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"Keeping the Boys Busy:" The Revival of Incremental, On-Site Design by National Park Service Designers During the Great Depression

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"Keeping the Boys Busy:" The Revival of Incremental, On-Site Design by National Park Service Designers During the Great Depression

Abstract: During the Depression of the 1930s, landscape architects, architects, and engineers were employed by the National Park Service (NPS) to design projects and provide daily on-site supervision of park improvements constructed by Civilian Conservation Corps (CCC) workers. The need to immediately begin and to continuously "keep the boys busy"[1] necessitated that designers design landscape improvements while construction was in progress. The structure of the CCC State Park Program made the most of this situation by enabling designers to develop their projects in response to what they observed on site. Two of the most memorable CCC built structures - California's Mount Tamalpais Mountain Theater and Denver's Red Rocks Theater - provided different models for how NPS designers worked both on paper and in the field to make incremental design decisions. Facilitated by this incremental decision making process, the NPS designers produced significant works of Landscape Architecture that were simultaneously influenced by the scheme's evolving form and the emerging native features of the landscape.

Today, every detail of new construction in most American public landscapes, from the location of new vegetation to the joints in pavement and the size of bolts, is drawn and specified on paper or computer screen before any ground is broken. Building contractors then construct the project from the designers' detailed drawings with the designers attending weekly - or less frequent - job meetings where they attempt to insure that their original intentions are constructed.[2] This separation of designing and building is a recent phenomenon. Throughout history, designed landscapes emerged from an incremental and interactive process of designing, constructing, observing and redesigning. As construction progressed, both the partially completed improvements and the intricacies of a site - such as the unexpected exposure of bedrock or a newly revealed vista - presented opportunities for new design insight and subsequent modifications. Variations of this process underlie our most influential landscape designs, from the great gardens of Italy, France and England to American icons such as Central Park and Dumbarton Oaks.[3]

While pursuing a study of American outdoor theaters, we discovered that park facilities built by the Civilian Conservation Corps (CCC) in the 1930s were also created through a cycle of design, construction, observation and redesign. These public works were developed under the extreme limitations of the depression and yet produced many of the most beautiful and site responsive outdoor theaters ever built in the American landscape. Why was this the case? Could the process of incrementally designing during the construction of these landmark projects have been an important part of their final form? And, if so, were there aspects of this incremental process that could be utilized today to improve public landscapes?

The CCC was one of the two major job creation programs enacted in response to the Great Depression of the 1930s. While the WPA (Works Progress Administration) employed skilled adults in many professions, the CCC employed mostly unskilled, young single men to do all forms of conservation. Franklin Delano Roosevelt's administration created the CCC when 25% of Americans were unemployed and 50 million acres of once fertile land had been eroded beyond cultivation. FDR intended that the CCC immediately put the maximum number of people to work conserving and restoring the natural environment, including the nation's parks (Rose 1994, McEntee 1940).

To accomplish this enormous task quickly, Roosevelt enlisted half of the federal departments. The Labor Department enrolled the men and the Defense Department housed the enrollees in 150–200 person camps near the work projects. The Departments of Agriculture and Interior, which included the National Park Service, chose the camp locations and projects, developed the plans and supervised the work. Both the work projects and the enrollees were approved and administered in 6-month units, or periods. Enrollees signed up for one six month period at a time and, if allowed an additional enrollment period, were often assigned to a different camp. Ten percent of the enrollees were middle-aged WWI veterans with skills as masons or carpenters, while ninety percent were unmarried "boys" between 17 and 23 with no particular skills. They were paid $30 a month, $25 of which went home to support their families. Local carpenters, masons and builders, known as Local Experienced Men (LEMS), trained enrollees at the work site with guidance from National Park Service and Forest Service supervisory personnel. From March of 1933 through June of 1942, the CCC employed 3,612,000 men as workers and as many as 28,000 supervisors at any given time.[4] Together, they planted 2 billion trees, constructed 5

million erosion control dams, laid 122,000 miles of roads, and built 45,000 bridges, 11,000 toilets and 4334 sewer systems (Wirth 1980).

The CCC program effectively presented the Interior and Agriculture Departments with thousands of housed, fed laborers ready to fulfill their plans and dreams. National Park Service (NPS) designers were particularly well positioned to take advantage of this opportunity. Through the 1920s, landscape architect Thomas Vint had built the NPS's Office of Planning and Design into an administratively powerful provider of master plans and detailed designs for national parks across the country (Can 1998, McClelland 1998). This experience prepared designers to work the bureaucracy and use it to implement their design visions. When FDR created the CCC, Vint's office, and the generation of designers it trained and influenced, were poised and ready to build an organization to plan and design the nation's parks. With a full twenty percent of the CCC resources available to parks, this work program built the structures that now symbolize parks to most Americans, including 1,477 cabins, 16,897 acres of campgrounds, 7,432 miles of park roads. (Wirth, 1980)

Led by landscape architect Conrad Wirth, a group of designers built a separate structure within the NPS to oversee CCC work in state and local parks, all which were designated as SP, or state park, projects. To supervise the massive number of simultaneous projects, Wirth devised a decentralized structure that allowed many design decisions to be made quickly as the recruits worked. He divided the country into districts, each to oversee the projects of approximately 50 camps (Wirth 1980). Aided by high levels of unemployment among designers, the state park program recruited hundreds of well trained landscape architects, architects and engineers to serve in three different capacities: 1) staff designers in district (later regional) offices who selected

work projects, developed master plans, designed projects, and oversaw the work projects; 2) senior design professionals who were hired as consultants to supplement the design work of the district offices and to travel site to site as "project inspectors," and 3) landscape and engineering foremen who worked daily with the recruits at the project sites (National Archives, Group 79).

Project Inspectors traveled from park to park, visiting each work site once or twice a month for a day or two. Detailed monthly reports filed by the Landscape Inspectors indicated that they were typically in the field more than 60% of their time and spent the balance of their days providing design services to the district office.[5] (National Archives RG79) The reports identified design projects and conditions that needed further study and described the progress of construction, often with photographs. Additionally, each park project was assigned a Landscape Foreman, an Engineering Foreman and a Forestry Foreman to direct the recruits. The Landscape Inspectors, who were experienced and often well-known designers, worked directly with the more junior CCC Landscape Foremen who supervised the actual construction and made day-to-day design decisions at the site. The job description for a Landscape Foreman required that: "The candidate must have graduated with a professional degree in architecture or landscape architecture from a school of recognized standing" although "two years of practical experience may be substituted for two years of college work" and that duties included "assist(ing) in the planning of the work by attendance at the staff meetings of the Landscape Architect in charge and by the preparation of such grading and planting plans as may be necessary for the proper execution of the work. Drafting room activities may be undertaken when the weather prohibits out-of-door work." (National Archives RG79, Records of Conrad Wirth, Job Specification No. 22.)

In the early years of the park construction program, many National Parks already had existing master plans and design proposals available for potential projects, but state and local parks typically did not. The imperative to begin work immediately and keep people busy, meant that construction on State Park Projects often began with no more than a conceptual diagram of a design generated by a NPS staff designer, inspector or foreman. As this program matured, local agencies were encouraged to rely less on NPS employees and retain their own design staff and consultants to develop master plans and schematic designs.

Although the lead time for developing schematic proposals increased over the nine years of the state park program, the need to repeatedly apply for a new 6-month funding period continued. This situation discouraged public agencies from completing construction drawings before the first stage of construction began because official approval of a new funding period was generally not forthcoming until the final months of the previous six-month period. (National Archives RG79, Wirth 1980, Blake Papers, Morse Papers)

The structure of the State Park construction program therefore led to a process of incremental design decisions somewhat as follows: a district inspector or a local designer would create a conceptual proposal for the entire project or perhaps just for the first element such as a road, a wall, a stage or the rough grading of an auditorium. The CCC foreman would direct enrollees to begin basic work, including the collection of local stone, timber and other at-hand materials for use in the projects. As materials were collected and construction progressed, the foreman would adjust the original schematic proposal through field direction or by drafting construction sketches at the campsite or nearby office. The district inspector would visit the site once or twice a month

to review the progress with the foremen and workers, give them direction on design issues and then report any concerns about design or quality of work to designers in the district office.

On complex projects or on projects identified as having design problems, the inspector or a designer in the district office might develop a detailed design solution to be implemented by the Foreman. After 1936, when much of the design work was shifted to local agencies, a local designer, rather than the park service employee, would usually prepare additional construction drawings as needed by the foremen and submit them for NPS approval. In either situation, this incremental process allowed the designer to develop the scheme during construction. By the time a project approached completion, detailed construction drawings would have been created piece-meal or have become moot because redesign had been carried out in the field (National Archives RG79, Blake Papers, Morse Papers).

As McClelland (1998), Carr (1998) and others have documented, the NPS design leadership was effective at codifying, disseminating and realizing their rustic design vision for the national parks. In the State Parks, the goal for structures to harmonize with nature was also important, but, since the state parks were not located in sites with national landmark status, park service designers supported a broader array of recreational facilities there than in national parks (Good,1938). This more flexible program of facilities also translated into greater design latitude as long as the structure did not dominate the landscape.

Although the NPS designers did not wish for the district and field designers to copy existing park service structures, there was concern that these new NPS employees become familiar with park structures designed in harmony with their sites (Good, 1938. McClelland, 1998). To aid the

Inspectors, Landscape Foremen and designers in district offices, Wirth's office oversaw the production of a series of portfolios that showed examples of appropriate park construction previously built in parks. The first two, Portfolio of Comfort Stations and Privies and Portfolio of Park Structures (1934), were compiled by Dorothy Waugh 8 from early CCC built projects as well as older state and national park projects. She presented the examples in simple dimensioned drawings that were assembled in a loose-leaf binder so that new examples could continually be added. (National Archives, RG79) In 1935, park service architect Albert Good published a more sophisticated and larger bound volume, Park Structures and Facilities that was illustrated with photographs and beautiful ink drawings depicting each structure in dimensioned plans and sections. The more than 2000 copies were quickly in active use and, in 1938, a more extensive 3 volume set, Park and Recreation Structures was published.

Outdoor Theaters – A Classic Typology Modified to the Site by the CCC Construction

Although the broader array of recreational facilities in state parks translated into more design flexibility than on National Park projects (McClelland 1998), much of the construction work in the State Park program went to the building of relatively standardized structures- roads, walls, fire towers, fireplaces and picnic facilities. On the other hand, many of the senior designers retained by the NPS had cut their design teeth in the 1920s working on grand estates and Beaux Arts influenced civic spaces. (Cutler, 1985) Outdoor theaters had been a part of this 1920s work and, although Good's included theater examples, most were large fire circles with simple wood seats. The inclusion of theaters in the local and state park projects presented these designers with the opportunity to draw upon their previous experience and exercise their abilities on larger, unique structures.

Outdoor theaters have a clear spatial typology – a performing space that must be seen and a gathering space from where one must see and hear. Calling upon both this clear typological diagram and the NPS directive to harmonize with the local landscape, the CCC theaters became modified forms of traditional theaters. As a result, they varied greatly in their configuration and materiality to reflect their locale and the unique character of their particular site. In fact, these "foreign" symmetrical forms often revealed more about the locale and unique character of a landscape than structures derived from vernacular sources because the modifications of their forms so vividly accentuated the particular features of a site.

Although there apparently is no listing of theaters constructed by the CCC, we have located sixty—one theaters constructed through the various work relief programs of the 1930s. At least ten of these were constructed by CCC labor and there are probably numerous more. Examples of CCC theaters built early in the program include Arizona's Pagago Park Theater (fig. 1) Berkeley's John Hinkle Park (fig. 2) and Boulder's Flagstaff (Sunrise) Theater (fig. 3). The existing Inspector's reports indicate that there were limited design drawings produced for these theaters (National Archives RG79, DeBoer papers). Although we have located no drawings of Hinkle (Berkeley Parks) or Papago Park built in 1933, the schematic plan completed by S.R. DeBoer for Boulder's Sunrise Theater (fig. 4) is probably representative of the nature of these early design proposals. DeBoer[6], a landscape architect best known for his contributions to Denver's "City Beautiful" improvements, worked as an inspector for NPS in 1933 and 1934. While designing a road, paths and picnic facilities for Boulder's Flagstaff Mountain Park, he determined that the end of the road atop Flagstaff Mountain needed a destination feature. (DeBoer papers, RG 79) The result was a classically symmetrical amphitheater proposal that was eventually rendered in rough stonework built by the CCC enrollees (Fig. 5).

DeBoer's plan, later redrawn for Good's book, delineated a semicircular plan at 1" = 20', but included no dimensions, no section, no detailed topographic changes or an indication of seat wall heights. Although an illustrative section was prepared after construction by DeBoer for Good's book, our field dimensions indicate that both DeBoer's plan and the Good drawings differ substantially from what was built: the free-standing seats became retaining walls, the back rows were built at a steeper rake than the front and a portion of the circular seats were eliminated, presumably to avoid more retaining walls and earthmoving. The March 16, 1934 Boulder Daily Camera, as well as DeBoer's inspector's reports, indicate that these design decisions were determined in the field by DeBoer and the on-site Superintendent, a retired military officer.

