Station, the exterior features needed to be restored as much as the interior rooms.

There was only one commissioner who expressed hesitation toward the Museum's request: State Senator Edward Willey.[419] When Carpenter explained that the SMV "would like to have control of the security, maintenance and custodial responsibilities that is now handled by the Division of Engineering and Buildings," Willey "emphasized that the Museum staff thoroughly familiarize themselves with the financial and other responsibilities involved in this pursuit."[420] He did not believe that the SMV had the staff or the resources necessary to care for the entire Station and its grounds. It is also likely that Willey did not want to relinquish state office space to the Museum; he was heavily involved with a development project to erect a business center around the train station.[421] Regardless of his wary response, Willey voted with the rest of the commissioners to recommend "to the Governor the entire existing terminal building with certain land surrounding that building" for Museum use.[422] They did specify that "no permanent plans should be made for the spur line right-of-way at this time nor should permanent plans be made for the use of the sheds," however, the SMV could temporarily inhabit these areas until further notice from the state.[423]

With full access to the Broad Street Station, the SMV began developing plans for the additional space. In a letter to H. Douglas Hamner, Jr., Carpenter laid out exactly how the Museum intended to use each floor of the building.[424] In the basement, the SMV would store "Donated Exhibits," while the second floor would be reserved for "Offices, [a] Board Room," and additional storage.[425] The station's ground level was earmarked for exhibit space, preserving the east wing for the Discovery Room.[426] The rotunda would be cleaned up and prepped for the "Crystallography exhibits" and the concourse would be renovated to house an "Exhibit area Expansion."[427] The SMV also hoped to build an auditorium or public meeting room in the west wing, as well as a planetarium adjacent to Station.[428]

To ready the Station for these ambitious plans, the Museum developed a three-phased renovation schedule that allowed for adequate fundraising and a historically-appropriate renovation of the building. The first phase of the project tackled the essential work that needed

to be done to get the Museum's most desired programs up and running. It included plans to "restore central areas of the Broad Street Station and to construct a major planetarium/space theater/astronomy exhibit area."[429] The second phase scheduled several interior and exterior renovations intended to improve the look and functionality of the building. For example, the SMV Board hoped to install exterior "lighting fixtures appropriate to the historic character of the building" and improve "the Women's Waiting Room to provide an enlarged and permanent store for the sale of items related to Museum's programs and exhibits."[430] Some of the more ambitious plans for phase II included the "installation of a freight elevator to move exhibits, equipment, and people from the lower level to exhibit spaces on the first, second, third, and fourth floors" as well as "solar collectors on train shed roofs to provide solar energy for new HVAC systems at [the] Museum."[431] The final phase focused on restoring the historic butterfly train sheds that were progressively soaking up moisture and deteriorating.[432] The Museum designed the master plan to commence over the duration of six years, provided adequate funds could be raised.[433]

The price tag for phase I of the Broad Street renovations was a hefty $7 million.[434] The SMV requested $6 million from the state for the 1977-78 biennium, however, the General Assembly only appropriated $2.5 million to the Museum.[435] The project did receive an additional $1 million of state monies from a 1977 bond issue, but the SMV's deficit still required over $3.5 million in fundraising.[436] Roughly $1 million had been pledged by donors, including the Jeffries family, before the Board of Trustees and state agencies finalized the Museum's master plan. These monies were earmarked to complete specific projects associated with phase 1, including the Crystallography exhibit.[437] To raise the remaining $2.5 million, the SMV initiated a fundraising drive in 1978 which included the distribution of widespread mailings to promising Virginia households and the solicitation of funds from potential corporate donors.[438] The road to improving Broad Street Station was long and onerous, but the Museum had a plan to immediately move forward with as many elements of the renovation as funds allowed.

While the Trustees and Foundation Directors searched for philanthropic sources, the Museum's staff continued to provide new science programming to citizens throughout Virginia. In April 1978, the Museum launched the repurposed Trans-Science 2.[439] By November, the unit clocked "over 313,647" visitors across the state.[440] The Museum also launched a lecture series featuring presentations by professional scientists and knowledgeable science enthusiasts. The

first speaker debuted on September 28, 1978.[441] Charles E. Arnold, cofounder and president of the Richmond Shells Club, delivered "Shells: More Stately Mansions" to Museum guests, a topical complement to the "Indo-Pacific Seashells" exhibit a year before.[442] Rae Carpenter and other university professors also participated in the lecture series, bolstering the institution's growing reputation as a resource for current scientific information.

Perhaps the most noteworthy administrative addition to the Museum during its master planning stage was the appointment of Neilson J. November to the Board of Trustees. Before serving the SMV, November had chaired the "the Capital Region Airport Commission," directed "the Jewish Community Center," and donated his time and money to several other institutions and organizations throughout the state.[443] He was born in New York City but grew up in Virginia, eventually enrolling in Washington and Lee University immediately before the outbreak of World War II.[444] November attempted to become a wartime pilot, but was rejected by the Navy "because of poor eyesight."[445] Ironically, he spent the remainder of the war "identifying enemy aircraft in the Pacific because he could recognize anything with wings."[446] Upon returning home, he worked for his family's business, Friedman-Marks Clothing Co., "for 25 years before going into real estate."[447] According to November, Godwin appointed him to the Museum's Board because he was "a mover" that could oversee the completion of the planetarium.[448] On July 5, 1978, the Trustees elected November chair because of his experience in "matters of direction, policy, [and] State funding."[449] With the first phase of renovations scheduled to begin in December 1978, the Museum needed a leader well-travelled in the state's political, business, and philanthropic circles.[450]

Planning a Planetarium and More Museum Programming

The most daunting task in the first phase of renovations was the construction of a planetarium. Dr. Knappenberger and the Museum's staff engaged in a months-long investigation to identify the best equipment available for planetarium theaters and the feasibility of building a physical addition to the historic Station. The Trustees envisioned a technologically-advanced facility that could seat hundreds of guests. Visitors to the SMV would be able to enjoy planetarium demonstrations and big-screen movies, all intended to enhance their educational

experience.[451] With the right projectors and design, the Museum's planetarium could offer Virginians shows unlike any others in the world. Such innovation, however, came at a price.

In January 1979, the SMV received an estimate for the inclusion of a 70mm Omnimax projection system in the Museum's planetarium. The sound equipment alone would cost the SMV roughly $150,000 in addition to the $221,335 projector.[452] Nonetheless, the possibility of housing an audiovisual system that rivaled that of the National Air and Space Museum in Washington, D.C. appealed to the SMV, especially since the Museum planned to use the 12,000-watt projection lamp to cast images across a large, tilted-dome screen; the first combination of its kind.[453] The Omnimax system would operate in tandem with a digital star projector for astronomy demonstrations; the only problem was digital planetarium projectors were still being developed in 1979. Up until the early 1980s, planetarium equipment had remained largely the same since its invention. As Kandy Kramer explained in an article for the *Richmond-Times Dispatch*, "every planetarium used a mechanical star projector—usually in the shape of a hollow metal ball with holes drilled in the surface." [454] When illuminated by a bulb, the machine "simulate[d] the star field."[455] However, Knappenberger and his colleague Charles Smith "felt restricted by the limitations inherent in the standard star projection equipment," and searched for a company that could offer a model with dynamic, moving stars, allowing viewers to "travel through space" during presentations.[456] After attending a demonstration in St. Paul, Minnesota, they identified that company as Evans & Sutherland.[457]

Beginning in 1968, Evans & Sutherland spent ten years developing DIGISTAR 1, a "digital star system."[458] By combining "the latest…digital computer hardware, state-of-the-art CRT developments and high precision optics," the company could assemble a projector that relied on computer programs to simulate the night sky. One of their advertisements boasted "your creativity is the only factor limiting the infinite star fields and special effects available with the Evans & Sutherland digital star system."[459] While impressive, DIGISTAR 1 was not as advanced as the company initially claimed. When Knappenberger and Smith first witnessed the system in action, they noticed that "the stars just weren't bright enough" when the projector cast the digital images onto a smooth surface; "there was considerable distortion and, worse, the stars 'jittered' as they moved across the dome."[460] Regardless, they "recognized the potential of the system" and drafted a contract "with Evans & Sutherland to produce a system that would meet certain specifications, including steadiness of motion, brightness of the image and reduction of

distortion."[461] The SMV secured the right to check in on the company's progress throughout the software's development, frequently sending Smith to Evans & Sutherland's headquarters in Salt Lake City to represent the Museum's interests.[462]

Back in Richmond, the Board navigated the legal waters surrounding the construction of an independent building to house the planetarium. As early as January 1978, the Museum was required to obtain permission from the city's Art Commission to erect a structure next to the historic train station.[463] Knappenberger assured the commissioners that "no changes" would "be made in the exterior appearance of the existing building" with the addition of a planetarium.[464] Instead, the Museum would build the structure "to the left rear of the" Station.[465] The Commission approved the SMV's plan on the condition that there would be no "visual conflict between the dome on the existing building and the proposed new dome for the planetarium."[466] By January 1979, the Museum hired Samuel Crothers Associates of Philadelphia to design the planetarium with the Commission's restrictions in mind.[467] Samuel Crothers, the firm's chief architect and namesake, fully embraced the need to preserve the Station's aesthetic presence on Broad Street.[468] "'This existing building," he believed, "is so strong and so monumental that we felt that, No. 1, we didn't want to change that at all and, too [sic], we felt that any addition we made to the building had to be subordinate to it."[469] As a result, his architects drafted blueprints for an inconspicuous but effective facility that utilized three domed layers to make up the planetarium's exterior roof and interior "projection area."[470]

Though time consuming, the Museum's planning efforts between 1979 and 1980 did not prevent the growing staff and volunteer corps from offering new exhibits, programs, and community events. In January 1979, several SMV volunteers formed the "Volunteer Association of the Science Museum of Virginia, or the 'Associates.'"[471] Members of the Association sought to "better serve the Museum and its many volunteers" by "establish[ing] a volunteer structure with a slate of officers" to "insure the continuance of Museum Programs by a cohesive volunteer force."[472] The Associates helped the SMV organize a number of events and programs, including an expedition to Big Sky Mountain to view a solar eclipse in February 1979.[473] For $680, guests could accompany representatives from the SMV to Montana for a chance to witness the eclipse in its totality.[474] The Museum also offered several onsite programs "on eclipse mechanics and photography, star identification, astrophotography, meteorology, modern exploration, and radio astronomy."[475]

Beginning in September, the Museum hosted showings of a laser light show titled "Laserlumia Laserdrive."[476] The "spectacular light and sound extravaganza" was a "'live' performance with [a] Krypton-Argon laser producing intense colors in a multitude of patterns" for guests to see.[477] According to the Associate's December newsletter, attendance for the evening program "topped 7500 before closing Dec. 2," completing an "eight-week engagement" at the Museum.[478] The Foundation also used the show to entertain donors at a black tie fundraising event for the SMV's renovation.[479] While lasers amused guests on wintery evenings, the Museum offered a series of daytime movies on weekends and sponsored community field trips to nearby institutions like the Mariners' Museum.[480] Dr. Knappenberger brought scientific information into the living rooms of Virginia families by participating in SMV radio programs, such as the weekly *Science Conversations* show.[481] Once the new year began, the Museum brought repeat visitors to its station to gaze at the Gossamer Albatross.[482] The "gangling craft" which had flown across the English Channel was suspended from the ceiling of the rotunda and introduced guests to the capabilities of "man-powered aircraft[s]."[483]

By the summer of 1980, the SMV had accomplished several fundraising drives, sponsored communal field trips, and presented visitors to Broad Street Station a plethora of exhibits and demonstrations meant to make learning about science fun for all ages. The staff also engaged in research and planning activities for the planetarium space theater. In July, the Trustees published their first annual report, detailing the educational offerings of the Museum and the progress made on the first phase of renovations.[484] In a letter from the director, Knappenberger informed readers that the planetarium would be open to the public "in early 1983"; construction of the facility was set to commence on October 12, 1980.[485] The Museum's programs were expected "to expand" as the SMV assumed the role of "a pacesetter in innovative approaches to informal science education" with the opening of the theater. Until then, the staff would continue to improve visitors' experiences at Broad Street Station by offering new permanent exhibits and community events.

Building the Universe and Completing Phase I of the Master Plan

On October 12, 1980, over 1,000 Virginians gathered outside of Broad Street Station to hear an imposing figure, clad in black, sanction the groundbreaking for the SMV's planetarium. Darth Vader, "the dark lord of the Empire," looked down on a multitude of small faces as he

chided the Museum's Director for planning such an advanced theater.[486] "You appear overly zealous in your concept of this new planetarium, Knappenberger," he exclaimed.[487] Indeed, the Sith lord contended, "I shall have my own purposes for this structure" once completed.[488] In the meantime, Vader approved of its construction and commanded the Museum to "begin your preparations there," pointing to a patch of ground just behind the Station.[489] On cue, "hundreds of yellow and red and blue balloons" were released from the location, signifying the first tangible step toward erecting a physical home for the space theater.[490]

The SMV sought to mark the occasion with an appropriately-named "sky-breaking" ceremony, featuring "the Governor and his wife, a top Hollywood star, [and] a host of dignitaries."[491] In addition to getting an autograph from Kermit Eller, the costumed interpreter of Darth Vader, attendees listened to a performance by the U.S. Atlantic Fleet Band and remarks from the Trustees' chairman, Neil November.[492] He promised to deliver a theater unlike any other in the world. The planetarium, called 'The Universe,' would allow onlookers to travel through space and time, viewing constellations and nebulas that typical mechanical star projectors could not display. The SMV's staff hoped that introducing the concept to the public with a guest from far, far away would spark their interest in the Museum and keep them coming back for more. Active construction behind the Station would not halt educational programming or the opening of new exhibits—the staff wanted to bring a steady flow of Virginians into the Museum while the planetarium was raised.

In March 1981, the Museum made local news for continuing to offer fun, hands-on activities to Richmond school children.[493] The staff executed a class on "paper airplane making," allowing "youngsters who had learned to make paper fly [try] out their creations."[494] The simple, but instructive, activity supplemented the information on flight presented by the Gossamer Albatross display. In July, the Museum also remodeled its Aquarium, expanding the tank to include more specimen for guests to examine.[495] The new fixture, however, was nowhere near as large as the analemmic sundial installed in the Museum's parking lot in September 1981. Its design was the brainchild of Walter Witschey, then an enthusiastic volunteer and local businessman who would later serve as the SMV's second director.[496] The Museum submitted the size of the unique clock-, not solar-, time-reading tool to *The Guinness Book of World Records*, receiving recognition in 1982 as the largest of its kind.[497] The sundial would maintain the distinction until 1987.

In the months after the planetarium's groundbreaking, the Museum also opened two new exhibits to the public. The first was *Computer Works*, a 400-sqare foot space with 19 displays and activities demonstrating the capabilities of computer technology.[498] The second, opening on January 16, 1982, was the highly-anticipated *Crystal World*, a striking visual display of "five giant crystals—one twenty-eight feet high."[499] Installed in the rotunda of the Station, each pod presented a different lesson about crystals, including how they grew and where they could be found in nature.[500] With a total of "94 displays, 46 of which [were] interactive," the new permanent exhibit gave museum visitors plenty to explore.[501] "While other museums have crystal displays that are exquisite to see," a pamphlet explained, "Crystal World is unique for it also explores crystals internally so that one can understand why their magic is so basic to our modern technology."[502] The display cost the Museum $800,000, but it was money well spent. When the space went live, it represented the "world's most comprehensive educational exhibit about crystals."[503] *Crystal World* distinguished the SMV from other science museums, offering guests an experience they could not get anywhere else.

While new exhibits debuted on Broad Street, the SMV continued to oversee the construction of the Universe space theater—another addition designed to set the Museum apart from its out-of-state competitors. On March 16, 1982, Richmonders traveling by the Station witnessed "two huge cranes" hoisting "the 25,000-pound dome frame" of the planetarium onto its base.[504] With the aluminum frame in place, the Foundation had to secure the last remaining funds necessary to outfit the planetarium with its projection equipment. Thankfully for the SMV, the Vice President for corporate planning at Ethyl Corporation was reevaluating the restrictions of a $500,000 gift to the Museum.[505] Arthur W. Helwig, who would later serve as director for the SMV's Foundation, convinced Ethyl Corporation to re-designate the donation intended to fund a chemistry exhibit. He argued that the corporation would benefit immediately from purchasing projection equipment, "whereas an identity derived from the chemistry exhibit would await its completion which could be several years away."[506] When learning of the corporation's decision to approve the change, November wrote Helwig thanking him for his efforts. "You have truly been indispensable," he wrote, recognizing the importance of the gift to completing the space theater on schedule.[507]

Conclusion: Introducing the Universe to Richmond

The weekend of April 22, 1983 was the busiest in SMV history.[508] Over 10,000 visitors arrived at Broad Street Station to experience the first few days of the Universe planetarium and space theater's operation.[509] With the world's first Digistar projector and a 76-foot tilted-dome screen, the facility was unlike any other educational theater on the globe. Planetarium shows began when an operator pressed "a button labeled 'Boldly Go,'" shooting viewers "through space to distant stars" and galaxies.[510] After learning about the far reaches of space, guests watched a short film projected onto the domed screen by the 70mm Omnimax audiovisual system.[511]

On opening weekend, the theater screened *Genesis*, "a geology-oriented movie about the origin of the Earth and of many of the Earth's present features."[512] The Museum promised to offer a variety of films in the future, some on loan from institutions outside Virginia and others produced by the SMV in the "new facility['s] ...recording studio."[513] Knappenberger and other Museum affiliates viewed several Omnimax productions from outside institutions before choosing *Genesis*.[514] In an interview with the *Richmond Times-Dispatch*, November recalled watching one particularly entertaining film, *The Great Barrier Reef*, which concluded with "a shark frenzy."[515] He enthusiastically recounted the scene as follows: "This shark in the middle is being torn into shreds!, [sic] great hunks of bloody meat…It's unbelievable. I've seen it three times."[516] The SMV chose the film to be its second feature presentation.

By all accounts, the opening of The Universe was a success for the SMV. With record turnout and widespread guest satisfaction, the busy spring weekend was an exciting time to be at Broad Street Station. However, there was still a great deal of work to be done to complete the remaining two phases of renovations. In addition to improving the building, the staff had to maintain current exhibits while simultaneously developing new attractions to bring more visitors through the Station's doors. The state's purse strings would only tighten with the completion of the theater, requiring Directors and Trustees to scramble for funds to support long-term projects. Operating a Museum with a world-class theater and unique exhibits was not easy; especially when the building housing those features still needed rounds of historically-aware renovations.

Chapter 4: The Challenges of Running a State Science Museum

As construction of the planetarium steadily progressed, Museum staff and affiliates began to see the early 1980s as a moment of opportunity. While the state was not pouring funds into the Museum to raise its bottom line, legislators allowed phase I of the renovation process to continue without outright opposition, even allocating some of the financial resources necessary to further the project. If the General Assembly witnessed institutional growth and quantifiable results from the SMV's structural additions, the Board believed the state would continue to support the growth of the Museum.

The Museum saw many successes in the 1980s, but its accomplishments were never enough to solicit the financial backing the Board required to accomplish all its goals. The opening of The Universe planetarium and space theater brought record visitation to the Station and world-wide acclaim. However, the success of the project did little to convince the General Assembly to fully support new plans or the last two phases of renovation. The Museum continued offering educational programming to the public, but Virginians wanted to see its staff do more to set the facility apart from other science centers in the state. To top it off, the SMV encountered resistance from the Assembly when requesting funds to hire more staff, leaving the growing institution with far less people than it needed to efficiently execute day-to-day operations.

By 1988, the Museum faced what one newspaper reporter described as a "crossroads": "in the next several years it will either move away from the pack and claim the birthright of its name or it will become just one of the several science museums related to the commonwealth."[517] The SMV needed to revamp its educational programming, reorganize its financial assets, and raise enough money to bring state-of-the-art exhibits to the site; a job for more than one director. This chapter details the final years of Paul Knappenberger's tenure at the SMV; a crucial time for the Museum as its staff, Trustees, and Foundation Directors attempted to meet the challenges of running an innovative state science museum. Shortly after Knappenberger left his office on Broad Street, Walter Witschey, a familiar face in Richmond, returned to Virginia to assume the directorship. Under his watch, the Museum charted a new course forward, building upon the foundation that Knappenberger and his team built with persistence and compromise.

Financial Struggles and Stationary Streetcars

In January 1982, a historically significant addition to the Science Museum of Virginia made its way to America's shores.[518] Elisabeth S. Bocock, a Richmond philanthropist, purchased an early twentieth-century streetcar identical to the ones that ferried residents throughout the capital city in the 1910s and '20s. She, along with the local Hop-on-Trolley committee, sought to transport the restored car from its home in Portugal to Virginia in the hopes of "restoring a functioning streetcar line to Richmond's downtown area."[519] The project was a timely one; the city's streetcar centennial, "commemorate[ing] the birth of the streetcar in Richmond," was only a few years away.[520] The SMV saw the rousing local enthusiasm for the car's preservation as an opportunity to design a new exhibit and link the Museum to the streetcar's line.

Walter Witschey, then serving as a member of the Foundation's board, volunteered to conduct a feasibility study for the project. He "interviewed many individuals and civic, government, and business organizations" to compile his report, ultimately laying "the groundwork for achieving the support, donations, and agreements necessary to make [the] project a reality."[521] He recorded a brief history of streetcars in Richmond and compiled a list of objectives as well as work, development and implementation plans. In his view, the functioning streetcar could supply the Museum with "a science and technology exhibit" while "accelerating the re-installation of trackage, railway cars, and public interest" during the last two phases of the Station's renovations.[522] The car could also promote "the Museum in the community by involving many and varied civic and business organizations in the development of this project."[523] Restoring the streetcar would bring more to the SMV than a transportation exhibit; it could stimulate interest in the Broad Street Station that resulted in more visitors and an increase in private financial support.

Throughout July and August 1982, the Board of Trustees, Foundation Directors, and museum staff agreed with Witschey's conclusions and greenlighted the plan.[524] Since construction of the planetarium was proceeding on schedule, there was no reason to slow the development of new or existing projects. Witschey began the process of bringing the streetcar to Broad Street by requesting "track, easements, and an exchange of property with the State" from

the Richmond, Fredericksburg, and Potomac Railroad (RF&P).[525] While representatives from the Railroad and the Museum engaged in negotiations, Witschey reached out to the City of Richmond to obtain a "permit [to allow] the streetcar to operate through intersections, to maintain the intersections, and to modify the traffic signals."[526] Approval of the project by the state was contingent upon the attainment of "four other approvals": "Secretary of Education—Casteen; Secretary of Administration and Finance—Anderson; Director, Department of Planning and Budgets—Connock; [and the] Public Buildings Commission—[chaired by State Senator] Willey."[527] Anderson offered to write "the State recommending variances be permitted" and Casteen approved of the project outright. However, as the Museum worked to prepare "a Capital Outlay Request…for Connock," Witschey awaited "an appointment with Senator Willey."[528] After a meeting with the Virginia Electric and Power Company (VEPCO), Bill Proffitt, the senior vice president, "indicated that VEPCO would provide overhead electrification and the DC Substation for the streetcar" in addition to presenting the Museum's "request for a $100,000 cash contribution to VEPCO's Gifts Committee."[529] By November 1982, the Museum was setting up meetings with the VCU Department of Communication, Arts, and Design to review student proposals "to undertake the Exhibit design work."[530] The Museum had built a network of community support around its new venture; the future of the streetcar appeared bright.

Witschey's enthusiasm for the project materialized into a series of meetings that put the streetcar on the right track to Broad Street—all he needed was Senator Willey's approval to begin setting the plans in motion. Unfortunately for the Museum, Willey did not authorize the project. In a letter to "Trolley Friends and Enthusiasts," Witschey outlined the fallout between the state senator and streetcar project:

> In December, at a meeting of the Public Buildings Commission, Senator Willey spoke in opposition to the proposed plan you have read. He raised several objections. Because of the other items before the General Assembly, the Science Museum waited until the close of the 1983 Session to approach Senator Willey about his objections. In two recent meetings held with Senator Willey, a revised plan designed to accommodate and deal with his objections was presented and reviewed. He still stood in opposition to the plan as revised.[531]

No matter how hard he tried, Walter Witschey could not formulate satisfying responses to the senator's objections. Willey balked at the streetcar opportunity for fear that it would congest his district with traffic and impede other local development initiatives.[532] Ultimately, "Senator

Willey's obvious antagonism toward" the project forced the Museum to "shelve" the exhibit and discontinue negotiations with all city, state, and private parties involved.[533]

Rae Carpenter wrote a letter to Witschey informing him of the Board's decision. He expressed "deep appreciation for his sustained hard work on [the] proposal."[534] Carpenter had hoped to see the project realized "as a means of preserving additional lengths of train sheds," among other reasons.[535] He assured Witschey that "this is not the first time we have had to bow to the express wish of a member of State government in spite of what we thought was in the long term [sic] interest of the Museum."[536] Indeed, the SMV would only face more challenges in the near future as it attempted to ascertain the requisite resources to operate Broad Street Station and its growing number of exhibits.

