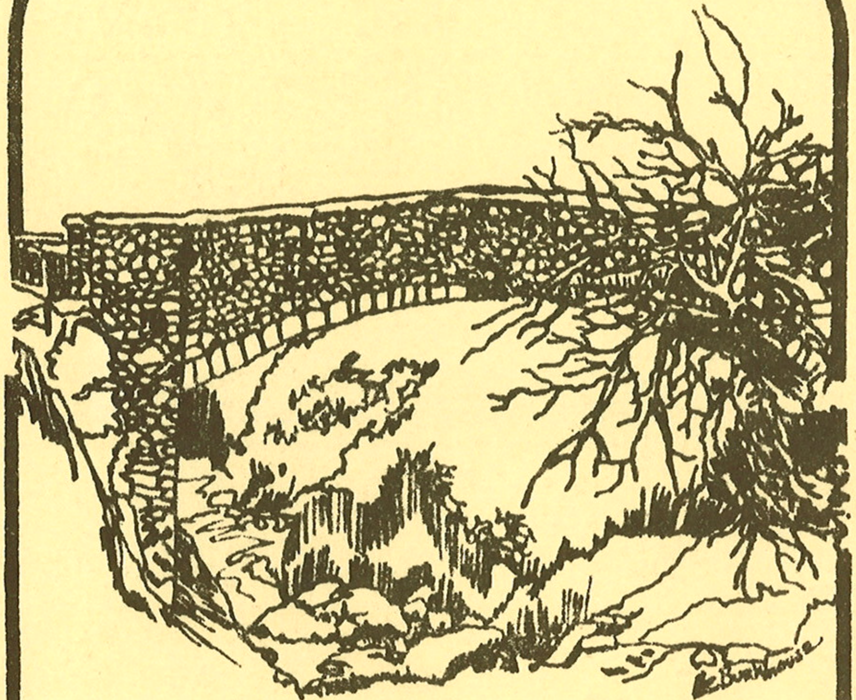
San Jose Parks & Recreation



Alum Rock Park Cultural & Natural History

Carl W. Stewart

CULTURAL and NATURAL

HISTORY of ALUM ROCK PARK

Submitted by

Dr. R.J. Hartesveldt
Dr. H.T. Harvey

to

City of San Jose

December, 1972

FIELD STUDIES and REPORTS
submitted by:

Glenn Harris -- Field Coordinator

Bill Bruener and Richard Heim -- Soils

Jim Harvey -- Fish

Harry Reeves -- Water Quality

Rick Main -- Insects

Roger Dockter -- Geology

Richard Paul -- Vertebrates

Dave Kemp -- History

Mike Brady -- Birds

Dave Powers -- Vegetation

TABLE OF CONTENTS

FIGURES

MAPS

TABLES

INTRODUCTION

Alum Rock Park, located in the foothills on the western slope of the Mount Hamilton Range in Santa Clara Valley, California, lies between 37° 24" North latitude and between 121° 47" and 121° 50" West longitude.

It occupies an area of approximately 700 acres between the north and south ridges which comprise the lower portion of the watersheds of Penitencia and Aguague Creeks. Topographically speaking, the majority of land in the park is composed of steep slopes; only a small portion of the land is level, or nearly so. The lowest point of elevation is that at which Penitencia Creek leaves the park at approximately 280 feet above sea level. The highest point is the top of the knoll directly above the confluence of Penitencia and Aguague Creeks. The elevation here is approximately 1325 feet above sea level.

Alum Rock Park is a significant asset to the park system of San Jose and to the people of Santa Clara County. This unique geological feature, with its perennial stream, varied wildlife and vegetation, extensive hiking and riding trails, and opportunities for people to become closer to nature, should be considered as one of the most prized possessions of the city of San Jose. Few large cities can boast such a remote and rugged area just a scant seven miles from the center of town. Few people of other major cities have had the foresight to preserve such areas for the future use of its citizenry.

Over the years, the Park has suffered from neglect and now stands sorely in need of restoration and protective management. Many of the features of this Park, both natural and historic, have been eroded by nature and vandalized by man until much of the value of the Park has been lost. This Park cannot be maintained and protected, as the City is aware, as just another urban park of lawns and park benches. In order for it to survive as a place to relax, a place to recover from the demands of our society, and in order not to become just another backwater area that can be used freely as a racetrack or a dump, this Park must be recognized as a unique natural resource which may be considered as maintainable but hardly renewable. The Park, however, has not received sufficient concern as an important ecological entity nor the directional management that is required for the full utilization of its intrinsic potential. Once the ecological balance of the Park has been destroyed it may be extremely difficult to restore. Hopefully this situation will soon be changed. Recent decisions by the city of San Jose to begin the restoration of the Park, and to determine its present condition in relation to what is desired of it, as reflected in part by this study, suggest that the Park may become again what it once was--a desirable place for families to relax and learn something of nature.

In 1912, a study not unlike the present one was prepared by a Mr. Stephen Child, a landscape architect and consultant in city planning from San Francisco. This old study was also of a planning nature and it also made extensive recommendations for future Park use. It is interesting to note that quite a few of the comments and recommendations made then are very similar as those made in later pages of this report. It would appear that many of the problems discussed in 1912 are virtually the same problems of today, but which, with time, are now more serious than then. It may well be significant that this study was conducted just 60 years following the first one. The reasons behind the lack of implementation of the Child recommendations are not known at this time.

In closing this introduction, it is appropriate to quote from the Alum Rock Park Proposal prepared by Youth Science Institute in 1971, the following objectives for Alum Rock Park:

> OBJECTIVES for Alum Rock Park are here considered in terms of meeting responsibilities to the present and future ENVIRONMENT, COMMUNITY, and INDIVIDUAL.
>
> ... to the ENVIRONMENT:
>
> 1. By restoring Alum Rock Park to a condition of ecological balance.
> 2. By maintaining the ecological balance of the Park while enhancing its role in community life.
>
> ... to the COMMUNITY:
>
> 1. By demonstrating responsible leadership.
> 2. By providing opportunities for safe, pleasurable, and informative ways to utilize the Park.
> 3. By making available environmental-educational opportunities for the general public as well as for local schools.
> 4. By re-establishing the more worthy image of the Park which in turn will contribute to San Jose's image.
> 5. By continually evaluating Park programs and needs in relation to fulfilling its role in community life.
>
> ... to the INDIVIDUAL:
>
> 1. By helping the individual to gain a more realistic attitude about the environment and his relationship to it.
> 2. By helping the individual understand it is possible to enjoy the Park's resources without damage to those resources.

This report on Alum Rock Park is here presented basically in two sections: the Cultural History and the Natural History. The Cultural History includes all cultural aspects up to, and including, the present. There are also historical sections used as introductory material to portions of the Natural History section. The authors felt that many natural aspects of the Park should include historical details relating to this aspect and so these details were not relegated to the history sections.

The references are included at the end of each section for easier use by the reader. They are numbered, and are referred to in the text by that number. A reference appearing in the text as "(5:16)" would refer to the sixteenth page of the fifth bibliographic reference at the end of the section.

CULTURAL HISTORY

Alum Rock Park has a long and colorful history. There are many details of this history that have become obscured by time and have not been located at this writing. This discussion of the Cultural History of the Park for the first time collects this material into one volume and presents it for the use of the people of San Jose. While this material is admittedly incomplete, we of the study team hope that the information presented here will stimulate added public interest in the history of the Park and that further attempts will be made to add to this historical account.

<u>Brief History</u>

The history of Alum Rock Park is marked by several distinct stages. There have been periods of over-use, others of neglect; it has been both abused and mis-used at various times, all of which has left the park with a checkered reputation which is not altogether deserved.

It is not difficult to criticize certain generations of San Joseans for their actions (or non-action) within the Park, although such criticism is not entirely justified. People have acted in a manner consistent with their particular society, resulting in the Park's condition a reflection of the times. The formality of the 1890's is mirrored in the rapid construction of baths and pavilions which occured in that period, while America's love affair with the automobile hastened the demise of any public transportation to the Park. The trying times of the Great Depression and World War II meant further neglect of the Park, as much as the prosperity of the post-war period brought in throngs of picnickers and other pleasure seekers.

Of the many things which have occurred with respect to the Park, some should be classified as important milestones in its development. The initial concern of the City fathers during the 1860's insured that the Park would belong to the people, and not fall into private hands. The development of the springs and baths in the 1890's, along with the railroad, was the next item of import. The Park was then both accessible and popular. The floods of

March, 1911, were devastating and forced a rebuilding program, and a study known as the Child's Plans of 1912 and 1916, which was the basis of the Park's present physical layout. Important in this period was the extension of the broad-gauged street railway into the Park, making it a popular spot for Sunday afternoon outings.