Similarly, the 6000 seat Mt. Tamalpais Mountain Theater (fig. 6) in California was built by the CCC from a conceptual sketch by noted landscape architect Emerson Knight[7] who became a NPS inspector in 1934. Knight, who had generated the sketch in 1924, with the exception of a planting plan, developed no additional design drawings for the Mountain Theater. The final plan configuration, however, indicates a rather significant departure from Knight's original geometry.[8] Knight directed these design refinements on the site, first in 1929 with volunteers and then, from 1934 until 1940, with the CCC crews. (Knight papers, Blake papers, RG 79)

In contrast, Denver's Red Rocks Theater (Fig. 7) was constructed from more than 125 sheets of schematic studies and detailed construction drawings. But, unlike the conventional method of completing drawings before beginning construction, the Red Rock drawings were produced piecemeal from December, 1935 until early 1941 while the theater's construction progressed (Morse Papers). Based on a 1935 schematic design that was utilized to obtain funding approval, the construction of this 10,000 seat facility began in April, 1936 (Cranmer Papers). Designed by

Denver architect Burnham Hoyt, the scheme proposed a simple sloped plane of seats between two grand rock formations. Detailed drawings of the theater were produced incrementally by the architect Stanley Morse. Morse, on Denver's payroll while working under Hoyt's direction, visited the site each morning and then returned to his city office to produce a constant flow of study sketches, details and construction drawings for use on the site by the NPS Project Superintendent and foremen.[7] In Morse's words "The layout plan for the entire theater was not actually completed until the construction was completed. A work sheet at scale 20'=1" contained most basic information and designs developed by me for the project, and was finally traced when the project was nearing completion" (Morse Papers).

Mount Tamalpais and Red Rocks were two of the great accomplishments of the CCC program and the final form of each reflects the influence of the incremental CCC process. Fortunately the NPS inspector's reports and the papers of the designers provide a substantial written and photographic record of how these landmark landscape designs developed. Their detailed construction stories are best understood in the annotated photographic timeline.

Mt. Tamalpias Sidney B. Cushing Mountain Theater

Today, the Sidney B. Cushing Amphitheater, known as the Mountain Theater, offers spectacular views of the San Francisco bay and skyline to an audience of nearly 5000 during each annual play performance and also provides an inspirational resting place for thousands of hikers throughout the year. The theater's story began in 1913 when 1200 people hiked to the natural bowl-shaped site on the south slope of Mt. Tamalpias eleven miles north of San Francisco. In 1925, the Mountain Play Association, formed in 1914 to produce an annual play, commissioned

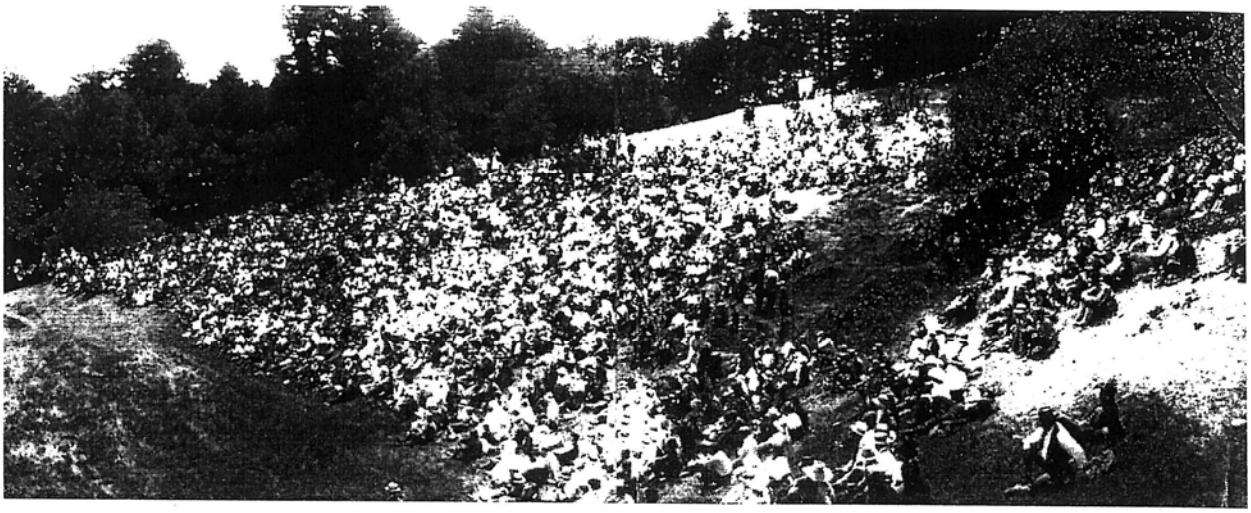
landscape architect Emerson Knight to design an outdoor theater for the site. Inspired by the Greek theater at Segeste, Sicily, Knight proposed a classical theater integrated into the topography and constructed of massive, uncut local stone (Fig. 10). Under Knight's guidance, the Play Association began construction in 1929 with volunteer labor. They partially filled Rattle Snake Gulch, one of two ravines that cut across the stage, and placed the first row of stones along the natural sweep of the topography. (Blake Papers, Mountain Play Association papers) This on-site placement of the first row of stones departed from the classical stage configuration shown in Knight's plan and set the direction of the eventual form of the theater.

In 1934, with the influence of local leaders and Knight, now a CCC inspector, CCC leaders assigned Company #1920 to construct the theater. Over the next seven years, the exact dimensions and final geometry of the theater evolved incrementally once the enrollees began setting the second row of stones to follow the row constructed in 1929. Knight visited the site several times a month working closely with Landscape Foreman Paul Holloway in the evolution of the theater's layout (National Archives RG79, Blake papers, Knight papers) With Knight's oversight and the daily direction of Holloway, the lower 20 rows of seating were constructed between 1934 and 1938. Between 1938 and 40, Knight, who was by then working for California State Parks, oversaw the layout of the upper rows that were supervised daily by a new Landscape Foreman, Howard Cox. (Knight papers, Clements, 1993)

Although Knight's original design (fig. 8) was based on the simple geometry of the Greek and Roman theaters that he admired, his 1924 concept drawing did indicate his willingness to interrupt the semicircular plan of a classical theater to accommodate topography, trees and rock outcrops. Our field measurements of the existing theater, (fig. 9, fig. 10) along with Knight"s

memos, reports and construction photographs, indicate that design decisions were made almost daily in the field. Although the organization of forty rows of seats, three horizontal aisles and four curving vertical aisles remained true to the conceptual drawing seat widths, seat heights, the vertical slopes and the final plan geometry were a result of on-site, rather than on-paper, decisions.

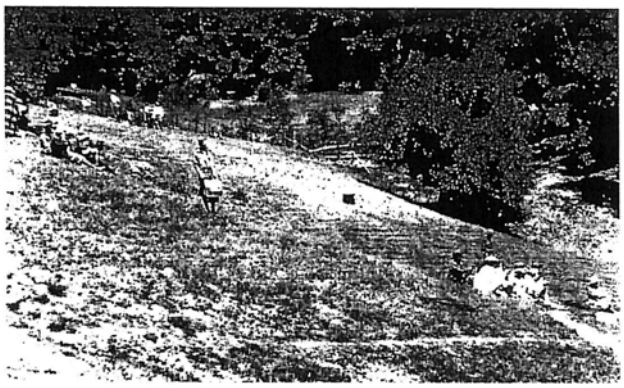
There was a significant change of Knight's layout of the upper twenty rows from the lower twenty. The lower rows were each built with a constant elevation from one end of the theater to the other. The depth from seat face to seat face changed along each row to accommodate the varying dimension from the bottom aisle to the middle horizontal aisle (fig. 9). In the upper rows however, while each row still varies somewhat in depth, its sitting surface also moves up and down vertically with the native topography. This unusual layout system seems to have been Knight's solution to not disturbing the topography of the regional trail that defined the top edge of the theater. The results were a startling image of monumental stone seats undulating up and down to reflect the site's original ravines and knolls (fig.11). Combined with the horizontal sweep of the rows interrupted by native rock and vegetation, the undulations of this monumental structure accentuate, rather than diminish, the unique natural features of this powerful landscape.



Mount Tamalpais Mountain Theater c.1913

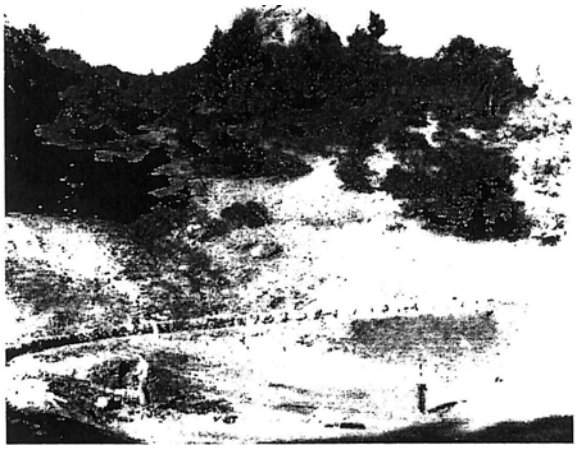
At early performances, audience members sat on the ground of the natural bowl. Note how they avoid the steep slopes of "rattlesnake gulch." (Courtesy of the Marin Historical Society)

At the first performance, "Abraham and Isaac" performers utilized the lower end of the site as a stage despite the sharp slope of Rattlesnake Gulch just behind them. (Courtesy of the Marin County Library)



View to south towards the head of Rattlesnake Gulch and the lone oak that today remains a landmark within the seating. The site was a popular picnic site, not only on performance days, but on other clear days when locals hiked to the site from a stop on the Mt Tam Railroad that operated from 1919 to 1929. (Courtesy of the Marin Historical Society)

View to north showing the cluster of oaks and the rock outcrops beyond Rattlesnake Gulch. After performances, the site was littered with newspapers used to provide a dry seat. (Courtesy of the Marin Historical Society)

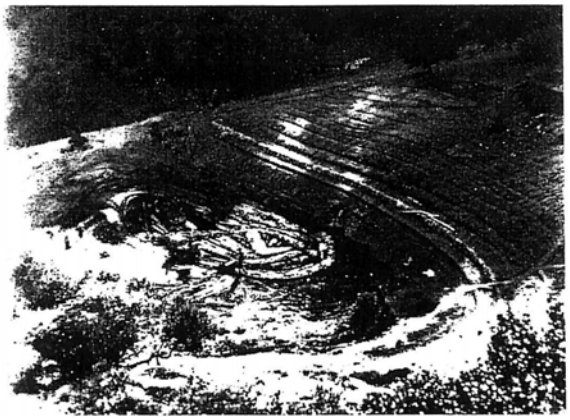


1929

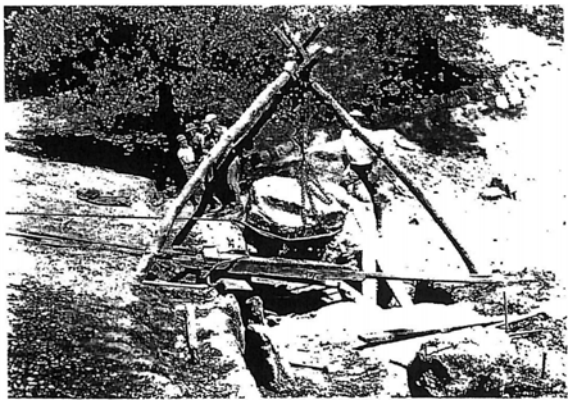
Under Knight's direction, the Mountain Play Association spent $-- and utilized volunteer labor to fill in the ravines crossing the stage and construct the first row of stone seats. This row of seats set the geometry of the final plan for the auditorium and stage. (Courtesy of the Mill Valley Public Library)

1934

View to South - In April CCC enrollees re-graded the stage, installed subsurface drainage lines, water supply lines for irrigation and began the rough terracing of the lower seats. The terracing followed the alignment of the stone seating previously installed by the Mountain Play Association. Earthmoving machinery was seldom available for CCC projects and this is the only instance that there is evidence of it being used on the site. (Courtesy of the Mill Valley Public Library)

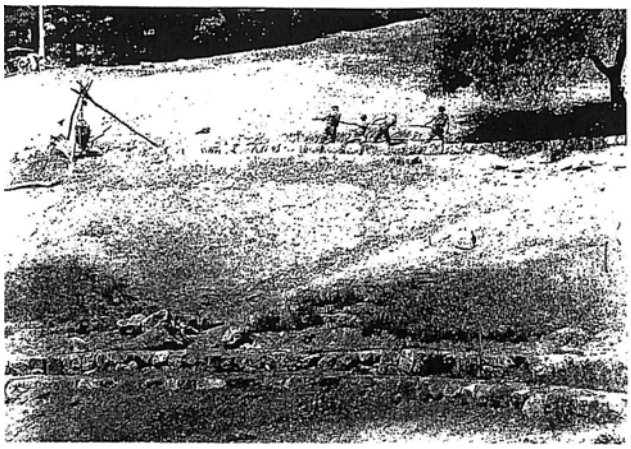


Overview of site showing temporary earth terracing of lower seats. (Courtesy of the Mountain Play Association)