In a report "compiled…to secure more funds from the General Assembly and Governor," the staff described a dramatic uptick in visitation, attracting over 70,000 more guests in the summer of 1983 than in previous years.[537] The influx of visitors "produced an increase in exhibit maintenance, building maintenance, custodial, security, exhibit floor operations, and a demand for longer hours of operation."[538] And yet, the report continued, "there [had] been a decrease in funding for these services as the Museum's budget was reduced 5% on July 1 and 1-1/2% more on September 23."[539] The SMV was "desperate" for "additional funds and positions to properly operate and maintain the Museum" in the coming years, especially since the disparity reflected negatively in state audit reports.[540] The SMV lacked an "adequate segregation of duties" in several departments, most notably the Museum's shop and ticket sales desk.[541] Staff had no cash registers to tender payment nor the equipment necessary to accurately record receipts.[542] As the state reduced the Museum's budget to pay other expenses, the staff made do with what little they had and were often forced to sacrifice efficiency to complete basic tasks. In the meantime, the SMV continued to grow, though at a much slower pace than the leadership anticipated.

New Exhibits and Phase II of Renovations

Soon after receiving a lack-luster audit report from the state, the Museum debuted its "first computer lab" on October 18, 1983.[543] It was one of several new exhibit spaces opened between fall 1983 and winter 1984. The lab "served as a 'prototype' for developing computer

education programs," bringing new technology into the Museum for staff and visitors to manipulate.[544] An "exhibit on visual perception opened" on July 22, 1984.[545] *Illusions, Science and Magic* challenged guests' interpretations of reality by tricking the eye with science. The Museum worked with VEPCO to deliver *Electriganza* to the public on October 9, 1984.[546] The exhibit reviewed "principles of electricity" and premiered in conjunction with a series of events paid for in part by the power company.[547]

The SMV rang in the new year with the opening of the Thalhimer *Aerodrome* exhibit.[548] Its presentation of "the history of flight from the Wright Brothers to the Space Shuttle" was the first of several exhibit areas made possible by a large donation from William B. Thalhimer, Jr. and his wife, Barbara.[549] The couple contributed over $2 million dollars to the SMV and both "served at different times on the board of trustees."[550] Thalhimer, Jr. had been President and CEO of the successful Thalhimer's department store chain before it merged with Carter, Hawley, Hale in 1978.[551] He remained involved in the business's management until 1990 when "Carter, Hawley, Hale sold Thalhimer's to The May Company."[552] Over the course of their time with the Museum, William and Barbara's gifts "increase[d] exhibit space by one-third."[553] 1985 was also the first year the SMV distributed four awards to Virginia's Outstanding Scientists and Industrialists.[554] In a ceremony attended by the Governor, the Museum recognized influential Virginians engaged in the research and application of science. Winners received medals displaying iconography that "blend[ed] past and present technologies, [with] modern and traditional symbols," such as "Earth, Air, Water, and [the] Cosmos."[555] The spirit of the award melded nicely with the Museum's new Creative Computing Center, a permanent version of the 1984 lab funded in part by Witschey and an anonymous donor.[556]

The successful unveiling of new areas of the Museum coincided with the beginnings of the second phase of renovations. It was delayed by several years as the SMV had to raise upwards of $800,000 to supplement inadequate funds from the state.[557] Foundation chairman George L. Yowell told reporters in 1988 that "the foundation has done more than it's been asked to do" to underwrite the renovation costs.[558] Phase II included improvements to the west wing, concourse, and lower level of the "main building" in addition to the installation of a "new heating and air conditioning system" in the east wing.[559] The SMV also hoped to construct a "new freight elevator to serve five levels," an essential component for any museum hoping to transport large displays or objects between multiple floors.[560] Remaining funds from the

Thalhimer donation were used to install "exhibits on aerospace, energy and electricity, and physics and chemistry" in the concourse, making up the Barbara and William B. Thalhimer J. Hall of Science Exploration.[561]

On June 12, 1988, "a decade after opening," the SMV neared completion of phase II and scheduled the new exhibits to open in January of the next year.[562] Initiating phase III, which included restoration of the historic butterfly train sheds, would have to wait until the Museum could organize another fundraising campaign to supplement the state's budget. Yowell hoped that the Foundation would begin raising the money "by the end of 1989," but in the meantime the Museum had to focus on promoting its upcoming exhibits and developing new educational programming to accompany them.[563] According to a study conducted shortly before the renovations ended, the SMV needed to "take broad steps to increase its visibility outside the Richmond area."[564] Thompson and Pendel Associates, the authors of the report, assembled a "detailed, 25-point plan of attack for museum officials," which included a new role for the Director.[565] As opposed to focusing on creating "exhibits and programs," the firm suggested that Knappenberger "give top priority to 'the building and maintaining of significant and diverse relationships for the Museum with Virginians.'"[566] Despite a recorded attendance of 302,578 for 1987, the SMV still "face[d] tight and shrinking budgets for day-to-day operations and maintenance of existing exhibits," including "the computer center…[which] remain[ed] open about 30 percent of the hours that the museum itself [was] open" because of a limited staff.[567] The main way for the Museum to grow its budget in the short term was to increase ticket sales. The staff had to attract more Virginians to Broad Street Station with statewide outreach, effective advertising campaigns, and new programs.

The Science Museum of Virginia as a Community Institution

In January 1989, the Museum dedicated the William and Barbara Thalhimer Hall of Science Exploration before a crowd of Virginia statesmen.[568] The annual General Assembly reception "marked the end of the second phase of renovation of Broad Street Station," and the beginning of a new direction for the SMV.[569] With "its new modern, fully-equipped fabrication and graphics shops in the Station's remodeled basement," the Museum could continue to offer the public exhibits built in-house.[570] Self-constructed exhibits could also be circulated to other

centers around the country, providing the SMV with one way to advertise its name abroad. This practice contributed to the Museum's effort to rebrand Broad Street Station as a community-centered institution open to all, inside or outside the state.

The SMV built three new exhibits in the Thalhimer Hall of Science: "A*erospace*, *ElectriWorks,* and *Science Sense*."[571] *ElectriWorks* was a product of the relationship forged between the Museum and Virginia Power, consisting "of two major sections: Electricity and Science, and Electricity and Energy."[572] The first "present[ed] fundamental concepts key to the understanding of the modern electrical energy system and applied electronics," including "voltage, current, fields, and electromagnetism."[573] The second was a creative space that gave "visitors the opportunity to control a model electrical energy system."[574] Of the three exhibits, guests agreed that ElectriWorks was the most "dramatic."[575] However, they also provided the Museum with mixed feedback, identifying a number of shortcomings with the displays, such as "too much [content] to read" or too few "simple explanations in large letters."[576] Though ready for visitors to browse, the exhibits in the Hall of Science needed to be progressively tweaked to fully satisfy patrons.

The summer after the concourse's debut was full of popular events that brought thousands of Virginians to the Museum. The first was on June 29th when the SMV welcomed Jerry Mathers, from "the original 'Leave it to Beaver," as the guest of honor to "a '50s party complete with oldies music, food, dancing, contests and autograph signings."[577] The retro shindig occurred in conjunction with other "opening festivities for *Beavers*, an IMAX film," and attracted almost 4,000 attendees.[578] The Museum also displayed "a replica of the Batmobile" during the month of July.[579] The iconic vehicle from the hit TV show *Batman* (1966-1968) drew about 2,000 visitors to Broad Street Station.[580] In the same month, Apollo 11 astronaut Buzz Aldrin spoke at the SMV; an appearance that coincided with the *To The Moon* exhibit located just outside the entrance of The Universe planetarium and space theater.[581] In addition to hearing tales from the famous space explorer, guests could interact with "a simulated moon surface, the museum's Space Port for children and a model of John Glenn's Mercury capsule."[582] Summer programing ended with an eclipse viewing in August, "cohosted with the Richmond Astronomical Society."[583] Roughly a thousand Richmonders trekked out to the Station to watch "as the moon darkened and turned to shades of red," a fitting end to an eventful season of events.[584]

With the onset of fall, the Museum developed several new education programs to keep Virginians coming to West Broad Street in the slower months of the fiscal year. In September, the SMV began producing Live Sky, "an interactive, inside look at the night sky with commentary by staff astronomers."[585] The program was shown in The Universe and introduced guests to a new kind of educational experience at the planetarium.[586] The Museum also hosted its first-ever Educator's Open House, a content-based event that "attracted teachers from throughout Virginia" looking for new ways to teach science in their classrooms.[587] The program was explicitly designed to court educators across the entire state, demonstrating the Museum's willingness to work with residents outside of Richmond. However, attention to such activities did not prevent the SMV from targeting city dwellers. In October, the staff coordinated Read Richmond Read, "the area's first literacy event" which "attracted 900 visitors, including Jeannie Baliles," the First Lady of Virginia and founder of the Virginia Literacy Foundation.[588] The month of October also marked the beginning of the Museum's popular camp in program when "forty adults and children spent the night" in the historic train station.[589] Attendees participated in "hands-on workshops featuring exciting topics," in addition to viewing a planetarium demonstration and IMAX movie.[590] The evening was meant to "motivate and stimulate young people to seek careers in science" as well as "improve participants' science knowledge and skills."[591] It was the first of what would become many camp ins organized by the SMV staff throughout the 1990s and 2000's.

While staff members coordinated the Museum's revamped schedule of events, Trustees negotiated a possible merger between the SMV and the Virginia Aviation Museum (VAM). VAM was founded in 1987 by the Virginia Aeronautical Historical Society (VAHS) upon receipt of a "collection of vintage aircraft and generous donations from many of the prominent Virginians who are flying buffs."[592] Housed in the Freedlander Wing of the Richmond International Airport, the Museum had "nearly three dozen aircraft on display—all in flying condition—and several more in storage" in 1989.[593] The driving force behind the "'marriage' of museums" was Neil November who had, at different points in his career, chaired the Board of Trustees for the SMV, the VAHS, and the Capital Regional Airport Commission, which leased the Freedlander Wing to VAM "for $1 a year."[594] November believed that VAM's collection of planes from the golden age of flight would complement the SMV's aeronautical exhibits in the Thalhimer Hall of Science.[595] VAM also had "no debt and a six-figure bank account," an

appealing financial situation to the SMV that November frequently reminded members of VAHS would not last indefinitely. [596] Without a "massive infusion of charitable cash each year," VAM could face crippling deficits.[597] "Now is the time to consolidate this merger," November argued, "and not wait until that inevitable time arrives when our financial reports begin to reflect solid red ink."[598] Anthony F. Troy, the SMV's acting chairman of the Board of Trustees, believed that the merge was "a concept that's worth pursuing if it makes financial sense."[599] However, the Museum needed to review the "potential benefits and costs of the acquisition" before a decision could be made.[600]

1989 was a crucial year for the Science Museum of Virginia. With the completion of phase II of renovations and the receipt of lack-luster financial reports, the Museum was forced to reevaluate its programming and reach out to more Virginians to raise ticket sales. Outside studies also revealed that the staff needed to target citizens throughout the state to set it apart from other science centers in the Commonwealth. Budget cuts from the General Assembly enticed the Museum to look inward when it needed to project outward; a trend that threatened to strip the SMV of its statewide mission and appeal. By hosting events with wide-ranging demand, like the Educator's Open House, museum staff put the SMV on course to serving more areas of the state.

In an almost symbolic coincidence, the Museum dedicated a plaque honoring Dr. Hughes, the "founder of the Science Museum of Virginia," in August 1989.[601] Roughly 100 guests attended the ceremony, including Hughes's widow, Elizabeth.[602] In an SMV press release, Knappenberger explained that the "plaque is our way of showing…appreciation."[603] In his view, Hughes had the "foresight and dedication" to make the Museum a reality, and his desire to offer all Virginians fun and informative science education continued to motivate the staff years after his death.[604] This observation was especially true in light of the SMV's new direction. Though the Museum still faced several financial and logistical challenges, the staff hoped to improve the SMV and develop it into an institution more in line with Hughes's original vision.

Knappenberger's Final Year as Director of the Science Museum of Virginia

With the onset of a new decade, Director Knappenberger sought to continue the Museum's crack at operational reform and begin fundraising efforts for phase III of renovations. While the staff made substantial progress toward rebranding the SMV as a state-conscious institution, there was still work to be done. The Board also had substantial hurdles to overcome to ensure a stable financial future at Broad Street. The General Assembly remained as skeptical as ever toward increasing the Museum's budget, forcing the staff to continue improving ticket sales. In the meantime, Knappenberger acclimated the Museum Board, Foundation, and staff to the idea of his departure; he planned to embark upon his next career as president of the Adler Planetarium in Chicago.[605] By 1991, the SMV was engaged in a search for its next director.

In January 1990, the Museum dedicated one of its most iconic fixtures in the Station's rotunda: the Foucault Pendulum.[606] Renovations from phase II included the relocation of *Crystal World* to exhibit space outside The Universe, making room for the simple swinging mechanism to be hung from the ceiling.[607] The installation illustrated the constant rotation of the Earth by gradually knocking over pegs affixed to the Museum's floor. Around the same time as the pendulum's debut, the SMV opened *About Faces*, a series of "spectacular exhibits demonstrating the range of information communicated by the human face."[608] The displays "attracted more than 33,000 visitors in its eight-week run."[609] Guests visiting Broad Street Station in the month of January also witnessed the premier of *Eye in the Sky*, a planetarium show that "peered into the history of telescopes and the future with the Hubble Space Telescope."[610] The Museum greeted the 1990s with a variety of activities for visitors, continuing the staff's attempt to bring more Virginians to the Station.

In addition to exhibits, the Museum hosted several successful events that exposed attendees to the science behind their everyday lives and environment. For example, in March, the SMV celebrated Chesapeake Bay Days, welcoming "3,700 people to the museum for a sampling of the sights, sounds and flavors of the bay."[611] The event highlighted existing conservation efforts and reminded visitors of the precious biodiversity in the estuary. Also in March, the SMV brought together "local officials and area leaders" for Richmond: Year 2000, a meeting "in the rotunda to discuss [the future of] education, transportation, and more" in Virginia.[612] In April, the Museum continued to sponsor Virginia's Outstanding Scientist and Industrialist Awards.[613] At its sixth installment, Governor Douglas Wilder presented medals to five individuals, two of which were executives at Ethyl Corporation; the company that donated

$500,000 to complete The Universe planetarium and space theater.[614] Leaders in science and industry were not the only ones to receive acknowledgement from the Museum. The SMV held its annual volunteer recognition dinner where the staff "honored its first group of 10-year volunteers."[615] Broad Street Station also served as the location for the state's geography bee in May 1990.[616] The winner, "Sophia Delano of Warsaw," competed against students from all over the Commonwealth, allowing the Museum to showcase its educational offerings to a diverse group of Virginia families.[617]

With the arrival of summer, the SMV initiated two significant structural changes that affected its educational outreach. First, the Board of Trustees "voted unanimously to accept the Aviation Museum at Richmond International Airport" in June 1990.[618] After months of deliberation, the SMV agreed that the collection of planes could supplement the Museum's aerospace exhibit. In addition, Chairman Troy believed the acquisition of VAM "further demonstrates that we are more than an edifice on Broad Street—that we are the state Science Museum for the commonwealth."[619] The SMV hoped to reach a variety of Virginians travelling through the Richmond International Airport with new hands-on programs in the Freedlander Wing hanger.

Second, the Museum debuted Science-by-Van, a "travelling science program [that] present[ed] informal educational experiences" to audiences in "towns and cities throughout the commonwealth."[620] In the same spirit of Trans-Science 1 and 2, Science-by-Van allowed the SMV to visit "schools, fairs, festivals, libraries and special events" beyond Richmond for a fee of no more than $500.[621] The staff divided the state into three regions and sent teams of two to deliver "one 20-minute all-school assembly performance; over 30 hands-on table top exhibits; 10 classroom workshops accommodating 36 students each; [and] make-it, take-it science toys for each workshop participant."[622] Local teachers could "choose from five different topics" when planning workshops, including Animal Tracks, Dinosaurs, Mirrors, and more.[623] Local newspapers in Chesterton and Lexington covered visits from the SMV's new program to area schools in 1990 and 1991.[624] One fourth grader from Chalkley Elementary School said the visit "was like we were going to the State Fair and riding on the rides."[625] Science-by-Van was made possible when local industries donated two vans to the Museum.[626] The fun and interactive program experienced a "strong demand" from local schools and was "presented 50 times" in 1990 alone.[627]

After getting Science-by-Van on the road and overseeing the SMV's acquisition of VAM, Director Knappenberger petitioned the General Assembly to allocate $3,000,000 for phase III of renovations to Broad Street Station.[628] The top priority of the Museum was to "repair and stabilize the historic train sheds," several of which had "been deteriorating since before the state acquired the property in 1976."[629] Knappenberger informed the state that the area was "now…a safety and health hazard."[630] The SMV needed funds to facilitate "asbestos removal," the "replacement of broken windows," and other crucial repairs.[631] "The minimum work required for the safety and stabilization of the deteriorating structures will not provide a usable, secure space," Knappenberger warned.[632] The state needed to eradicate "the retention of moisture within the roof structure, rusting of the structural members and the deterioration of concrete" to effectively "eliminate any hazards to the public, employees, and to the structural integrity of the train sheds."[633]

In January 1991, the Trustees supported Knappenberger's request by reaching out to state representatives and petitioning for its inclusion in the General Assembly's budget. For example, Carpenter wrote several letters to delegates and approached other statesmen, including the governor, in person about the dire state of the train sheds.[634] He argued that "the operating budget of the museum has suffered more than the percentage applied to most agencies."[635] While a majority of "cuts have thus far been absorbed by unfilled positions, partly by increased recruiting of volunteers and reduction of maintenance," the Trustees were beginning to consider "what time in the next 6-8 weeks staff would have to be furloughed to prevent a deficit on 30 June."[636] The Museum could not afford to repair the sheds by itself.

Unfortunately for the SMV, the General Assembly once again refused to appropriate the entirety of Knappenberger's request. The disappointing budget would be the last the director witnessed in his tenure at the Science Museum. Knappenberger completed his final year at Broad Street in 1991. The trustees began their search for the Museum's new director the same year, hoping to find another individual with the same level of enthusiasm and charisma that Knappenberger exuded throughout his 18 years in Richmond. In an advertisement for the position, the Trustees stressed that a successful candidate "must be capable of…dealing with State government, community and business groups"; the Museum's director "serve[d] as representative of the institution at the state, national and international levels with political and legislative bodies, scientific and academic professionals, business and community leaders, and

members of other sister institutions."[637] The Trustees also hoped to hire an individual that could "train and motivate subordinates and measure the performance of his/her staff on a regular basis" while maintaining "sensitivity and commitment to advancing cultural, gender and racial diversity in programming and staffing at all levels of the institution."[638] To top it off, this person needed to possess "a Ph. D. degree," ideally "in an area of science."[639] Knappenberger had set the bar high with his experience before coming to the Museum. The growth of the institution since necessitated an equally qualified candidate to sustain basic levels of operation. Thankfully for the SMV, the Trustees had already worked with one such individual: Walter Witschey.

Conclusion: Walter Witschey is Hired as Director of the Science Museum of Virginia

In a 1998 interview with the *Virginia Review*, Walter Witschey explained that he became director of the SMV "by one of those curious quirks of fate."[640] After working with Knappenberger to install the record-breaking analemmic sundial in the Museum's parking lot, Witschey told his new friend, "I think you have a wonderful job. If you ever give this job up, give me a phone call."[641] Witschey remained involved with the Museum through the Foundation until he moved his family to New Orleans to obtain a PhD in Maya Archaeology from Tulane University.[642] While in school, he became fascinated with "an ongoing program of archaeological field research in Muyil, an ancient Maya site on the Yucatan Peninsula in Mexico."[643] Once his studies were complete, Witschey submitted his dissertation for review and "got a phone call" from the SMV.[644] A staff member suggested that Witschey apply for the directorial position and he faxed his resume to Broad Street.[645] According to the article, "after a nine month wait, and a national search, in 1992 Walter Witschey got the job, and moved his family back" to Virginia.[646]

Witschey returned to the Museum in a challenging economic climate. As Knappenberger quickly learned when requesting funds to restore the train sheds, "Governor Wilder's response to the budget crunch was to cut all unnecessary expenses, or 'niceties, not necessities' as he called them."[647] Witschey would have to work with the Trustees and Foundation Directors to chart a viable financial course forward for the SMV, prioritizing phase III of renovations and the incorporation of the Virginia Aviation Museum into the Museum's programming. While the state was an important resource for financial assistance, the SMV needed to build more

relationships beyond the Virginia Capital. If Witschey hoped to continue Knappenberger's attempt to expand the Museum's outreach, he had to find the right people to run a significant fundraising campaign that fostered lasting partnerships with private donors. This need became all-the-more acute when Witschey revealed his plans to begin "one of [the Museum's] most aggressive outreach programs of its history."[648]

Chapter 5: Expanding the Science Museum of Virginia

Upon his installment as director, Walter Witschey took stock of the Science Museum of Virginia's situation.[649] From its finances to the physical condition of Broad Street Station, the new director met with staff members and Trustees to determine the first actions he should take at the institution's helm. The most pressing task was the completion of phase III of renovations. The Foundation needed to secure enough funds to finish the project; the rotting train sheds behind the Museum would not sustain another five years of neglect. In the fall of 1992, "on the 20th anniversary of the six year plan," the SMV received money from a state bond issue that allowed the staff to continue renovations.[650] Witschey oversaw the "refurbish[ment] and clean up [of] the perimeter property of the museum," in addition to the "complete…restoration of the passenger platforms and the historic butterfly canopies."[651] It would be another four years before the space opened to Museum guests, but the 1992 bond issue allowed Witschey to begin managing phase III of renovations in his first year as director.

Witschey also reevaluated the educational programming offered by the SMV. He realized that the Museum lacked a permanent exhibit on the life sciences; a crucial and evolving field with countless everyday implications for the lives of visitors. At the dedication ceremony of Dr. Hughes's commemorative plaque in August 1989, Elizabeth Hughes explained to the crowd, "As a biologist, I hope the next stage [at the SMV] will be life sciences—the universe within."[652] Knappenberger agreed, telling news reporters that "a study is about to begin to come up with proposals for opening the east wing of the Science Museum to life-sciences exhibits."[653] Walter Witschey had an opportunity to transform the study's findings into a reality; a challenge he met with enthusiasm.[654]

In addition to renovating the train sheds and bringing life science displays to Broad Street, Witschey wanted to grow the Museum's sphere of influence by constructing satellite science centers throughout the state. Ideally, every Virginian would have access to a public-science institution within fifty miles of their home.[655] While the museum continued to operate under its relatively unchanged 1970 legislative authorization, its scope and mission had deviated significantly from the original vision of the 1967 Study Commission for a statewide network of science centers. Witschey hoped to restore the Museum's original, state-sanctioned design by

initiating "one of its most aggressive outreach programs [in the SMV's] history": the development of regional satellite science centers across the Commonwealth.[656]

This chapter explores Witschey's term as director and the work carried out by staff members, Trustees, and Foundation directors to transform the SMV according to his vision. The expansion of the Museum experienced inspiring successes and discouraging shortfalls; especially with the dawn of the millennium and the onset of a nation-wide recession. By the end of his tenure as director, Witschey left a lasting impression on the Museum with the development of new exhibits, educational programs, renovated spaces, and, most of all, a locally-supported science center in Danville, VA. While Knappenberger had "done a remarkable job…mov[ing] the institution from zero to an exciting leadership position in the world of science centers," Witschey wanted to improve upon that progress and usher the SMV into the twenty-first century. In an interview with the *Virginia Review*, he explained, "We didn't try to modify our mission so much as to focus on additional strategies for implementing it well."[657] Like his predecessors in the Museum's leadership, he would find more success in some of his endeavors than others.