The Park then fell into a long period of non-use owing to the growing popularity of the automobile, and to the Depression and war which followed. Railroad service into the Park was finally stopped due to the small patronage, and because of the fact that people were more concerned with survival and security than recreation. Any hope of public funding for Park improvement was difficult to impossible. Some improvements were made through the WPA.

The prosperity of the post-war period brought the last era of popularity to the Park. Use of the facilities was so heavy that the Park was taxed far beyond its capabilities to recuperate. Unfortunately, the heavy use was concentrated in one area near the Natatorium. This period came to an end in the early 1960's, due in part to a change in recreation habits of the public, which preferred to drive greater distances to places with a less formal setting, and partly to a growing reputation that the Park was a hang-out for gangs, a place where robberies, rapes, and fights were common occurrences. This reputation is not entirely deserved, but has survived to this day. A recent warm Sunday brought a total of only twelve people to the Park, a far-cry from earlier years, and a sad situation, indeed.

The future of the Park is somewhat brighter, though. It appears that the City intends to use it as a living, Natural History

Museum, with the Youth Science Institute as a base. It has been suggested that displays be set up at various places in order to decentralize the visitor population. The most serious problems plaguing the Park have resulted from the concentration of people in a rather limited area. Trails are planned and should be developed into the back areas of the Park in order to facilitate the decentralization. Posted nature-walks in the remoter areas would serve good purpose in this respect.

From the standpoint of history, it is suggested that the City establish some sort of archive where historical items can be safely deposited and that they be collected from all possible sources and accessioned under a common procedural policy. There have been times when it appeared that the retention or destruction of a particular item was left to whomever cared to make an effort in that direction. Such a policy is not conducive to the best interests of the citizens of Santa Clara Valley. Records of the City took a beating during the WPA Historical Records Survey, when many of the documents disappeared as souvenirs. All that exists today is a reference that the item existed. It is impossible to find the contents of some of them. As many of these documents and photographs still exist it would be wise for the City to issue an appeal for their donation to the City Museum or Archives.

The result is that any history of the Park must now be based largely upon fragmentary and second-hand data. It appears that most of the accounts of the Park were only copied from previous accounts. The situation is unavoidable, and much of this report was done of necessity in a similar manner. An attempt was made to overcome the exaggeration that sometimes occurs in local newspapers and Chamber of Commerce reports. However, because of the lack of more authoritative accounts, it is suspected that this historical presentation is influenced or colored by the claims of earlier eras.

Origin of Park Name

There appears to be some basic urge in the human species which insists that everything have a label. Alum Rock Park has had numerous titles during its existence, as has the stream which flows through it. Originally, the Park was known simply as "The Reservation", or the "City Reservation". On one or two occasions, there was a reference to the "Penitencia Reservation" in the City Council Minutes, but only as an unofficial title. The first official mention of "Alum Rock" was found in the Council minutes of June 6, 1890, p. 275. The name "Alum Rock" was taken from the rock at the point where the canyon narrows. This rock was supposed to be composed of "alum". It was named by John Martin Ogan (date unknown), who gave the name to the entire canyon (69:5). The exact date at which the area became known as "Alum Rock Park" is obscure, but it was no later than the turn of the century. By that time, most maps and official references used that name, but some continued the old "Reservation" title.

The creek that runs through the Park was known to the Indians as Shistuk, or Shestuc. The Spaniards called it Aguague or Aguaje (literally: Watering Place). They also gave that name to the Guadalupe River in the first Pueblo where it was diverted for man's use. There was also a creek called La Penitencia near the present boundary between San Jose and Milpitas, where the Friars used to go for Penance, which the Indians called "Yukisma". Somewhere in the

Americanization of the area, the name Penitencia was transferred to the Aguaje, and it has been known as Penitencia Creek ever since (59:203). There have been a few occasions where the name "Alum Rock Creek" has been attached to the stream, although not in reliable documents, but mainly in promotional papers such as "Sunshine, Fruit & Flowers" (54).

Park Area

Determining the Park acreage would appear to be a rather simple matter in view of the fact that records and histories of the area are so plentiful; yet such is not the case. Estimates of the Park area range from less than 400 acres to about 1000 acres. Following is a listing of the various estimates portraying widely divergent estimates over the years. It should be kept in mind that acquisitions of land were made for the Park in 1875, 1904, 1928-29, and 1937 that account for a portion of the discrepancy.

There are two recent estimates which still reflect the uncertainty of the Park area, 776.8 acres, and the other, 700.78 acres, of which the latter appears the more reliable. This figure is based upon a city map that lists areas by deed and page numbers, giving the acreage of each. The boundaries of this map appear to coincide exactly with the map that was prepared in conjunction with this study. Assuming that the figures given are correct, they total 630.55 acres in the main part of the Park. Adding the 68.63 acres at Cherry Flat, and the 1.5 acres at the various springs acquired in 1904 (see land section), the total area is 700.78 acres. It would appear that the higher figures are either due to error in totaling the individual parcels, or were derived through Chamber of Commerce usage.

Following is a listing of the various acreage figures according to date and source:

Acres	Date	Source
"several hundred"	21 Apr 1907	San Jose Mercury-Herald, p. 20
less than 400	7 Apr 1873	Minutes, City Council (43)
399.82	28 Mar 1867	Bk "A" of Maps, County Survey Office, p. 53
about 400	1876	Thompson & West, p. 14 (24:14)
400	1887	Santa Clara County, Vol. I, No. 1 (58)
400.55	28 Mar 1867	Bowen's Survey, used in the Act which established the Park in 1872
400.55	13 Mar 1872	Daily Alta California, 2 Apr 1872 (70:13) and City Ordinances (42), quoting Section 63 of Act of State Legislature
410	1871	Hall (19:187)
450	late 1850's	"Peninsular Living", (33:10)
460	1916	Robinson's Intro. to Child's 1916 revised proposal, (12)
460	ca. 1916	Sawyer, (59:203)
500	Mar/Apr 1904	"Seeing San Jose and the...", (60:10)
580	1896	"Sunshine, Fruit and Flowers", (54:43)
580 plus other sources to 1000	present	Card in California Room, San Jose Public Library
600	Jun 1912	Child, in Mercury-Herald, 30 Jun 1912
some 600	1912/1916	Child's Proposal, (12:6)
over 600	1921	Chamber of Commerce, (51)
627	1912	Map accompanying Child's Proposal, (12)
629	10 Oct 1933	Chamber of Commerce, (46)
678	1 Oct 1972	"California Today", Mercury-News, p. 12
687	26 Sep 1970	"Peninsular Living", (33)
687	1956	Park Handbook for Employees, (39)
687	1946	Chamber of Commerce, (47)
700.78+	present	Map of Park Boundaries, (78)
716	present	Association of Metro, San Jose (card)
716	ca. 1930's	Chamber of Commerce, (48)
776.8+	present	File card, Parks Department
810.722	1912	1912 Map, reproduced by Planning Comm., (76)
1000	1904	Chamber of Commerce, (50)
1000	late 1912 or early 1913	James & McMurry (26:150-164)
about 1000	1922	Sawyer, (59:205)

Land

The land that is now Alum Rock Park was acquired in stages and by various means. The original titles prior to 1872 were rather vague, but establishment of the Park by the State Legislature settled the problem. All new land after that was acquired by purchase, with clear title and at surprisingly low cost.

The basis for the original claim is the grant to the Pueblo de San Jose de Guadalupe by Governor Felipe de Neve on 22 July 1778 (9:31) under the provisions of the Recopilacion de Leyes de los Reynos de las Indias, Lib. IV, Tit. V, Ley 6 (19:334). There has been some discussion as to whether the grant was from Phillip II or Charles III, as a grant technically is made by the King. Phillip II wrote the ordinance, but since he died in 1598, he knew nothing of San Jose. Charles III was King at the time of the founding of the Pueblo. The provisions of this ordinance stated that each pueblo would be entitled to "cuatro Leguas en candro". Translations of this varied. Some took it as four square leagues, while others read four leagues square, a substantial difference (16 square leagues, or approximately 48 square miles), (30:370). The struggling Pueblo did not exercise its right to the land because simple survival required all their efforts in the early days.