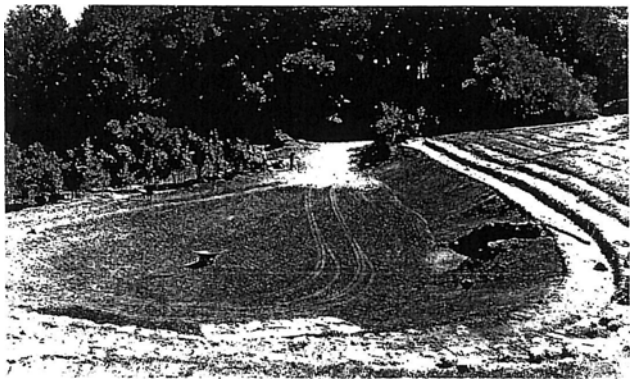


1934

At the beginning of construction, before more sophisticated equipment and techniques were utilized, rough on-site timber was made into simple tripods to help move the 1000 pound to two ton rocks into place. Note the NPS foremen overseeing the construction in his regulation hat and jodphurs. (Courtesy of the National Archives)



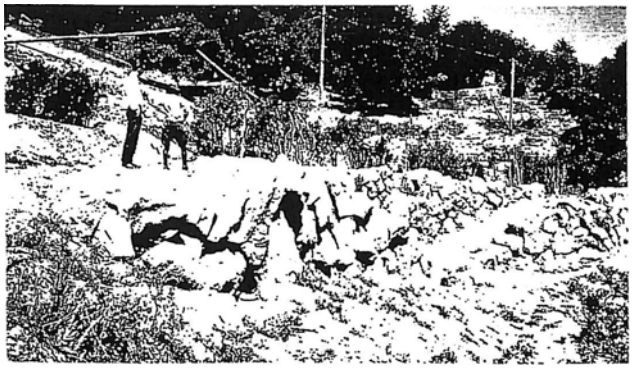
April, 1934. The enrollees installed the rock edging to the lower and midway horizontal aisles before laying out the seats between the two. Each aisle was kept at a constant elevation along its entire length, providing a datum for the constant elevation of each of the lower rows of seats. (Courtesy of the National Archives)



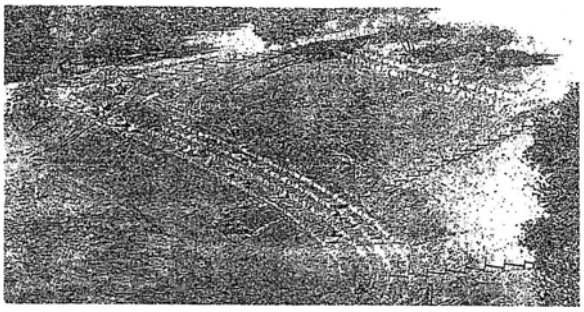
View to south. A screen of chicaquin oaks was planted as a backdrop to the stage. The sloped embankment separating the stage and auditorium was sufficiently high to accommodate the stone prompter's box seen in the mid right portion of the photo. The finish grading of the stage is completed by hand and readied for a wild flower sod that was collected from a nearby grassland. (Courtesy of the National Archives)

1935

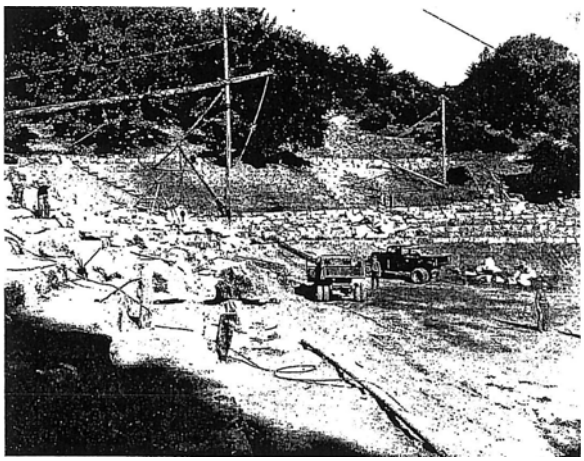
View southeast to the Bay. The finished stage provides a backdrop to help contain the sound and provide cover for backstage transitions, yet does not cut off long views from most seating. (Courtesy of the Marin Historical Society)

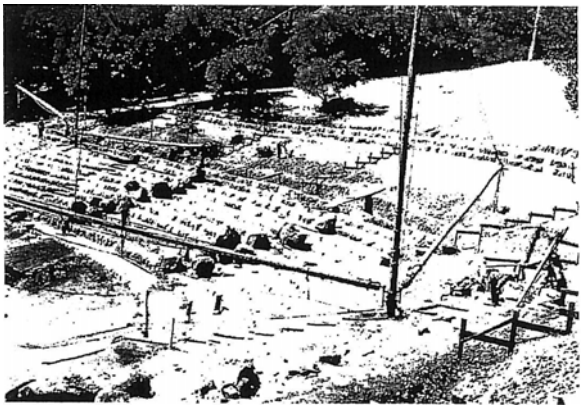


View looking northwest. Stone retaining walls were constructed to support the approximately twelve foot of fill in the ravine that once crossed the stage. These walls also provided a system of ramps that allowed actors to move from stage left to stage right without being seen by spectators. (Courtesy of the Marin Historical Society)

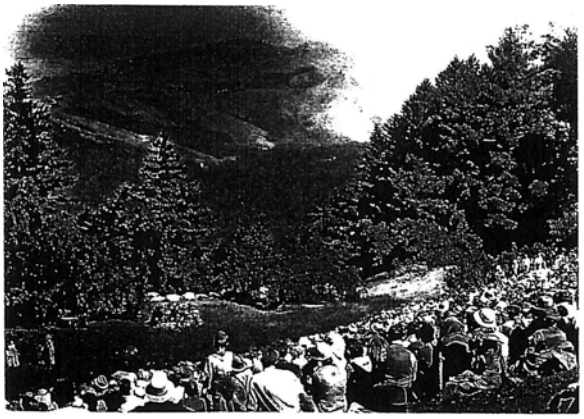


1935
After the aisles were defined, the foremen laid out and constructed wood templates in four locations with differing horizontal distances from bottom aisle to top aisle. The templates divided each section into twenty rows, resulting in shorter distances row to row in the areas where the two aisles were close to one another and longer row to row dimensions where the two aisles diverged further apart. (Courtesy of the Marin County Public Library)

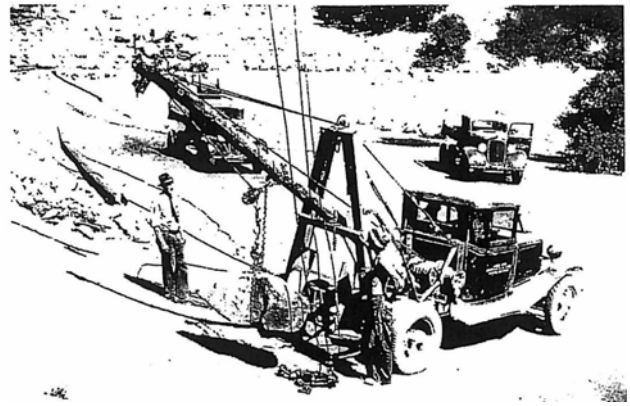




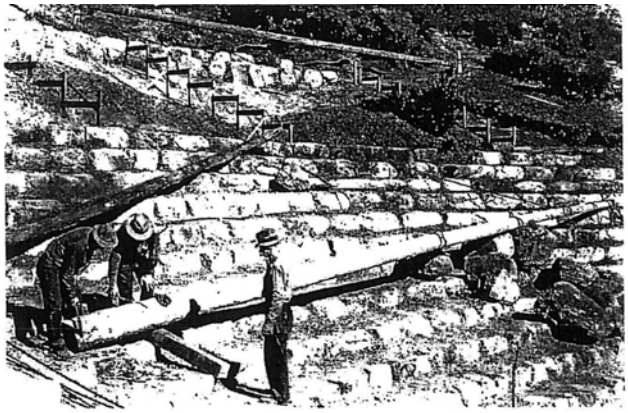
By 1936, progress had been facilitated by the construction of 80 foot high booms that were used to move the heavy rocks into place. Note the difference in the actual size of the rocks waiting to be placed and the amount of rock exposed once buried. Fourteen and one half rows of stone (4350 linear feet) were complete by September 1, 1936. (Above, courtesy of the Marin Historical Society; left, courtesy of the University of California College of Environmental Design Archives)



In May of 1936, the annual play was performed with 9 rows of stone sets completed. Although construction equipment and the horizontal booms were removed for the performance, the 80 foot high masts remained in place. (Courtesy of the University of California College of Environmental Design Archives)



Gradually new equipment was introduced to the site. The hoist mounted on the body of a truck proved invaluable to "pick up rocks in the field and load them on trucks. Also is an aid in placing rocks." The man wearing a hat and tie, rather than the NPS uniform worn by foremen, was likely a designer from the district office, perhaps William Penn Mott who was working in the district office and sometimes substituted for Knight as an inspector. (Courtesy of the National Archives)



1937

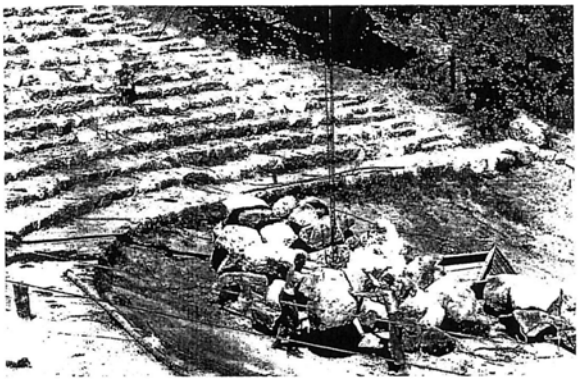
A park master plan drawing indicated that there were approximately seven rows of the lower seats still unfinished in October. Construction progressed slowly in throughout the year for several reasons: a decline in enrollees working on the project, Knight was working on park master plans elsewhere and Holloway was assigned duties to oversee additional projects. A foreman without a strong design background was assigned the seat construction, resulting in work that was judged unsatisfactory by Knight and Arthur Blake of the Mountain Theater Construction. (Courtesy of the National Archives)

After a series of meetings of Knight Holloway, NPS District designers and the Blake (Mountain Play Assoc), it was decided that a new Landscape Foreman, Howard Cox, be assigned to oversee the installation of stone seats. Holloway determined that it should take two more years with xx men at the quarry and xx men at the theater site to complete the work. It was also decided to have McCleod make a survey of the work completed since no drawing of the built seating existed. (Courtesy of the Marin Historical Society)

1938

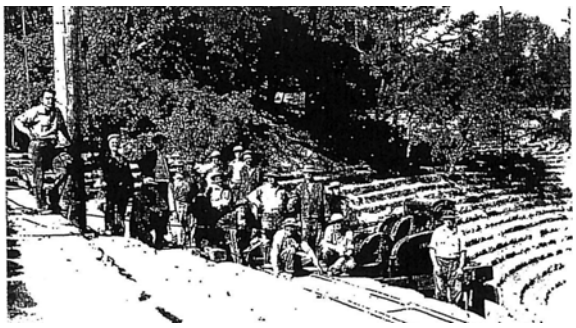
It was decided that the upper seats should be laid out with grades hubs rather than the templates utilized in the lower twenty rows. Knight worked with McCleod in the field to approve grade hubs that were set along every third seat. This precision allowed the top of the seats within a row to be set at varying elevations to give the theater its distinctive vertical undulations. (Courtesy of the Marin Historical Society)

A system of track rails was installed along the mid aisle to distribute stone across the site to the booms that are now located higher on the site. (Courtesy of the Marin Historical Society)



The last of the rocks stored on the stage are attached to a chain hanging from the boom. Workers carefully selected 1500-2500 pound local stones, each with two weathered surfaces perpendicular to one another. These right angles surfaces provided flat tops and vertical risers for the seats without compromising the weathered look of the stones by cutting them. (Courtesy of the National Archives)

Knight was adamant that stones should not be cut and he gave detailed guidelines to the Foremen and workers for selecting stone such that the "character of age-old ruggedness was maintained" (Knight papers). More than half of the stones' bulk was placed below grade to avoid using cement binder and "to give the feeling that the structure will remain secure and intact for centuries" (Knight 1949, National Archives RG79). (Courtesy of the National Archives)



(Courtesy of the Marin Historical Society)

Red Rocks Theater

Nestled above the plains on the Front Range of the Rocky Mountains, Red Rocks Theater provides a 200-mile panorama of the surrounding landscape and an inspiring view of the Denver skyline. Featuring exceptional acoustics, this 60-year old theater remains one of the most popular performance venues in America (Pollstar, 1990) The space was first created more than 200 million years ago when volcanic movement forced enormous sandstone ledges up through a prehistoric ocean floor to form the "walls" of the theater. Sightseers began visiting the site in the 1870s. By 1910, developers were dreaming of creating a grand theater and presenting a 50-piece orchestra on a wooden stage. (Bernet, 1962, 1968). Famed soprano Mary Garden sang amongst the rocks and commented.

> *Never in an opera house, the world over, have I found more perfect acoustic properties than those under Creation Rock .... I predict that someday twenty thousand people will assemble there to listen to the world's greatest masterpieces.* (Mary Garden, in "How Red Rocks Came to Be")

In the 1920s the City of Denver acquired the site and George Cranmer, Denver's Manager of Parks, took up the cause to create a spectacular theater between the rocks. Cranmer hired local architect Burnham Hoyt to produce a schematic design and used the drawings to get the theater designated at CCC project. (Cranmer Papers) Hoyt's initial design respected and accentuated the defining red rock walls by proposing the simplest possible form built out of contextual materials.