Initiating Walter Witschey's Vision for the Science Museum of Virginia

Once phase III of renovations was underway, the SMV could focus on initiating the first steps toward achieving Witschey's goals for the Museum. Almost by chance, the administration began with the development of a satellite science center in Danville; a city in economic decline after the closing of several tobacco warehouses and textile mills. Witschey had personal connections to the struggling city. His mother and father in law lived in Danville, members of a community that hoped to rebuild their home's financial infrastructure by developing new industries and businesses in the area.[658] When Witschey visited his in-laws, he explained his plans for expanding the SMV.[659] They concluded that the Museum should "do this in Danville" and build a satellite science center to serve Southside Virginia.[660] Before Witschey could wrap his head around the idea, his family was suggesting "names of key local arts organizers and government officials he needed to contact to get things rolling."[661] At one point in their conversation, his mother in law disappeared from the room and "returned, saying one of those key people was on the phone, and he needed to talk to him."[662] Just like that, the Danville Science Center was set in motion.

To ensure the financial success of the project, Witschey needed someone to coordinate a fundraising effort on the ground in Danville. Governor Wilder's budget cuts in the face of an economic recession ensured that the General Assembly would not appropriate monies for a satellite center; it was hard enough for the Museum to secure funding for its daily operations in Richmond.[663] In April 1992, Witschey asked a business-savvy member of the Board of Trustees to serve as executive director of the Foundation: Robert 'Bobby' Thalhimer.[664] Bobby Thalhimer was the son of William B. Thalhimer, Jr. and "served on the board of the Science Museum of Virginia Foundation" both "before and after his staff duties with the Science Museum."[665] He was responsible for converting a tranche of donations into an endowment for the Museum during Knappenberger's last years at the SMV.[666] Witschey hoped that Thalhimer could accompany him to significant meetings in the planning process of Danville and design a successful localized fundraising strategy to get the center on its feet.

Together, Witschey and Thalhimer approached Whittington W. Clement, a popular state delegate from Virginia's 20th district, to begin planning a capital fundraising campaign.[667] Clement supplied the pair with a list of seven potential donors in the community, six of which pledged gifts to the project and agreed to serve as board members for the Danville Science Center.[668] One of the potential donors—the local Kiwanis Club—provided a large initial grant for exhibits, which effectively sparked the community fund-raising effort. Shortly after forging these relationships, the SMV sent a staff team, led by David Hagan, down to Danville to boost local support for the center and design future educational programming. Hagan and Thalhimer met with local teachers and other residents of Danville to collect and incorporate their ideas for a public science institution.[669] The SMV placed Hagan in charge of exhibition design for the center while Thalhimer helped three local women continue raising funds for the campaign.[670] At first, Eileen Stendig, Lamar Owen, and Virginia Hall needed Thalhimer to lead their meetings with potential donors.[671] With time, they learned the ins and outs of fundraising and, in the end, managed to raise $1 million for the center.[672]

Meanwhile, the SMV facilitated discussions between the growing team of community representatives, the City of Danville, and Norfolk Southern Corporation (NS) to secure a viable location for the center. NS owned property that housed the Southern Railroad Passenger Station, a structure built in 1899 that had fallen into disrepair.[673] All parties agreed that if the space could be restored, it would be an ideal site for the science center.[674] When ground was broken

on November 11, 1994, the Danville Science Center became one of several initiatives associated with the city's Crossing at the Dan, "a multiphase project which included the renovation of the 1899 Southern Railroad Passenger Station, the 1885 Gibson Beverage Company Building, the 1904 Southern Railroad Freight Depot and the 1856 Richmond/Danville trestle bridge."[675] Locals interpreted the series of renovations as a useful "development tool" to improve Danville's business district.[676]

As Museum staff and community representatives continued working on the Danville Science Center, the SMV established the Center for Science Education (CSE) in 1995.[677] The CSE was "not a place or a thing," but a committee responsible for "manag[ing the SMV's] extensive (and growing) statewide education activities" and "serv[ing] as its link to Virginia school systems."[678] The committee sought to "involve scientists and institutions in activities of the Science Museum of Virginia and the Center for Science Education," "increase participation of the statewide scientific community with the Science Museum and to build partnerships for science education," "identify and cultivate scientists for participation in programs and exhibits where needed," and "identify individuals, corporations and foundations who may fund the initiatives of the Science Museum and the SMV Foundation."[679] The CSE was particularly useful for building and maintaining relationships with educators throughout the state, an important support network for the Museum and segment of its consumer base.

With the CSE up and running, the SMV turned its attention to building a substantial, permanent life sciences exhibit at Broad Street Station. To achieve this goal, and fund other projects in the Museum's master plan, Bobby Thalhimer and members of the staff designed the Journey into Science Campaign, "a five-year $30 million" fundraising initiative that strung together exhibit spaces in Broad Street Station with a coherent theme.[680] According to this plan, "visitors to the Science Museum will participate in interactive journeys exploring a number of science and technology topics based on thematic storylines."[681] The seven newly-designed, or reorganized exhibits, would include "Journey to the Edge of the Galaxy, Deep Ocean Space, Journey through Life, Journey through Cyberspace, Discovery Park, Steps to Understanding and On the Move."[682] Each "journey" was intended to "immerse visitors in a story educating them about the various scientific principles and disciplines."[683] Practically, the campaign allowed the Museum to grow out of its unstable financial situation by securing $10 million dollars from the state "while the remaining two-thirds" of the $30 million was obtained "from private

resources."[684] Thalhimer managed the campaign by bringing in sales professionals to secure corporate sponsorships for films or exhibits.[685] He also used the Museum's existing assets to forge long-term donation relationships with private businesses and philanthropic families.

One of the most rewarding financial partnerships that Thalhimer built was between the SMV and Reynolds Metals Company. In October 1992, the Company gave a historic "deep-diving submersible" to the Museum.[686] The *Aluminaut* was "the world's first aluminum submarine" which "set a world record for the deepest dive by a submarine and traveled the globe to perform scientific research and emergency salvage missions" throughout its lifetime.[687] Thalhimer promised the Company that the submersible would become "the first outdoor installation" in the "seven-acre area north of the museum's concourse."[688] Along with "a [planned] transportation technology exhibition and…nature park," the *Aluminaut* would serve as "the centerpiece of outdoor events and educational activities" at the Museum.[689] In return, the Reynolds family agreed to donate $1 million dollars to the Journey into Science Campaign.[690] The *Aluminaut* arrived at the Museum on May 6, 1995.[691]

Before the public could view the record-breaking machine, the SMV needed to improve the grounds behind Broad Street Station. A significant part of the project was the reinstallation of "2,800 feet of railroad track leading to" the Museum building.[692] This track would allow the SMV to move railroad cars to and from the proposed outside-exhibit area, creating space for an adaptable transportation display. On March 31, 1994, Witschey submitted an application pursuant to the relatively-new "federal Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991."[693] If approved, an ISTEA grant could provide the Museum with enough funds to begin working on the track "as rapidly as possible."[694] Witschey requested a total of roughly $1 million from the federal government, $619,000 of which would go toward "installing railroad track in our exhibit area."[695] On June 22, 1995, he received word that the Museum was awarded "a grant of $416,000…under" the ISTEA; less than Witschey hoped, but enough to begin construction on the track.[696]

While Thalhimer and Witschey devoted their efforts to the Journey into Science Campaign, the Museum's staff coordinated events and programming at the Virginia Aviation Museum. In August 1994, VAM attracted "record crowds" to celebrate "the 50th anniversary of the liberation of Paris."[697] The Museum displayed "a photographic exhibition and the film, 'Merci, America,' both on loan from the Embassy of France in Washington, D.C."[698] Children

could also become "scouts in a French Resistance scavenger hunt," and participate in other hands-on activities.[699] In November 1994, VAM supervised the movement and rededication of a Civil War Balloon Corps Monument on site.[700] "Uniformed Confederate and Union" reenactors spoke with guests and the "ceremony featured a hot air balloon."[701] VAM also welcomed "aviation museum professionals from around the world" in April 1995 by hosting the annual Mutual Concerns of Air and Space Museums Conference.[702] Attendees "discuss[ed] current trends in aviation history museum management" and perused the Museum's collection of air-worthy planes.[703] Though much of the SMV's staff was hard at work on the Journey into Science Campaign, the Museum was still responsible for managing the every-day activities of its first satellite center, the Virginia Aviation Museum. In December 1995, they would add the Danville Science Center to their operational obligations.

Opening the Danville Science Center and Building a Broad Street Campus

On a chilly December 9, 1995, the Danville Science Center opened its doors to guests for the first time.[704] In a few years of operation, the Center "attract[ed] more than 25,000 visitors annually," including "school groups from as far away as Prince Edward County."[705] In consultation with the SMV's staff on Broad Street, the new employees in Danville "forged cooperative partnership programs with area schools" and worked to provide local residents with fun, hands-on science education.[706] According to an agreement between the Center and the City of Danville, museum staff was responsible for "interior maintenance and operating expenses" while City employees were charged with "maintaining the building's exterior and paying the utilities."[707] This arrangement allowed the Museum to save money and the City to support a new financial asset located in the Crossing at the Dan.

As the Danville Science Center made a name for itself in Southside Virginia, Walter Witschey oversaw the transformation of Broad Street Station into a "learning campus."[708] On April 2, 1996, the SMV sealed a deal with the Richmond Children's Museum to move their operation to the site of a "closed ABC store on the lot next" to the Station.[709] "The acreage in the back" of Broad Street was still in the process of "being developed for train access, as well as an ecology" commons called Discovery Park.[710] Witschey believed that the triumvirate of educational sites would fit "in beautifully with museum activities just blocks away at the

Virginia Historical Society" and the Virginia Museum of Fine Arts.[711] The SMV hoped to develop "shuttle tours…to tie all these activities together," allowing guests to easily travel between the different institutions.[712]

On April 3, 1996, the Museum gained another off-site asset when a former Ambassador to Australia, Walter Rice, and his wife, Inger, donated their home to the Foundation.[713] The couple "commissioned famous West Coast architect Richard Neutra to design" the "modern structure" on the James River in 1960s Richmond.[714] The blueprint for the building was "an example of Neutra's philosophy that design should connect man with nature and blend the interior with the exterior."[715] Once constructed, the home was "unlike anything in the Richmond area."[716] Inger Rice offered the property to the SMV on the condition that the Museum would not put it on the market; a stipulation that led the VMFA and University of Richmond to reject a similar proposal from Inger before she came to Broad Street.[717] She wanted the house to be preserved, not sold, and Witschey was willing to look into the opportunity and accept the gift according to her wishes.

Witschey, Thalhimer, and Elizabeth Blatt, Deputy Director of the SMV, each researched an aspect of the property to determine if it would be a financially viable addition to the Museum.[718] The gift included roughly 30 acres of land: 11-acre Lock Island and 19 acres of shore land.[719] The land possessed ecological as well as historical significance "because of its proximity to the railroad, foundries and sites like Tredegar Iron Works."[720] The SMV could use the property to "study plant and animal species around the home and in the river, as well as researching ways of drawing power from the river."[721] Throughout the course of a year-long negotiation, the Museum convinced Rice to sell the 19 acres of shore land and use the proceeds to fund a charitable remainder trust which would pay her and her husband 6% a year of the island property's prior year in value until they either both passed away or relinquished the home.[722] In the meantime, Walter and Inger Rice could remain in the house as long as they agreed to maintain it.[723] Rice had hoped that the Museum's director would eventually live on site, however, the SMV opted to rent the space out for special events including "parties, weddings and meetings" instead.[724]

In addition to preparing the Rice House Donation, the SMV also piloted a new educational program in 1996: the AT&T Teacher Institutes.[725] The "week-long, residential course" offered educators from "the entire state" a series of "sessions…that focus[ed] on the use

of hands-on science techniques in the classroom."[726] The inaugural group of teachers included four participants from "Richmond, Prince George County, Spotsylvania County and Fluvanna County."[727] Their evaluations of the program were so positive that the Museum decided to expand the class to 11 teachers in 1997 and "the same program materials were also used in two sessions for the Lead Science Teachers from the City of Richmond."[728] By 1998, over "90 teachers attended the AT&T Institute (including four teachers from West Virginia and 67 from the City of Richmond)."[729] The overwhelming success of the program led AT&T to renew its financial commitment in 1999 and the City of Richmond to "earmark funding from its NSF grant" for future programming.[730]

Undoubtedly, the AT&T Teachers Institute, along with other programming offered by the SMV, contributed to the Museum's "first ever unqualified ten-year accreditation by the American Association of Museums" (AAM) in October 1996.[731] In a letter to Governor George Allen, Witschey explained how the Museum "elected to be reviewed by its peers against the highest standards of museum professionalism and passed with flying colors."[732] Before representatives from the AAM arrived in Richmond, Blatt "and many other staff members invested heavily in preparing for the" inspection.[733] The Association's Commission "pa[id] special attention to the quality and content of all museums' interpretive programs" as well as "the visual and intellectual experience of the visitor in the museum."[734] Its members were particularly impressed by the capital campaign and the "high level volunteers" that staffed exhibits and carried out educational demonstrations.[735] According to the Commission's report, the Museum "benefit[ted] from quality volunteer oversight, well qualified and devoted staff, and constantly improving physical facilities and programs."[736] The AAM did warn the SMV that "Staff cuts in the Universe Theater group have caused the Planetarium program to run at a minimal level"; "a situation" that needed "attention if the institution" hoped "to continue to have a leading planetarium."[737] Witschey and his staff learned from the accreditation process that there was still improvements to be made on Broad Street, but the changes they had implemented were being received positively by outside observers. The accreditation was welcome news as the Museum approached its 20th anniversary, but the standards it set would require a great deal of care to maintain. Nonetheless, that seemed more-than-possible as the capital campaign ended two years ahead of schedule.

The SMV's 20th Anniversary: More Events, Exhibitions, and Renovations on Broad Street

On January 11, 1997, the SMV hosted a celebration marking the twentieth anniversary of the Discovery Room. The event attracted several high-profile guests including Governor George Allen, former Governor Mills Godwin, and Patricia Cornwell, an American novelist.[738] Cornwell, whose bibliography includes several well-known crime thrillers, donated a $250,000 gift to the SMV to "develop an exhibition on forensics as a cornerstone of the Life Sciences Exhibit."[739] The gift helped the Museum's staff shape the plans for the permanent exhibit space, especially staff scientist Dr. Gene Maurakis.[740] Amidst the events commemorating Broad Street's 20th anniversary, Maurakis continued to work with his staff to develop educational content for the "$5.5 million project."[741] He determined that the Journey into Life exhibit, known as *Bioscape*, would be broken up into "three new galleries: Health and Human Biology; Molecular Biology and Genetics; and Environmental Sciences."[742] However, before any of Maurakis's ideas could be installed, the Museum needed to ready both wings of the Station.

In April 1997, the SMV initiated its final major renovation and restoration of Broad Street Station.[743] The work included changes to the interior and exterior of the building, most notably the renovation of "the east and west wings…to provide exhibit space for the museum's largest exhibition *Bioscape*," a 10,000 square-foot project set to "occupy the entire second floor."[744] The SMV's plans also included the opening of the "rotunda's walls…on the second and third floors to allow visibility into these exhibition areas from the lobby."[745] "Elegant new bridges" were designed to "allow visitors to cross from one wing to the other, and beautiful glass elevators" would be installed "in the vestibule" to "lift visitors to the exhibition floors."[746] Finally, "a new stepped demonstration theater" was planned for the "east wing of the third floor," necessitating the "reconfigure[ation of] staff offices…in the remaining spaces on the third and fourth floors."[747] The extensive changes scheduled for the Station required "most of the museum's staff" to relocate to "a modest rented building one mile west on Fitzhugh Avenue."[748] The SMV's annual report claimed that "the new offices put staff in closer contact with each other," resulting in "an improvement in communication."[749] Regardless of whether tight quarters increased the productivity of staff members, the renovations posed a challenge for the institution's employees who "continue[d] to meet at Broad Street" to provide educational programming to Virginia's residents.[750]

While construction on the east and west wings commenced, the SMV sponsored several events to counter the decrease in public exhibits inside the Station. In May 1997, the Museum hosted an Arts and Sciences Benefit Auction.[751] Attendees witnessed "celebrity and guest auctioneers" sell "more than 60 works of art, generating $50,000 to support the new Life Sciences exhibition."[752] In the same month, the SMV welcomed local leaders in industry to the Business Associates Breakfast which featured Dr. Robert Templin, "Director of Virginia's Center for Innovative Technology," as the guest speaker.[753] The staff also "kicked off the summer" with a series of annual events, including "Spring N2 Summer and Scooper Bowl V."[754] Roughly "4,000 visitors" came out to the Broad Street Station in 1997 to enjoy "five varieties of Breyer's ice cream" along with "fun and educational activities, guest performances and demonstrations."[755] It was essential for the Museum to keep residents coming back to Broad Street amidst renovations; the continuous enthusiasm of visitors could translate into an even more successful grand opening of *Bioscape*.

The Museum offered more than events to keep Virginians interested in the SMV's future. 1998 was the pilot year for the Capital One Career Ladder program, an after-school initiative that "targeted inner-city schools" by inviting "elementary school students and their teachers to a series of classes at the Science Museum."[756] The SMV also developed "a program for middle school students and paid positions for high school students" to "serve as classroom aides, helping to teach the younger students and serving as role models for them."[757] School children of all ages could take advantage of a variety of "SAT workshops, classes in Internet skills, and tutors for students who need help maintaining the required grade levels."[758] Though initially funded by a $65,000 grant from Capital One, after witnessing the success of the program, company executives upped their financial support to $108,000 for Career Ladder's second year.[759]

The SMV also utilized what space remained open to continue educating guests. In March 1998, the Museum made use of its newly installed railroad tracks to "welcome trains from our past, present and future."[760] "The first train to test out the new track 7" was the American Orient Express.[761] The SMV planned to acquire more cars to make up its *On the Move* exhibit, a "$13.5 million" outdoor display intended to "introduce visitors to the surface transportation technology of tomorrow, including high-speed rail technology, intermodal freight, smart cars and smart highways."[762] Inside the Station, staff members helped students from Varina High School construct "the world's largest Periodic Table of Elements" on a wall of the rotunda[763] Witschey

submitted the science honor students' creation to *The Guinness Book of World Records*; the entry was accepted in July 1998.[764]

Though the world's largest Periodic Table was a welcome headline for the Museum, the SMV received even better news in June 1998.[765] The Foundation recorded the last donation it needed to meet the capital campaign's fundraising goal two years ahead of schedule.[766] In total, the Museum raised $36 million in three years with a 3% expense ratio.[767] The effective campaign was the work of several people in and outside the Museum, not least of which was Bobby Thalhimer whose management piloted the initiative onto a fast track to success.[768] The money it raised allowed the SMV to fund new exhibits and programs in addition to the major renovations around *Bioscape*. For example, the Museum acquired four more train cars for its *On the Move* exhibit in the summer and fall of 1998, including the RF&P's "Presidential Car," or Car ONE, "constructed in 1919 by the American Car and Foundry Company."[769] The Universe Theater was also "closed for renovation in September 1998."[770] The space would feature "new lighting, seats, carpet, railings and a brighter screen for improved viewing and effects" when it reopened the next year.[771]

A *ZOOMzone* activity center opened in January along with the 1999 premier of the widely-popular PBS show *ZOOM*.[772] Visitors to the center could "try new activities, ask questions and have fun exploring science and math."[773] The SMV also debuted Bioexpress the same year, a mobile program featuring "workshops for students in grades 3-8."[774] The topics of the workshops correlated with content found in the upcoming *Bioscape* exhibition and offered hands-on instruction in the life sciences to supplement Virginia Standards of Learning (S.O.L.s).[775]

Despite these successes, not every Museum project in 1999 managed to get off the ground. In January, the SMV prepared a grant request for the Transportation Equity Act for the 21st Century to create a 0.8 mile trolley loop throughout the anticipated Discovery Park.[776] Once again, Witschey attempted to put Elizabeth S. Bocock's trolley back into operation by connecting the SMV with its soon-to-arrive neighbor, the Children's Museum of Richmond, via an electrified "loop."[777] The "Elisabeth S. Bocock Trolley and loop" was pitched as "an integral feature of" the 16-acre Discovery Park which was intended to "provide guests a hands-on interactive experience with core scientific principles in novel and playful ways."[778] However, neither project was realized with the economic downturn that accompanied the new millennium.

Despite the construction in and outside the Station, 1999 was a busy year for the SMV. By March, the staff unveiled the refurbished *Aluminaut* and opened the newly-renamed Ethyl IMAX Dome and Planetarium.[779] In conjunction with the VMFA, the Science Museum debuted *Splendors of Ancient Egypt* in May, "a fascinating [blockbuster] exhibition displaying treasures more than 1000 years old."[780] To supplement the exhibit, "the IMAX film 'Mysteries of Egypt'" was shown at the Dome along with a "new planetarium show [titled] 'StarDate: Ancient Horizons.'"[781] When the film premiered, the staff engaged in a plethora of hands-on activities with the public, including "Egyptian makeovers" to explain "how make-up related to climate in ancient Egypt."[782] In September, the Museum received word that the Danville Science Center dedicated a Butterfly Greenhouse.[783] The space allowed visitors to witness the transformation of caterpillars into butterflies and enjoy the "flowers both inside and outside of the greenhouse."[784] By October, the SMV opened *Time of Your Life*, "a major new exhibition exploring natural cycles and biological clocks."[785] The displays encouraged guests to "explore …the cycles of the sun, Earth and moon, and their influences in shaping timing mechanisms that increase an organism's chance of survival."[786]

The Center for Science Education closed out the Museum's year with a report of selected statistics. According to the CSE's calculations, "museum educators [were] delivering programs valued at more than $444,000 to Richmond Public Schools."[787] The AT&T Teachers Institute continued to grow, "provid[ing] more than 100 teachers with a week of intense training and coaching."[788] All of the SMV's mobile units experienced an active summer, delivering "39 all-day programs" to schools throughout the state.[789] The Capital One Career Ladder program helped "29 inner-city youth receive job skill training, academic assistance, SAT preparation, college planning guidance, and cultural enrichment."[790] All-in-all, the renovations to the Station did not prevent the Museum from delivering hands-on science education to Virginians. If anything, the success of the Journey into Science Campaign allowed the SMV to expand its programming and exhibits; the largest of which were yet to debut at the grand reopening of Broad Street Station. However, before the staff could celebrate the Museum's new exhibits and additions, they needed to plan for the coming millennium.

Plans for a New Millennium and the Grand Re-Opening of Broad Street Station

While there was little difference between life in 1999 versus 2000, the SMV staff, and frankly most Americans, realized that the pace of change had been intensifying over the decade. The half-life of technology was shrinking, a phenomenon that directly affected the mission of the Science Museum. If staff members hoped to deliver fun and interactive educational programming to more Virginians in the twenty-first century, they needed to make use of state-of-the-art technologies that improved the rate and quality of communication between educators and guests. However, the rapid pace of change meant that the Museum could commit itself to a machine or internet platform that would be defunct in five years. The SMV needed a clear and well-thought out plan to deliver informal science education in the future.

The Center for Science Education took the lead in outlining initiatives for the new millennium. At its January meeting, the committee crafted a list of goals to conform to "the Governor's education initiatives and the Director's strategic plan for the Science Museum."[791] Their top priority was to establish "a position to take SMV to a leadership role in educational technology."[792] Integrating new methods of communication into the Museum's programming would help the staff deliver more current and exciting information to the public. In addition, new technological resources could allow the Museum to conduct "prompt and discerning evaluation[s] of SMV programs" in house.[793] The CSE also sought to use the internet to "expand the educational services of the Virginia Science Resource Network, VSRN," an online database of contact information for educators looking to speak with scientific experts.[794] In the same connective spirit as the VSRN, the CSE wanted to bring teachers and the Museum together through a "statewide program establishing a teacher-ambassador in each school building in Virginia."[795] Ambassadors could connect to the SMV and other teachers throughout the Commonwealth "through email, internet connections and on-going delivery of resources and training."[796] While the committee agreed that improving existing programs was always a worthwhile goal, the Museum had to develop new ways to deliver scientific resources to the public.