When California joined the Union, one of the Acts of the first State Legislature, which met in San Jose, was to incorporate the City of San Jose on the 27th of March 1850, with the City attaining all legal rights and claims of the Pueblo (19:335, 17:46). On 9 April 1850, the City pledged all Pueblo lands to a land company as security for a loan obtained to build the legislature building (57:145), and (17:46). This is known locally as the "40 Thieves" case, which is pertinent only in that it caused the City to research and survey its property. An ordinance was adopted on 31 March 1851 by the "Common Council" appointing a commission to obtain whatever information it could regarding the original grant, and Mayor White called for the City attorney to conduct a thorough search of all archives in San Jose, Benicia, Monterey, and if necessary, Mexico for an authentic copy of the grant in order to establish the title of lands belonging to the City outside of the boundaries of the established town (30:366, 369). The decision came down from the U.S. Land Commissioner in the land company case on the 5th of March 1856 confirming to the City four square leagues, measured one league in each cardinal direction from the City Plaza (a league is approximately three miles) (19:336). The Council asked the City attorney to study the decision (43:86, M.O. 20, 11 Feb 1856), and he found a loop-hole that later proved to be valid as follows:

The Recopilacion had a provision that if a square tract of land was not possible, the grant extended to the summit of the first range of hills. Since the Missions of Santa Clara and San Jose had land which precluded the boundary from extending one league to the north, the City filed in district court for land under this provision. The district court, on 6 August 1857, reversed the Land Commissioner's decision pertaining to the boundaries, and granted to the City lands which were described in part as follows:

> Beginning at a point in the woods, at a live-oak tree on the dividing line between said Pueblo and what was formerly known as the lands of the Mission of San Jose, and if said tree is gone, where the same was in March, 1838: running thence a southeast course which

passes through the mountains that are called Las Buellas, Pala, San Felipe, Las Animas, and Agua de las Llagas, to a monument of stone erected in March, 1838; and having reference to all the landmarks on this line, and to the stone in the middle of the Pala. This line is in length eleven and a half leagues, ..." (19:338).

This partially answered the question of land ownership in the area although the rather interesting method of using a tree which may have died, and whose identity may have been lost in the 20 years span of time, left some doubts regarding ownership which was not completely settled until 1872 when the State Legislature officially created the Park.

The U.S. Supreme Court confirmed in mid-1866 certain Pueblo lands to the City (43:348, 4 June1866 and 19:342), which then proceeded to set up a survey of the lands. On 13 September 1866 the Common Council passed the following resolution:

"Resolved that the Committee on Public Buildings and Lands procede (sic) at once to cause a survey of such parts of the lands on and in the vicinity of the Penitencia Creek, as they may deem sufficient and necessary for the purpose of being set apart, for all time to come, as a public park" (43:376). This appears to be the first concrete evidence of official City involvement in the Park.

The survey was begun on the 9th of July 1866 by G.H. Thompson, Deputy Surveyor, under instructions from L. Upson, U.S. Surveyor-General for California (19:480). This survey report begins:

"Commencing at a point on the Guadalupe river, as near as could be ascertained where the last live-oak on said river was in March, 1838, and which is the same point described in the decree as the termination of the northwest boundary line of the Pueblo Lands (all traces of said tree are now gone, but the point established is well known to be about the point where it formerly stood), at which point is set a redwood post, marked "P.S.J.l." Thence from "P.S.J.l." in the direction of a live-oak tree in the mountains, which is plainly seen from this point, N. 61½ deg., E. 554 chains (variation 16 deg. E.), to a live-oak about 20 inches in diameter, standing on the summit of a rocky chemisal point on the west side of the summit of the ridge..."

Noticeable in this description, and the one previously quoted, is a reference to March, 1838. The only thing that could be found on this subject was that at that time an attempt was made to complete the first survey of San Jose. The Governor ordered 3 men, William Guilnac, Guillermo Castro, and Salvio Pacheco, to make a map of the lands. They undertook a survey, but no record appears of them ever reporting back to the government. The first known completed survey of San Jose, and also the first correct California survey, was conducted by William Campbell and his brother in 1847 (55:#72: 49).

A report of the approval of the Thompson survey by the U.S. Surveyor-General for California appears in Council minutes on 21 January 1867 (43;427). To establish the proposed Park, the City had the county surveyor, J.J. Bowen, make a survey of the Park which he determined to be 400.55 acres, on the 28th and 29th of March, 1867 (42:349, M.O. 3, and 70:1, 2 Apr 1872). This survey was the basis for the Park as established by the State Legislature in 1872.

The 1866 survey brought the issue of Woolsey Shaw to light. Shaw had been purchasing and appropriating land to the east for some time. He had by this time a ranch of over 700 acres, the "Alum Rock Ranch" (59:205). He was still buying property from the City (exact parcels not known as of this writing) as late as March, 1868 (43:63, 24 Dec 1867, and 43:76, 2 Mar 1868). The City, in the early 1870's felt that about 450 acres of the Park property belonged to them, and thus filed suit to recover it from Shaw and Stratton, to whom Shaw had sold a hotel which had been constructed on the site in the meantime (33:10 and 59:205). (See section on Hotels.) The suit was decided in favor of the city, and the 13 March 1872 Act of the California Legislature which gave the Park to the City precluded any further threat to the Park.

From this time on, title to the Park remained quite clear. On 13 March 1872, the California Legislature approved an "Act to Re-Incorporate the City of San Jose" (70:1, 2 Apr 1872). Pertinent to this paper is Section 63 which is quoted in Mayor's Docket and Ordinances:

> All that certain tract or parcel of land situate and lying in the County of Santa Clara, and State of California, and being a portion of the Pueblo lands of the City of San Jose and commonly known as the "City Reservation" and containing 400.55 acres as surveyed by J.J. Bowen, County Surveyor of Santa Clara County, March 28 & 29th, 1867, be and is hereby declared a Public Park: the Mayor and Common Council of said city are hereby authorized and empowered to pass such ordinances as may be necessary for the preservation of such Reservation or Park for public use; but said Mayor and Common Council shall have no power to sell or dispose of or alienate the said Park or Reservation; provided, however, that said Mayor and Common Council may lease the same for a term not exceeding ten years, upon such terms and conditions as they may deem proper, but such lease shall not authorize or permit any use or diposition (sic) of said Park or Reservation as to prevent the free use thereof during the existence of such lease, by the people of said city as a public park (42:349).

The Mayor, A. Pfister, greeted the news with less than enthusiastic acclaim, feeling that it would cost the people too much. In his Annual Message to the Common Council he said:

> "...It appears that the Legislature, in its wisdom, have not only determined that we shall have a reservation upon the Penitencia Creek of 400 acres, for a public park, but that we shall have a shady avenue, leading from our city to the park. While many of our citizens--including myself--were not anxious to have so much greatness thrust upon us, it becomes our duty to avail ourselves of all the advantages which may accrue to our city be the investment of the money which we will be compelled to expend in the

> carrying out of the project; I would therefore recommend that your Honorable body determine some plan by which the park may be leased to some responsible party for a number of years, upon such terms as will secure its improvement and under such restrictions as will permit the use of a portion of the grounds by the public, and reserving to the city the right of according to the sick and needy the privileges of enjoying the benefits arising from a free use of the sulpher springs." (42:350)

A Commission was established by the same Act to build Alum Rock Avenue, which was financed by a special ten-cent tax over a four-year period. The road was paved with large red adobe bricks and was tree-lined on both sides. Quite an impressive avenue, according to later visitors. Little development was undertaken in the Park prior to the late 1880's.

On 4 January 1875, a 5.6 acre tract with an impressive view called Buena Vista Point was given to the City (actually sold for $5) by Cyrus Jones, L.A. Hicks and General Giles A. Smith (26:120 and 59:203). The turn-out for this lookout still exists, although it was closed to vehicles by Parks Director Roy West some years ago because the car lights disturbed the residents downhill. It is on Alta Vista Way, near Miradero, just below the water tanks. This tract included most of the hillside where the one-way road leaves the Park to join Crothers Road.

A later purchase of isolated areas around some of the springs and certain Riparian water rights areas totalled approximately an acre and a half. The purchase was made from Minnie and Calvin Miller on 9 July 1904, for the sum of $4500 (Park Department Records).

The area of the Cherry Flats dam and reservoir was purchased from the Grant Company of 6 August 1928 and 29 April 1929. The parcel consisted of 68.63 acres, and was priced at $6863, or $100 per acre. The dam was completed in 1932, solving the constant problem of flood and drought that recurred each year.

The final portion of presently-owned property in the park was purchased for $2500 from Lillie Crothers on 18 December 1937. This was of 14.07 acres, and is believed to be the remaining portion of the south slope, controlling the remainder of the one-way road (Park Department Records).

Hotels and Leasing

Much of the early development of the Park was done with an eye toward building a European-type spa. It was logical that a hotel be placed near the springs, considering the life-sytle and transportation of the times. A hotel did, in fact, appear and was a point of major consideration for replacement for many years after its demise.