Hoyt, Morse and the CCC supervisors refined and modified this initial scheme as the theater's final form evolved over the five years of construction. The dated sequence of 125 sheets of drawings, historic documents and photographs reveal how how these incremental refinements occurred (Morse Papers, National Archives RG79). In April, 1936, CCC enrollees excavated for the foundation of the stage while Morse completed initial stage plans and literally drew a line of the finish stage elevation on to the face of Stage Rock where the stage was to be located. Once enrollees completed the stage sub-basement, Morse apparently then decided to lower the stage elevation slightly from his original field location. Placing the stage where it would best merge with Stage Rock, he drew the new stage elevation in black pen on a construction photograph of the stage sub-basement. Enrollees then built the stage to this new elevation and delineated the back edge of the stage floor to match the undulating form of the rock wall.

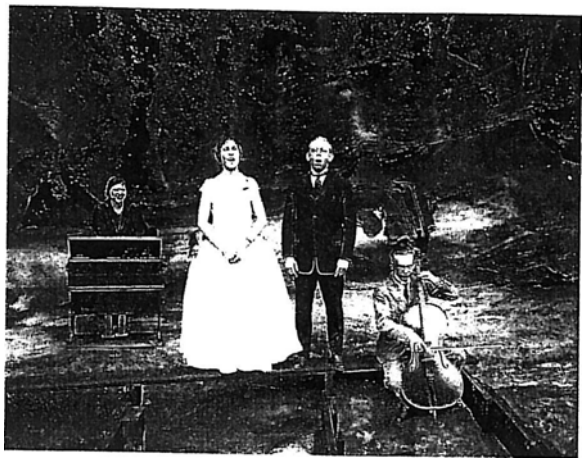
The overall geometry of the theater was also modified on-site. Hoyt initially drew a near symmetrical classical form balanced on a visual centerline between the two rock walls. As enrollees excavated 28 feet on the north side (fig. 12) and filled the south side to set the rough base for the seating, they uncovered protruding ledges along the north rock wall just below grade. Rather than re-center the seating that was aligned with the completed stage or attempt to remove the ledges, Hoyt and Morse had enrollees build the northern stairway along the line set by the ledges and then fill in space between the stairs and the existing centerline with seats. The result is an asymmetrical plan that highlights the primacy of the site by giving visitors the sense that rocks molded the form of theater. (fig. 13)

Interestingly, on site decision-making also tempered the contextualism of the design to make the theater a more effective contrast to the site. Initial plans call for red limestone on the walkways

as well as the face of each row of seats. A visiting CCC inspector suggested that the stone was unnecessary on the walkways and proposed using concrete instead (National Archives RG79). The resulting smooth, reflective surfaces combine with the shadows of the seats to project a sharp graphic contrast to the rock walls.

Unfortunately, the elegant, resonant form that emerged from this process has been somewhat undermined through renovations, including lighting towers, expanded dressing rooms, and a canopy over the stage. In spite of these changes, Red Rocks Theater remains a testament to the power of a strong, simple contextual design refined in response to the site. Architectural Forum recognized this power in 1945,

> *"For a setting of weird natural beauty, Burnham Hoyt has designed an outdoor theater which in sheer dramatic structure is unrivaled in the world...Hoyt preserved the original flavor of the majestic setting—restraint which for once, admits nature as a full collaborator ... With a minimum of architecture per se, Red Rocks Amphitheater is unquestionably an architectural triumph."*



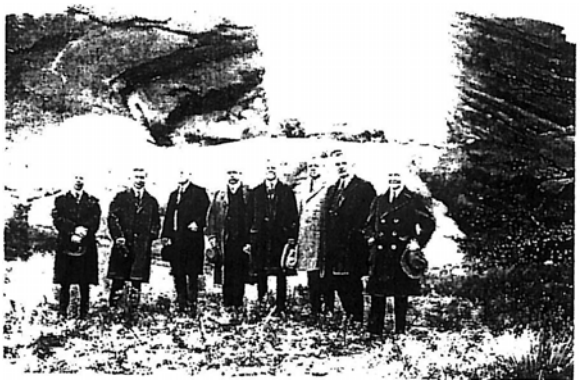
1910

Through the 25 years before construction, supporters of building an amphitheater arranged testing of the natural acoustics, such as the 1910 demonstrations depicted in these three photographs. (Courtesy of the Denver Public Library)

The topography and the surrounding rock formations carried sound from stage rock to the the top of the bowl a 1000 feet away. During construction workers monitored the acoustics by spinning a coin on stage rock and checking to be sure you could still hear it fall from the top of the theater.

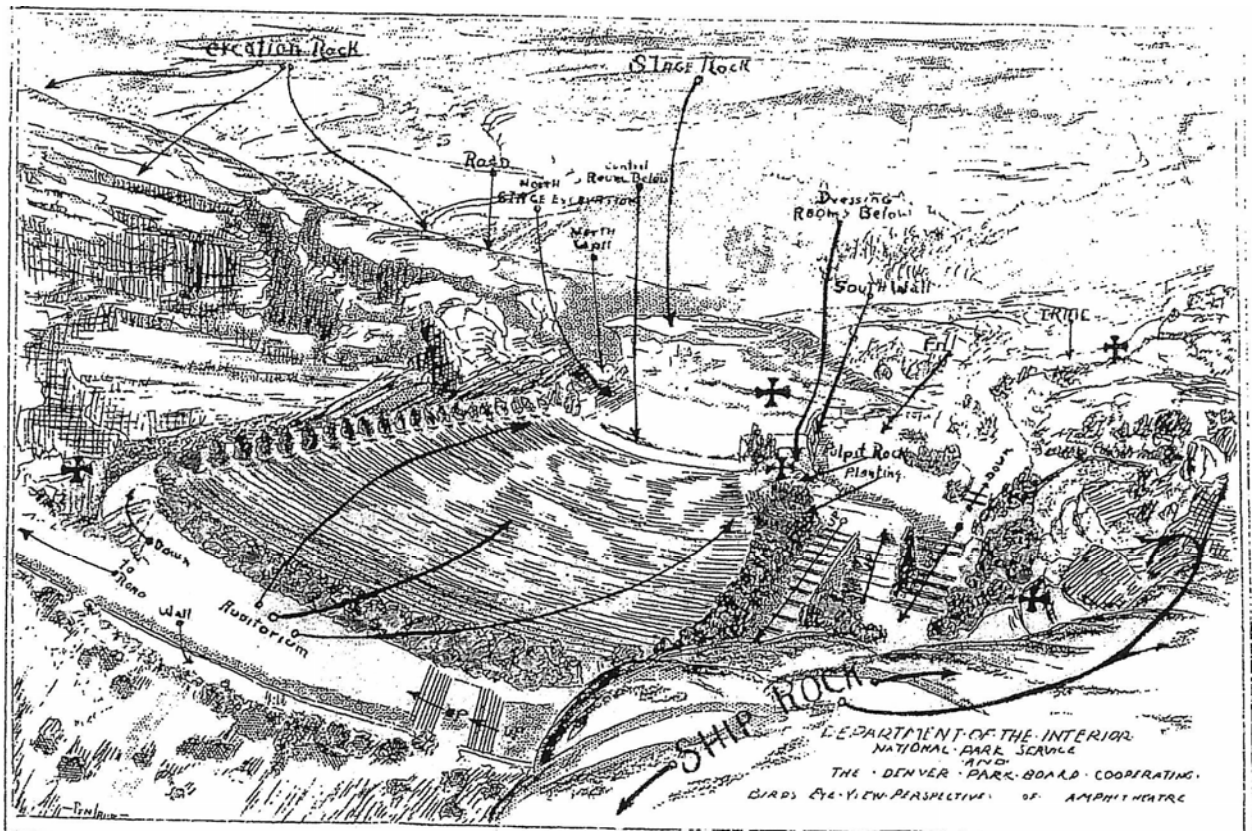
1929

An aerial view shows the five mile scenic road to the site completed in 1929 as part of an attempt to boost the idea of constructing an amphitheater. It connected to a temporary road criss-crossing the auditorium site between the rocks shown in the photograph on the next page. A similarly placed construction road can be seen on later photographs. During construction, George Cranmer would regularly take his family for drives through the site to evaluate the road's alignment (McLaughlin 2001) (Courtesy of the Denver Public Library)



November 1935

As late as November 1935, Mayor Stapleton (fourth from right) was still bringing dignitaries to the site to experience its natural wonder and development potential. (Courtesy of the Denver Public Library)



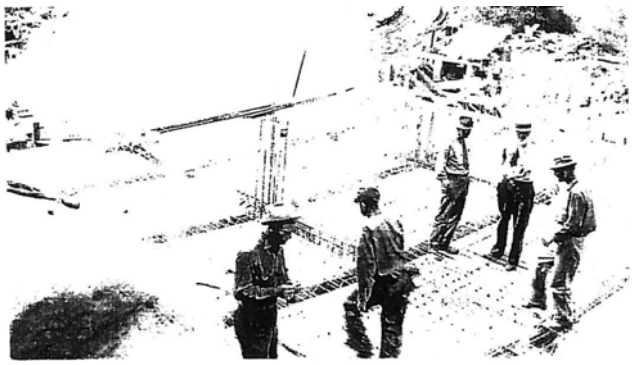
November 1935 Director of Parks and Recreation George Cranmer commissioned Burnham Hoyt to produce this birds-eye perspective in November 1935 as part of the application for CCC funding. NPS Superintendent John Harris then used this drawing as a base map for his August 1936 report on the initial construction of the theater. The "X" at the center of the drawing marks the location of the second photograph on the next page. (Courtesy of the National Archives)

A closer view of the auditorium site before construction shows the significant scale of the rock features which had to be removed to build the seating. Also evident are the distinct forms of the native junipers which later became a key design element of the theater. George Cranmer remembered this view from his first visit to the site as a school kid, "It look quite different then. There were huge red boulders all over the area where the seats are now located." (Bernet 1962) (Courtesy of the Denver Public Library)

May—July 1936

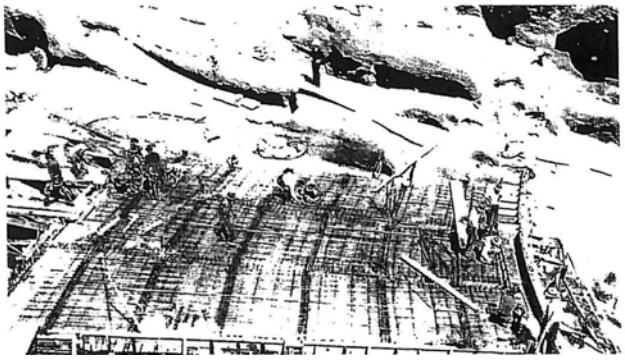
In keeping with the CCC 6 month enrollment periods, construction was divided as much as possible into projects, the first being the stage area. These two photographs show CCC enrollees cutting and filling the area around stage rock by hand in preparation for setting the stage foundation. (Courtesy of the National Archives)

While the CCC had and wanted to use labor, the limited mechanical resources show in these photographs likely encouraged the designers to alter their form to match the rock formations, rather than try to move mountains. Hoyt and Morse designed sub-basement dressing rooms that filled the drop in topography at the south end of stage rock. On top of this sub-basement they placed a full story basement of dressing and service rooms set back into the rock just under the stage.



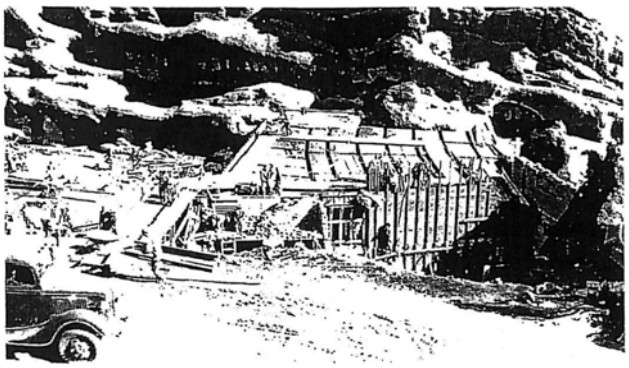
September 1936

After excavating from May through August, enrollees next built the form work for the sub-basement at the south end of stage rock. Enrollees worked under the supervision of LEMs (local experience men) with skill in concrete construction. The two men in ties facing the camera on the right are likely park and CCC supervisors. (Courtesy of the National Archives)



October 1936

Enrollees proceeded on the sub-basement form work through the fall. In the background of this photograph, you can see the chalk line drawn across stage rock to mark the eventual finish elevation of the stage. Also note the formally dressed observer perched above the workers on the rock. (Courtesy of the National Archives)

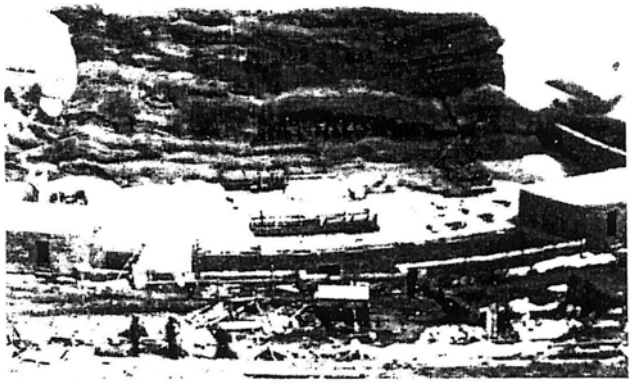


November 1936

By November, enrollees are filling the forms by wheel barrow and setting the stone veneer, using locally quarried limestone which would be used throughout the theater. (Courtesy of the National Archives)