Several of the Museum's millennial initiatives also related to the grand reopening of Broad Street Station. The staff organized a schedule of progressive debuts for newly renovated spaces leading up to the main event. For example, in April 2000, the SMV opened the Sundaze Café, housed in Kitchen/Power Car #20.[797] The ice cream parlor served "delicious homemade ice cream, sandwiches and refreshing beverages" to patrons "in the restored railroad car on Track

One."[798] In the same month, staff members unveiled the Museum's new gift shop, Shop for Science.[799] These additions to Broad Street coincided with the opening of the Children's Museum of Richmond next-door to the SMV.[800] Visitors could now bring their children to both museums for a day of interactive learning.

By June, Museum staff members were "mov[ing] back into new offices in the Broad Street Station headquarters."[801] They left the rental building on Fitzhugh Avenue and immediately launched into more "preparations for the grand opening in October."[802] The SMV rolled out new productions by the Carpenter Science Theater, a live drama program that "offer[ed] audiences three unique kinds of…performances."[803] The newly-renovated Eureka! Theater allowed these "members of Richmond's acting community" to bring "science to life" in the Museum's galleries and on stage.[804] While the theater entertained guests young and old, the SMV introduced a series of adult-only discussions in August.[805] The "Bioethics 2000 initiative" was "a two-year collaboration project designed to increase public understanding of bioethical issues and to establish a foundation for sound judgement and responsible action in public policy."[806] Eugene Maurakis hosted the program while Lou Dean, a Foundation Board Member "and host of WRVA's 'Evening Newsroom,'" moderated the Sunday-afternoon discussions.[807] On the opposite end of the age spectrum, the Museum relocated *Wonderplace* to the Railway Express Car in October.[808] This "early childhood education program" engaged children from age 4 to grade level 2 in "45 minutes of hands-on activities" and a guided tour through the Museum's galleries.[809] The relocation of *Wonderplace* occurred one day before the highly-anticipated grand reopening; ending months of intensive preparations and years of planning.

On October 21, 2000, the SMV held a celebration called *Discover Life!* to mark the grand reopening of Broad Street Station and the debut of *Bioscape*, the Museum's largest permanent exhibition. Festivities began an evening before the main event with a black-tie gala commemorating the successful Journey into Science campaign.[810] The next day, the SMV welcomed Patricia Cornwell back to the Museum to see the gallery her donation helped create.[811] The Forensics Theater allowed visitors to "take a stab at crime solving" before exploring the rest of the My Size Gallery, a space that "feature[d] human biology and health science" displays.[812] The gallery was one of three thematic areas that made up *Bioscape*. The first "focuse[d] on molecular biology and genetics" while the last "spotlight[ed]…environmental sciences."[813] The thousands of *Discover Life!* attendees could also meet Bill Nye, a popular TV personality and

mechanical engineer made famous by hosting the PBS show *Bill Nye the Science Guy*.[814] Nye did a series of live performances throughout the day and autographed copies of his book sold in the new Shop for Science.[815] In addition to these festivities, guests could meet a live interpreter of Albert Einstein and explore *Lets Connect!*, an exhibit sponsored by Verizon that displayed "cutting-edge technologies in the field of telecommunications."[816]

Discover Life! represented the culmination of a successful fundraising campaign and years of educational planning and physical renovations to Broad Street Station. Walter Witschey and the SMV's staff had executed several of their goals for the Museum's future, including the institution's first significant life sciences exhibit. Much of what guests see today when they walk through the doors of the Station and look up into the vast rotunda was seen for the first time by those who attended the grand reopening. However, the successful reveal of *Bioscape* and the newly renovated rotunda was not the final chapter of Witschey's tenure at the Museum. The SMV faced difficult challenges ahead as the nation slumped into an economic recession and experienced the most devastating foreign terrorist attack on American soil in modern history.

SMV Back in Business when Business is Slow

Shortly after the excitement died down on Broad Street, the Science Museum received a troubling update from state government. In December 2000, the General Assembly approved a hiring freeze across all state agencies.[817] The move was intended to mitigate the effects of a slowing national economy, but it ultimately prevented the Museum from increasing its paid staff immediately after expanding the square footage of exhibit space in the Station.[818] By 2002, the Museum's staff dropped "25 percent below [the] authorized level," resulting in an "approximately 16 percent" decrease in employees since the freeze was implemented.[819] The SMV received more bad news in May 2001 when the front desk reported a slow in attendance.[820] After a successful spring run of the blockbuster exhibit *Invasion of the Dinosaurs*, the Museum could not entice enough visitors to come back to Broad Street after 75,000 had seen the animatronic giants.[821]

The attendance problem continued to worsen following the terrorist attacks on September 11, 2001. Museums across the country experienced a decrease in visitors after nineteen al-Qaeda

terrorists hijacked four U.S. commercial airliners and flew them into several high-profile targets on American soil.[822] Witschey informed readers of the 2001-2002 annual report that the Science Museum suffered less than "some of our sister institutions," yet still experienced a drop in attendance as Americans opted to travel less in the wake of the attacks.[823] The Museum hung American flags in the Station's rotunda "to salute those lost" on September 11th.[824]

The SMV attempted to rebound from the lull in visitation by hosting beloved community events and opening new exhibits and films. The popular annual Model Railroad Show returned to Broad Street in November.[825] At the event, William H. Leighty, chief of staff to Governor Mark Warner, presented a steam engine model to Walter Witschey.[826] The gift complemented the *On the Move* exhibit behind the Station. By June 2002, the Museum opened *Space Station*, a new exhibition that included a Micro-Gravity Drop Tower.[827] The mechanism "consist[ed] of a shoebox-sized experimental package that [was] lifted 40 feet to the top of the Barbara and William B. Tahlhimer Jr. Hall of Science Exploration" and "dropped, falling back to visitor level in 1.35 seconds."[828] Whatever contents were included inside "the package" experienced "weightless freefall" with a gravity level "near zero."[829] The Museum also welcomed several travelling exhibits in 2002, including *Titanic Science* and *Psychology: It's More Than You Think!*[830] The Dome theater showed the popular IMAX films *Titanica* and *China: The Panda Adventure*.[831] Meanwhile, the Virginia Aviation Museum was added to America's Aviation Adventure, "a history trail comprised of 15 aviation centers from Kitty Hawk, N.C. to Baltimore."[832] The designation attracted much-needed attention to VAM which, like the SMV, experienced a decline in visitation.

Amidst the Museum's attempts to bring more people to Broad Street Station, Walter Witschey entered into negotiations with a German company located in Aicha vorm Wald to design a massive, to-scale granite sculpture of the Earth and its moon.[833] The 29-ton 'Earth,' situated in front of the Museum, would float on top of a thin layer of water running across its base.[834] The smaller 'moon' would be located off to the side of the Station at a distance proportional to the actual 238,900 miles that separates the two heavenly bodies in space. Once installed, guests would be able to turn the stone sculptures "as though [they] weighed nothing at all."[835] Construction of the balls and their bases back in Richmond began in 2002 and was finished in time for a dedication ceremony on January 28, 2003.[836] "With the outside temperature hovering near 8 degrees F," Governor Warner helped Witschey "cut the ribbon to

open the Mary Morton Parsons Earth-Moon Sculpture," referred to colloquially as the 'kugel," the German word for 'ball.'[837] The iconic stone that sits outside Broad Street Station today is not, however, the one that Warner and Witschey christened on the cold winter morning. The original Kugel was made of a dark South African granite that soon "developed a crack" which "eventually made the shape not perfectly spherical."[838] The defect "caused the massive stone to simply sit in its cradle," necessitating its replacement.[839] Today guests can once again turn the giant stones with their hands and enjoy a unique scale model of the Earth and its moon.

Conclusion: Walter Witschey's Final Years as Director of the SMV

A year after the Museum dedicated the Mary Morton Parsons Earth-Moon Sculpture, Trustees and Foundation Directors launched "a program presenting new science and new visitor opportunities at Virginia's flagship science center."[840] The plan outlined a series of changes to the Broad Street campus in addition to the development of new satellite science centers in Northern Virginia, Bristol, and Harrisonburg.[841] Witschey and other members of the Museum's administration hoped that the projects would continue transforming the SMV into a statewide system of informal science education.[842] Building more sites around the Commonwealth would fulfill Witschey's vision of a science center within fifty miles of every Virginian. However, he would announce his retirement before the plan could be executed in full. Through a combination of financial hurdles and unfortunate timing, the Museum's *Blue Print for Broad Street Station Campus* was a grand idea that could not be realized.

The official purpose of the project was to "create the opportunity for visitors to take new journeys…of Science Exploration and Discovery."[843] A series of five major changes would allow the Museum to achieve its goal, including "new exhibitions in four existing galleries, and [the] creation of two new gallery spaces." [844] The project also called for the construction of "galleries in the [still unfinished] Discovery Park of Science."[845] One of the most ambitious steps in the program was the relocation of the Virginia Aviation Museum to Broad Street.[846] While the Virginia Aeronautical Historical Society and SMV officials once believed that visitors to VAM "would include many commercial air travelers on layover," changes to the airport's operations eliminated the existence of "layover passengers or other passengers with time to visit."[847] To "increase the number of attractions at the Broad Street Campus" and "significantly

increase attendance at the Virginia Aviation Museum," the facility needed to be moved to an accessible and visible location on "Museum-owned property east of Leigh Street."[848]

Around the time of the *Blueprint*'s publication, the SMV made firm commitments in Northern Virginia to establish a science center.[849] The building would be located "on the Occoquan River" and "include several exhibition galleries, a large format film theater and other amenities."[850] The Belmont Bay Science Center, as it came to be called, was designed to "fully support school groups and tourists" who frequented the nearby shopping center Potomac Mills and the nation's capital in Washington, D.C.[851] The Museum scheduled the Center to open in 2005, however, the "cost of construction" steadily rose as the years passed, preventing the SMV from acquiring enough state funding to complete the facility on time.[852] Witschey continued to work to get the Center off the ground while engaging in conversations with representatives from Bristol and Harrisonburg to establish more satellite locations.[853]

Despite the difficulties in Northern Virginia, Witschey and his staff experienced a boost of confidence when the Museum received news that Broad Street Station was chosen to host the 2005 annual conference of the Association of Science and Technology Centers (ASTC).[854] The "international conference" was expected to bring "1,600 science center professionals from around the world" to Richmond, "provid[ing] a rare and exciting opportunity to showcase the Science Museum…to" colleagues in the museum field.[855] The good news inspired private donations in excess of $100,000 to "support…the Museum's preparations for the ASTC conference."[856]

In the director's letter for the 2003-2004 Annual Report, Witschey informed readers that the event "accelerates our program, a focused effort called the *Blueprint for the Broad Street Station Campus*."[857] Indeed, the SMV did host a successful conference in October 2005. International travelers laid eyes on the vast improvements to Broad Street Station, demonstrating how far the building had come since the Museum opened the Discovery Room in 1977. However, preparations for the conference took its toll on the staff which continued to shrink in the worsening economic climate.[858] They were stretched ever thinner to carry out daily operations as the country neared the Great Recession of 2008.[859]

Two years prior to the financial fallout, Walter Witschey announced his desire to retire effective June 1, 2007.[860] He intended to spend the next chapter of his life as a Professor of Anthropology and Science Education at Longwood University in Farmville, Virginia.[861] The

timing of his departure was unfortunate for the Museum's *Blueprint*; however, his fifteen years at the SMV left a lasting mark on the institution. Today, when visitors walk up to the Station, they pass by the giant kugel, perhaps giving it a push to watch the stone sculpture spin. As guests enter the rotunda, they can look up at the exhibits that await them and ride the glass elevator up to the second and third floors, looking down at other visitors below. They can explore the train cars behind the Station and walk under the butterfly train sheds that Paul Knappenberger tried so hard to convince the General Assembly were worth preserving. Though the SMV may not directly serve as many Virginians as Witschey had hoped, he helped build upon the foundation that Knappenberger established and readied Broad Street Station to meet some of the challenges unique to the twenty-first century. With his retirement, the Museum once again needed to find a talented replacement that could handle the educational, political, and economic demands on Broad Street.

Chapter 6: The Science Museum of Virginia Today

In 2017, the Science Museum of Virginia is no longer confined to one wing of Broad Street Station. Nor is it an expansive network of science centers across Virginia, offering science education within easy driving distance of every resident in the Commonwealth. Instead, the SMV inspires visitors to learn more about science after seeing a live cooking demonstration, gazing up at a dynamic Cold-War era spy plane, or exploring a world-renowned travelling exhibit in the new Dewey Gottwald Center. Guests can still interact with SMV staff in Danville, but the Virginia Aviation Museum is no longer open to the public. The Museum may not be exactly what Roscoe Hughes or others in its history intended, but it is the culmination of years of hard work, dedication, and sometimes even mistakes. This chapter brings the story up to the present day. Like Knappenberger and Witschey, the SMV's new director, Richard Conti, has transformed, and continues to transform, the Museum in the twenty first century.

Search for a New Director

When Walter Witschey announced his retirement in November 2006, the Museum's staff adjusted their plans and began searching for another director. The Long-Range Planning Committee (LRPC) changed its purpose entirely, "from development of a detailed strategic plan to a product intended to offer a position statement of strategic direction for the Science Museum and its new director."[862] The Committee conducted a study based on "two key questions": "What is the outlook for the next 6 years for significant increases in State funding support to SMV?" and "What is the best way to accomplish the Science Museum's mandate of providing science education to every citizen of the Commonwealth of Virginia?"[863] After speaking with other members of the staff and answering the questions among themselves, "an urgent theme emerged" from the LRPC: "the need to set priorities of focus for boards and staff."[864] The Committee concluded that "the financial environment" required the next director to "make critical decisions about [the] strategic direction" of the Museum, including how "best [to] utilize and leverage current resources."[865] On December 8, 2006, the Committee put together a list of priorities for the incoming director; an important document that informed the actions of the soon-to-be-appointed selection committee.[866]

Above all else, the Museum needed to "focus on existing SMV owned and operated facilities and locations rather than building/leasing new facilities around the State."[867] If expansion was authorized, the director should prioritize "the move…of the Virginia Aviation Museum to the Broad Street Station campus."[868] The Committee's recommendation did not preclude the possibility of developing satellite centers. Indeed, the document explained that "the Science Museum of Virginia will support effective community based efforts to create science centers where local interest and support exist."[869] However, if a community did not petition the Museum for a local center, the SMV would continue to "develop cost effective strategies to expand statewide delivery of science education programs and interactive experiences" from Broad Street.[870] In addition, the LRPC highlighted the importance of "develop[ing] a clear, high profile and recognizable brand identity" to permeate "our products, services, profile, and key messages to our public."[871] The SMV needed to increase its visibility in Virginia and the creation of a unique brand would catch the eyes—and open the pocketbooks—of potential visitors.

With these operational priorities in mind, the Board of Trustees created the SMV Director Selection Committee to organize the job search.[872] Bobby Thalhimer and Tony Troy headed the Committee which also included five former-Trustees, three of whom had served as Chair of the Board.[873] Beginning December 2006, the Committee debated how to go about the search and ultimately what qualities they hoped for in an ideal candidate.[874] At first, its members decided not to hire a search firm, but eventually they changed their minds and enlisted the services of Judy Lankford, president of Lankford and Associates, LLC.[875] After conducting confidential interviews with business leaders in the Richmond community, Lankford reinforced the conclusions of the LRPC and "cautioned [the SMV] against further physical expansion until Broad Street, 'the mother ship' as several called it, has been fully transformed and until institutional capacity and infrastructure c[ould] bear the weight of growth."[876] Her interviewees agreed that "work remain[ed] to complete the central campus, develop partnerships, and build audiences."[877] In sum, the next director had to possess a commanding knowledge of business.

Lankford's conclusion was not an easy pill to swallow for the Committee, especially since roughly half of its members agreed that a doctorate in a scientific or engineering field was an essential qualification for the job. In a January 2007 meeting with the Foundation Board, Bobby Thalhimer explained the Committee's split.[878] "Some believe we need someone who is a

scientist who's respected in the field," he told the Directors.[879] "The other way of thinking is that [the] SMV needs someone who understands business and has a sense of how to attract people to the museum."[880] Lou Dean agreed that both roles were essential and listed several attributes for the ideal candidate: "administrator, scientist, fundraiser, politician, can work with governmental system, love for science, and understands 'the Virginia way of doing things.'"[881] Thalhimer cautioned the Directors, "We may not find everything in one person, but [we] need someone who understands and appreciates all of this and will work with others to carry it out."[882] The matter was inadvertently settled after a series of interviews at the Jefferson Hotel.[883] As each candidate filed in and out of the room, Thalhimer turned to Troy and concluded, "you know, it's not a PhD. We need someone who knows how to run the museum."[884] As a result, the SMV narrowed its list of potential directors down to three names.[885]

While the search continued, the Museum was run by an interim director, Jack Parry. Howell John Parry, Jr. had served in several different capacities at Broad Street Station since his employment in 1988.[886] He came to the Museum to oversee "operations and planning responsibilities for [SMV] divisions and affiliate sites."[887] From 2001-2002, he "performed the duties of interim Executive Director" for the Foundation and was "assigned to develop the Belmont Bay Science Center and its supporting foundation" in 2003.[888] Before coming to the Museum, Parry was the Senior Project Engineer at Media General, Inc. in Fairfax County, Virginia; his third career after serving as an officer and aviator in the United States Navy.[889]

Parry took the helm of the SMV in a particularly precarious economic environment. In June 2007, he was forced to eliminate four positions "from [the SMV's] payroll" to "save the state museum about $80,000 for the fiscal year."[890] He explained to a local reporter, "We didn't want to get rid of any of these positions, but it's a matter of making the numbers work."[891] Despite the cuts, Parry was able to lead the Museum through the interim period and continue educational programming. In November 2007, the SMV opened *New Energy Virginia*, an exhibit with "hands-on" activities "explor[ing] alternative sources of renewable energy."[892] The exhibit was housed inside a building "located behind the museum," powered by "solar panels, a wind turbine and geothermal energy."[893] A new base was installed under the Foucault Pendulum depicting "a beautiful image of the Earth inscribed in terrazzo—a mixture of crushed marble, colored glass and mirror in an epoxy resin."[894] The Dome theater also showed a number of IMAX films including *Mummies: Secrets of the Pharaohs* and *Harry Potter and the Order of the*

Phoenix.[895] The former featured a "sand re-creation of the temple Abu Simbel" in the theater's exhibit area.[896] Several travelling exhibitions also passed through Broad Street, such as *Savage Ancient Seas* and *Zap! Surgery Beyond the Cutting Edge*.[897] Visitors to the latter could challenge their surgical skills with a "giant Operation game."[898] The lack of a permanent director did not prevent the SMV from offering new programs, exhibits, and events. However, the staff did not have to wait long before Richard Conti arrived in Richmond to lead the Museum.

Richard Conti Arrives as New Director of the SMV

After rounds of interviews, the Selection Committee settled on the executive director of Nauticus, a science center in Norfolk, Virginia, to head the SMV. Richard Conti had spent a decade transforming Nauticus "from an urban theme park [in]to a maritime-themed science center with interactive exhibits."[899] Most notably, he "played a key role in bringing the battleship [U.S.S.] Wisconsin to downtown Norfolk and helped attract major cruise ships to the area."[900] The changes "doubled" the center's attendance "from 191,000 [annual visitors] to 350,000."[901] His career did not begin in museums, however. Before accepting the position at Nauticus, Conti served as assistant to Norfolk's city manager.[902] In 1991, he "commanded seven [naval flight] missions over Northern Iraq" after graduating from the United States Navy Fighter Weapons School, popularly known by its moniker Top Gun.[903] The SMV chose Conti as its next director because of his success with "market driven decision making."[904] He was an ideal candidate for "doing less better" in "the middle of [a] recession."[905]

Once Conti arrived at the Museum in November 2007, he oversaw two important events while looking for ways to run the SMV more efficiently. In March 2008, "notable designers and architects" met "in a day-long charrette to help shape the future of" the Rice House.[906] At the time, the Museum agreed to continue renting the home for special events at a rate of $5,000.[907] In May 2008, the SMV experienced an accreditation review by the American Association of Museums (AAM).[908] AAM agreed to renew the institution's accreditation, once again recognizing the SMV's "commitment to accountability and public service, professional standards and excellence in education."[909] Around the same time, Conti decided that the Museum needed to begin reducing the number of full-time staff positions to offset the negative budgetary effects

of the Great Recession.[910] His decision was not a popular one, especially since he cut the SMV's "82 employees" down to a total of "58 workers" by 2013.[911]

The reduction in staff became part of the Museum's new strategic plan. In October 2009, the SMV released details of an extensive overhaul of the institution's mission, brand, and educational programming.[912] "New advancements in science and technology now surface with increasing rapidity," the 2009-2010 Annual Report explained. "It is time again to step forward and meet the challenge; to transform our Museum into a platform for current and relevant science that fosters the development of 21st century learning skills."[913] The SMV charted its new course after conducting a "two-year study of what the museum is and what it should be, beginning with questions for stakeholders."[914] Conti found "some of the responses…surprising."[915] For example, "educators…said the museum's biggest contribution wasn't teaching science but rather getting students excited about learning."[916] As a result, the director concluded, "It is not our job to teach them, but to inspire them in the subject matter, to show them that they can do it."[917] The strategic plan embraced this observation, debuting the Museum's new mission statement: "Inspiring Virginians to enrich their lives through science."[918]

In accordance with the plan, the Museum also hired a firm to redesign the institution's logo in May 2010.[919] In place of the generic and vague symbol from the nineties, the designers created the WonderMark, "a colorful burst of energy" with "a star [that] represent[ed] space," "a cogwheel…emblematic of technology and curiosity," and "an atom symboliz[ing] pure science and the sense of discovery."[920] The SMV also initiated a new "$60 million fundraising campaign."[921] The money would be used to rebrand "the state institution as [a] 'marketing agency for science.'"[922] Inspiring the public to seek out information about scientific fields required the Museum to develop new exhibits and programs. The trick was convincing Virginians to walk into Broad Street Station to fulfill their scientific curiosities as opposed to plugging keywords into an internet search engine.[923]

In January 2011, the SMV debuted a few of its new exhibits designed to promote science education. The first was Science on a Sphere, "a 6-foot-wide suspended ball [that] show[ed] images of the Earth as seen from space, storms as they cross the planet or deadly ocean waves rippling out from a tsunami."[924] The mechanism gathered its "data from the National Oceanic and Atmospheric Administration, which sponsored the exhibit."[925] Second, the Museum unveiled the Watt Wall, a screen displaying "energy consumption and global sustainability [as]

an evolving landscape."[926] Guests could "see a breakdown of global usage, alternative energy sources and new developments" on the Wall; information that could "potentially be used to power homes and businesses in the future."[927] Finally, a space filled with "giant foam blocks, mats, wagons, fabric and crates" made up the new Imagination Playground.[928] The odds and ends allowed "children to play, dream, build and explore [the] endless possibilities" of their own "creative potential."[929]

The SMV also designed several new events to engage residents in the local community. For example, the 2011 InnoBlitz locked "14 college students…in the Science Museum of Virginia for 24 hours with nothing but their wits, plenty of coffee and [the possibility of winning] $500."[930] The students "from the VCU da Vinci Center for Innovation" were "divided into two teams and each given a challenge" related to exhibit design or educational programming.[931] In February, the Museum hosted its first meeting of the Teacher Advisory Group, a collection of "science specialists and teachers from Chesterfield, Hanover and Henrico."[932] The educators participated in "demonstrations and informative discussions full of creative and intriguing ideas for improving Museum programming."[933]

Richmonders came out to Broad Street Station for two events in Spring 2011. The first was a Family Energy Festival that showcased "fascinating demonstrations, activities and [the Museum's] newest exhibits."[934] The SMV partnered with EnergyForward, a "community outreach initiative" to bring guests "activities featuring energy challenges and the latest green technologies for [the] home."[935] The second was a collaborative effort between "Museum Staff and students from VCU's School of Engineering" called NanoDays.[936] The team "led…guests through the world of nanotechnology with exciting exhibits and demonstrations including activities from the Nanoscale Informal Science Education Network (NISE Net)."[937]

By the beginning of summer, the SMV installed an Electric Vehicle Charging Station in front of Broad Street Station.[938] The addition was constructed in "the spirit of continuously reducing our carbon footprint" and included "two charging units available to Museum guests."[939] The Station attracted the attention of Ford Motor Company which identified the SMV as "one of the top twenty coolest places to charge your car."[940] The good news came on the heels of a private donation that, at the time, was the largest corporate gift in Museum history.[941] In December 2011, the SMV "announced the receipt of a $2.2 million gift from Health Diagnostic Laboratory."[942] In addition to funding "new exhibit galler[ies]," the money would "be used to

create an interactive display to come up with a wellness and self-improvement curriculum for students."[943] Conti, who now identified as the "chief wonder officer of the Science Museum," believed that the donation created "a way for us to take a subject like fitness or health or childhood obesity and make it fun and relevant."[944]

In 2012, the Museum welcomed three popular travelling exhibits to Richmond. The first, *RACE: Are We So Different?*, opened in January and "explored the science, history, and influences of the concept of race on culture and modern society."[945] *RACE* "was the centerpiece of a series of exhibitions and programs that drove community discussion on the legacy of the Civil War and Race in our region."[946] In the blistering summer months, *BODY WORLDS & the Brain* broke an attendance record when "over 100,000" visitors came to see real human bodies on display in the name of science.[947] The blockbuster exhibit "also bolstered retail sales and membership growth," helping to "fund [the Museum's] education mission."[948] The final travelling exhibit of the 2012 season was *Guitar: The Instrument that Rocked the World*.[949] The scheduled program included "live performing acts both in the gallery and in the [Eureka!] theater."[950] Guests had plenty of activities to explore on Broad Street while the SMV continued to roll out changes with its new strategic plan.