The particulars of Woolsey Shaw's land claim over the Park land and the City's recovery of it is covered in the section on Land Acquisition. Pertinent to this part is that sometime between the late 1850's, when he started acquiring the land for his "Alum Rock Ranch (33:10 and 59:205) and 13 March 1872, when the State Legislature approved the new City Charter and gave the Reservation to the City (70:1, 2 Apr 1872, pl:3), Shaw built a small and reportedly "comfortable" hotel in a nook among some large oaks, (58:23). The exact location was about where the present concession stand is located, or somewhat to the east of that (74 or 75). Sometime later, the City filed suit to recover the land. Shaw sold that portion of the Ranch which contained the hotel to J.O. Stratton, who made more improvements and continued building bath houses, etc. to develop a commercial spa. The legislative act which gave the Park to the City settled the matter in 1872, although Stratton was still appealing for a stay of writ 18 months later (43:380, MO 22, 6 Oct 1873).

With the question of City ownership of the land settled, the hotel and springs became subject to lease, usually on a yearly basis (59:205). Stratton apparently saw the handwriting on the wall as early as summer of 1869 and began applications to the City for a lease of the Reservation (43:160, MO 22, 16 Jun 1869). Shaw stuck to his guns throughout, but finally applied for a lease on 16 June 1872, following the legislative action (70:1, 16 Jun 1872).

Stratton offered to give up his claim to the title of the land, provided the City reimburse him for the cost of his improvements. His contention was that he had purchased the land and hotel from Shaw in good faith, there was no fraud intended, and while the City had no obligation to pay for his loss in land purchase, he felt that the improvements which he had made, and which were now being used by the City, should, in all fairness, be paid for. He asked $3000 for this. After much bickering, the Alum Rock Park Commission decided that he should be allowed $1000, which was the cost of the materials involved. Stratton agreed to this settlement, but ran into trouble when he applied to the Common Council for the money (59:205). After six weeks of bickering about the amount, the Council finally allowed that he was entitled to $1000, but that the Park Commission should pay it. They considered the matter to be out of the Council's jurisdiction (43:587, MO 22, 6 Sep 1875; 43:592, MO 22, 13 Sep 1875; 43:600, MO 22, 4 Oct 1875; 43:606, MO 22, 25 Oct 1875).

Year after year, Stratton applied to the Council for the money, and year after year the Council refused. Stratton died without having received a cent for his claim. His heirs did not press the issue, and the matter thus died with Stratton.

Although dispossessed from title to the land, Stratton continued to operate the hotel for a number of years as lessee. No records appear to exist which would indicate whether Stratton's venture was successful or not, but there were few applicants for the lease until 1889. The hotel's existence was ignored by many, in fact an 1871 history calls the place "unimproved" (19:187), while another, of 1876, claims that a "magnificent hotel is to be erected on the grounds" (24:14). Mayor Murphy, in his annual message to the Common Council in 1874 or 1875, called attention to the movement then current to build a hotel in the Park (42:440 undated). It is assumed that Stratton's hotel had but a few rooms, while the clamor was to build a more ambitious establishment, possibly on the order of the Hotel Vendome. It is doubtful that the attendance at the springs would have justified that sort of venture before the 1890's.

The first mention of the hotel and springs in the City Directory was in the 1887-88 Edition (43). At that time, the springs were leased and managed by George B. Poppelwell, who resided at the hotel (13:347). The initial issue of a local magazine (Santa Clara County) which was started in 1887 gave mention to the hotel and springs as points of interest in the county (58:23). Unfortunately, the periodical folded after the first issue.

There is little remaining record of activity in the Park prior to the summer of 1888. It is assumed that during this period the springs and hotel were a rather limited operation. On the 18th of June 1888, the Construction Committee of the Common Council recommended that a new bath house be constructed by the city to replace the "old and inadequate" facilities, and that the fresh water capabilities to the hotel be increased (43:36, 18 Jun 1888). The City Architect (Page) made the plans and specifications for the bath house, providing for a stone foundation for the building. This was accepted by the Council and the matter was advertized for bids on 9 July 1888 (43:45, 9 Jul 1888). The contract was awarded to J.E.

Clinton, who submitted a low bid of $2892 (43:53, 23 Jul 1888). In a later biographical sketch (1904), Jacob Lenzen is credited with the construction of the bath house, having drawn the plans, supervised construction, etc. (18:795). In consideration of the fact that many biographical sketches in those days were written by the subject, or his family, and adding the fact that payments were made by the Council to Clinton, it appears that Lenzen may have contributed much time and effort to the erection of the baths, but they were built by Clinton.

It was decided by the Common Council that the hotel, bath house and springs should be leased for a period of one year, beginning on 1 January 1889, and advertisements for bids were put out by the City Clerk (43:112, MO 26, 17 Dec 1888). The bids were opened on the 28th of December, with the highest being from Harry Loryea for $100 per month, and he was granted the lease under those terms (43:116, MO 26, 28 Dec 1888 and 43:122, 7 Jan 1889). He proved to be the last person to operate the hotel. Loryea was listed as "Proprietor" of the hotel in the 1890-91 Edition of the City Directory (52:260, 843), but it is likely that he was proprietor in the sense of manager, rather than in the sense of owner. Apparently the enterprise was enjoying some measure of success, as during the year 1889 several people petitioned the City to be allowed to lease the area for terms up to as long as ten years (43:209, 29 Jul 1889). A Committee of three Council members was formed to determine what terms, conditions, and length that any lease should have (43:249, 21 Oct 1889). The issue continued past the year's end, until it became a choice between Loryea and H.F. Plummer, who both bid $1200 for a lease covering one year.

The decision was made on 24 February 1890 to give the lease to Plummer, who was to also make improvements to the extent of $100. With this, the clerk was instructed to notify Mr. Loryea to deliver possession on 1 March 1890 (43:291, MO 26, 24 Feb 1890). Loryea duly surrendered the property to the Chief of Police when notice was served, and a man was reportedly placed in charge of the premises by either Loryea or the Chief (43:294, 3 Mar 1890). On February 28th, 1890, the hotel burned to the ground (72:1, 29 Feb 1890). Apparently no one suspected foul play, and the $2500 insurance on the building was promptly paid to the City (43:303, 24 Mar 1890). Loryea was permitted later by the City to remove some 30 cords of wood which he had stored at the site (43:337, 9 Jun 1890).

The bath house which remained was then leased to Dennis Hunt, but many complaints were received about his management of the facility (43:302, 24 Mar 1890; 43:342, 23 Jun 1890; 43:345, 30 Jun 1890). The place was re-advertised and finally leased again beginning August first. A point of interest in this lease is that this one, and all that followed, had the provision that no liquors were to be sold on the Reservation (43:354, 21 Jul 1890). This was later incorporated into the City Codes, to include no consumption of any liquor on the property. Leasing of the baths continued until the Natatorium was constructed during the 1912-1916 building spree. The Natatorium was operated by the City.

The hotel area was fenced in to make a "deer paddock", which stood until a few years ago when the animals kept in this small "zoo" were moved to more spacious quarters in Kelley Park.

When the railroad was electrified at the turn of the century Park attendance increased greatly. Hugh Center, head of the railroad at that time, led the call for a new hotel to be built (72:3, 26 Jul 1902). Plans became fairly definite, and it was thought by most persons that a hotel would be built during 1903 (10:156). For some undetermined reason construction never started. Still, the Chamber of Commerce included the suggestion of a hotel in the Park as a "profitable investment for capitalists" in the information brochure on San Jose during 1904 (50: inside back cover). The matter dropped from sight after that, with the next, and last, mention being during 1913 when Charles Davidson (former Mayor) was rumored to be considering building a hotel on his property adjoining the Park on the southwest, near what is now the one-way exit road (72:8, 26 Feb 1913). The San Jose Mercury editorialized that a hotel in the canyon would be a "gold mine" (72:8, 26 Feb 1913).

Robinson and Child, in their proposal of 1912 for the Park, insisted that there should be no hotel on the premises (12:54). The City accepted their recommendation, and the Alum Rock Hotel issue has remained closed to this day.

Railroads

The railroads were both a blessing and a danger to Alum Rock Park. It cannot be ignored that the development of the railroads into the park were the prime cause for its popularity in those days. The railroads, being in business to make a profit, did all that they could to entice people to ride their line to the point where they felt that the Park was theirs to use and exploit as they wished. Fortunately for the people, the rail companies were usually kept in line by the City.

With the surge of rail construction throughout the area during the 1860's, it was inevitable that a line to Alum Rock Park would be considered. Hall, in his local history published in 1871, stated that a railway would soon be extended into the Park (19:187). By the year 1887 there were two lines into the Park, but the location of these has not yet been determined (58:85). The City had an ordinance under consideration relating to rapid transit (shades of the present!) into the Reservation on 5 November 1888 (43:97, MO 26, 5 Nov 1888), but no record can be found of the contents of the proposed ordinance.