December 1936

The sub-basement is complete at the bottom right hand comer of this photograph from Morse's papers. Here Morse has reset the finish elevation of the stage by drawing a new line across the photograph below the chalk line seen in the October photograph. At each stage of construction, Morse reconsidered how the theater would best mesh with its site. (Courtesy of the Denver Public Library)

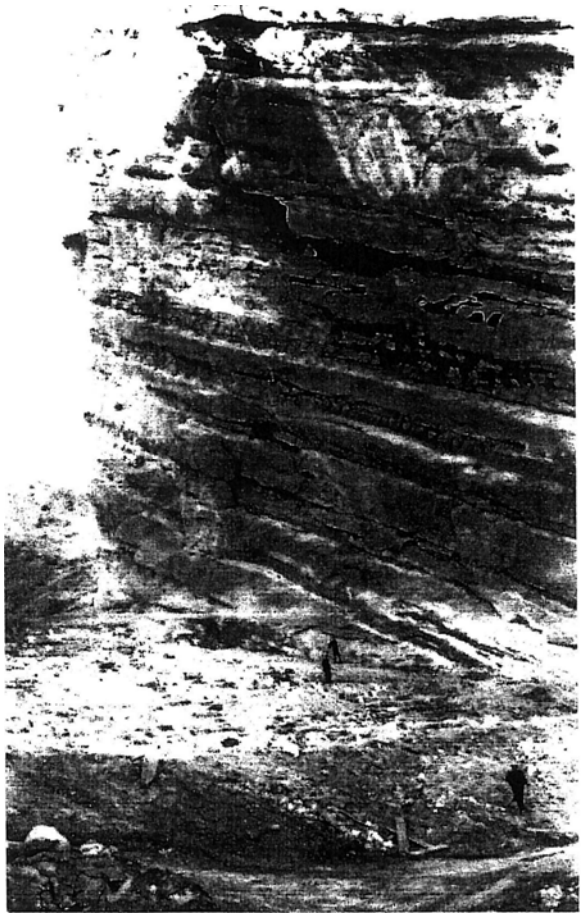


Mid 1937

Six months later the full story basement, stage and auxiliary buildings are complete. The back edge of the stage follows the ragged form of stage rock at the elevation Morse marked on the photograph above. (Courtesy of the Buffalo Bill Memorial Museum)

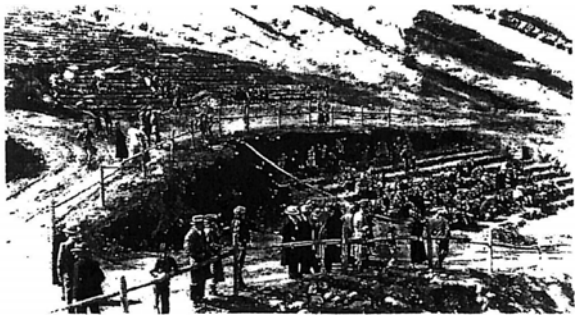
Mid 1937

Rather than maintain a traditional level elevation across the seating rows, Hoyt and Morse sloped the entire theater 3.3% from north to south in line with the rock strata underlying the entire landscape of the rock formations and auditorium space.



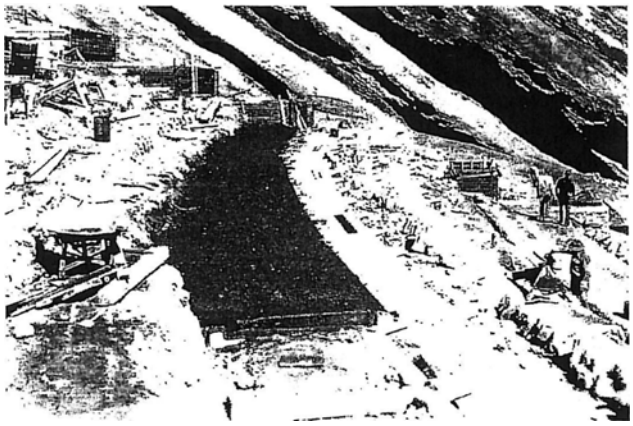
Mid 1937

To create the base for the seat grading, enrollees cut as much as 28' from the upper north side. Excavation revealed a protruding ledge running along the north wall just below grade. Rather than try to blast away the ledge, Hoyt and Morse realigned the edge of the theater, breaking with the original more symmetrical plan and creating a dynamic form which resonates with the gesture of the massive stone walls. (Courtesy of the Buffalo Bill Memorial Museum)



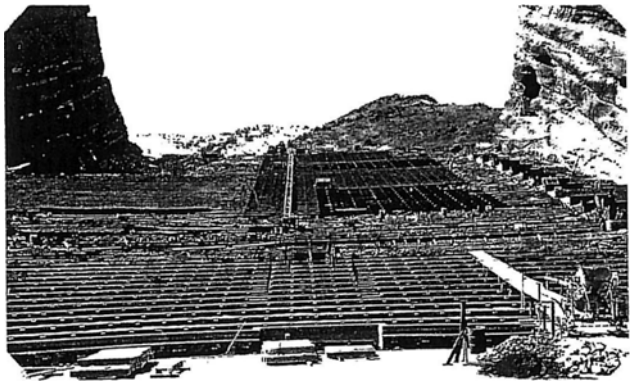
Late 1937

Throughout construction, Cranmer organized periodic performances at the theater to sustain interest and support. At this point the roughly graded auditorium seating is interrupted by a construction road. Eventually, the road terrace was graded away to meet the seat slope above and below. (Courtesy of the Buffalo Bill Memorial Museum)



1938

By the summer of 1938, enrollees were pouring and finishing seating section by section. This process continued through 1941. In the top photograph, enrollees have poured concrete around preformed supports for the redwood seating. In the next photograph, enrollees are using a pipe under lumber to form the shallow gutter than runs across the theater north to south at the back of each aisle under the seat. As Morse explained and the sequence of drawings show, the exact form of the seating was developed by sketching, building an in-place prototype and then finely designing and drawing the detail. (Courtesy of the Denver Public Library)

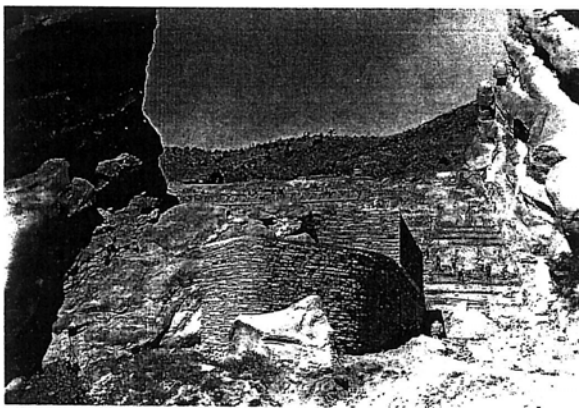


1938

The third photograph shows the unusual sequence in which the seating rows were constructed. Apparently, enrollees began in the middle where the dark square can be seen just to the right of the center of this photograph. The shadow is cast by the first redwood bench seats put in place. Enrollees then proceeded up from the middle while simultaneously building a separate section immediately in front of the stage. Enrollees also did not pour the middle section all the way out to the northern edge until the north stair and planters were complete. This allowed the north stair alignment to be adjusted to fit the newly revealed form of the rock wall and then as a last step connected to the seat rows. (Courtesy of the Denver Public Library)

1938

Here enrollees are placing the redwood benches on the preformed supports immediately in front of the stage while others in the background are pouring rows higher up in the theater. This photograph also highlights the contrast between the textured limestone face of each riser and the bright, smooth concrete of the aisle. This contrast, critical to the final graphic form of the theater, was the result of a construction observation by a traveling CCC inspector. In his report, the inspector noted that using limestone on the aisle was unnecessary and suggested replacing it with concrete. (Courtesy of the Denver Public Library)



1938

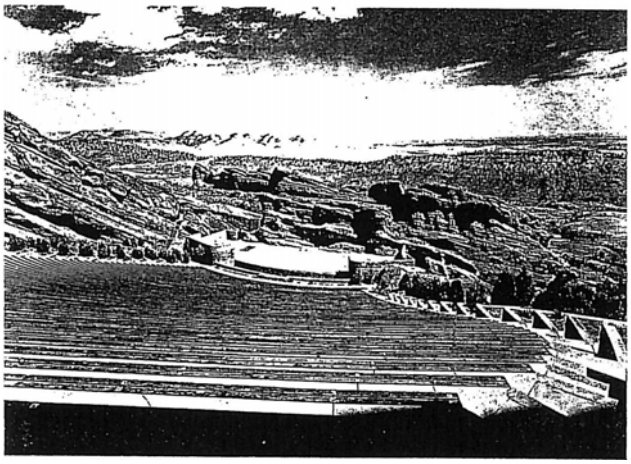
These two views of the north stair highlight how the northern edge of the theater was set by the protruding ledge on the north rock wall seen at the right side of both photographs. These photographs also offer a second view of the sequence of construction: the seating was built out from the middle (left to right) and the stair out from the rock wall (right to left) to eventually meet. Like the bench seats, the stair planters were sketched, test built in place and then drawn in detail. (Courtesy of the Denver Public Library)

1939

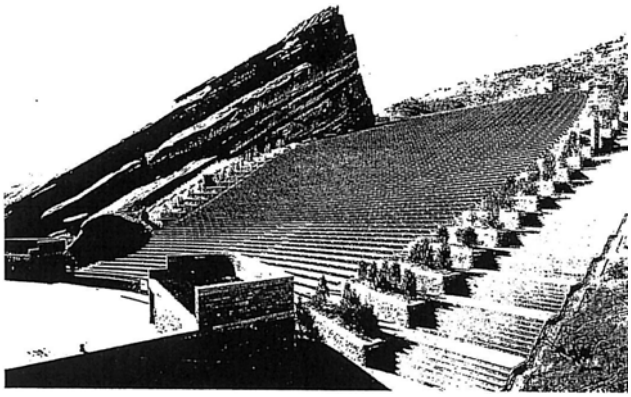
As stage rock defined the bottom of the theater, the plateau and peaks of the rock walls defined the top edge. Here the plateau is being used as a construction staging area. The final design called for service buildings merged into the rock, like the dressing rooms below the stage, so as to preserve the naturally defined grand entrance to the theater. A version of these buildings are only now being built. (Courtesy of the Denver Public Library)

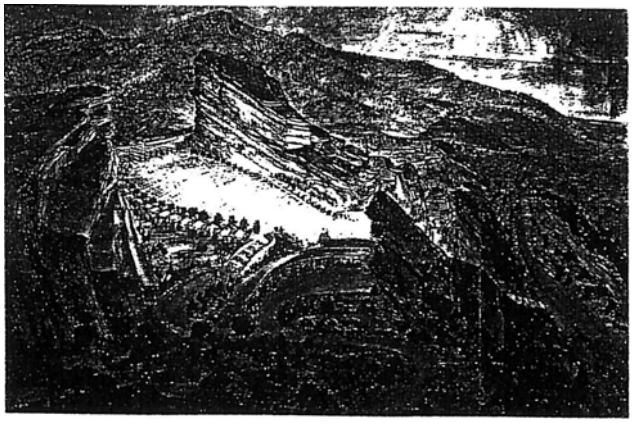
1941

This aerial shows the form of the theater just before completion. The construction conveyor still in place down the center of the theater highlights the final asymmetrical form. The photograph illustrates how this form reflects the distinct gestures of the two rock walls. (Reprinted from The American City, March 1944)



(Courtesy of the Denver Public Library)





1943

A rendering by Hugh Ferris shows how the theater caught designers' imaginations. Interestingly, it may also demonstrate the subtlety of the moves that integrate the theater into the landscape. Even as a master renderer, Ferris has missed the unusual north south slope running across the theater, drawn in a non-existent center line and moved that line to the south to re-impose more symmetry on the design. (Courtesy of the Denver Public Library)

Conclusion

In June of 1942, Congress terminated the CCC as the depression economy slowly improved and war effort accelerated. But, its lessons live on in its extraordinary projects. The CCC's dual purpose of addressing both the economic and environmental crisis sowed the seeds of an interactive, incremental design process for the project designers. The recurring cycle of designing, constructing, and evaluating the partially completed projects fostered built works that responded to the eccentricities of native landscapes. At the same time, two of the most memorable landmarks produced by the CCC program - Mt. Tamalpais and Red Rocks Theaters – began with clear, powerful diagrams of cultural interventions into pristine landscapes. With both projects, skilled designers translated these design concepts into exceptional landscape architecture by incrementally adjusting their original conceptual schemes to the emerging landscape.

These two projects suggest that reserving more design decisions to the construction site might benefit designers today. Although creating a process of deferred design decisions would be a challenge in today's milieu of competitive bids, code restrictions and extensive monitoring, it is a challenge worth taking. The results would again help us create landscapes that inspire confidence that nature and human culture can not only coexist, but can also enhance one another.

End Notes:

1. The necessity to "keep the boys busy" was expressed by William Penn Mott in a 1992 interview with Jewell. Mott, who worked for the NPS during the thirties as both a Landscape Foreman and a District Inspector, was warning Jewell that she should not expect to find many finished drawings of CCC built projects. He explained that the first priority was to keep the recruits busy building, often leaving little time to develop detailed designs on paper before construction began.