SMV in a Technological Age

A major goal of Conti's strategic plan was to "transform [the] Museum into a platform for current and relevant science."[951] In order to do so, the SMV installed major permanent exhibits that made use of new technologies. The first opened in June 2013 and "focused on health and wellness."[952] *Boost!* offered "25 exhibit experiences," challenging guests to execute different activities like "hold a yoga pose," "remember a pattern of squares," and "sing on key."[953] Visitors used "individual QR code[s] to activate each" station, storing "their results in different areas and, if they return[ed] several times, how much they change[d]."[954] The codes encouraged them to "compete with [their] family and friends," all the while "learn[ing] how science can literally improve…quality of life."[955]

Boost! was only the beginning of the Museum's health initiatives. In Spring 2014, the SMV launched an Employee Wellness Program, resulting in an "Active RVA" certification from Sportsbackers.[956] The Museum also planned a Food Revolution Day for May 16, 2014.[957] The

staff coordinated the celebration with "Jamie Oliver's Food Foundation" and included "food trucks and live music" on the Station's front lawn.[958] The opening of the Bons Secours Washington Redskins Training Camp in July 2013 even brought sports-related memorabilia to the Station.[959] The SMV "host[ed] the three Lombardi Trophies from the Washington Redskins' three Super Bowl victories" while locals watched football players drill on the new field.[960] *Boost!* inspired over a year of physical activity programming at the Museum and continues to entertain guests today.

The SMV designed its second major exhibit around a futuristic aircraft from the Cold War. Scheduled to debut in 2016, *Speed* included the suspension of "an SR-71 Blackbird supersonic jet…from the ceiling of the main concourse."[961] The jet would be one of many displays in the exhibit intended to showcase some of the fastest and slowest objects and organisms on Earth. In 1999, VAM received a record-breaking SR-71 as a donation.[962] Fifteen years later, the SMV lifted the 43,000-pound aircraft out from in front of the Museum's hanger and moved it in pieces to Broad Street Station.[963] The construction began in earnest in 2015 when the SMV moved the *Aluminaut* out from behind the Museum "to make way" for the installation of the SR-71.[964] Engineers had cut a large hole in the concourse to transfer each piece of the jet into the Station.[965] They reassembled the Blackbird "at an angle" because the aircraft had a wingspan of 55 feet while "the walls inside the museum were only 49 feet wide."[966] Installing the SR-71 was only the first step in completing *Speed*; the SMV hoped to infuse the exhibit with technologically advanced displays to wow visitors.

When the development of *Speed* began, the Museum received "the largest private gift in its history."[967] In December 2013, the "Herndon Foundation, a Gottwald family charitable organization," pledged "$4 million to support [a] new 17,000-square-foot community event and exhibition center."[968] The family intended the center to be named after Floyd D. Gottwald Sr., the "patriarch of Richmond's Gottwald family and former chairman of Ethyl Corp."[969] The Museum hoped to use the new facility to "host special events and changing exhibitions of [a] national caliber."[970] Conti believed that the "Dewey Gottwald Center [would] strengthen the museum's position as a world-class destination for STEM learning and community engagement."[971] Construction on the $9 million-dollar building began in fall 2015, the remainder of its price tag paid for by "state capital projects funds."[972]

As two of the Museum's most anticipated projects neared completion, the SMV continued to host events, open travelling exhibits, and enmesh itself within the Richmond community. In May 2015, the Emerging Leaders Council, the "Museum's young professionals group," sponsored its "first annual Science on Tap craft beer festival to benefit the Science Museum of Virginia."[973] The event attracted "over 1,200 guests" with "live music, interactive craft brewing demonstrations and craft beers from across the Commonwealth."[974] Also in May, the Museum opened *Bikes: Science on Two Wheels*, an exhibit that coincided with the 2015 UCI Road World Championships in Richmond.[975] The displays "traced the evolution of the bicycle and showcased a diverse collection of historic, rare and peculiar bikes."[976] In October 2015, the SMV offered a "Back to the Future theme[d]" event called Science After Dark: GLOW.[977] Roughly 1,000 guests came to Broad Street to explore "two blacklight rooms" and see an original "DeLorean in the Rotunda."[978] As guests awaited the reopening of the concourse, peering through the walls of the glass elevator to catch a glimpse of the suspended SR-71, the Museum's staff was hard-at-work offering educational programming and events that sparked the curiosity of Virginia residents.

Conclusion: The Science Museum of Virginia Today

Over the past year, the SMV has debuted several new exhibits and spaces to achieve its goals from the 2009 strategic plan. In April 2016, the staff unveiled *LightPlace*, "a permanent gallery designed to promote skill development in infants to five-years-old."[979] The "hands-on learning gallery" serves as a "safe place" for young children to "begin building scientific foundations" by facilitating "cognitive growth."[980] *LightPlace* seeks to equip youngsters with the tools they need to explore STEM fields in their adult lives. Also in April, the SMV renamed the second floor of Broad Street Station the Inger Rice Learning Center.[981] The space, "designed to spark the curiosity of guests and to inspire an interest in science beyond the classroom," is dedicated to Inger Rice in recognition of a $3.5 million-dollar endowment created by the profitable sale of her home.[982] In the Spring prior to the dedication, the Museum convinced Rice to put the house on the market because it "needed a lot of upkeep."[983] In the form of an endowment, Rice's gift will serve generations of museumgoers without the drain of the house's regular maintenance.

On May 21, 2016, the SMV reopened its concourse and welcomed guests to explore *Speed*. In addition to gazing upon "the most ambitious undertaking in the Museum's 40 year history"—the suspended SR-71—visitors can interact with "50 exhibits grouped in[to] five categories": "Speed of Sound and Light"; "Sports Speed Matters"; "Too Fast to See"; "Too Slow to See"; and "Machines Fast and Slow."[984] According to the director, "Using speed as the theme for the main concourse offers a new way to explore and organize scientific content ranging from biology to physics."[985] As opposed to delineating one exhibit from another according to specific fields, Conti hopes to continue opening a series of permanent displays that integrate several themes together and challenge guests to "think about the world differently."[986]

For some visitors to *Speed*, seeing the SR-71 in Broad Street Station was a sad reminder of its previous home. On June 30, 2016, the Virginia Aviation Museum closed its doors, ending 24 years of operation.[987] After "several years" of "attempts to find a new location" for VAM's collections, the SMV decided to close the facility which suffered from "problems with climate control" and structural integrity.[988] Conti explained to local reporters that the Museum "tried to raise private and public funding" to repair the hanger, but "didn't have much success."[989] Troy Bell, "a spokesman for Richmond International Airport," agreed with the SMV's evaluations and explained to the press that the hanger "would require a lot of repairs going forward."[990] However, Tim McSwain, chairman of the Virginia Aeronautical Historical Society, "characterized the concerns over the building condition as overblown," illustrating tension between the Society and the Museum over the closing.[991] When interviewed by the *Richmond Times-Dispatch*, Neil November, the driving force behind the initial merger between VAM and the SMV, did not hold back any criticisms of the decision and explained that he was "very disappointed" by the closure.[992] In the midst of mixed feelings between local "aircraft enthusiasts" and SMV officials, the Museum is currently facilitating the transfer of the historic airplanes to new locations.[993]

This past summer, the SMV debuted the new Dewey Gottwald Center by bringing "a unique state-of-the-art SENSORY4™ multimedia gallery" to North America.[994] *Da Vinci Alive—The Experience* opened on May 13, 2017 and offered guests a chance to view recreations of the Florentine's inventions, original codices written in his characteristic backwards-script, and a multimedia collage of Da Vinci's work punctuated by dramatic music and visual commentary taken from his Renaissance writings.[995] The travelling exhibition from Australia is only the first

to come to the new Center; the Museum plans on using the 21,000 square-foot space to display special exhibits every summer. When not in use for Museum programming, the Dewey Gottwald Center "will…be rented out for special events, such as weddings and proms," freeing up space in the Station for the development of more learning areas.[996] The first, called *The Forge*, is currently under construction.[997] Described as "part maker space, part interactive exploration, part community innovation sandbox," *The Forge* emphasizes "connections" between guests by transforming "visitors into participants, and participants into collaborators."[998] The Museum intends the new lab to "showcase how STEM skills matter in" a variety of different environments from the home to the workplace.[999]

Today, the Science Museum of Virginia embraces the ever-changing role of technology in Virginians' lives and tries to design informal science education to fit their needs and desires. In some ways, the institution looks quite different from the system of science centers outlined in the 1970 legislative act that created it. In others, the twenty-first century staff is striving to emulate the same mission that motivated the architects of the 1977 Discovery Room: offer fun and informative hands-on activities that reveal the science behind everyday life. Regardless of the continuities and disjunctions the SMV shares with its past, one conclusion is certain: that education, institutions of learning, and even science will continue to evolve as history marches on. The ultimate test will be whether the Science Museum of Virginia can adapt to meet those changes head on.

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[1] For more information on the demographics of Virginia from 1885-1915 as well as the construction of Monument Avenue in Richmond, see Ronald L. Heinemann, et. al, *Old Dominion, New Commonwealth: A History of Virginia, 1607-2007* (Charlottesville: University of Virginia Press, 2007), pg. 276, 267.
[2] Ibid., pg. 279.
[3] Ibid., pg. 285.
[4] Thomas S. Driscoll, *A Brief History of Broad Street Station and the Science Museum of Virginia, 1992*, manuscript, in Science Museum of Virginia Archives, print (accessed Jul. 29, 2017), pg. 4.

[5] Ibid.
[6] Ibid., pg. 4-5.
[7] "Jeffers Member Va. Science Unit: Five Men Commission to Foster Pursuit Scientific Work," *Farmville Harold* (Farmville, VA), Aug. 16, 1946.

[8] Milton J. Elliott, III, "Science Museum: A Reminiscence," *Richmond News Leader* (Richmond, VA), Apr. 20, 1983.

[9] Heinemann, et. al, *Old Dominion, New Commonwealth,* pg. 324-327.
[10] "Jeffers Member Va. Science Unit."
[11] Heinemann, et. al, *Old Dominion, New Commonwealth,* pg. 327-326.

[12] "Jeffers Member Va. Science Unit."
[13] "Virginians in the Public Eye," *The Commonwealth,* June 1941, pg. 22.
[14] Ibid.
[15] "Jeffers Assumes Presidency of Va. Academy of Science," *Richmond Times-Dispatch* (Richmond, VA), May 7, 1941.
[16] George W. Jeffers, *The Virginia Academy of Science—A History*, manuscript, in Greenwood Library Archives and Special Collections at Longwood University, *George William Jeffers Collection*, print, (accessed Jul. 25, 2017).
[17] Ibid.
[18] Ibid.
[19] Associated Press, "Urges Scientists to Press Forward with Normal Affairs: Dr. George Jeffers, Head of Virginia Academy of Science, Addresses Annual Meeting of Group," *Baltimore Sun* (Baltimore, MD), May 8, 1942.
[20] Ibid.
[21] Ibid.
[22] Ibid.
[23] "Jeffers Member Va. Science Unit."
[24] Ibid.
[25] Ibid.
[26] *Minutes of the Museum Advisory Commission, November 2, 1946*, meeting minutes, in Science Museum of Virginia Archives, print (accessed Jul. 31, 2017).
[27] Ibid.
[28] Heinemann, et. al, *Old Dominion, New Commonwealth,* pg. 328.
[29] Ibid., pg. 340.
[30] Jeffers, *The Virginia Academy of Science—A History*.
[31] Ibid.
[32] Driscoll, *A Brief History*, pg. 4.
[33] Ibid.
[34] Ibid.
[35] *The Roscoe D. Hughes Human Genetics Fund, 1981*, announcement, in Science Museum of Virginia Archives, print (accessed Jul. 28, 2017).
[36] *R. D. Hughes Memorial Issue (1903-1976) of Basic Facts: Bulletin for the School of Basic Health Sciences at the Medical College of Virginia*, bulletin, in Science Museum of Virginia Archives, print (accessed Aug. 7, 2017).
[37] Ibid.
[38] Ibid.
[39] Ibid.
[40] *Resolution on Museum of Science Passed by the Conference of the Virginia Academy of Science on 4 May 1967 at Norfolk and forwarded to Governor Godwin*, resolution, in Science Museum of Virginia Archives, print (accessed Jul. 30, 2017).
[41] Ibid.
[42] Ibid.
[43] Ibid.
[44] Ibid.
[45] Ibid.
[46] The Junior Nature Museum and Planetarium is now known as the Virginia Living Museum (VLM). For more information on the history of the VLM, see "History," *Internet Archive*, http://web.archive.org/web/20080413055519/http:/www.thevlm.org/aboutus/overview/history.php (accessed Aug. 7, 2017).
[47] *Science Museum of Virginia: Serving the Future, Preserving the Past,* mailing, in Science Museum of Virginia Archives, print (accessed Jul. 25, 2017).
[48] "A Museum of Science in Virginia," *Virginia Journal of Science* 20 (1969): pp. 73.
[49] *Brief Report of the Museum of Science Study Commission's Feasibility Study, July 1969*, manuscript, in Science Museum of Virginia Archives, print, (accessed Jul. 24, 2017).
[50] State Museum of Science Study Commission, *Resume of Public Hearings, 1,2,3,4, 1969*, report, in Science Museum of Virginia Archives, print, (accessed Jul. 24, 2017), pg. 1.
[51] Ibid.
[52] Ibid.

[53] Edwin Cox, III, *Letter from Edwin Cox II to Roscoe D. Hughes, January 13, 1969*, letter, in Science Museum of Virginia Archives, print (accessed Jul. 30, 2017).
[54] Ibid.
[55] State Museum of Science Study Commission, *Resume of Public Hearings,* pg. 3.
[56] Ibid.
[57] Ibid., pg. 4.
[58] *Report of The Virginia Museum of Science Study Commission*.
[59] Ibid., pg. 4.
[60] Ibid.
[61] Ibid.
[62] Ibid.
[63] *History of the Science Museum Association of Roanoke Valley*, handout, in Science Museum of Virginia Archives, print (accessed Jul. 27, 2017).
[64] Ibid.
[65] Ibid.
[66] Ibid.
[67] D. Rae Carpenter, Jr., *A Statement for Public Release or for Use by Dr. Hughes and Others, June 19, 1969*, announcement, in Science Museum of Virginia Archives, print, (accessed Jul. 24, 2017).
[68] Ibid.
[69] D. Rae Carpenter, Jr., *Letter from D. Rae Carpenter to Senator William F. Parkerson, June 9, 1969*, letter, in Science Museum of Virginia Archives, print, (accessed Jul. 24, 2017).
[70] "Study Commission Proposes Virginia Museum of Science," *The Virginia Outdoors*, January 1970, pg. 6.
[71] Ibid.
[72] Ibid.
[73] Milton J. Elliott, III, "Science Museum: A Reminiscence," *Richmond News Leader* (Richmond, VA), Apr. 20, 1983.
[74] Robert C. Haynes and R. Wesley Batten, *Narrated Slide Presentation in Support of the Establishment of the Science Museum of Virginia, January 2, 1970,* presentation, in Science Museum of Virginia Archives, print (accessed Jul. 25, 2017).
[75] Ibid.
[76] Ibid.
[77] Vera B. Remsburg, *Letter from Vera B. Remsburg to George S. Aldhizer, February 3, 1970*, letter, in Science Museum of Virginia Archives, print (accessed Jul. 29, 2017).
[78] *The Science Museum of Virginia, 1972,* pamphlet, in Science Museum of Virginia Archives, print (accessed Jul. 29, 2017).
[79] Roscoe D. Hughes, Cynthia B. Stuart and T.D. Stewart, *Letter from Hughes, Stuart and Stewart to Friends of the Museum, Mar. 16, 1970*, letter, in Science Museum of Virginia Archives, print (accessed Jul. 24, 2017).
[80] Ibid.
[81] *Senate Bill No. 8, April 3, 1970*, legislative act, in Science Museum of Virginia Archives, print (accessed Jul. 31, 2017).
[82] Roscoe D. Hughes, *Letter from Roscoe D. Hughes to Special Friends of the Science Museum of Virginia, Mar. 4, 1970*, letter, in Science Museum of Virginia Archives, print (accessed Jul. 24, 2017).
[83] *The Science Museum of Virginia, 1972,* pamphlet, in Science Museum of Virginia Archives, print (accessed Jul. 29, 2017).
[84] Heinemann, et. al, *Old Dominion, New Commonwealth,* pg. 361.
[85] Ibid.
[86] Ibid., pg. 362.
[87] Milton J. Elliott, III, *Letter from Milton J. Elliott, III to Robert L. Thalhimer, March 6, 1997*, letter, in Science Museum of Virginia Archives, print (accessed Jul. 26, 2017); *Science Museum of Virginia: Serving the Future, Preserving the Past,* mailing, in Science Museum of Virginia Archives, print (accessed Jul. 25, 2017).
[88] Milton J. Elliott, III, "Science Museum: A Reminiscence," *Richmond News Leader* (Richmond, VA), Apr. 20, 1983.
[89] Elliott, Milton. J., III, interview by Kasey Sease, personal interview, Richmond, July 18, 2016.
[90] There is also mention of an additional volunteer named Henrietta Near, though it is unclear when exactly she joined the SMV staff. See Elliott, III, "Science Museum: A Reminiscence ; for quote see Milton J. Elliott, III, "Elliott: Early Days of the Science Museum of Virginia," *Richmond Times-Dispatch* (Richmond, VA), June 3, 2016.

[91] Elliott, III, "Science Museum: A Reminiscence."
[92] Ibid.
[93] Ibid.
[94] Ibid.
[95] Ibid.
[96] *Science Museum of Virginia: Resume of Board Action and Discussions, March 1971-January 1973, February 20, 1973,* report, in Science Museum of Virginia Archives, print (accessed Jul. 31, 2017).
[97] Ibid.
[98] Ibid.
[99] Ibid.
[100] Department of City Planning, Roanoke, VA, *Master Development Plan: Mill Mountain Park, September 1967*, report, in Science Museum of Virginia Archives, print (accessed Jul. 27, 2017).
[101] "Frederick Campus Backed for Museum," *Ledger-Star* (Norfolk, VA), March 3, 1972.
[102] *Science Museum of Virginia: Resume of Board Action and Discussions.*
[103] Ibid.
[104] Richmond City Planning Commission, *The Potential for Facilities of the Science Museum of Virginia in the Richmond Area, October 20, 1971,* report, in Science Museum of Virginia Archives, print (accessed Jul. 25, 2017).
[105] Ibid., pg. 6.
[106] *Science Museum of Virginia: Resume of Board Action and Discussions.*
[107] Wiley & Wilson, Engineers, Architects, Planners, *The Science Museum of Virginia: Project Report, April 27, 1972*, report, in Science Museum of Virginia Archives, print (accessed Jul. 25, 2017).
[108] Ibid., pg. 3-4.
[109] Ibid.
[110] Ibid.
[111] Ibid.
[112] Ibid.
[113] J. R. Booton, *Letter from Wiley & Wilson to Jack M. Goodykoontz, July 12, 1972,* letter, in Science Museum of Virginia Archives, print (accessed Jul. 28, 2017).
[114] Wiley &Wilson, Engineers, Architects, Planners, *The Science Museum of Virginia Western Division Roanoke Region Natural History Facility Site Evaluation Preliminary Report, April 28, 1972,* report, in Science Museum of Virginia Archives, print (accessed Jul. 27, 2017).
[115] Ibid.
[116] Robert B. Sears, "Localities Could be Assessed for Science Museum Finances," *Roanoke Times* (Roanoke, VA), May 2, 1972.
[117] Ibid.
[118] Ibid.
[119] *Planning Report Accepted by Science Museum Board, 1972*, press release, in Science Museum of Virginia Archives, print (accessed Jul. 29, 2017).
[120] Ibid.
[121] *Science Museum of Virginia: Resume of Board Action and Discussions.*
[122] Ibid.
[123] Roscoe D. Hughes, *Letter from Roscoe D. Hughes to Roy L. Webber, November 3, 1972,* letter, in Science Museum of Virginia Archives, print (accessed Jul. 28, 2017).
[124] Ibid.
[125] *Science Museum of Virginia Foundation, Inc., Background, September 5, 1973*, handout, in Science Museum of Virginia Archives, print (accessed Jul. 31, 2017).
[126] Linwood Holton, *Letter from Linwood Holton to Dr. Roscoe D. Hughes, January 2, 1973*, letter, in Science Museum of Virginia Archives, print (accessed Jul. 30, 2017).
[127] Roscoe D. Hughes, *Memorandum #59 from Roscoe D. Hughes to Trustees, Science Museum of Virginia, September 5, 1972*, memorandum, in Science Museum of Virginia Archives, print (accessed Jul. 30, 2017).
[128] Roscoe D. Hughes, *Letter from Roscoe D. Hughes to Linwood Holton, December 20, 1972*, letter, in Science Museum of Virginia Archives, print (accessed Jul. 30, 2017).
[129] Roscoe D. Hughes, *Letter from Roscoe D. Hughes to John W. Garber, July 13, 1972*, letter, in Science Museum of Virginia Archives, print (accessed Aug. 12, 2017).
[130] Roscoe D. Hughes, *Memorandum #50 from Roscoe D. Hughes to Trustees, Science Museum of Virginia, June 28, 1972*, memorandum, in Science Museum of Virginia Archives, print (accessed Jul. 30, 2017).