The idea of a steam line to the park appeared in 1888 (27:37). A local wood and coal dealer by the name of Richard H. Quincy was the first to actually build anything of this sort. With minimal funds he obtained a franchise from the county on 6 April 1891, to construct a steam-dummy line of narrow gauge (3 feet) from the horsecar terminus of the SJC & SC at Santa Clara Street and McLaughlin Avenue (24th Street) (38:3). He began construction on 11 May and by 26 June had reached White Road and bankruptcy. One of the provisions of the franchise was that he contribute $3000 towards the repair of Alum Rock Avenue, alongside which he was building his line. This extra cost proved to be too much for his resources (26:138 and 27:37). Quincy gamely continued construction alone, by pick and shovel, until he obtained some financial support from John Center, a wealthy San Franciscan who put up $7300 and set up the incorporation of the Alum Rock Railway Company on 2 November 1893 (27:38). Unfortunately for Quincy, the market crashed shortly after and the nation entered a period of depression. Although Quincy remained as president of the Company until mid-1894, he accomplished little (52:49, 1894). John Center foreclosed the line and sold it (for $1) to a favorite nephew, Hugh Center, who obtained a new franchise in July, 1894, for operation into the Park (26:138). Hugh Center completed the line into the park in 1896, the eastern terminus being near the present junction of Penitencia Creek Road and Alum Rock Avenue, in the picnic area now known as Rustic Lands (77). The fare was 25¢ for the trip (27:40) which was known for the soot-laying characteristics of the engine which was apparently taken in good nature by the passengers (29). The rails were light, causing many derailments, although none of a really serious nature (27:40).

Hugh Center began to collect stock in the SJC-SC Line until he had enough to take control and consolidate the two lines on the

26th of April 1901 (26:151). In November of that year he started the electrification of the Alum Rock Line by constructing a gasoline-driven power house at the mouth of the canyon. This was said to be the largest on the coast at the time. Total electrification of the line was completed in April of 1902 (27:44). At some time between August, 1896, and the year 1900, the line was extended into the Park proper, with the new terminal being about where the present band-stand is situated. This was the depot that is seen in most pictures surviving to this day. The line was then affectionately known as the "Narrow-Gauge Electric" to the natives (26:138). The line proved popular with San Joseans and tourists alike, and carried capacity crowds during the summer months (72:4, 28 Jul 1902).

Hugh Center, who was quite powerful in part because of the success and popularity of his railroad, was now able to dictate some policy regarding the Park. This was not unique for a railroad president, considering the actions of the Southern Pacific, Union Pacific and others at that time in California. One example of his control was the successful blocking of dam construction for flood control in July, 1902. Water has been a problem in the Park ever since man can recall. The winter rains swelled the creek to unbelievable heights during wet years, and in summer the creek bed was often dry. The facilities for drinking water in those days were limited and thus created a minor crisis each year. Engineers proposed building a dam in the upper area to control the flooding and assure an adequate water supply for the summer, but the estimated cost was $25,000 to $50,000. Mayor Worswick was not enthusiastic about that large an expenditure, feeling that wells might be a partial answer to the problem.

Hugh Center became the deciding factor. It is not known why he opposed a dam, but he pointed out to the City that before he put in the electric road, the largest month's revenue from the Park to the City was $400, and June 1902 brought $1000. He hinted that City revenue would be $2000-$3000/month in two or three years _if_ (emphasis his) wells were drilled (72:1; 26 Jul 1902). The final result of this ploy was that the City waited until 1932 before the necessary dam was completed.

On 6 June 1903, the Alum Rock Railway had the one bad accident in its history, which caused three deaths, and several injuries. A rail car on the siding in the Park, without an engine, was being boarded by several passengers when it started rolling down the grade. For reasons never determined, the brakes failed to work when the conductor applied them. The grade from the depot in the Park to the canyon mouth averaged 3%, which is a substantial drop. The conductor estimated that the car reached a speed of 60 mph before leaving the track which may have been an exaggeration. The crash occurred on a sharp curve just west of the tunnel at Alum Rock. The car was demolished and people were thrown as far as forty feet in the air. Edwin B. Goodrich, Deputy Assessor and Proprietor of the stone quarry on Almaden Road that had supplied much of the material for Lick Observatory and Stanford University, was in the car and died of his wounds before they got him to town. Two others, including a small girl, died the next day in the hospital.

It was considered a miracle that more fatalities did not occur. The cars without engines were quite light, and the railroad at that time was still narrow-gauged (3 feet) (18:298, 455; and 72:1, 7 Jun 1903).

The first years of the new century were a time of expansive plans for the railroads. The year 1904 saw a proposal for an electric line to Yosemite Park and a company actually was formed to build a line from San Jose to the Lick Observatory on Mount Hamilton (26:152). More pertinent to Alum Rock Park was the appearance of Lewis E. Hanchett, who took over the SJC-SC Railroad and began to expand its operation. He broadened the gauge of the lines in town and proposed a new line to the Park by way of Berryessa (38:5). By mid-1906 he was well on his way toward acquiring the franchises and rights-of-way and would probably have completed a line into the park by 1908 if not for the depression of 1907 (27:50). That shelved the Alum Rock line for the time being.

The "Narrow-gauge Electric" continued as the sole public transportation into the park until March 1911, when nature decided against it. The line was antiquated by then, in serious need of repair or replacement by broad-gauged rails. In July 1909 the tunnel was declared unsafe because of creeping of the hillside. The supports were bending, and it was thought to be but a matter of time until the whole thing would collapse or slide into the creek. Spring floods of that year had rendered the lower bridge at the Park entrance practically useless, while the bridge at the upper end of the pass needed repair. Mr. Lawson, manager of the Traction Company (Hanchett's) proposed that the tunnel be wrecked by tearing out the hillside above it and establishing a rock-crushing plant in the pass with funds voted for that use some six or eight years previously (72:1; 22 Jul 1909). This was done, with the crushed rock being hauled to the City for use in street construction and repair.

Heavy rains fell on the state during March 1911, causing flooding which culminated in the closing of service from the mouth of the canyon to the bath house on March 5th. People using the Park then walked the canyon to the powerhouse at its mouth, caught a street car to Jackson Avenue where the tracks were also flooded, and then rode buses to the car barn at 26th Street where they caught the car into town (72:7, 6 Mar 1911).

The rains continued for several days, swelling Penitencia Creek to torrential proportions. The creek overflowed its banks on 6 March below the mouth of the canyon, creating flooded conditions all the way to its junction with the Coyote River. At Capitol Avenue the water stood three feet deep (72:1, 7 Mar 1911). The water level peaked on 7 March, sending an eight-foot wall of water through the railroad tunnel which wiped out for good the narrow-gauge line.

Total damage to the Park from the storm over the several days included: creek channel changes, hills eroded, four-foot bridges washed out, the Park water system completely destroyed, four wagon bridges destroyed, all railroad bridges washed away except the one at the powerhouse, one tunnel completely destroyed and the other rendered unusable, and the tracks and ties completely washed away in both of them. Many sections of the road were rendered unusable which resulted in the stranding of ranchers above the Park who used, as they do today, the Park roadway as access to their property. Some animals in the Park were killed. There is reference to the three crocodiles in the Park being killed (72:3, 8 Mar 1911), and thousands of fish were left stranded on the rocks to die when the water finally receded. One man reported finding a nine-pound "salmon trout" on the rocks near the mouth of the canyon. Other reports tell of trout washed ashore many miles below the park (72:4, 11 Mar 1911).

The effect of this flood in the canyon as far as the railway was concerned (also facility construction in the park) was that the slate was wiped clean. The issue of building a new standard-gauge line into the Park was forced. There was no need to consider the old line, as it no longer existed in the canyon.

Hanchett was so thoroughly discouraged by the loss of his line that he sold his various railroads to the Southern Pacific for more than $4,000,000, on 7 April 1911, and retired from the transportation picture for good (27:62). The Peninsular Railway, a subsidiary of the Southern Pacific, was chosen to take over the Alum Rock operation. Service continued on the narrow-gauge as far as the Toyon station, but a new road bed into the Park itself was necessary. The franchises and rights-of-way that Hanchett had were still good, and the Peninsular used these in their construction the following year (27:63).