2. Typically only 10-15% of a Landscape Architect's fee is assigned to construction administration for design input after construction has begun.On the other hand, 50-65 % of the fee is assigned to the production of Design Development and Construction Documents. The Construction Documents are legal documents describing on paper precisely what the building contractor will build for the client.

3. Newton, Jellico and other landscape history references have referred to the incremental evolution and field decisions made in English and Renaissance gardens. In his personal papers, Olmsted described his daily field supervision of Central Park.

4. Wirth (1980) and other authors provide detailed accounts of the number of enrollees in the CCC. Because enrollees served distinct terms of six months, numbers are reported for each term, which can be summed for a total of 3,612,000. This is the best number available, though it does double count men who served multiple terms. In contrast, less detail information is reported on the number of supervisors, leaving us to extrapolate from available data. Wirth reports 14,915 supervisors serving in September 1933, when there were 1520 total CCC camps. At the CCC's peak in late 1935 there were 2916 camps. If the supervisorial ratio stayed the same, that would make for 28,613 supervisors overall at the CCC's peak.

5. We derived this number by compiling the information in 24 periodic inspector reports that we collected at National Archives in College Park, MA; Denver, CO, and San Bruno, CA. In each report, inspectors detail their daily itinerary. Out of 249 total work days covered in the 24 reports, inspectors spent 153 days (61%) in the field and 96 days (39%) in the office. The time spent in the field varied office-by-office. Inspectors from the model Southwest Office, run by Herbert Maier, spent as much as 90% of their time in the field.

6. For more information on S.R. DeBoer, see Pioneers of Landscape Architecture, Charles A. Birnbaum and Robin Karson editors, published by McGraw-Hill, 2000.

7. For more information on Emerson Knight, see Pioneers of Landscape Architecture, Charles A. Birnbaum and Robin Karson editors, published by McGraw-Hill, 2000.

8. The illustrative plan was generated by Jewell from a combination of field dimensions, air photographs and an "as built" survey of the lower 20 seats made in 1938 by the NPS.

9. Martha Morse, widow of Stanley described Morse's routine to Jewell in a telephone interview in January 2002. Although Mrs. Morse was not married to Stanley during the red Rocks construction, they were married during his 1950's renovation of the theater stage. She indicated that he often spoke of his daily routine of visiting the Red Rocks site during construction.