[131] Ibid.
[132] *Science Museum of Virginia: Resume of Board Action and Discussions.*
[133] *Dr. Paul H. Knappenberger, Jr., July 5, 1972*, resume, in Science Museum of Virginia Archives, print (accessed Jul. 31, 2017).
[134] Ibid.
[135] Ibid.
[136] Roscoe D. Hughes, *Letter from Roscoe D. Hughes to John R. McCutcheon, September 29, 1972,* letter, in Science Museum of Virginia Archives, print (Accessed Jul. 29, 2017).
[137] Ibid.
[138] Ibid.
[139] *Science Museum of Virginia: Resume of Board Action and Discussions, March 1971-January, 1973, February 20, 1973,* report, in Science Museum of Virginia Archives, print (accessed Jul. 31, 2017).
[140] Roscoe D. Hughes, *Memorandum #81 from Roscoe D. Hughes to Trustees, Science Museum of Virginia, December 15, 1972,* memorandum, in Science Museum of Virginia Archives, print (accessed Jul. 30, 2017).
[141] *Science Museum of Virginia: Headquarters/Physical Sciences Facility Project Criteria, November 1973*, report, in Science Museum of Virginia Archives, print (accessed Jul. 26, 2017).
[142] Howard A. MacCord, Sr., *Letter from Howard A. MacCord, Sr. to William F. Parkerson, Jr., December 26, 1972*, letter, in Science Museum of Virginia Archives, print (Accessed Jul. 30, 2017).
[143] D. Rae Carpenter, Jr., *Letter from D. Rae Carpenter, Jr. to Charles W. Gunn, January 29, 1973*, letter, in Science Museum of Virginia Archives, print (accessed Jul. 30, 2017).
[144] Ibid.
[145] Ibid.
[146] MacCord, Sr., *Letter from Howard A. MacCord, Sr. to William F. Parkerson, Jr., December 26, 1972.*
[147] Howard A. MacCord, *A Critique of the Science Museum of Virginia's Masterplan for the Capital Division, February 20, 1973*, letter, in Science Museum of Virginia Archives, print (accessed Jul. 30, 2017).
[148] Ibid.
[149] Ibid.
[150] MacCord, Sr., *Letter from Howard A. MacCord, Sr. to William F. Parkerson, Jr., December 26, 1972.*
[151] *Defects in Present Planning Concepts: Science Museum of Virginia, 1972*, manuscript, in Science Museum of Virginia Archives, print (accessed Jul. 31, 2017).
[152] Carpenter, Jr., *Letter from D. Rae Carpenter, Jr. to Charles W. Gunn, January 29, 1973.*
[153] Victor J. Danilov, *Letter from Victor J. Danilov to Paul H. Knappenberger, Jr., November 8, 1973*, letter, in Science Museum of Virginia Archives, print (accessed Jul. 27, 2017).
[154] Ibid.
[155] Ibid.
[156] "For a Local Science Museum," *Roanoke Times* (Roanoke, VA), January 26, 1974; Robert B. Sears, "Official Hasn't Given Up on Virginia Museum System," *Roanoke Times* (Roanoke, VA), March 2, 1973.
[157] Science Museum Association of Roanoke Valley, *Toward a Science Museum Center in Roanoke Valley*, mailing, in Science Museum of Virginia Archives, print (accessed Jul. 27, 2017).
[158] Robert B. Sears, "Official Hasn't Given Up on Virginia Museum System," *Roanoke Times* (Roanoke, VA), March 2, 1973.
[159] Ibid.
[160] Trudy Willis, "Science Center to Go it Alone if Necessary," *Roanoke Times* (Roanoke, VA), January 4, 1974.
[161] Science Museum Association of Roanoke Valley, *Toward a Science Museum Center in Roanoke Valley*, mailing, in Science Museum of Virginia Archives, print (accessed Jul. 27, 2017).
[162] Ibid.
[163] Harold Soldinger, *Letter from Harold Soldinger to Linwood Holton, March 9, 1973,* letter, in Science Museum of Virginia Archives, print (accessed Jul. 30, 2017).
[164] Ibid.
[165] Paul H. Knappenberger, Jr., M*emorandum #88 from Paul H. Knappenberger to Trustees, Science Museum of Virginia,* memorandum, in Science Museum of Virginia Archives, print (accessed Jul. 30, 2017).
[166] Roscoe D. Hughes, *Memorandum #43 from Roscoe D. Hughes to Trustees, Science Museum of Virginia, May 16, 1972,* memorandum, in Science Museum of Virginia Archives, print (accessed Jul. 30, 2017).
[167] Ibid.
[168] D. Rae Carpenter, *Science Museum of Virginia: A Few Early Landmark Dates, October 2008*, handout, in Science Museum of Virginia Archives, print (accessed Jul. 26, 2017).

[169] Carpenter, D. Rae, Jr., interview by Kasey Sease, personal interview, Charlottesville, July 20, 2016.
[170] "History," Exploratorium.edu, https://www.exploratorium.edu/about/history (accessed Aug, 16, 2017).
[171] Ibid.
[172] Ibid.
[173] Mary Ross Scott Reed, *Letter from Mary Ross Scott Reed to Roscoe D. Hughes, April 30, 1973,* letter, in Science Museum of Virginia Archives, print (accessed Jul. 29, 2017).
[174] Neil November, *Resolution, September 27, 1979,* resolution, in Science Museum of Virginia Archives, print (accessed Jul. 29, 2017).
[175] Reed, *Letter from Mary Ross Scott Reed to Roscoe D. Hughes, April 30, 1973.*
[176] *New Board Chairman Elected By Science Museum Trustees, July 5, 1973*, press release, in Science Museum of Virginia Archives, print (accessed Jul. 30, 2017).
[177] Ibid.
[178] "Dr. Carpenter New Head of Museum Unit," *Richmond News Leader* (Richmond, VA), July 6, 1973.
[179] *Science Museum of Virginia: Headquarters/Physical Sciences Facility Project Criteria, November 1973*, report, in Science Museum of Virginia Archives, print (accessed Jul. 26, 2017).
[180] Ibid.
[181] Science Museum of Virginia, *Letter from the Science Museum of Virginia and its Solar Energy Planning Team to Charles Hauer, April 18, 1974*, letter, in Science Museum of Virginia Archives, print (accessed Jul. 26, 2017).
[182] Ibid.
[183] Carpenter, *Science Museum of Virginia: A Few Early Landmark Dates, October 2008.*
[184] *Science Museum of Virginia: Serving the Future, Preserving the Past,* mailing, in Science Museum of Virginia Archives, print (accessed Jul. 25, 2017).
[185] Ibid.
[186] Beverly Orndorff, "UVB Gives $75,000 for Science Mobile," *Richmond Times-Dispatch* (Richmond, VA), n.d.
[187] Ibid.
[188] *Remarks of K.A. Randall, Chief Executive Officer, United Virginia Bankshares, Inc., Sciencemobile Press Conference, Thursday, September 6, 1973*, transcript, in Science Museum of Virginia Archives, print (accessed Jul. 30, 2017).
[189] Ibid.
[190] Don Harrison, "Mobile Science Exhibit Planned," *Roanoke Times* (Roanoke, VA), Sept. 7, 1973.
[191] *Award Presentation by Governor Godwin to Feature Mobile Unit Stay at State Fair, September 19, 1974*, press release, in Science Museum of Virginia Archives, print (accessed Jul. 30, 2017).
[192] Ibid.
[193] Ibid.
[194] *Science Museum's New Mobile Unit to Begin Operation November 14, November 12, 1973*, press release, in Science Museum of Virginia Archives, print (accessed Jul. 30, 2017).
[195] Ibid.
[196] Ibid.
[197] Ibid; *Trans-Science 1, December 3, 1973,* invitation, in Science Museum of Virginia Archives, print (accessed Jul. 30, 2017).
[198] *Science Museum's New Mobile Unit to Begin Operation November 14, November 12, 1973.*
[199] *Trans-Science 1 Schedule: April 20-June 30, April 26, 1974*, schedule, in Science Museum of Virginia Archives, print (accessed Jul. 30, 2017).
[200] Trudy Willis, "Mini Science Museum Challenges Senses," *Roanoke Times* (Roanoke, VA), November 11, 1973.
[201] Ibid.
[202] Ibid.
[203] Don C. Kunze, "A Message from the President," *Happenings in Science* (1973): pg. 1.
[204] *History of Involvement of the Junior League of Richmond with the Science Museum of Virginia,* handout, in Science Museum of Virginia Archives, print (accessed Jul. 31, 2017).
[205] *Project proposal: Volunteer Structure for the Science Museum of Virginia, January 11, 1974,* proposal, in Science Museum of Virginia Archives, print (accessed Jul. 31, 2017).
[206] Ibid.
[207] Ibid.
[208] Ibid.
[209] Ibid.
[210] "Partial Solar Eclipse 'Heard' Around Nation," *Science Museum of Virginia Newsletter* 4 (1975): 3-4.

[211] Ibid.
[212] Ibid,
[213] Ibid.
[214] Ibid.
[215] *A Few Facts You Ought to Know About the Science Museum of Virginia*, flyer, in Science Museum of Virginia Archives, print (accessed Jul. 25, 2017).
[216] *Science Museum of Virginia: Headquarters/Physical Sciences Facility Project Criteria, November 1973*, report, in Science Museum of Virginia Archives, print (accessed Jul. 26, 2017).
[217] Ibid.
[218] Ibid.
[219] Paul H. Knappenberger, Jr., L*etter from Paul H. Knappenberger, Jr. to Edward E. Willey, January 23, 1975,* letter, in Science Museum of Virginia Archives, print (accessed Jul. 29, 2017).
[220] *Science Museum of Virginia: Serving the Future, Preserving the Past,* mailing, in Science Museum of Virginia Archives, print (accessed Jul. 25, 2017).
[221] Robert B. Sears, "Steps Taken to Establish Western Va. Museum," *Roanoke Times* (Roanoke, VA), April 30, 1974.
[222] *Science Museum of Virginia: Brief History, December 3, 1974*, report, in Science Museum of Virginia Archives, print (accessed Jul. 30, 2017).
[223] "Progress Toward a Science Museum," *Roanoke Times* (Roanoke, VA), May 5, 1974.
[224] Ibid.
[225] *The Science Museum of Virginia: Alternate Funding Request, 1974*, announcement, in Science Museum of Virginia Archives, print (accessed Jul. 26, 2017).
[226] Ibid.
[227] Paul H. Knappenberger, Jr., L*etter from Paul H. Knappenberger, Jr. to Mrs. William T. Reed, March 27, 1974*, letter, in Science Museum of Virginia Archives, print (accessed Jul. 26, 2017).
[228] Ibid.
[229] *History of Involvement of the Junior League of Richmond with the Science Museum of Virginia,* handout, in Science Museum of Virginia Archives, print (accessed Jul. 31, 2017).
[230] Ibid.
[231] Sears, "Steps Taken to Establish Western Va. Museum."
[232] Ibid.
[233] "Ex-Hollins Professor Gets Museum Post," *Roanoke Times* (Roanoke, VA), July 17, 1974.
[234] Ibid.
[235] Ibid.
[236] Ibid.
[237] Carpenter, *Science Museum of Virginia: A Few Early Landmark Dates, October 2008.*
[238] Sears, "Steps Taken to Establish Western Va. Museum."
[239] Ibid.
[240] *Western Division/Science Museum of Virginia Meeting Agenda, August 1, 1974*, agenda, in Science Museum of Virginia Archives, print (accessed Jul. 27, 2017).
[241] "Planning Contract Let for Science Museum," *Roanoke Times* (Roanoke, VA), August 2, 1974.
[242] Ibid.
[243] *Report on the Architect Selection Review Meeting with SMARV, August 1, 1974*, report, in Science Museum of Virginia Archives, print (accessed Jul. 28, 2017).
[244] "Planning Contract Let for Science Museum."
[245] Don Harrison, "Roanoke Site of New Museum," *Roanoke Times* (Roanoke, VA), September 20, 1974.
[246] Ibid.
[247] City Council of Roanoke, VA, *Resolution No. 21806, September 16, 1974*, resolution, in Science Museum of Virginia Archives, print (accessed Jul. 27, 2017).
[248] *Western Union Telegram from the President of the Blue Ridge Parkway Association to the Science Museum of Virginia Board of Trustees, September 18, 1974*, telegram, in Science Museum of Virginia Archives, print (accessed Aug. 22, 2017).
[249] *Invitational Meeting of the Tidewater Board Member of the Science Museum of Virginia, September 12, 1974*, notes, in Science Museum of Virginia Archives, print (accessed Jul. 31, 2017).
[250] Ibid.
[251] Ibid.

[252] Ibid.
[253] Paul H. Knappenberger, Jr., *Letter from Paul H. Knappenberger, Jr. to Richard E. Hughes, September 24, 1974*, letter, in Science Museum of Virginia Archives, print (accessed Jul. 28, 2017).
[254] Richard E. Hughes, *Letter from Richard E. Hughes to Paul H. Knappenberger, Jr., September 18, 1974*, letter, in Science Museum of Virginia Archives, print (accessed Jul. 28, 2017).
[255] D. Rae Carpenter, Jr., L*etter from D. Rae Carpenter, Jr. to Richard E. Hughes, September 27, 1974*, letter, in Science Museum of Virginia Archives, print (accessed Jul. 28, 2017).
[256] Ibid.
[257] "100,000th Visitor to Mobile Unit is Recognized by Governor Godwin," *Science Museum of Virginia Newsletter* 3 (1974): 1-2
[258] Ibid.
[259] Ibid.
[260] *Award Presentation by Governor Godwin to Feature Mobile Unit Stay at State Fair, September 19, 1974*, press release, in Science Museum of Virginia Archives, print (accessed Jul. 30, 2017).
[261] Maurice B. Rowe, *Letter from Maurice B. Rowe to Heads of State Agencies and Institutions, September 26, 1974*, letter, in Science Museum of Virginia Archives, print (accessed Jul. 29, 2017).
[262] Ibid.
[263] Ibid.
[264] Edward E. Willey, *Letter from Edward E. Willey to D. Rae Carpenter, Jr., October 11, 1974*, letter, in Science Museum of Virginia Archives, print (accessed Jul. 29, 2017).
[265] Maurice B. Rowe, *Letter from Maurice B. Rowe to D. Rae Carpenter, Jr., October 7, 1974*, letter, in Science Museum of Virginia Archives, print (accessed Jul. 29, 2017).
[266] *National Energy Conservation Award is Won for Science Museum Facility, November 18, 1974,* press release, in Science Museum of Virginia Archives, print (accessed Jul. 26, 2017).
[267] Ibid.
[268] Paul H. Knappenberger, Jr., *Letter from Paul H. Knappenberger, Jr. to Edward Willey, January 23, 1975*, letter, in Science Museum of Virginia Archives, print (accessed Aug. 22, 2017).
[269] "Solar Lab was 'Hottest' Show in Town," *Science Museum of Virginia Newsletter* 4 (1975): 1-2.
[270] Ibid.
[271] Ibid.
[272] *Resolution: Commending the Science Museum of Virginia for Leadership in the Field of Solar Energy Development in Virginia, 1974*, resolution, in Science Museum of Virginia Archives, print (accessed Jul. 28, 2017).
[273] Ibid.
[274] D. Rae Carpenter, Jr., *Letter from D. Rae Carpenter, Jr. to George W. Grayson, January 22, 1975*, letter, in Science Museum of Virginia Archives, print (accessed Jul. 29, 2017).
[275] Ibid.
[276] D. Rae Carpenter, Jr., *Letter from D. Rae Carpenter, Jr. to Carter O. Lowance, May 9, 1975,* letter, in Science Museum of Virginia Archives, print (accessed Jul. 28, 2017).
[277] Ibid.
[278] *Solar Energy Research Grant is Awarded Science Museum, May 15, 1975*, press release, in Science Museum of Virginia Archives, print (accessed Jul. 28, 2017).
[279] Ibid.
[280] *Solar Energy for Virginia: Conference Prospectus, 1975*, prospectus, in Science Museum of Virginia Archives, print (accessed Jul. 28, 2017).
[281] Ibid.
[282] *Solar Energy for Virginia: Conference Prospectus, 1975*, prospectus, in Science Museum of Virginia Archives, print (accessed Jul. 28, 2017).
[283] "Richmond Conference Draws Thousands," *Science Museum of Virginia Newsletter* 4 (1975): 1-2.
[284] D. Rae Carpenter, Jr., *Letter from D. Rae Carpenter, Jr. to Eugene Doering, September 19, 1975*, letter, in Science Museum of Virginia Archives, print (accessed Jul. 28, 2017).
[285] Ibid.
[286] *House Bill No. 1222, February 9, 1976.*
[287] Ibid.
[288] Ibid.
[289] Paul H. Knappenberger, *Letter from Paul H. Knappenberger to Undisclosed Recipients, December 11, 1974*, letter, in Science Museum of Virginia Archives, print, (accessed Jul. 25, 2017).

[290] "Book Fair Response was Overwhelming," *Science Museum of Virginia Newsletter* 4 (1975): 1.
[291] Ibid.
[292] Paul H. Knappenberger, Jr., *VCU Interior Design Model for Capital Division*, invitation, in Science Museum of Virginia Archives, print (accessed Jul. 26, 2017).
[293] "Snack Bar Counts Calories," *Buena Vista News* (Buena Vista, VA), June 5, 1975.
[294] Knappenberger, Jr., *VCU Interior Design Model for Capital Division*.
[295] Paul H. Knappenberger, Jr., *Letter from Paul H. Knappenberger, Jr. to Ontario Science Centre Trip Participants, March 24, 1975*, letter, in Science Museum of Virginia Archives, print (accessed Jul. 29, 2017).
[296] J. T. Wilson, "Ontario Science Centre Attracts the Millions," reprinted from the *Canadian Geographical Journal* (1976), pg. 2.
[297] Knappenberger, Jr., *Letter from Paul H. Knappenberger, Jr. to Ontario Science Centre Trip Participants, March 24, 1975.*
[298] Ibid.
[299] Paul H. Knappenberger, Jr., *Letter from Paul H. Knappenberger, Jr. to Trustees, Science Museum of Virginia, June 23, 1975,* letter, in Science Museum of Virginia Archives, print (accessed Jul. 26, 2017).
[300] *Titled Dome Design Meeting Meets June 11 and 12 in Detroit, 1975*, press release, in Science Museum of Virginia Archives, print (accessed Jul. 26, 2017).
[301] Ibid.
[302] Ibid.
[303] Ibid.
[304] Robert B. Sears, "Science Museum Gets Reprieve," *Roanoke Times* (Roanoke, VA), June 20, 1975.
[305] Ibid.
[306] National Park Service, *Environmental Assessment for Access Road in Conjunction with the Science Museum of Virginia, July 1975*, report, in Science Museum of Virginia Archives, print (accessed Jul. 27, 2017).
[307] Ibid.
[308] D. Rae Carpenter, Jr., *Letter from D. Rae Carpenter, Jr. to Jack A. Ramey, February 18, 1976,* letter, in Science Museum of Virginia Archives, print (accessed Jul. 27, 2017).
[309] Ibid.
[310] D. Rae Carpenter, *Science Museum of Virginia: A Few Early Landmark Dates, October 2008*, handout, in Science Museum of Virginia Archives, print (accessed Jul. 26, 2017).
[311] Lea Setegn, "Anna Lauder Garner dies at 83," *Richmond Times-Dispatch* (Richmond, VA), October 29, 2005.
[312] Ibid.
[313] Ibid.
[314] *Brief Excerpts from Budget Hearing Before Governor Godwin, Budget Advisory Committee, October 21, 1975*, report, in Science Museum of Virginia Archives, print (accessed Jul. 29, 2017).
[315] Ibid.
[316] Ibid.
[317] Ibid.
[318] Ibid.
[319] Ibid.
[320] Ibid.
[321] Ibid.
[322] D. Rae Carpenter, Jr., *Letter from D. Rae Carpenter, Jr. to A.B. Niemeyer, Jr., November 7, 1975*, letter, in Science Museum of Virginia Archives, print (accessed Jul. 29, 2017).
[323] Ibid.
[324] Ibid.
[325] Ibid.
[326] *Broad Street Station: Union Station of Richmond,* broadside, in Science Museum of Virginia Archives, print (accessed Aug. 23, 2017).
[327] Ibid.
[328] Ibid.
[329] Ibid.
[330] Ibid.
[331] Thomas S. Driscoll, *A Brief History of Broad Street Station and the Science Museum of Virginia, 1992*, manuscript, in Science Museum of Virginia Archives, print (accessed Jul. 29, 2017), pg. 3.
[332] Ibid.

[333] D. Rae Carpenter, Jr., *Letter from D. Rae Carpenter, Jr, to Norma Moran, December 1, 1975*, letter, in Science Museum of Virginia Archives, print (accessed Jul. 27, 2017).
[334] Ibid.
[335] Edward Fordyce, *Letter from Edward Fordyce to James M. Glave, January 20, 1976*, letter, in Science Museum of Virginia Archives, print (accessed Jul. 26, 2017).
[336] "Hard Times for Science Museums," *Roanoke Times* (Roanoke, VA), January 31, 1976.
[337] Jack A. Ramey, *Letter from Jack A. Ramey to D. Rae Carpenter, January 29, 1976*, letter, in Science Museum of Virginia Archives, print (accessed Jul. 27, 2017).
[338] Ibid.
[339] D. Rae Carpenter, Jr., *Letter from D. Rae Carpenter, Jr. to Jack A. Ramey, February 18, 1976,* letter, in Science Museum of Virginia Archives, print (accessed Jul. 27, 2017).
[340] Ibid.
[341] Paul H. Knappenberger, Jr., *Letter from Paul H. Knappenberger, Jr. to Roscoe D. Hughes, February 12, 1976,* letter, in Science Museum of Virginia Archives, print (accessed Jul. 29, 2017).
[342] Carpenter, Jr., *Letter from D. Rae Carpenter, Jr. to Jack A. Ramey, February 18, 1976.*
[343] Ibid.
[344] Victor J. Danilov (director of the Museum of Science and Industry in Chicago), *Letter from Victor J. Danilov to Paul H. Knappenberger, Jr., April 21, 1976*, letter, in Science Museum of Virginia Archives, print (accessed Jul. 27, 2017).
[345] Ibid.
[346] Milton J. Elliott, III, *Letter from Milton J. Elliott, III to J. Stuart Barret, January 18, 1978*, letter, in Science Museum of Virginia Archive, print (accessed Aug. 5, 2017).
[347] Ibid.
[348] Ibid.
[349] Ibid.
[350] Lacey E. Putney, L*etter from Lacey E. Putney to D. Rae Carpenter, Jr., March 12, 1976,* letter, in Science Museum of Virginia Archives, print (accessed Jul. 29, 2017).
[351] *Science Museum of Virginia Attachment G.O. Form Budget 29, February 5, 1976*, form, in Science Museum of Virginia Archives, print (accessed Jul. 29, 2017).
[352] "Museum will Occupy Broad Street Station," *Science Museum of Virginia Newsletter* 5 (1976): 1-2.
[353] Ibid.
[354] Ibid.
[355] Carpenter, D. Rae, Jr., interview by Kasey Sease, personal interview, Charlottesville, July 20, 2016.
[356] *History of Involvement of the Junior League of Richmond with the Science Museum of Virginia,* handout, in Science Museum of Virginia Archives, print (accessed Jul. 31, 2017).
[357] Ibid.
[358] Ibid.
[359] "Museum will Occupy Broad Street Station."
[360] D. Rae Carpenter, *Science Museum of Virginia: A Few Early Landmark Dates, October 2008*, handout, in Science Museum of Virginia Archives, print (accessed Jul. 26, 2017).
[361] "Dr. Hughes Succumbs; Pioneered Development of Science Museum," *Science Museum of Virginia Newsletter* 5 (1976): 1.
[362] *The Roscoe D. Hughes Human Genetics Fund, 1981*, announcement, in Science Museum of Virginia Archives, print (accessed Jul. 28, 2017).
[363] "Dr. Hughes Succumbs; Pioneered Development of Science Museum."
[364] *Our Energy Future, 1976,* proposal, in Science Museum of Virginia Archives, print (accessed Jul. 30, 2017).
[365] *Science Museum of Virginia: Serving the Future, Preserving the Past,* mailing, in Science Museum of Virginia Archives, print (accessed Jul. 25, 2017).
[366] Ibid.
[367] *Our Energy Future, 1976.*
[368] Ibid.
[369] Ibid.
[370] Beverly Orndorff, "Simple Items Preferred," newspaper clipping, in Science Museum of Virginia Archives, print (accessed Aug. 16, 2017).
[371] Ibid.
[372] Ibid.