The broad-gauge into the Park was built on a higher elevation than the old line, thus lessening the danger of washouts (38:7). General Manager Frank E. Chapin of the Peninsular Railway obtained a franchise to enter the Park from the City on 26 April 1912 (27:63). One of the provisions of the franchise was that the railway must carry freight destined for the Park free of charge. This necessitated a road bed designed for the use of heavy oil cars and the like (72:30, 3 Nov 1912). This right-of-way is presently used as equestian trails below Alum Rock, and as a foot path above. Near the mouth of the canyon where the bridges have been taken out, it lies unused. The new road was quite an engineering accomplishment, as there was no natural route in the canyon that could be used with a line of that size and equipment of such great weight. In the words of one of the workmen, it was "steam shovel all the way" (72:22, 3 Nov 1912). There were four bridges spanning the creek, with lengths of 210 feet (steel), 250 feet (curved), 170 feet and 180 feet (Ibid.). The concrete archway, which still stands at the junction of Penitencia Creek Road and Alum Rock Avenue, has a reported span of 260 feet, and pouring of its concrete required from early on a Tuesday morning to 11:00 pm Wednesday (72:30, 3 Nov 1912). This archway was one of the few concessions made by the railroad to Child's recommendations in that the surface was left alone, rather than being covered with a finishing layer of smooth concrete, as was the case in most construction of the day.

The new line was bally-hooed by the general manager Chapin who told of ambitious plans with statements such as, "The Alum Rock Road has all the earmarks of a transcontinental railway, and that is why we will be able to carry Pullman cars right into the very heart of San Jose's great natural park" (72:30, 3 Nov 1912). Others described how parties of tourists could have their private cars taken off the main Southern Pacific line at Niles, and then tour the Park, and on to Saratoga, Palo Alto and other points of interest within Santa Clara (72:22, 3 Nov 1912).

In a wildly glowing descriptive pamphlet written around this time (undated, but very likely between 1912 and 1917) was mention of a "meteor", possibly the largest in the world, with the promise that the train would stop there for large parties if requested. No notice was given to the repeated statements of scientists that it was not a meteorite. It went on to promise a first-rate hotel once again, with covered access to the baths; construction was to start almost immediately (56:8). The round-trip fare from San Jose was 25¢ (56:6). Perhaps the Peninsular had a reason to push the line as hard as they did; a great amount of time, labor and capital had been expended in its construction. Two miles of road, for example, cost $150,000 in one part of the canyon (72:30, 3 Nov 1912). People responded well to the advertising on weekends, but on weekdays it proved to be a white elephant. Fares were dropped to 10¢ one-way (38:7), and a brief attempt was made at using a gasoline-powered rail-bus in 1916, but the public failed to respond as hoped (27:65). The Line managed to stay at that level of usage through World War I and into the 1920's, making money on weekends and losing money during the week.

About at this time, the automobile was becoming popular, and with the better roads into the Park (again Child's plan)people preferred to avoid the railroad for personal convenience. The final blow to the railroad was the 1929 market crash, a fact which is not unique to the Alum Rock Railway. The depression was a determining factor which forced the decision to abandon the line in 1931 when losses of $13,000 were experienced (27:76). There was little opposition at the public meeting where it was announced that passenger service would cease and freight would be carried only to Noble Avenue and the line into the canyon was abandoned on 11 July 1932 (26:165 and 38:11). The rails remained for some years after, finally being sold to Japan through an Oregon scrap dealer on 27 November 1934 (27:79).

The old Narrow-gauge continued in service as far as the Toyon Station where a wooden bridge was built across Penitencia Creek for passengers to transfer to the Broad-gauge after its construction. Residents of the Linda Vista District finally forced the Alum Rock Avenue line to be standard-gauged, but that part between Alum Rock Avenue and Penitencia Creek (via Kirk, McKee, and Toyon) remained as a shuttle (72:6, 19 Aug 1913). The shuttle ran until it died quietly in 1920 (38:11).

Mining and Minerals

A goodly portion of the West's history consists of the continual struggles between society in general and the mining interests. Alum Rock Park is no exception. It is presumed that the hills of the Diablo range were targets of exploration by miners in the 1850's, as were numerous other areas of the State. The earliest known record that is definitely related to Alum Rock Canyon was a petition by W.F. Stewart, et al, to the City Council on 10 May 1869which requested the privilege of mining for Maganese (sic) upon the "Reservation". This was referred to a committee, but apparently permission was never granted (43:154, 10 May 1869). Three months later, the City did quit-claim certain manganese lodes and veins to a W.T. Hall, but it is not known whether this was on Park property or not (43:170, 20 Aug 1869).

The fact that there were minerals in the area was well known when the Park was established in 1872, as the San Francisco Chronicle of 13 January 1872 (pg. 2), speaking of minerals in the Bay Counties, reported: "In Penitencia Canon, near San Jose, are ledges of talc containing crystals of platinum. In the same vicinity is a heavy bed of black manganese, extensive deposits of alum, soda and indications of coal." Although petitions to prospect for minerals continued to plague the Council, all were denied.

The two greatest threats to the Park in this area of mining were

1. An attempt to prospect for and develop oil, gas, iron, and petroleum upon the Reservation by Messers Center, Greeninger, and Hatcher in 1900.

These were powerful and influential persons at that time. They offered to give the City 15 percent of the gross income. Even the San Jose Daily Mercury was against it (72:1, 4 Jan 1900). Fortunately, the request was denied. 2. A minor gold rush occurred in 1913 when J.H. Harrell reportedly found Porphyritic ore where the railroad cut through a ledge during the construction of the broad-gauge line. He filed a quartz claim of 20 acres, 1500 feet long, 600 feet wide. The ore was assayed at $45.42 per ton, which caused a rush to the hills when the news was made public (72:1, 23 Feb 1913). Several claims were filed over the next few days, mostly by three or four people in various partnerships with each other. The strike proved to be useless, however, as either the claim was too small for economic pursuit, or there are claims that the land was "salted" in order to stimulate interest falsely and to raise land prices.

A mining tunnel was discovered just beyond the Park boundary in 1911 which contained a complete set of mining tools; the gold ore, however, did not prove rich enough for economic development (72:2, 25 Feb 1911).

Sulphur mining has been scattered throughout the Diablo range since 19th century with the greatest activity in the east Oakland hills. Activities continued into the 1930's and 40's, but there is no indication of active locations within the Park boundaries.

Mention must be made of the "meteor" which served as an attraction for so many years. This was a huge boulder of manganese oxide about fifteen feet in diameter, which stood at the edge of the creek near the entrance to the Park. It weighed an estimated 2000 tons. Credit for discovery of the boulder is given to Al Bascom, date unknown (72:2, 17 Jul 1902). He acquired some adjacent land, thinking that he had a lode to develop, but then found that it was but the one boulder. The Peninsular Railway labeled it as the "Alum Rock Meteor", claiming it to be an aerolite which fell in remembered time, but scientists of the time repeatedly said otherwise. There was also record of some old inhabitant from the Spanish and Mexican eras remembering it there since earliest recollection (59:203). They indicated that their fathers and grandfathers remembered it there, also (72:13, 29 Jul 1917). The "meteor" served as a great attraction for the Park, which may be why the Park Commission did not take down the sign placed there by the railroad. The "meteor" came to an end during the Great War. Sometime during late 1917 or 1918, it was taken and melted down for its manganese to assist in the war effort. Additional information of the "meteor" can be found in the section on Geology.

There is no danger atthis time of any excavating or mining in the Park. The materials there are of too little extent to develop profitably. The City has held off all attempts during the years when conservation was not in vogue, and it is inconceivable that any mining would be allowed in this time of ecological concern.

The Child Report

In late 1909, Charles M. Robinson addressed the Outdoor Art League, answering critics of the Park's appearance with a call for funds and a systematic plan to develop and landscape the Park. Not very much was done at that time, but the disastrous flooding of March 1911 gave an opportunity to begin anew, so to speak. Stephen Child, a noted landscape architect and consultant in city planning, was engaged to develop a comprehensive plan for the Park's reconstruction. He submitted a tentative plan in May or June of 1912. His proposal was dated the 15th of May, but it was not reported in the local newspaper as submitted until 30 June (72:1, 30 Jun 1912). The plan had many points which the city adopted, at least in a modified form, and some that were not.

The major characteristics of the proposal included: extension of the Park to include the summits of the hills along both sides of the canyon, including some water rights in that vicinity; a parkway system along the Penitencia Creek, to the point where it entered the City near Mabury Road and King Road; construction of certain roads and trails to make the back area of the Park more accessible to the general public; concentration of the formal buildings and gardens in one rather limited area, and including a music court constructed on the pattern of the one in Golden Gate Park; a return of the balance of the Park to a natural state with vegetation limited to that naturally occurring there.

To a certain degree, the proposals were adopted. The formal music court, which was to seat 2500 people, ended up as a bandstand, while the pavilion and plunge were reversed in location. These two structures still exist, but are due for demolition in early 1973. Many of the trails that Child proposed were adopted, including the "Madrona" Trail to the Middle Mountain, the trails to the South Falls, both the one presently following the creek and the one which has been found in disrepair along the ridge just south of the creek bed. The concentration of formality in the music court area was followed, but turned out to be detrimental to the Park in later years.