8. Waugh was the daughter of distinguished Landscape Architecture educator Frank Waugh, mentor to Wirth.

Figure 1

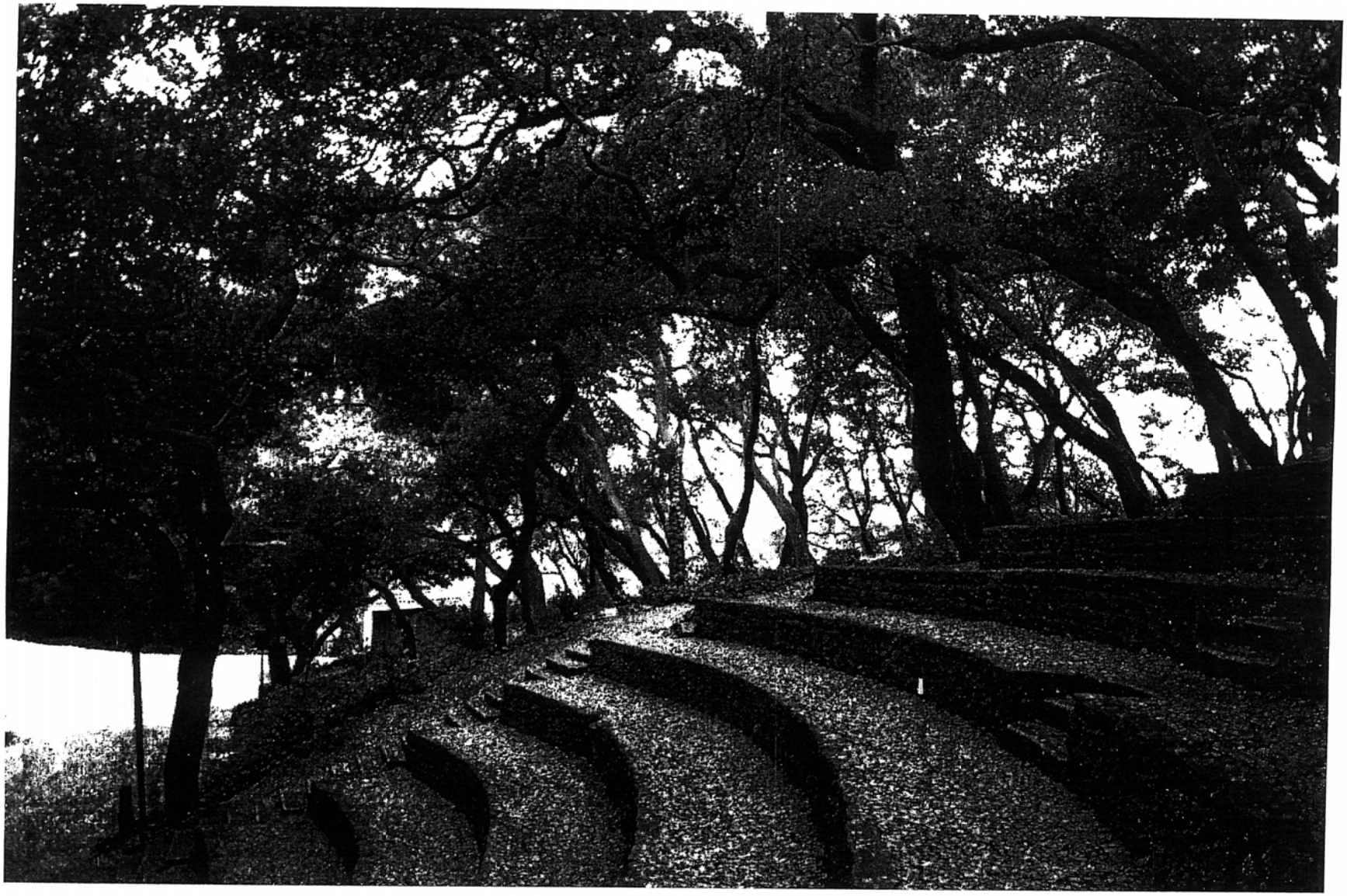


Figure 2

Figure 3

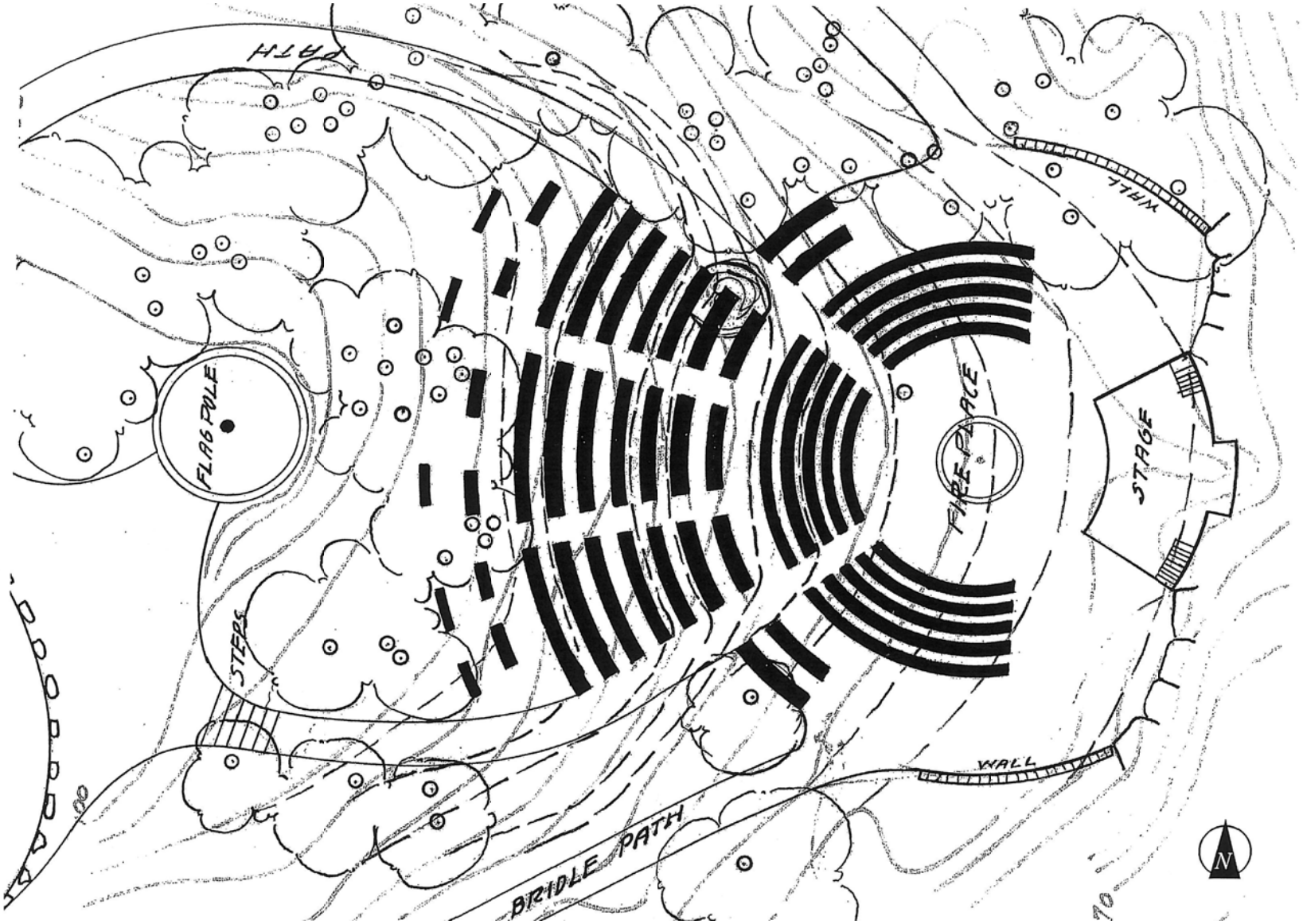

STAGE
WALL
FIRE PLACE
WALL
FLAG POLE
STEPS
BRIDLE PATH
PATH
N

Figure 4

Figure 5

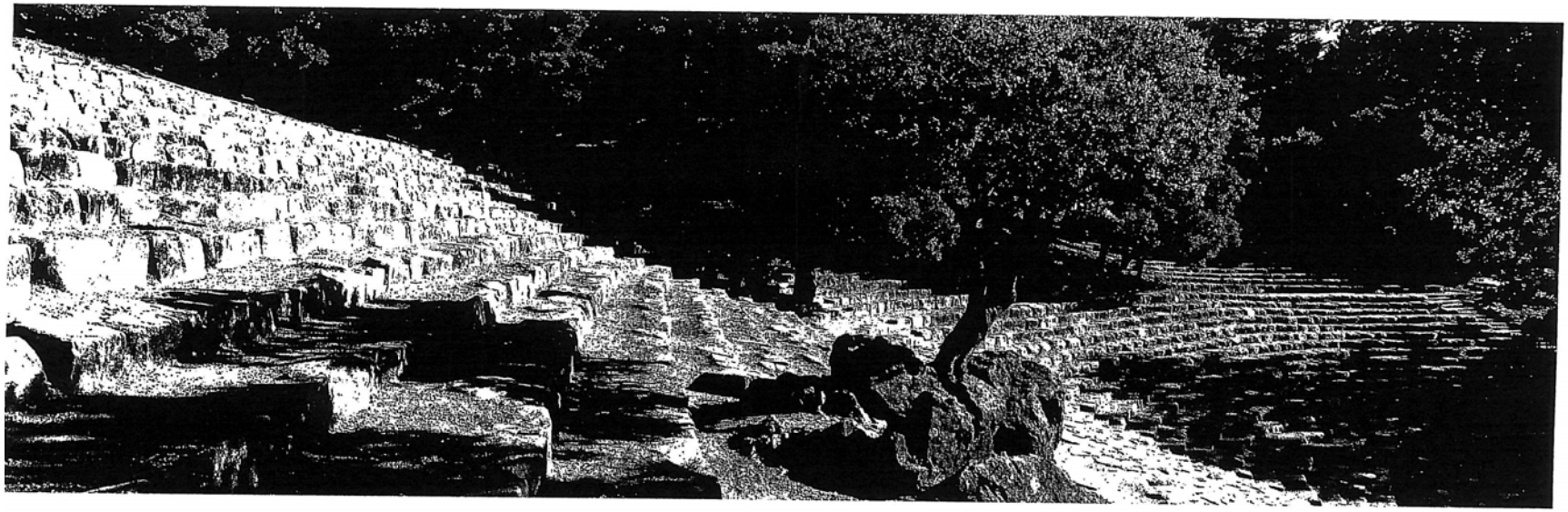


Figure 6

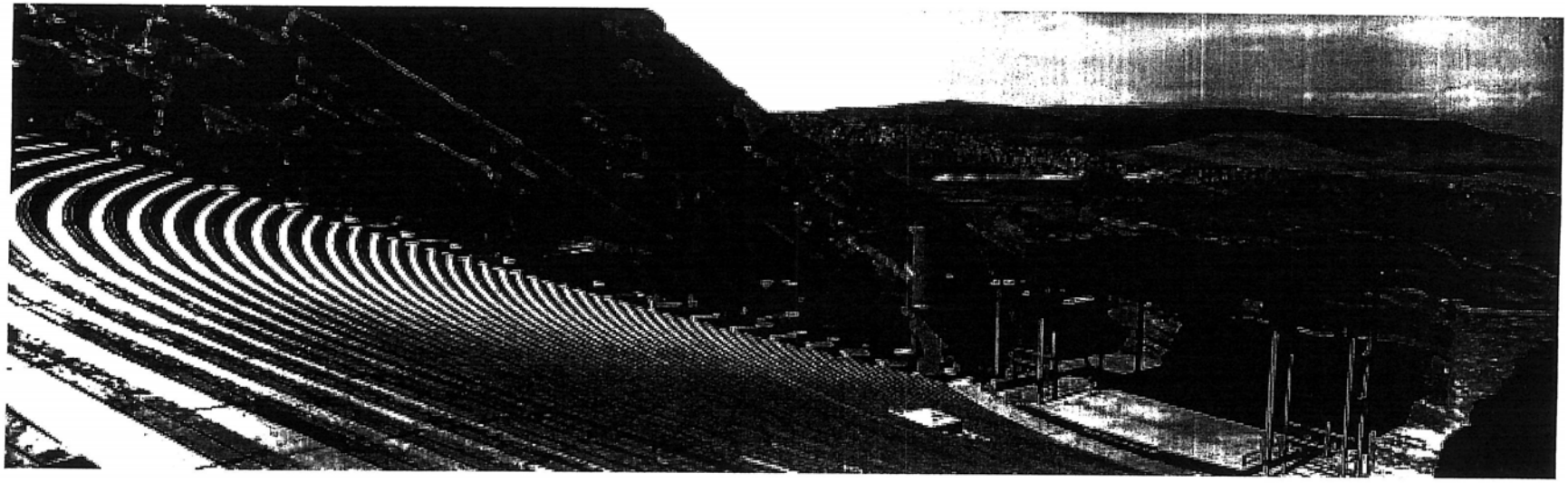
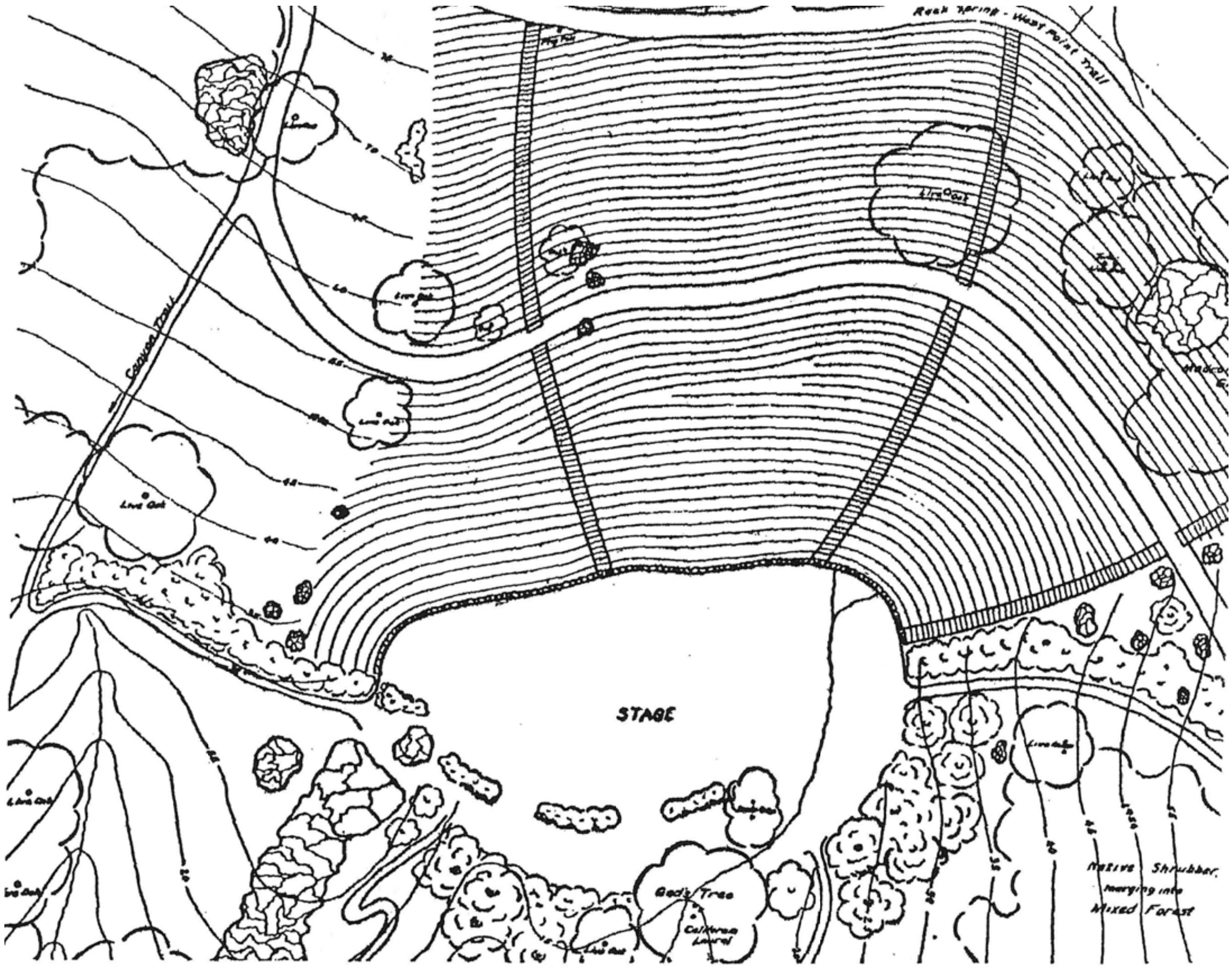


Figure 7



PROPOSED DEVELOPMENT OF THE MOUNTAIN THEATRE ON MT. TAMALPAIS
Plans by Emerson Knight, Landscape Architect.