[373] *Remarks of the Honorable John Dalton, Lieutenant Governor of Virginia News Conference, Science Museum of Virginia Broad Street Station, Richmond, Virginia, Thursday, August 26, 1976*, transcript, in Science Museum of Virginia Archives, print (accessed Jul. 31, 2017).
[374] Ibid.
[375] Ibid.
[376] Jack A. Ramey, *Letter from Jack A. Ramey to Science Museum Association Member, February 4, 1976*, letter, in Science Museum of Virginia Archives, print (accessed Jul. 27, 2017).
[377] Ibid.
[378] "History," *smwv.org*, http://smwv.org/about/ (accessed Aug. 26, 2017).
[379] Ibid.
[380] Ibid.
[381] Dale W. Lick, *For Press Release 10:00 A.M., Tuesday September 28, 1976*, press release, in Science Museum of Virginia Archives, print (accessed Jul. 31, 2017).
[382] Ibid.
[383] Ibid.
[384] Thomas S. Driscoll, *A Brief History of Broad Street Station and the Science Museum of Virginia, 1992*, manuscript, in Science Museum of Virginia Archives, print (Accessed Jul. 29, 2017), pg. 6.
[385] Ibid.
[386] D. Rae Carpenter, Jr., *Letter from D. Rae Carpenter, Jr. to William B. Thalhimer, Jr., July 23, 1984*, letter, in Science Museum of Virginia Archives, print (accessed Aug. 14, 2017).
[387] Ibid.
[388] Carpenter, D. Rae, Jr., interview by Kasey Sease, personal interview, Charlottesville, July 20, 2016.
[389] Beverly Orndorff, "First Science Facility at Station is Opened," *Richmond Times-Dispatch* (Richmond, VA), January 7, 1977.
[390] Ibid.; "Science Museum Sets Mid-November Opening," *Richmond Times-Dispatch* (Richmond, VA), August 27, 1976.
[391] *Science Museum of Virginia: A Few Early Landmark Dates, October 2008.*
[392] Mary Randolph Spencer, *Letter from Mary Randolph Spencer to Paul Knappenberger, November 5, 1976*, letter, in Science Museum of Virginia Archives, print (accessed Aug. 5, 2017).
[393] *Resume of Mary Randolph Spencer, November 12, 1976*, resume, in Science Museum of Virginia Archives, print (accessed Aug. 5, 2017).
[394] Spencer, *Letter from Mary Randolph Spencer to Paul Knappenberger, November 5, 1976.*
[395] Ibid.
[396] Paul H. Knappenberger, Jr., *Letter from Paul H. Knappenberger, Jr. to Richard Cocke, February 3, 1977*, letter, in Science Museum of Virginia Archives, print (accessed Aug. 17, 2017).
[397] Ibid.
[398] Ibid.
[399] Ibid.
[400] Alberta Cliborne, "Science Museum Offers 2 Saltwater Exhibits," newspaper clipping, in Science Museum of Virginia Archives, print (accessed Aug. 10, 2017).
[401] Ibid.
[402] Ibid.
[403] Ibid.
[404] Ibid.
[405] Paul H. Knappenberger, Jr., *Letter from Paul H. Knappenberger, Jr. to J. Stuart Barret, February 14, 1977*, letter, in Science Museum of Virginia Archives, print (accessed Aug. 16, 2017).
[406] Alberta Cliborne, "Gifted Students Explain Exhibits," *Richmond News Leader* (Richmond, VA), May 25, 1977.
[407] Ibid.
[408] Ibid.
[409] *Director's Meeting: Science Museum of Virginia Foundation, Inc., May 24, 1977*, minutes, in Science Museum of Virginia Archives, print (accessed Aug. 16, 2017).
[410] Ibid.
[411] James Marston Fitch, John L. Young, and David V. Abramson, *Historic Preservation Consultant's Report on Adaptation for Reuse and Preservation of Union Station, Broad Street, Richmond, Virginia, For the Science Museum of Virginia, August 12, 1977*, report, in Science Museum of Virginia Archives, print (accessed Aug. 14, 2017).

[412] Ibid., pg. 4, 7.
[413] *Science Museum of Virginia: A Few Early Landmark Dates, October 2008*, handout, in Science Museum of Virginia Archives, print (accessed Aug. 5, 2017).
[414] Ibid.
[415] D. Rae Carpenter, Jr., *Letter from D. Rae Carpenter, Jr. to Maurice B. Rowe, November 10, 1977*, letter, in Science Museum of Virginia Archives, print (accessed Aug. 16, 2017).
[416] Ibid.
[417] *Minutes of the Meeting of the Virginia Public Buildings Commission held at 2 p.m., Tuesday, December 20, 1977 in House Committee Room 2, State Capitol Building*, minutes, in Science Museum of Virginia Archives, print (accessed Aug. 15, 2017).
[418] Fitch, Young, and Abramson, *Historic Preservation Consultant's Report on Adaptation for Reuse and Preservation of Union Station, Broad Street, Richmond, Virginia, For the Science Museum of Virginia, August 12, 1977.*
[419] *Minutes of the Meeting of the Virginia Public Buildings Commission held at 2 p.m., Tuesday, December 20, 1977.*
[420] Ibid.
[421] Carpenter, D. Rae, Jr., interview by Kasey Sease, personal interview, Charlottesville, July 20, 2016.
[422] *Minutes of the Meeting of the Virginia Public Buildings Commission held at 2 p.m., Tuesday, December 20, 1977.*
[423] Ibid.
[424] D. Rae Carpenter, Jr., *Letter from D. Rae Carpenter Jr. to H. Douglas Hamner Jr., April 25, 1977*, letter, in Science Museum of Virginia Archives, print (accessed Aug. 16, 2017).
[425] Ibid.
[426] Ibid.
[427] Ibid.
[428] Ibid.
[429] *The Road to Discovery…and Understanding,* pamphlet, in Science Museum of Virginia Archives, print (accessed Aug. 5, 2017).
[430] *Science Museum of Virginia: Master Plan Phase II Partial List of Priorities, January 1980*, handout, in Science Museum of Virginia Archives, print (accessed Aug. 15, 2017).
[431] Ibid.
[432] *Amendment Brief Submission for 1991: The Science Museum of Virginia, 1990*, amendment request, in Science Museum of Virginia Archives, print (accessed Aug. 20, 2017).
[433] Charles Slack, "Crossroads: Science Museum Seeks a Vision for the Future," *Richmond Times-Dispatch* (Richmond, VA), June 12, 1988.
[434] Paul H. Knappenberger, Jr., *Letter from Paul H. Knappenberger, Jr. to Edward E. Willey, November 22, 1978*, letter, in Science Museum of Virginia Archives, print (accessed Aug. 14, 2017).
[435] Slack, "Crossroads: Science Museum Seeks a Vision for the Future."
[436] Knappenberger, Jr., *Letter from Paul H. Knappenberger, Jr. to Edward E. Willey, November 22, 1978.*
[437] Ibid.
[438] Ibid.
[439] *Science Museum's Solar Energy Unit to Visit Lexington, April 3-6, 1978*, press release, in Science Museum of Virginia Archives, print (accessed Aug. 15, 2017).
[440] Paul H. Knappenberger, Jr., *Letter from Paul H. Knappenberger, Jr. to Edward E. Willey, November 22, 1978*, letter, in Science Museum of Virginia Archives, print (accessed Aug. 14, 2017).
[441] *Shells: More Stately Mansions: An Artist Responds to Seashells, September 28, 1978*, advertisement, in Science Museum of Virginia Archives, print (accessed Aug. 5, 2017).
[442] Ibid.
[443] Harriet McLeod, "November Stars at Planetarium," *Richmond Times-Dispatch* (Richmond, VA), 1983.
[444] Ibid.
[445] Ibid.
[446] Ibid.
[447] Ibid.
[448] Ibid.
[449] Neil November, *Memorandum No. 130 from Neil November to Trustees, Science Museum of Virginia*, memorandum, in Science Museum of Virginia Archives, print (accessed Aug. 14, 2017).

[450] D. Rae Carpenter, Jr., *Letter from D. Rae Carpenter, Jr. to Lacey Putney, January 22, 1979*, letter, in Science Museum of Virginia Archives, print (accessed Aug. 14, 2017).
[451] Susan Wilson, *Announcement Submitted by Susan Wilson, Extension Service Coordinator, 1980*, announcement, in Science Museum of Virginia Archives, print (accessed Aug. 14, 2017).
[452] George T. Keeley, *Letter from George T. Keeley to Paul H. Knappenberger, Jr., January 16, 1979*, letter, in Science Museum of Virginia Archives, print (accessed Aug. 15, 2017).
[453] Beverly Orndorff, "The Universe Will Open Today," *Richmond Times-Dispatch* (Richmond, VA), April 24, 1983.
[454] Kandy Kramer, "Digistar: Only One of Its Kind," *Richmond Times-Dispatch* (Richmond, VA), April 24, 1983.
[455] Ibid.
[456] Ibid.
[457] Ibid.
[458] *Evans & Sutherland: The Stars are Just the Beginning…*, folder, in Science Museum of Virginia Archives, print (accessed Aug. 16, 2017).
[459] Ibid.
[460] Kramer, "Digistar: Only One of Its Kind."
[461] Ibid.
[462] Ibid.
[463] *Excerpt from the Minutes of the January 6, 1978 Meeting of the Art Commission, January 26, 1978*, memo, in Science Museum of Virginia Archives, print (accessed Aug. 15, 2017).
[464] Ibid.
[465] Ibid.
[466] Ibid.
[467] "Science Museum Restoration Begun," *Richmond News Leader* (Richmond, VA), January 9, 1979.
[468] Kandy Kramer, "Planetarium Design First for Architect," *Richmond Times-Dispatch* (Richmond, VA), April 24, 1983.
[469] Ibid.
[470] Ibid.
[471] Christine A. Smith, *Letter from Christine A. Smith to the Trustees of the Science Museum of Virginia, March 15, 1979*, letter, in Science Museum of Virginia Archives, print (accessed Aug. 17, 2017).
[472] Ibid.; *Science Museum of Virginia: Volunteer Structure, September 19, 1978*, handout, in Science Museum of Virginia Archives, print (accessed Aug. 17, 2017).
[473] *An Expedition to View the Total Solar Eclipse, February 1979*, advertisement, in Science Museum of Virginia Archives, print (accessed Aug. 5, 2017).
[474] Ibid.
[475] Ibid.
[476] "Laserlumia Laserdrive: Voyage into Another Dimension," *Spectrum* 2 (1979): 1.
[477] Ibid.
[478] *Chats 'n Pats* 1 (1979): 1; *Spectacular Laser Show Set at Science Museum, October 10, 1979*, press release, in Science Museum of Virginia Archives, print (accessed Aug. 5, 2017).
[479] *On the Occasion of the Dedication of the Discovery Room, January 6, 1977*, invitation, in Science Museum of Virginia Archives, print (accessed Aug. 17, 2017).
[480] *November-December 1979*, program, in Science Museum of Virginia Archives, print (accessed Aug. 5, 2017).
[481] Ibid.
[482] Beverly Orndorff, "Gossamer Albatross May Pave Way for 'Poor Man's Satellite,'" *Richmond Times-Dispatch* (Richmond, VA), February 7, 1980.
[483] Ibid.; Driscoll, *A Brief History of Broad Street Station and the Science Museum of Virginia, 1992*, pg. 7.
[484] *Science Museum of Virginia: A Report, June 1980,* report, in Science Museum of Virginia Archives, print (accessed Aug. 17, 2017).
[485] Ibid.
[486] Peter Bacqué, "Invader Approves Planetarium," *Richmond Times Dispatch* (Richmond, VA), October 13, 1980.
[487] Ibid.
[488] Ibid.
[489] Ibid.
[490] Ibid.

[491] Neil November, *Letter from Neil November to Alden Aaroe, October 10, 1980*, letter, in Science Museum of Virginia Archives, print (accessed Aug. 14, 2017).
[492] *Science Museum of Virginia Groundbreaking Ceremony, Sunday, October 12, 1980*, schedule, in Science Museum of Virginia Archives, print (accessed Aug. 14, 2017).
[493] "Ready, Set, Fly," *Richmond Times-Dispatch* (Richmond, VA), March 22, 1981.
[494] Ibid.
[495] Driscoll, *A Brief History of Broad Street Station and the Science Museum of Virginia, 1992*, pg. 7.
[496] Amanda Oaks, "Richmond in the Record Books," *Richmond Times-Dispatch* (Richmond, VA), August 18. 2004.
[497] Ibid.
[498] *Joint Exhibits Committee Meeting, April 26, 1982*, minutes, in Science Museum of Virginia Archives, print (accessed Aug. 11, 2017).
[499] *Crystal World*, pamphlet, in Science Museum of Virginia Archives, print (accessed Aug. 11, 2017).
[500] Ibid.
[501] *Joint Exhibits Committee Meeting, April 26, 1982*.
[502] *Crystal World*, pamphlet.
[503] "A Sparkling Crystal World," clipping from *Commonwealth Magazine*, 1982, in Science Museum of Virginia Archives, print (accessed Aug. 11, 2017).
[504]Driscoll, *A Brief History of Broad Street Station and the Science Museum of Virginia, 1992*, pg. 7; "Capping the Universe," *Richmond Times-Dispatch* (Richmond, VA), March 18, 1982.
[505] A. W. Helwig, *Letter from A. W. Helwig to The Files, December 9, 1982*, letter, in Science Museum of Virginia Archives, print (accessed Aug. 10, 2017).
[506] Ibid.
[507] Neil November, *Letter from Neil November to Arthur W. Helwig, December 16, 1982,* letter, in Science Museum of Virginia Archives, print (accessed Aug. 10, 2017).
[508] 2009-2010 Annual Report, in Science Museum of Virginia Archives, print (accessed Aug. 28, 2017).
[509] Ibid.
[510] Beverly Orndorff, "The Universe Will Open Today," *Richmond Times-Dispatch* (Richmond, VA), April 24, 1983.
[511] Ibid.
[512] Ibid.
[513] Ibid.
[514] Ibid.
[515] Harriet McLeod, "November Stars at Planetarium," *Richmond Times-Dispatch* (Richmond, VA), 1983.
[516] Ibid.
[517] Charles Slack, "A More Visible Science Museum Needed, Study Says," newspaper clipping, in Science Museum of Virginia Archives, print (accessed Aug. 30, 2017).
[518] "Richmond Streetcar No. 192 Starts its Trip Here," newspaper clipping, in Science Museum of Virginia Archives, print (accessed Aug. 30, 2017).
[519] Walter R.T. Witschey, *Streetcar Feasibility Study, June 19, 1982*, report, in Science Museum of Virginia Archives, print (accessed Aug. 12, 2017).
[520] Ibid.
[521] Ibid.
[522] Ibid.
[523] Ibid.
[524] *Make it Happen! Update, August 17, 1982*, mailing, in Science Museum of Virginia Archives, print (accessed Aug. 12, 2017).
[525] Ibid.
[526] Ibid.
[527] Ibid.
[528] Ibid.
[529] Ibid.
[530] Walter R.T. Witschey, *Letter from Walter R.T. Witschey to Streetcar Fans & Enthusiasts, October 11, 1982*, letter, in Science Museum of Virginia Archives, print (accessed Aug. 12, 2017).
[531] Walter R.T. Witschey, *Letter from Walter R.T. Witschey to Trolley Friends and Enthusiasts, July 6, 1983*, letter, in Science Museum of Virginia Archives, print (accessed Aug. 12, 2017).
[532] Witschey, Walter R. T., interview by Kasey Sease, personal interview, Farmville, August 17, 2016.

[533] D. Rae Carpenter, Jr., *Letter from D. Rae Carpenter, Jr. to Walter R. T. Witschey, June 21, 1983*, letter, in Science Museum of Virginia Archives, print (accessed Aug. 12, 2017); D. Rae Carpenter, Jr., *Letter from D. Rae Carpenter, Jr. to Paul H. Knappenberger, Jr., June 21, 1983*, letter, in Science Museum of Virginia Archives, print (accessed Aug. 10, 2017).
[534] Ibid.
[535] Ibid.
[536] Carpenter, Jr., *Letter from D. Rae Carpenter, Jr. to Paul H. Knappenberger, Jr., June 21, 1983.*
[537] *Science Museum of Virginia: Operating, July 30, 1983*, handout, in Science Museum of Virginia Archives, print (accessed Aug. 14, 2017).
[538] Ibid.
[539] Ibid.
[540] Ibid.; *The Science Museum of Virginia, Richmond, Report on Audit for the Fiscal Year Ended June 30, 1983*, report, in Science Museum of Virginia Archives, print (accessed Aug. 15, 2017).
[541] Ibid.
[542] Ibid.
[543] Driscoll, *A Brief History of Broad Street Station and the Science Museum of Virginia, 1992*, pg. 7.
[544] Ibid.
[545] Ibid.
[546] Ibid.
[547] Mary Ellen Stumpf, *Memorandum from Mary Ellen Stumpf to Paul Knappenberger, May 31, 1984*, memorandum, in Science Museum of Virginia Archives, print (accessed Aug. 8, 2017).
[548] Driscoll, *A Brief History of Broad Street Station and the Science Museum of Virginia, 1992*, pg. 8.
[549] Ibid.
[550] John D. Clarke, "Richmond Philanthropist Barbara Thalhimer Dies," *Richmond Times-Dispatch*, April 29, 2009, accessed August 30, 2017, http://www.richmond.com/entertainment/richmond-philanthropist-barbara-thalhimer-dies/article_b1d67673-69c4-593b-a69c-32aa1684a7c1.html.
[551] "A Guide to the William Blum Thalhimer, Jr. Corporate and Family Archives, 1862-1992," *vahistorical.org*, accessed Aug. 30, 2017, http://www.vahistorical.org/collections-and-resources/how-we-can-help-your-research/researcher-resources/finding-aids/thalhimer.
[552] Ibid.
[553] Clarke, "Richmond Philanthropist Barbara Thalhimer Dies."
[554] *Virginia's Outstanding Scientist and Industrialist, April 23, 1990*, pamphlet, in Science Museum of Virginia Archives, print (accessed Aug. 11, 2017).
[555] Ibid.
[556] *Exhibit Committee Minutes, December 15, 1983*, minutes, in Science Museum of Virginia Archives, print (accessed Aug. 7, 2017).
[557] Charles Slack, "Crossroads: Science Museum Seeks a Vision for the Future," *Richmond Times-Dispatch* (Richmond, VA), June 12, 1988.
[558] Ibid.
[559] *Phase II, Science Museum of Virginia, Supporting Information, July 18, 1984*, handout, in Science Museum of Virginia Archives, print (accessed Aug. 7, 2017).
[560] Ibid.
[561] Slack, "Crossroads: Science Museum Seeks a Vision for the Future."
[562] Ibid.
[563] Ibid
[564] Charles Slack, "A More Visible Science Museum Needed, Study Says."
[565] Ibid.
[566] Ibid.
[567] Ibid.
[568] Driscoll, *A Brief History of Broad Street Station and the Science Museum of Virginia, 1992*, pg. 8-9.
[569] Ibid.
[570] Ibid.
[571] Ibid.
[572] *ElectriWorks Project Report, July 20, 1989*, report, in Science Museum of Virginia Archives, print (accessed Aug. 20, 2017).
[573] Ibid.

[574] Ibid.
[575] Ibid.
[576] Ibid.
[577] Annual Report, 1989-1990, in Science Museum of Virginia Archives, print (accessed Aug. 30, 2017), pg. 13.
[578] Note: the exact number of attendees to the *Beaver* event is recorded as 3,900 in the Annual Report for 1989-1990, Ibid.
[579] Ibid., pg. 5.
[580] Ibid.
[581] Ibid., pg. 9.
[582] Ibid.
[583] Ibid., pg. 6.
[584] Ibid.
[585] Ibid.
[586] Ibid.
[587] Ibid., pg. 9.
[588] Ibid.
[589] Ibid.
[590] *Educational Programs Descriptions,* word document, in Science Museum of Virginia Archives, print (accessed Aug. 18, 2017).
[591] Ibid.
[592] Andrew Petkofsky, "Talks May Lead to 'Marriage' of Museums," *Richmond News Leader* (Richmond, VA), June 20, 1989.
[593] Ibid.
[594] Thalhimer, Robert B., interview by Kasey Sease, personal interview, Richmond, September 16, 2016; Petkofsky, "Talks May Lead to 'Marriage' of Museums."
[595] Ibid.
[596] Ibid.; Neil November, "Merger Update," *Virginia Eagles* 12 (1989): 3.
[597] Ibid.
[598] Ibid.
[599] Petkofsky, "Talks May Lead to 'Marriage' of Museums."
[600] Ibid.
[601] Annual Report, 1989-1990, pg. 5.
[602] Ann Holiday, "Science Museum Founder Honored," *Richmond News Leader* (Richmond, VA), August 12, 1989.
[603] *Science Museum Founder is Honored, August 11, 1989*, press release, in Science Museum of Virginia Archives, print (accessed Aug. 20, 2017).
[604] Ibid.
[605] "Adler Planetarium President Dr. Paul H. Knappenberger, Jr. Announces Plans to Retire," *prnewswire.com*, March 7, 2012, accessed August 31, 2017, http://www.prnewswire.com/news-releases/adler-planetarium-president-dr-paul-h-knappenberger-jr-announces-plans-to-retire-141791683.html.
[606] Annual Report, 1989-90, pg. 13.
[607] Ibid.
[608] Ibid.
[609] Ibid.
[610] Ibid.
[611] Ibid. pg. 15.
[612] Ibid. pg. 17.
[613] Ibid.
[614] *Virginia's Outstanding Scientist and Industrialist, 1990*, pamphlet, in Science Museum of Virginia Archives, print (accessed Aug. 18, 2017).
[615] Annual Report, 1989-90, pg. 17.
[616] Ibid., pg. 19.
[617] Ibid.
[618] *Science Museum Approves Aviation Museum Acquisition, June 21, 1990*, press release, in Science Museum of Virginia Archives, print (accessed Aug. 20, 2017).
[619] Ibid.
[620] *Experience Science-By-Van*, pamphlet, in Science Museum of Virginia Archives, print (accessed Aug. 20, 2017).

[621] Ibid.
[622] Ibid.
[623] Ibid.
[624] John C. Boyle, "Science Program Exciting for Kids," *Chesterfield Gazette* (Chesterfield, VA), October 4, 1990; "Experimenting," *News-Gazette* (Lexington, VA), January 30, 1991.
[625] Boyle, "Science Program Exciting for Kids."
[626] D. Rae Carpenter, Jr., *Letter from D. Rae Carpenter, Jr. to Frank W. Nolan, January 31, 1991*, letter, in Science Museum of Virginia Archives, print (accessed Aug. 20, 2017).
[627] Boyle, "Science Program Exciting for Kids."
[628] *Amendment Brief Submission for 1991: The Science Museum of Virginia, 1990*, amendment request, in Science Museum of Virginia Archives, print (accessed Aug. 20, 2017).
[629] Ibid.
[630] Ibid.
[631] Ibid.
[632] Ibid.
[633] Ibid.
[634] D. Rae Carpenter, Jr., *Letter from D. Rae Carpenter, Jr. to Paul H. Knappenberger, Jr., January 28, 1991*, letter, in Science Museum of Virginia Archives, print (accessed Aug. 20, 2017).
[635] D. Rae Carpenter, Jr., *Letter from D. Rae Carpenter, Jr. to Frank W. Nolan, January 31, 1991*, letter, in Science Museum of Virginia Archives, print (accessed Aug. 20, 2017).
[636] Ibid.
[637] *Science Museum of Virginia: Position Specification, Director, 1991*, job advertisement, in Science Museum of Virginia Archives, print (accessed Aug. 20, 2017).
[638] Ibid.
[639] Ibid.
[640] Alyson Lindsey Taylor-White, "The Wonderful World of Walter Witschey: The Science Museum of Virginia—Where Fun is Serious Business," *Virginia Review* 76 (1998): pg. 14-15.
[641] Ibid.
[642] Ibid.
[643] Ibid.
[644] Ibid.; Witschey, Walter R. T., interview by Kasey Sease, personal interview, Farmville, August 17, 2016.
[645] Ibid.
[646] Taylor-White, "The Wonderful World of Walter Witschey," pg. 14-15.
[647] Ibid., pg. 15.
[648] Ibid.
[649] Witschey, Walter R. T., interview by Kasey Sease, personal interview, Farmville, August 17, 2016.
[650] Alyson Lindsey Taylor-White, "The Wonderful World of Walter Witschey: The Science Museum of Virginia—Where Fun is Serious Business," *Virginia Review* 76 (1998): pg. 13.
[651] Ibid.
[652] Ann Holiday, "Science Museum Founder Honored," *Richmond News Leader* (Richmond, VA), August 12, 1989.
[653] Ibid.
[654] Witschey, Walter R. T., interview by Kasey Sease.
[655] Witschey, Walter R. T., interview by Kasey Sease; Thalhimer, Robert B., interview by Kasey Sease, personal interview, Richmond, September 16, 2016.
[656] Taylor-White, "The Wonderful World of Walter Witschey," pg. 15.
[657] Ibid.
[658] Taylor-White, "The Wonderful World of Walter Witschey," 16-17.
[659] Ibid.
[660] Ibid.
[661] Ibid.
[662] Ibid.
[663] Ibid.
[664] Thalhimer, Robert B., interview by Kasey Sease.
[665] "Bobby Thalhimer, Senior Consultant," *themonumentgroup.net*, accessed September 2, 2017, http://themonumentgroup.net/staff_member/bobby-thalhimer/.
[666] Thalhimer, Robert B., interview by Kasey Sease.