Sadly, the land acquisition that he suggested, some 765 acres, was almost completely ignored. The area that he proposed for inclusion was the ranchland to the north of the Park, where he envisioned a road to the North Summit. The road was to follow the right-of-way for what was then called Lundy Avenue, now known as Boulder Drive, which is essentially closed off at Penitencia Road due to earth slippage. The road was meant to connect with Sierra Road, and so continue farther up into the hills. A South Road was to have been built along lines generally following the present Crothers Road for a distance, on land to be obtained south and west of the Aguague Canyon. Observation turn-outs were to be provided on each summit, North and South. An interesting factor in his proposal was that these two roads could be constructed as one-way roads, in his opinion. Child did not indicate whether the roads were to be one-way to or from the mountain-tops, nor did he say how the people were to make the return trip.

Other good features of his plan were doing away with some of the older, run-down buildings; eliminating some of the out-of-place things such as the Tea House, exotic plants in the main area, and poison oak near the paths, the latter being a problem as it is today. The plan was ahead of its time in the suggestion that all pipes and wires be placed underground; that only native plants be used in the planting; in suggesting the cleaning up of the creek, that no camping be permitted because of inadequate sewers; and that all commercial establishments, such as hotels, horse rentals and restaurants be kept outside the Park limits. He called for extensive use of ivy or other plants to cover the bare slopes in the shortest possible time. This was apparently done, judging from some of the hillsides today. At his suggestion, the railroad bed was adjusted in the vicinity of Alum Rock, and a concrete arch was used there instead of the proposed steel trestle. At the same arch, which still stands, the process of leaving the roughened concrete as the final finish was perfected. This was done rather than applying a false layer of smooth plaster or concrete to finish it off. Another interesting suggestion was to use poison oak in the rather inaccessible areas as vegetation to hold the soil on the slopes. However, he also proposed making all areas easily accessible to the public.

The most important feature of Child's proposal was the treatment of the area near the natatorium and pavilion. It was his intention to concentrate all formal structures and activity in this small area, leaving the rest of the Park in a relatively natural state. These eight or ten acres were to have most of the parking, playgrounds, picnic areas, swimming, and concessions. He made provisions for various service and social clubs to have facilities there. The Native Daughters of the Golden West did build their cabin near the natatorium, while the Sainte Claire Club Building was proposed on the opposite slope, halfway up the county road. The "Lions Den", that is the clubhouse of that fraternal organization, was to be included in the Park by purchase of the land upon which it stood.

In respect to concentrating all activity in one area, Child was successful. This has proven to be one of the problems of the Park today. This area is over-used, while the other parts are often scarcely used at all. The facilities exist in the area of concentration to this day to accomodate some 1500 people at tables, not to mention the additional tables available in the lower part of the Park. For many years, especially during the forties and fifties, throngs of people went to the Park for their picnics. Even the Depression did not dampen their enthusiasm, and more than 4400 cars were recorded in the Park on Easter Sunday, 1935 (45:?, 2 Apr 1935).

Child was also ahead of his time in proposing to make Alum Rock Park a part of a regional park concept. In this concept those parks on both sides of the bay would form a wish-bone, with Alum Rock at the juncture. The idea of regional parks has been carried out in the Oakland-Berkeley area, although San Jose did not participate in the program.

Revisions to the 1912 proposal were submitted now and then, mostly just to give more detail to a specific item. The first plan was based on admittedly poor maps, and therefore many trail and road locations were only approximate. By 1916, most of the development had been completed, so Child decided to revise and resubmit his proposal. His

1916 plan is the one that seems to exist most prevalently today, notably in the San Jose Parks Department and the Bancroft Library at U.C. Berkeley. Not much action was taken on the revision, however, probably due to the war in which the country was soon involved.

Not willing to go down without a last attempt, Child made a few more minor revisions, mostly to accomodate the automobile, and re-submitted his plan, at least in summary form, on 29 October 1929. Unfortunately, that particular Tuesday is historically remembered as the day that the bottom fell out of the stock market, heralding the Great Depression. That ended any chance of further plan adoption, and little more of his plan has been adopted to this day.

Historical Bibliography

1. Bancroft, Hubert Howe. History of California, Vol. VII, 1860-90. (Vol. XXIV of The Works of H.H. Bancroft.) Santa Barbara, Wallace Hebberd, 1970.
(Good background for the growth of the area during the period covered.)

2. Barrett, Dick. Dick Barrett, '66. San Jose, Harlan-Young Press, N.D. (A series of articles of local interest by San Jose Mercury-News columnist.)

3. ________. Dick Barrett, '67. San Jose, Harlan-Young Press, N.D. (Articles of local interest published during 1967.)

4. Bentel, Dwight E. and Freitas, Dolores. Stories of Santa Clara Valley. San Jose, Rosicrucian Press, ca. 1942.
(Stories of the area, good source for personalities in local history.)

5. (Bingham, Earl S.) Santa Clara County, California. San Francisco, Crocker, 1897.
(A souvenir of the 16th International Convention of Christian Endeavor, held 7-12 July 1897. Has some old Park pictures.)

6. Boone, Lolla Rookh. History of Santa Clara Valley, Spanish Period. Berkeley, Univ. of Calif., 1922.
(A master's thesis, gives good background on the Pueblo of San Jose de Guadalupe.)

7. Braly, John Hyde. Memory Pictures, an Autobiography. Los Angeles, Neuner Co., ca. 1912.
(Autobiography of a local citizen, gives quite vivid accounts.)

8. Brooke, John P. Natural Wonders in Alum Rock Park. San Jose, N.P., February, 1968.
(A one-page typewritten paper covering some of the natural formations in the Park, by an Assistant Professor of Geology at San Jose State College.)

9. Burnett, David M. "The Origin and the History of Land Grants in Santa Clara County," in Papers read before the Santa Clara County Historical Society. San Jose, the Society, 1911.
(A paper read on 14 December 1910 to the Society, giving background for the land title question in San Jose.)

10. Carroll, Mary Bowden. Ten Years in Paradise. San Jose, Press of Popp and Hogan, 1903.
(Reminiscences of a Society reporter, highly inaccurate, but a good place to start from to find Club support for the Park.)

11. Caughey, John and Laree. California Heritage. Los Angeles, the Ward Ritchie Press, 1962.
(An anthology of California history and literature. Not specific on the Park, but great for the Valley.)

12. Child, Stephen and Robinson, Charles M. A Plan for the Development of Alum Rock Park (Reservation) at San Jose, California. San Francisco, N.P., 1912 and 1916.
(A comprehensive plan by a noted landscape architect for the development of the Park after the Spring, 1911 floods. Originally submitted 15 May 1912, revised and re-submitted in 1916, and again in October, 1929. The plan was generally followed by the City.)

13. Cottle, Benjamin H. and Wright, Theodore F., publishers. Directory of San Jose for 1878. San Jose, Cottle & Wright, 1878.
(A City Directory which gives a historical sketch of the City, including the Park.)

14. Dodge, John W. "Electric Railroading in Central California," Pacific Railway Journal, Vol. I, No. 12, December 1956.
(An account of the development and demise of San Jose railroads.)

15. Foote, Horace S., Ed. Pen Pictures from the Garden of the World, or, Santa Clara County, Calif. Chicago, Lewis, 1888.
(Very descriptive vignettes of the area.)

16. (________.) Picturesque San Jose and Environments. San Jose, H.S. Foote & C.A. Woolfolk, (1893).
(A good description of the Park in this.)

17. Greer, John L. "A Case of Graft," in Papers read before the Santa Clara County Historical Society. San Jose, the Society, 1911.
(A well-researched account of the "Forty Thieves" case, where the Land Company attempted to take City property.)

18. Guinn, J.M. History of the State of California and Biographical Record of Coast Counties, California. Chicago, the Chapman Publishing Co., 1904.
(Gives biographical accounts of local greats, usually highly complimentary. Possibly written by the subject.)

19. Hall, Frederic. The History of San Jose and Surroundings. San Francisco, A.L. Bancroft & Co., 1871.
(The authority for mid-nineteenth century San Jose. Includes biographical sketches. Most later histories are taken from this.)

20. ________. "History of San Jose (1876)," San Jose Pioneer, 1877.
(A later summary of his 1871 work.)

21. Hare, Mrs. Alice. *San Jose and the Santa Clara Valley.* Santa Clara, California, the Author, ca. 1903.
(Another local history.)

22. Hare, G.H. *Guide to San Jose and Vicinity.* San Jose, N.P., 1872.
(Gives a fair account of the area before Park development.)