Figure 8

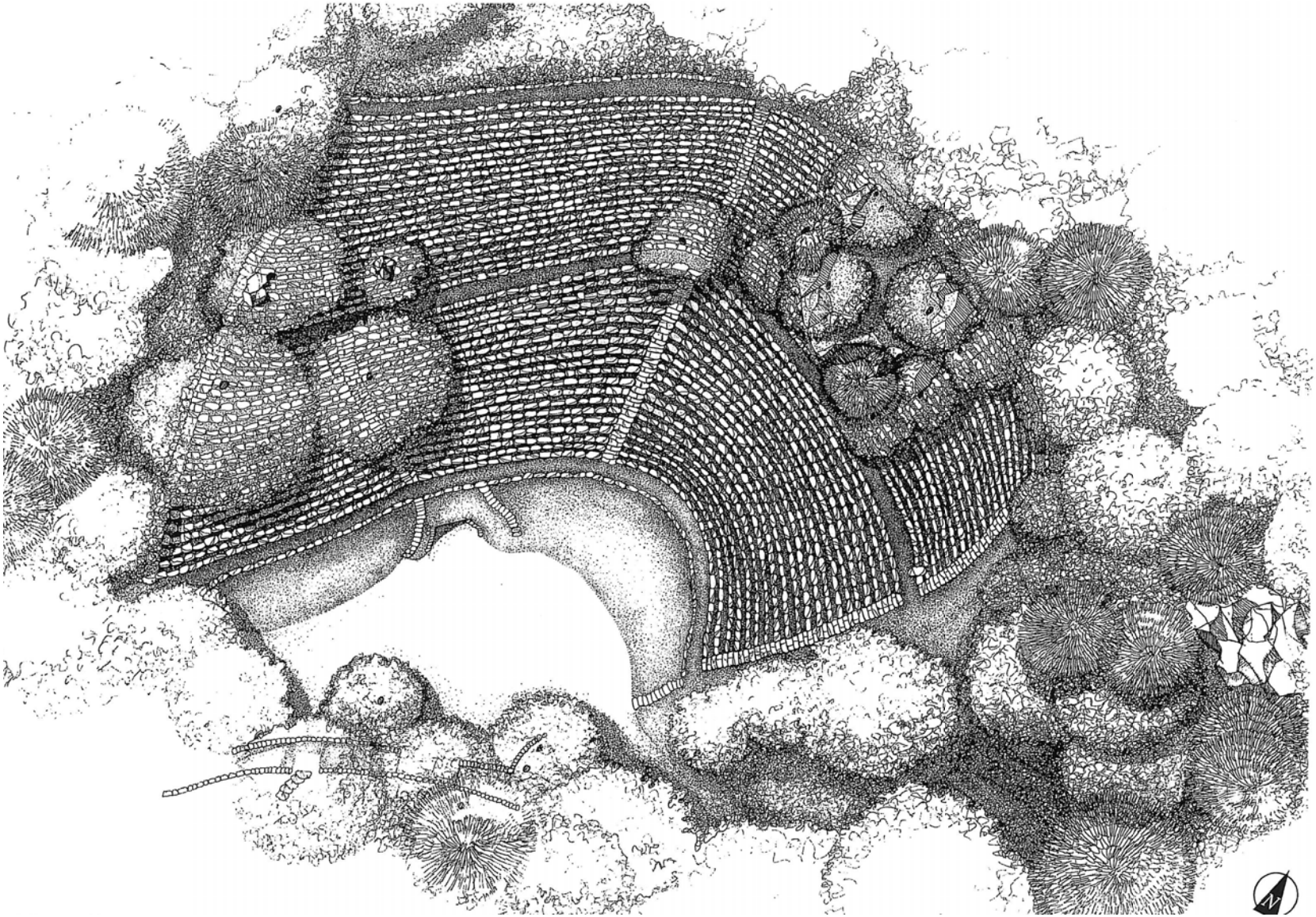


Figure 9

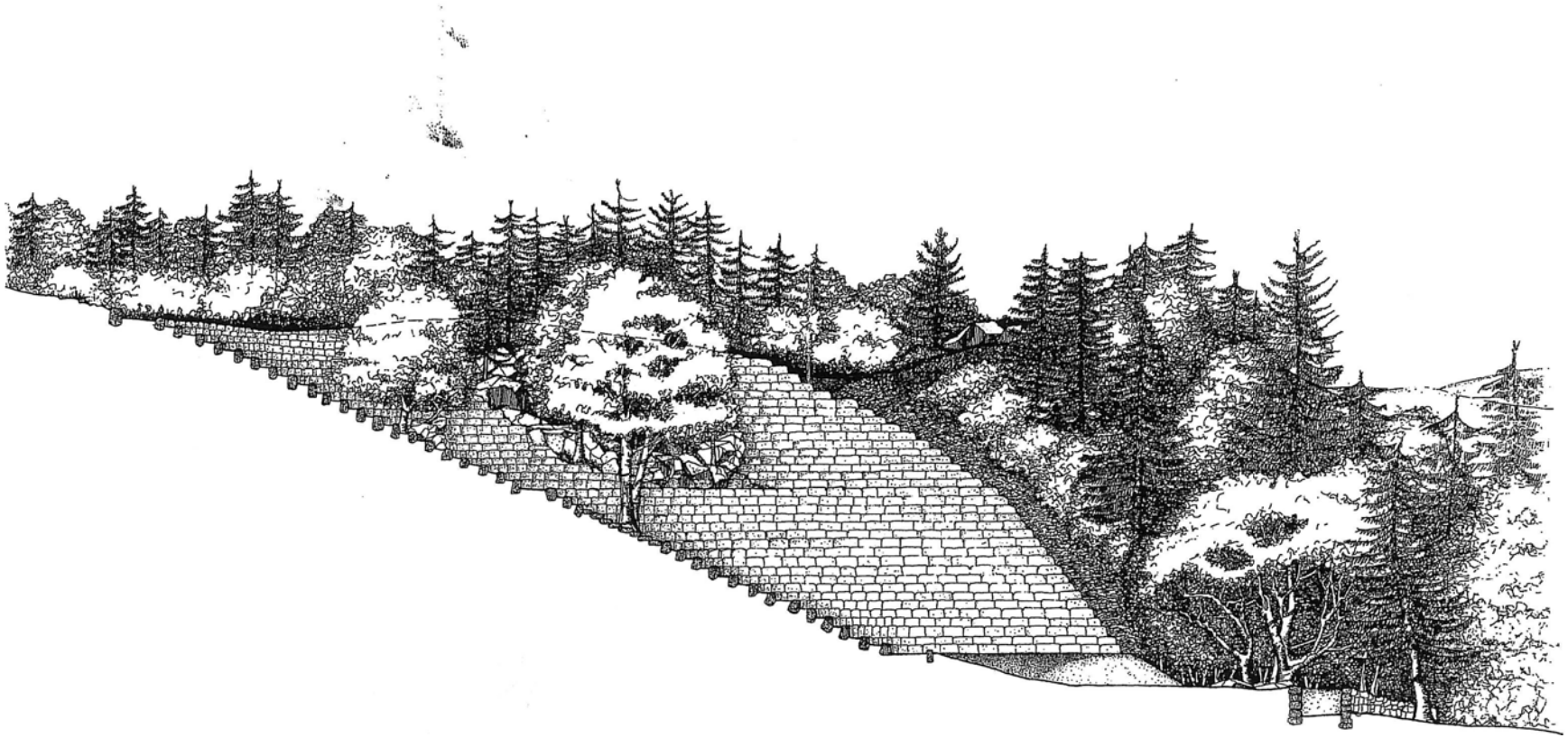


Figure 10

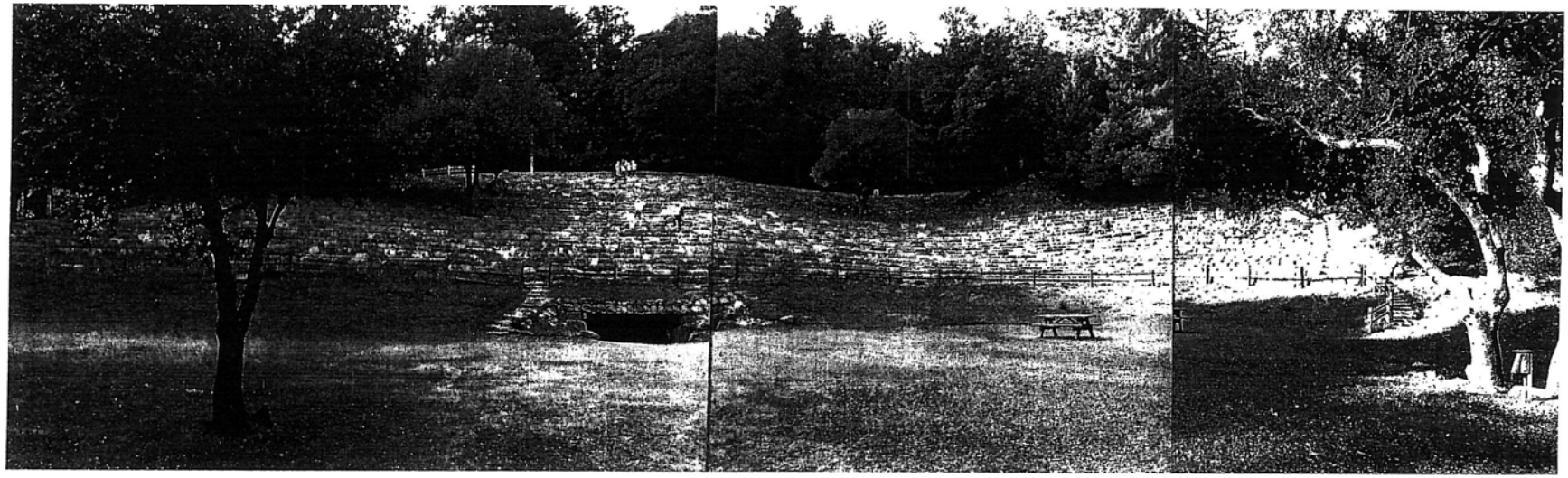


Figure 11

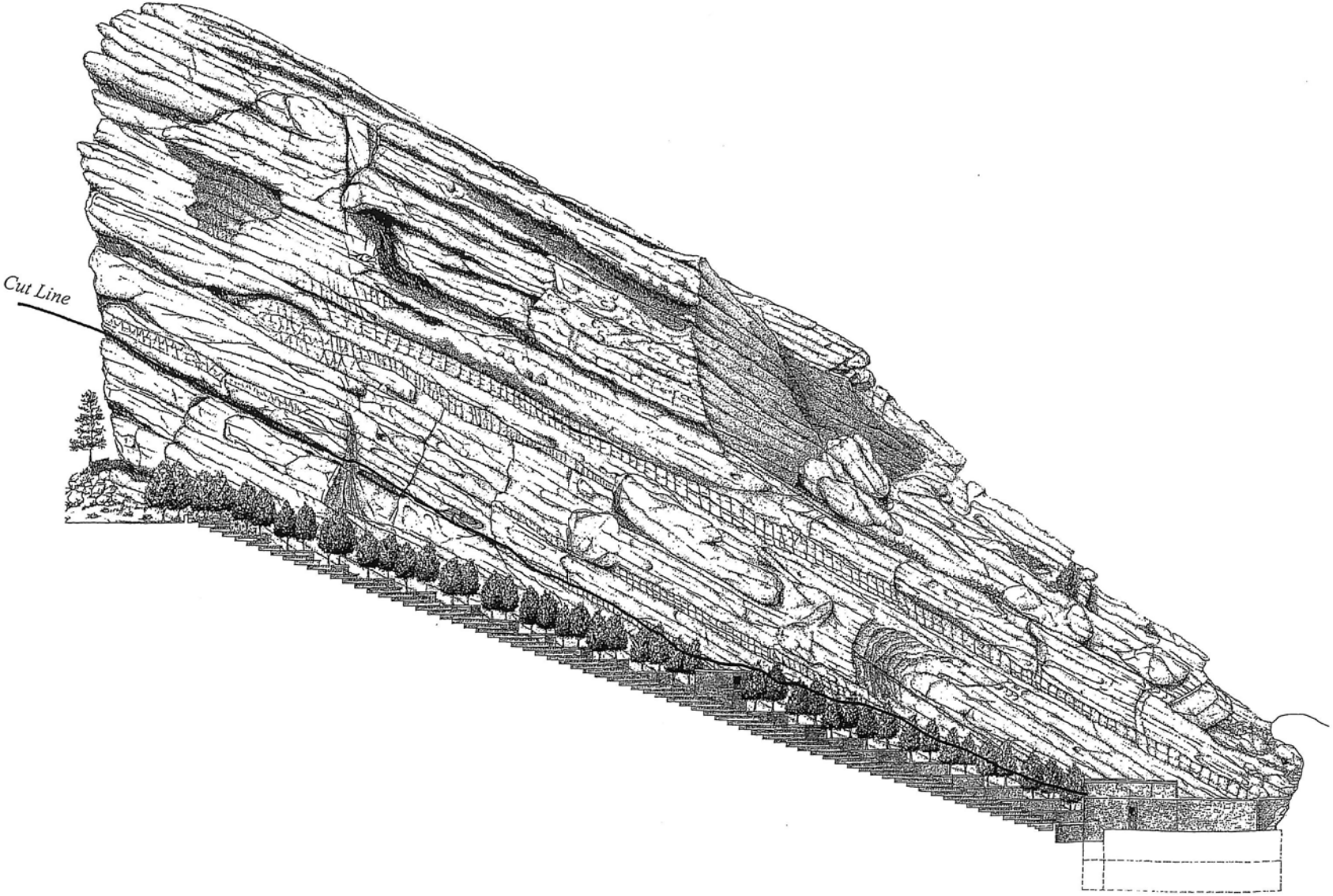


Figure 12

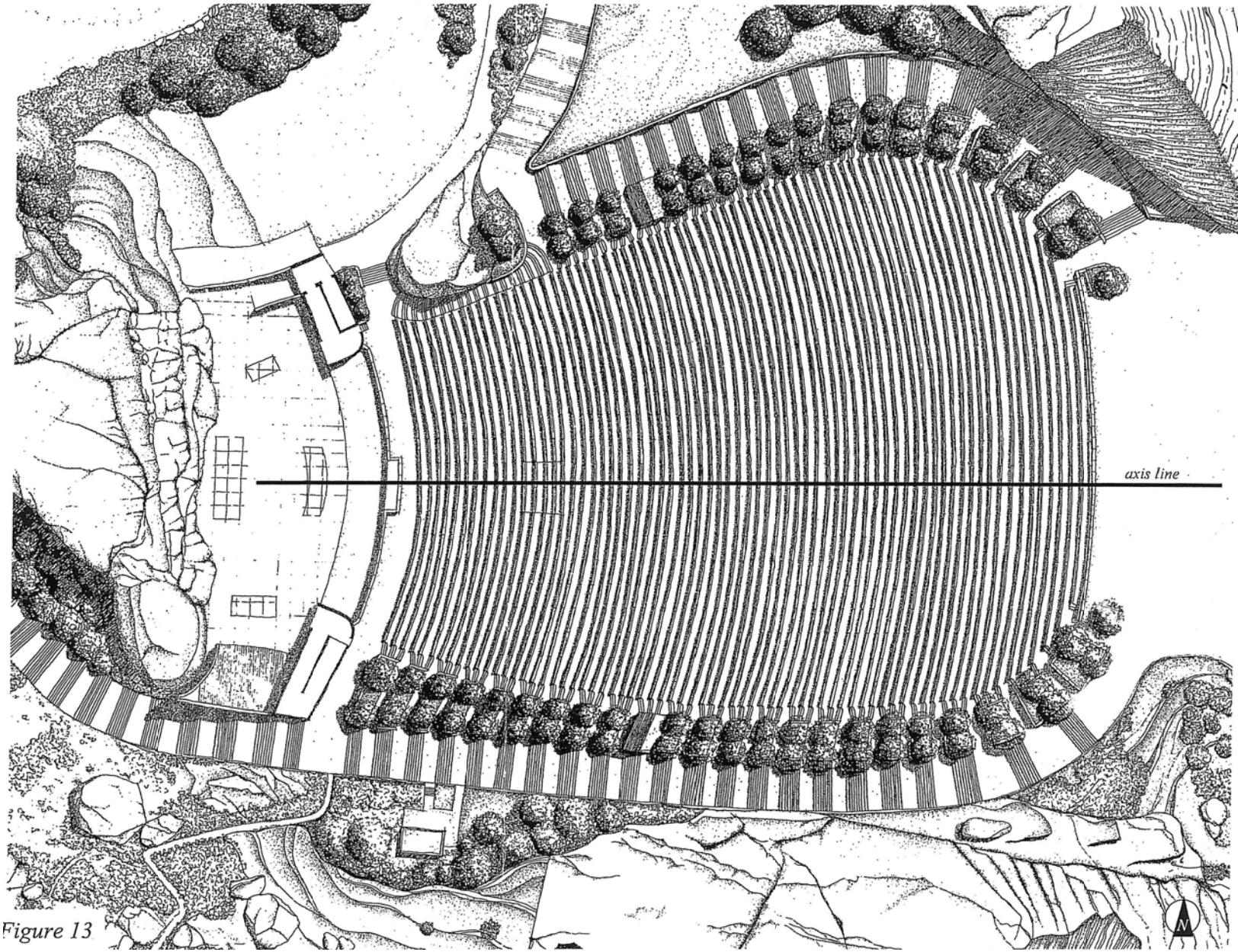


Figure 13

References

Architecture Forum.1945. Red Rocks Amphitheater. 82, no. 5:97-102.

Bernet, M. E. 1962. The Incomparable Red Rocks from Dinosaurs to Rock 'n Roll. Self published.

_____. 1968. How Red Rock Came to Be. *Denver Post Empire Sunday Magazine*. 4 August: 8-13.

Berkeley Parks and Recreation Department. Undated. History of the Amphitheater at John Hinkle Park. Unpublished report.

Bernstein, I. 1985. *A Caring Society*. Boston: Houghton Mifflin Company. Blake, A. Papers. Marin County Historical Society (California).

Carr, E. 1998. Wilderness by Design. Lincoln: University of Nebraska Press. Civilian Conservation Corps. RG 79. National Archives, College Park, MD.

Clements, T. 1993. Mount Tamalpais Mountain Theater. Unpublished paper, University of California, Berkeley.

Cranmer, George. Papers. Colorado Historical Society, Denver.

Cutler, P. 1985 *The Public Landscape of the New Deal*. New Haven: Yale University Press.

Denver, City of. 1992. Factual data on Red Rocks. Department of Theaters and Arenas, Denver. Duplicated.

Ferguson, J. R. 1996. The Civilian Conservation Corps. *Historically Jeffco* Summer:2-6.

Garden, Mary. 1911. *How Red Rocks Came to Be*. _____.

Gleyre, L.A., and Alleger, C.N. 1936. *History of the Civilian Conservation Corps in Colorado*. Denver: Press of the Western Newspaper Union.

Good, A. H. 1990. *Park and Recreation Structures*. Boulder: Graybooks. (reissue of 1938 United States Department of Interior publication)

Jellicoe, G., and Jellicoe S. 1995. The Landscape of Man. London: Thames and Hudson.

Knight, E. 1959. Mountain Theater on Mt. Tamalpais. *Landscape Architecture Quarterly*. October, 1959:5-9.

McClelland, L. F. 1998. *Building the National Parks*. Baltimore: Johns Hopkins University Press.

McEntee, J. 1940. *Now They are Men*. Washington D.C.: National Home Library Foundation.

McLaughlin, S. C. 2001. Conversation with Linda Jewell. Berkeley, CA. October.

Morse, Martha. 2002. Telephone Conversation with Linda Jewell. January.

Morse, Stanley. Papers. Denver Public Library.

Moss, A. 1988. Denver Mountain Park System. Unpublished Nomination to the National Registry of Historic Places.

Mountain Play Association. Papers. Marin Historical Society.

Mumey, N. 1962. *History of Red Rocks Park and Theater*. Boulder: Johnson Publishing.

National Park Service. 1988. National Register of Historic Places Continuation Sheet, Red Rocks Park.

Newton, Norman.1971. Design on the Land. Cambridge: Harvard University Press.

Pollstar. 1990. Concert Industry Awards. No. 5:2

Rose, N. E. 1994. *Put to Work: Relief Programs in the Great Depression*. New York: Monthly Review Press.

Wirth, C.L. 1980. *Parks, Politics and the People*. Norman: University of Oklahoma Press.