[667] Ibid.
[668] Ibid.
[669] Ibid.
[670] Ibid.
[671] Ibid.
[672] Ibid.
[673] A. Ray Griffin, Jr., "Historic Preservation as Development Tool Making its Mark in Danville," *Virginia Review* 76 (1998): pg. 32.
[674] Thalhimer, Robert B., interview by Kasey Sease.
[675] Griffin, Jr., "Historic Preservation as Development Tool Making its Mark in Danville," pg. 32.
[676] Ibid.
[677] Annual Report, 1996-97, in Science Museum of Virginia Archives, print (accessed Sept. 2, 2017), pg. 7.
[678] *Scientific Community Advisory Committee: Science Museum of Virginia Foundation, March 9, 1996*, notes, in Science Museum of Virginia Archives, print (accessed Aug. 20, 2017); Annual Report, 1996-97, pg. 7.
[679] *Capital Campaign Scientific Community Advisory Committee Summary Notes, March 9, 1996*, notes, in Science Museum of Virginia Archives, print (accessed Aug. 20, 2017).
[680] Annual Report, 1997-98, in Science Museum of Virginia Archives, print (accessed Sept. 2, 2017), pg. 7.
[681] *Transportation Equity Act for the 21st Century 1999 Enhancement Grant Request: Intelligent Transportation Systems & Historic Railroad Car Rehabilitation, 1999*, application, in Science Museum of Virginia Archives, print (accessed Aug. 20, 2017), pg. 10.
[682] Ibid.
[683] Ibid.
[684] Thalhimer, Robert B., interview by Kasey Sease; *Capital Campaign Scientific Community Advisory Committee Summary Notes, March 9, 1996.*
[685] Thalhimer, Robert B., interview by Kasey Sease.
[686] Thomas S. Driscoll, "Milestones," in *A Brief History of Broad Street Station and the Science Museum of Virginia, 1992*, manuscript, in Science Museum of Virginia Archives, print (Accessed Jul. 29, 2017).
[687] *Group Visit and Program Guide, 2000-2001*, guide, in Science Museum of Virginia Archives, print (accessed Aug. 20, 2017).
[688] Annual Report, 1994-95, in Science Museum of Virginia Archives, print (accessed Sept. 2, 2017), pg. 4.
[689] Ibid.
[690] Thalhimer, Robert B., interview by Kasey Sease.
[691] Annual Report, 1994-95, pg. 4.
[692] Ibid. pg. 3.
[693] Rick Olson, *Memo from Rick Olson to Walter Witschey, Jack Parry, and John Hammond, January 26, 1999*, memo, in Science Museum of Virginia Archives, print (accessed Aug. 21, 2017); Walter R.T. Witschey, *Letter from Walter R.T. Witschey to Robert O. Cassada, March 31, 1994*, letter, IN Science Museum of Virginia Archives, print (accessed Aug. 21, 2017).
[694] Ibid.
[695] Ibid.
[696] Annual Report, 1994-95, pg. 3.
[697] Ibid., pg. 8.
[698] Ibid.
[699] Ibid.
[700] Ibid.
[701] Ibid.
[702] Ibid.
[703] Ibid.
[704] *Danville Science Center Wins TEA-21 Grant Award of $530,000 for Expansion, June 14, 2000*, draft of press release, in Science Museum of Virginia Archives, print (accessed Aug. 21, 2017).
[705] Ibid.
[706] Ibid.
[707] Ibid.
[708] Driscoll, "Milestones."
[709] Taylor-White, "The Wonderful World of Walter Witschey," pg. 18.
[710] Ibid.

[711] Ibid.
[712] Ibid.
[713] Thalhimer, Robert B., interview by Kasey Sease.
[714] Carol Hazard, "Rice House Along James River Sells for $2 Million to Private Owners," *richmond.com*, March 1, 2016, accessed September 2, 2017, http://www.richmond.com/business/local/rice-house-along-james-river-sells-for-million-to-private/article_0650464b-8bc4-5c4d-ac94-7c5b98f7717a.html.
[715] Ibid.
[716] Ibid.
[717] Thalhimer, Robert B., interview by Kasey Sease.
[718] Ibid.
[719] Ibid.
[720] Holly Prestidge, "New Life for the Rice House," *Richmond.com*, May 7, 2011, accessed September 2, 2017, http://www.richmond.com/entertainment/new-life-for-the-rice-house/article_422cdfbc-a9e0-503a-adf1-2bcda9a3eb02.html.
[721] Ibid.
[722] Thalhimer, Robert B., interview by Kasey Sease.
[723] Ibid.
[724] Ibid.; Hazard, "Rice House Along James River Sells for $2 Million to Private Owners."
[725] *Minutes of the Science Education Committee, January 22, 1998,* notes, in Science Museum of Virginia Archives, print (accessed Aug. 20, 2017).
[726] Ibid.
[727] Ibid.
[728] Ibid.
[729] *Minutes of the Science Education Committee, October 22, 1998*, notes, in Science Museum of Virginia Archives, print (accessed Aug. 20, 2017).
[730] *Minutes of the Science Education Committee, January 21, 1999*, notes, in Science Museum of Virginia Archives, print (accessed Aug. 20, 2017).
[731] Walter R.T. Witschey, *Letter from Walter R.T. Witschey to Honorable George Allen, Honorable Beverly H. Sgro, and the Science Museum Family, October 31, 1996*, letter, in Science Museum of Virginia Archives, print (accessed Aug. 20, 2017).
[732] Ibid.
[733] Ibid.
[734] Bonnie Pitman, *Letter from Bonnie Pitman to Walter R.T. Witschey, October 24, 1996*, letter, in Science Museum of Virginia Archives, print (accessed Aug. 20, 2017).
[735] *Narrative Report and Recommendation: Science Museum of Virginia*, report, in Science Museum of Virginia Archives, print (accessed Aug. 21, 2017).
[736] Ibid.
[737] Ibid.
[738] Annual Report, 1996-1997, in Science Museum of Virginia Archives, print (accessed Sept. 2, 2017), pg. 5.
[739] Ibid.
[740] *Capital Campaign Scientific Community Advisory Committee Summary Notes, March 9, 1996*, notes, in Science Museum of Virginia Archives, print (accessed Aug. 20, 2017).
[741] Ibid.
[742] Ibid.
[743] Driscoll, "Milestones."
[744] Annual Report, 1996-1997, pg. 9; *Capital Campaign Scientific Community Advisory Committee Summary Notes, March 9, 1996.*
[745] Annual Report, 1997-1998, pg. 9.
[746] Ibid.
[747] Ibid.
[748] Ibid.
[749] Ibid.
[750] Ibid.
[751] Annual Report, 1996-97, pg. 5.
[752] Ibid.
[753] Ibid.

[754] Ibid.
[755] Ibid.
[756] *Minutes of the Science Education Committee, January 22, 1998,* notes, in Science Museum of Virginia Archives, print (accessed Aug. 20, 2017).
[757] Ibid.
[758] Ibid.
[759] *Minutes of the Science Education Committee, October 22, 1998*, notes, in Science Museum of Virginia Archives, print (accessed Aug. 20, 2017).
[760] Annual Report, 1997-98, pg. 7.
[761] Ibid.
[762] Ibid.
[763] Ibid., pg. 9.
[764] Ibid.
[765] Driscoll, "Milestones."
[766] Thalhimer, Robert B., interview by Kasey Sease.
[767] Ibid.
[768] Ibid.
[769]*Transportation Equity Act for the 21st Century 1999 Enhancement Grant Request: Intelligent Transportation Systems & Historic Railroad Car Rehabilitation, 1999*, application, in Science Museum of Virginia Archives, print (accessed Aug. 20, 2017); Driscoll, "Milestones."
[770] Annual Report, 1997-98, pg. 7.
[771] Ibid.
[772] *Group Visit and Program Guide, 2000-2001*, guide, in Science Museum of Virginia Archives, print (accessed Aug. 20, 2017), pg. 7.
[773] Ibid.
[774] *Science Museum of Virginia-Outreach, 2000*, report, in Science Museum of Virginia Archives, print (accessed Aug. 20, 2017).
[775] Ibid.
[776] *Transportation Equity Act for the 21st Century 1999 Enhancement Grant Request: Elisabeth S. Bocock Trolley Loop, 1999*, application, in Science Museum of Virginia Archives, print (accessed Aug. 20, 2017).
[777] Ibid.
[778] Ibid.
[779] Driscoll, "Milestones"; Annual Report, 1997-98, pg. 8.
[780] Ibid.
[781] Ibid.
[782] *Center for Science Education Department Reports, April 21, 1999*, report, in Science Museum of Virginia Archives, print (accessed Aug. 20, 2017).
[783] *Danville Science Center Board of Director's Meeting First Quarter, July-September 2000*, notes, in Science Museum of Virginia Archives, print (accessed Aug. 21, 2017).
[784] Ibid.
[785] Annual Report, 1998-99, in Science Museum of Virginia Archives, print (accessed Sept. 2, 2017), pg. 2.
[786] *Group Visit and Program Guide, 2000-2001*, pg. 7.
[787] *Center for Science Education: Selected Statistics, April-December, 1999*, report, in Science Museum of Virginia Archives, print (accessed Aug. 20, 2017).
[788] Ibid.
[789] Ibid.
[790] Ibid.
[791] *Minutes: Science Education Committee, January 27, 2000*, notes, in Science Museum of Virginia Archives, print (accessed Aug. 21, 2017).
[792] Ibid.
[793] Ibid.
[794] Ibid.
[795] Ibid.
[796] Ibid.
[797] Driscoll, "Milestones"; *Discovery Life! Science Museum of Virginia*, pamphlet, in Science Museum of Virginia Archives, print (accessed Aug. 21, 2017).

[798] Ibid.
[799] Ibid.
[800] Driscoll, "Milestones."
[801] *Education Committee Meeting Information Memo: Director's Progress Report, June 15, 2000,* report, in Science Museum of Virginia Archives, print (accessed Aug. 21, 2017).
[802] Ibid.
[803] Annual Report 1999-00, pg. 15.
[804] *Group Visit and Program Guide, 2000-2001*, pg. 10.
[805] *Adult Classes and Programs at the Science Museum of Virginia, Fall 2000*, pamphlet, in Science Museum of Virginia Archives, print (accessed Aug. 21, 2017).
[806] Ibid.
[807] Ibid.
[808] *Group Visit and Program Guide, 2000-2001*, pg. 4.
[809] Ibid.
[810] Annual Report, 2000-01, in Science Museum of Virginia Archives, print (accessed Sept. 3, 2017), pg. 1.
[811] *Discover Life! Science Museum of Virginia*, pamphlet, in Science Museum of Virginia Archives, print (accessed Aug. 21, 2017).
[812] *Group Visit and Program Guide, 2000-2001*, pg. 3.
[813] Ibid.
[814] Ibid.
[815] Ibid.
[816] Ibid.
[817] Annual Report, 2001-2002, in Science Museum of Virginia Archives, print (accessed Sept. 3, 2017), pg. 1.
[818] Ibid.
[819] Ibid.
[820] Annual Report, 2000-01, pg. 21.
[821] Ibid.
[822] Annual Report, 2001-2002, pg. 1.
[823] Ibid.
[824] Ibid., pg. 27.
[825] Ibid. pg. 14.
[826] Ibid.
[827] Ibid. pg. 1.
[828] Ibid.
[829] Ibid.
[830] Ibid.
[831] Ibid., pg. 3-4,
[832] Ibid., pg. 2.
[833] Ibid., pg. 25.
[834] "The Grand Kugel," *atlasobscura.com*, accessed September 3, 2017, http://www.atlasobscura.com/places/the-grand-kugel.
[835] Ibid.
[836] Annual Report, 2002-03, in Science Museum of Virginia Archives, print (accessed Sept. 3, 2017), pg. 2.
[837] Ibid.
[838] "The Grand Kugel."
[839] Ibid.
[840] *Blueprint for the Broad Street Station Campus*, report, in Science Museum of Virginia Archives, print (accessed Aug. 21, 2017).
[841] Ibid.
[842] Witschey, Walter R. T., interview by Kasey Sease.
[843] *Blueprint for the Broad Street Station Campus*, pg. 2.
[844] Ibid., pg. 2.
[845] Ibid.
[846] Ibid. pg. 36.
[847] Ibid.
[848] Ibid.

[849] Thalhimer, Robert B., interview by Kasey Sease.
[850] Annual Report, 2001-2002, pg. 26.
[851] Ibid.
[852] Christy Goodman, "State Funds Promising for Science Center," *washingtonpost.com*, February 18, 2007, accessed September 3, 2017, http://www.washingtonpost.com/wp-dyn/content/article/2007/02/16/AR2007021602401.html.
[853] Thalhimer, Robert B., interview by Kasey Sease; Richard Foster, "Witschey's Legacy as a Museum Director," *styleweekly.com*, March 14, 2007, accessed September 3, 2017, https://www.styleweekly.com/richmond/witscheys-legacy-as-a-museum-director/Content?oid=1380575.
[854] Annual Report, 2003-04, in Science Museum of Virginia Archives, print (accessed September 3, 2017), pg. 4.
[855] Ibid.
[856] Ibid.
[857] Ibid., pg. 4-5.
[858] Kirk, Suzanne, interview by Kasey Sease, personal interview, Williamsburg, September 2, 2016; Chalkley, Janet G., interview by Kasey Sease, personal interview, Williamsburg, September 2, 2016.
[859] Ibid.
[860] Freda Mindlin, *Opportunity Resources Inc. Capabilities in Executive Search for Not-For-Profit Cultural/ Educational Institutions, Prepared doe Science Museum of Virginia, December 8, 2006*, report, in Science Museum of Virginia Archives, print (accessed Aug. 21, 2017).
[861] "Curriculum Vitae: Walter R. T. Witschey," *longwood.edu*, November 9, 2016, accessed September 3, 2017, http://www.longwood.edu/staff/WitscheyWR/assets/wrtw-vita-nov-2016.pdf.
[862] Freda Mindlin, *Opportunity Resources Inc. Capabilities in Executive Search for Not-For-Profit Cultural/ Educational Institutions, Prepared doe Science Museum of Virginia, December 8, 2006*, report, in Science Museum of Virginia Archives, print (accessed Aug. 21, 2017).
[863] Ibid.
[864] Ibid.
[865] Ibid.
[866] Ibid.
[867] Ibid.
[868] Ibid.
[869] Ibid.
[870] Ibid.
[871] Ibid.
[872] *SMV Director Selection Committee, December 8, 2006*, notes, in Science Museum of Virginia Archives, print (accessed Aug. 22, 2017).
[873] *Search Committee Report to the Science Museum of Virginia's Board of Trustees, November 5, 2007*, report, in Science Museum of Virginia Archives, print (accessed Aug. 22, 2017).
[874] Ibid.
[875] *Science Museum of Virginia Foundation Board of Directors: Director Search Discussion, January 24, 2007*, notes, in Science Museum of Virginia Archives, print, (accessed Aug. 22, 2017); Thalhimer, Robert B., interview by Kasey Sease, personal interview, Richmond, September 16, 2016; *Final Report to Science Museum of Virginia Foundation Interviews of Museum Friends & Stakeholders, March 4, 2007*, report, in Science Museum of Virginia Archives, print (accessed Aug. 22, 2017).
[876] Ibid.
[877] Ibid.
[878] *Science Museum of Virginia Foundation Board of Directors: Director Search Discussion, January 24, 2007.*
[879] Ibid.
[880] Ibid.
[881] Ibid.
[882] Ibid.
[883] Thalhimer, Robert B., interview by Kasey Sease.
[884] Ibid.
[885] Ibid.
[886] "Howell John Parry, Jr.," resume, in Science Museum of Virginia Archives, print (accessed Sept. 3, 2017).
[887] Ibid.
[888] Ibid.

[889] Ibid.
[890] Janet Caggiano, *"Science Museum Cuts Four Positions," June 30, 2007*, newspaper clipping, in Science Museum of Virginia Archives, print (accessed Aug. 21, 2017).
[891] Ibid.
[892] Annual Report 2007-08, in Science Museum of Virginia Archives, print (accessed Sept. 3, 2017), pg. 2.
[893] Ibid.
[894] Ibid., pg. 15.
[895] Ibid. pg. 4.
[896] Ibid.
[897] Ibid.
[898] Ibid.
[899] Janet Caggiano, "Norfolk Director Tapped to Lead Science Museum of Va.," *Richmond Times-Dispatch* (Richmond, VA), November 6, 2007.
[900] Ibid.
[901] Debbie Messina, "He Changed Nauticus, and It Changed Him," newspaper clipping, in Science Museum of Virginia Archives, print (accessed Aug. 29, 2017).
[902] A.J. Hostetler, "Science Museum Chief Found Right Formula in Norfolk," newspaper clipping, in Science Museum of Virginia Archives, print (accessed Aug. 29, 2017).
[903] *Richard Conti*, evaluation, in Science Museum of Virginia Archives, print (accessed Aug. 29, 2017).
[904] Ibid.
[905] Peter Bacqué, "Rich Conti: Marketing Agent for Science," *Richmond Times-Dispatch* (Richmond, VA), September 9, 2013.
[906] Annual Report 2007-08, pg. 10.
[907] Bacqué, "Rich Conti: Marketing Agent for Science."
[908] Annual Report 2007-08, pg. 15.
[909] Ibid.
[910] Bacqué, "Rich Conti: Marketing Agent for Science."
[911] Ibid.
[912] Annual Report, 2009-10, in Science Museum of Virginia Archives, print (accessed Sept. 3, 2017), pg. 3.
[913] Ibid., pg. 3.
[914] Katherine Calos, "Science Museum Reaches Out to Inspire the Young," newspaper clipping, in Science Museum of Virginia Archives, print (accessed Aug. 29, 2017).
[915] Ibid.
[916] Ibid.
[917] Ibid.
[918] Ibid.
[919] Katherine Calos, "Science Museum Reaches Out to Inspire the Young," newspaper clipping, in Science Museum of Virginia Archives, print (accessed Aug. 29, 2017).
[920] Richard Conti, "We're Not Your Dad's Science Museum!" newspaper clipping, in Science Museum of Virginia Archives, print (accessed Aug. 29, 2017); Calos, "Science Museum Reaches Out to Inspire the Young."
[921] Bacqué, "Rich Conti: Marketing Agent for Science."
[922] Ibid.
[923] Conti, Richard, interview by Kasey Sease, personal interview, Richmond, November 1, 2016.
[924] Calos, "Science Museum Reaches Out to Inspire the Young."
[925] Ibid.
[926] 2011 Annual Report, in Science Museum of Virginia Archives, print (accessed Sept. 3, 2017), pg. 2.
[927] Ibid.
[928] Ibid., pg. 3.
[929] Ibid.
[930] Ibid., pg. 5.
[931] Ibid.
[932] Ibid., pg. 19.
[933] Ibid.
[934] Ibid. pg. 7.
[935] Ibid.
[936] Ibid., pg. 8.

[937] Ibid.
[938] Ibid., pg. 10.
[939] Ibid.
[940] Ibid.
[941] Zachery Reid, "Science Museum Receives its Largest Corporate Gift," *Richmond Times-Dispatch* (Richmond, VA), December 2, 2011.
[942] Ibid.
[943] Ibid.
[944] Ibid.
[945] 2012 Annual Report, in Science Museum of Virginia Archives, print (accessed Sept. 3, 2017), pg. 4.
[946] Ibid.
[947] Ibid., pg. 5.
[948] Ibid.
[949] Ibid.
[950] Ibid.
[951] Annual Report, 2009-10, pg. 3.
[952] Bacqué, "Rich Conti: Marketing Agent for Science."
[953] Katherine Calos, "Science Museum of Va. Gets a Boost! with New Exhibit," *Richmond.com*, June 20, 2013, accessed September 3, 2017, http://www.richmond.com/entertainment/weekend/science-museum-of-va-gets-a-boost-with-new-exhibit/article_67a979d9-7ede-51db-8a67-58a5d742d544.html.
[954] Ibid.
[955] Calos, "Science Museum of Va. Gets a Boost! with New Exhibit"; 2013 Annual Report, in Science Museum of Virginia Archives, print (accessed September 3, 2017).
[956] 2014 Annual Report, in Science Museum of Virginia Archives, print (accessed Sept. 3, 2017), pg. 10.
[957] Ibid., pg. 11.
[958] Ibid.
[959] 2013 Annual Report, in Science Museum of Virginia Archives, print (accessed Sept. 3, 2017), pg. 7.
[960] Ibid.
[961] Calos, "Science Museum of Va. Gets a Boost! with New Exhibit."
[962] Katherine Calos, "SR-71 Spy Plane Takes to the Air at Aviation Museum," *richmond.com*, June 29, 2015, accessed September 3, 2017, http://www.richmond.com/news/sr--spy-plane-takes-to-the-air-at-aviation/article_93a7a87a-bdc8-5687-857c-de4abec6f1ef.html.
[963] Ibid.
[964] 2015 Annual Report, in Science Museum of Virginia Archives, print (accessed Sept. 3, 2017), pg. 5.
[965] John Ramsey, "Spy Plane Disassembly Begins at Virginia Aviation Museum Ahead of Move to Science Museum," *Richmond.com*, January 12, 2016, accessed September 3, 2017,
[966] Ibid.
[967] Peter Bacqué, "Science Museum Receives $4 million gift," *Richmond.com*, December 21, 2013, accessed September 3, 2017, http://www.richmond.com/business/science-museum-receives-million-gift/article_e31781e1-fb95-569a-b577-a2f0161670ed.html.
[968] Ibid.
[969] Ibid.
[970] Ibid.
[971] Ibid.
[972] Ibid.
[973] 2015 Annual Report, pg. 12.
[974] Ibid.
[975] Ibid., pg. 13.
[976] Ibid.
[977] Ibid., pg. 15.
[978] Ibid.
[979] 2016 Annual Report, in Science Museum of Virginia Archives, print (accessed Sept. 3, 2017), pg. 7.
[980] Ibid.
[981] Ibid.
[982] Ibid.

[983] Carol Hazard, "Rice House along James River Sells for $2 Million to Private Owners," *Richmond.com*, March 1, 2016, accessed September 3, 2017, http://www.richmond.com/business/local/rice-house-along-james-river-sells-for-million-to-private/article_0650464b-8bc4-5c4d-ac94-7c5b98f7717a.html.
[984] 2016 Annual Report, pg. 2; Katherine Calos, "'Speed' Brings New Perspective to Science Museum of Virginia," *Richmond.com*, May 18, 2016, accessed September 3, 2017, http://www.richmond.com/entertainment/museums/speed-brings-new-perspective-to-science-museum-of-virginia/article_cba15b1d-9d00-550d-8373-1df14b83b3ce.html.
[985] Ibid.
[986] Ibid.
[987] Robert Zullo, "Virginia Aviation Museum at Airport Closing this Month," *Richmond.com*, June 8, 2016, accessed September 3, 2017, http://www.richmond.com/news/virginia-aviation-museum-at-airport-closing-this-month/article_2eecad2c-8541-5525-bcbe-1bad77e40e15.html.
[988] Ibid.
[989] Robert Zullo, "Aviation Museum Closure is a Bitter Pill for Aircraft Enthusiasts," *richmond.com*, July 2, 2016, accessed September 3, 2017, http://www.richmond.com/news/virginia/aviation-museum-closure-is-a-bitter-pill-for-aircraft-enthusiasts/article_eeb1bcb0-9160-5343-a301-295d80fe091e.html.
[990] Zullo, "Virginia Aviation Museum at Airport Closing this Month."
[991] Zullo, "Aviation Museum Closure is a Bitter Pill for Aircraft Enthusiasts."
[992] Ibid.
[993] Ibid.
[994] Antoinette Essa, "'Da Vinci Alive—The Experience' Opens Saturday at Science Museum of Virignia," *wtvr.com*, May 12, 2017, accessed September 3, 2017, http://wtvr.com/2017/05/12/da-vinci-alive-the-experience/.
[995] Colleen Curran, "New 'Da Vinci' Exhibit Debuts in New Building at Science Museum of Virginia," *richmond.com*, May 13, 2017, accessed September 3, 2017, http://www.richmond.com/entertainment/new-da-vinci-exhibit-debuts-in-new-building-at-science/article_a015bd68-7ffc-5714-8366-645aa1814426.html.
[996] Ibid.
[997] "The Forge: Science Museum of Virginia," *roto.com*, accessed September 3, 2017, https://roto.com/science-centers/the-forge.
[998] Ibid.
[999] Ibid.