23. Heininger, Charles P., publisher. *A Souvenir of San Jose, Calif.* San Francisco, C.P. Heininger, 18__?
(Several good photos and descriptions of the Park.)

24. *Historical Atlas Map of Santa Clara County, California.* San Francisco, Thompson & West, 1876.
(Has a fair map of boundaries and roads.)

25. Historical Records Survey. *California, Santa Clara County (San Jose).* San Francisco, Historical Records Survey, 1939.
(The WPA project, inventorying all records. Unfortunately, most of these records are now gone.)

26. James, William F. and McMurry, George. *History of San Jose, California.* San Jose, Smith Printing Co., 1933.
(Great store of information, but short, choppy style.)

27. McCaleb, Charles S. *The San Jose Railraods, Centennial 1868-1968.* N.P., Foothill Jr. College District, 1968.
(A well-written account of San Jose railroads.)

28. *Map of Santa Clara and Santa Cruz Counties, California.* San Francisco, Punnett Bros., 1908.
(Good for checking boundaries, shows some Grant boundaries.)

29. Mars, Amaury. *Reminiscences of the Santa Clara Valley and San Jose.* San Francisco, printed by Mysell-Rollins, Co., 1901.
(A flowery collection of memories by a visiting Frenchman, also a souvenir of President McKinley's visit to San Jose during the Carnival of Roses, 13-15 May 1901.)

30. Munro-Fraser, J.P. (also spelled Munro-Frazer). *History of Santa Clara County, California.* San Francisco, Alley, Bowen & Co., 1881.
(A very descriptive narrative of the geology, geography, topography and climatology of the area. Includes biographical data on some civic leaders.)

31. Owen, J.J. *Santa Clara Valley.* San Jose, Mercury Steam Print, 1873.
(Lists resources, towns, railroads, climate and pen sketches of some prominent citizens. Reissued in 1875.)

32. Parkhurst, W.A. and Son. *San Jose and Santa Clara County, California.* San Jose, Mercury steam book and Job Printing House, 1887.
(A sales job for the city. Has some advertising matter in it.)

33. "Peninsular Living," weekly supplement to The Advance-Star and Redwood City Tribune, issue of 26 Sep 1970. Redwood City, California, Peninsular Newspapers, Inc., 1970.
(Sunday Supplement, giving a short history of the Park.)

34. Rambo, Ralph. (Historical Cartoon Book of Santa Clara Valley.) No publishing data available.
(Has pen sketches of narrow and broad-gauge trains to Park.)

35. (Rambo, W.T.) History of the Sainte Claire Club. San Jose, the Club, ca. 1945.
(Local Civic Club, which almost had a clubhouse erected in the Park.)

36. Rice, Bertha Marguerite. Builders of our Valley (A City of Small Farms), Vol. I. San Jose, N.P., 1957.
(Includes a short history of the development of the Junior Museum.)

37. Ross, Frank H. Drives about San Jose and Vicinity. San Jose, A.C. Eaton Print, 19__?
(Descriptions of some stage drives in the area, by the Mount Hamilton Stage Company around the turn of the century.)

38. "San Jose and the Alum Rock Interurban," Western Railroader, Vol. 21, No. 3, January, 1958.
(A detailed and well-written account of the Alum Rock Railroads.)

39. San Jose, California. Recreation Manual. San Jose, City of San Jose, 1955.
(City Manual, includes some descriptive information.)

40. San Jose, California. Annual Report, 1 December 1917. San Jose, City of San Jose, 1917.
(Has good information as to some of the revenues and expenses of the Park at that time.)

41. San Jose, California. San Jose Municipal Code. San Jose, City of San Jose, 1950.
(Codes governing the Park are a good source of information.)

42. San Jose, California. Mayor's Docket (1 Jul 1855-6 Apr 1857) and Ordinances (27 Apr 1857 to Present). San Jose, City of San Jose.

43. San Jose, California. Minutes, City Council. San Jose, City of San Jose, 12 April 1855 to date.
(Minutes of meetings of the Mayor and Common Council.)

44. San Jose, California, City Council. San Jose: A Course for Continued Progress. San Jose, San Jose City Council, 1965.
(A proposal for development, submitted in conjunction with a bond issue that year.)

56. San Jose and Santa Clara Railroad Co. Alum Rock Park, San Jose's Beautiful Resort. San Jose, San Jose and Santa Clara Railroad Co., N.D.
(A publicity pamphlet put out by the Railroad some time between 1900 and 1918.)

57. Santa Clara County. Record of Deeds, Book "A". San Jose, Santa Clara County, N.D.

58. Santa Clara County, California, Vol I, No. 1, September 1887. San Francisco, W.B. Bancroft & Co., 1887.
(A well done descriptive periodical put out with San Jose Board of Trade help, however it folded after this first and only issue.)

59. Sawyer, Eugene Taylor. History of Santa Clara County, California. Los Angeles, Historical Record Co., 1922.
(A well-written and extremely informative local history.)

60. Seeing San Jose and the Santa Clara Valley via the Electric Observation Car Route. Issue of March-April, 1904, San Jose, the Guide Publishing Co., 1904.
(Gives a nice description of the ride to the Park, including a good account of the "meteor".)

61. Souvenir of San Jose and Vicinity, "The Garden City". San Francisco, Crocker & Williams, 1894.
(A collection of photographs, including some very good ones of the Park.)

62. Sunset, Vol, 9, No. 1, May 1902.
(Another descriptive account of the attractions in the Park.)

63. Swanson, Dorothea Louise (Schmitt). History of Santa Clara Valley, the American Period, 1846-65. Berkeley, University of California, 1928.
(A master's thesis. Good source for information on the land title problems after the Gold Rush and Statehood.)

64. Tremayne, Frank Gilbert. History of Santa Clara Valley, The Mexican Period. Berkeley, University of California, 1923.
(A master's thesis. Nothing on the Park itself, but good information on the old Rancho s which joined the Park.)

65. U.S. District Court, California (Western District). Decree confirming Pueblo of San Jose. N.P., N.D.
(Decree and letters pertaining to the granting of the Pueblo rights to the City of San Jose, located in the Bancroft Library, U.C. Berkeley.)

66. Walter, Carrie (Stevens). In California's Garden, Santa Clara Valley. San Jose, A.C. Eaton, ca. 1897.
(Descriptions of casual life in the Park.)

67. Winther, O.O. The Story of San Jose, 1777-1869. Number 2 of "Histories of Early California Towns". California Historical Society Quarterly. Vol. XIV, No. 1, March 1935. (A good, quality history of early San Jose.)

68. Wittemann, Adolph. Souvenir of San Jose, California and Lick Observatory (Mount Hamilton). New York, Albertype Co., ca. 1892. (Views of the Park, fairly good quality.)

69. Wyatt, Roscoe D. and Arbuckle, Clyde. Historic Names, Persons and Places in Santa Clara County. San Jose, San Jose Chamber of Commerce for the California Pioneers of Santa Clara County, 1948. (By local historian, gives many origins of names.)

Newspapers

70. Daily Alta California. San Francisco, California, 12 Apr 1872.

71. San Francisco Chronicle. San Francisco, California, 1872.

72. San Jose Mercury. Also known at various times as:
San Jose Daily Mercury
San Mercury-Herald
San Jose Mercury-News
San Jose News

Maps

73. Boundaries, Alum Rock Park. Parks Department, 1956.

24. Historical Atlas of Santa Clara County. San Francisco, Thompson & West, 1896.

74. Improvements East of Bath House, Alum Rock Park. Parks Department, 1900.

75. Improvements West of Bath House, Alum Rock Park. Parks Department, 1899.

28. Map of Santa Clara and Santa Cruz Counties. San Francisco, Punnett Bros., 1908.

76. Proposal for Development of Alum Rock Park. San Jose, 1912. (Accompanied Stephen Child's Proposal.)

77. Proposed Railway, Terminus to Springs. 1896.

78. Topographic Map of Alum Rock Park, American Aerial Surveys, Sacramento, 1972.

79. Tracks of Railway in Alum Rock Park. Blueprint filed 1906.

NATURAL HISTORY

The natural history of Alum Rock Park is varied, interesting and is, of course, responsible for its preservation as a park and recreational area. The following section includes most of the natural aspects of the Park from the geology and climate of the area to the identified species of plants and animals. In some sections the information collected in the present study is preceded by historical accounts of studies of the same sort. This will aid in identification of changes that are taking place within the Park and may also indicate something of the changes in human attitudes as they may affect the Park.

Geology

Introduction

Object: this portion of the report has been compiled from previous studies, principally from Crittenden (1951), in an attempt to present the known geologic information of Alum Rock Park.

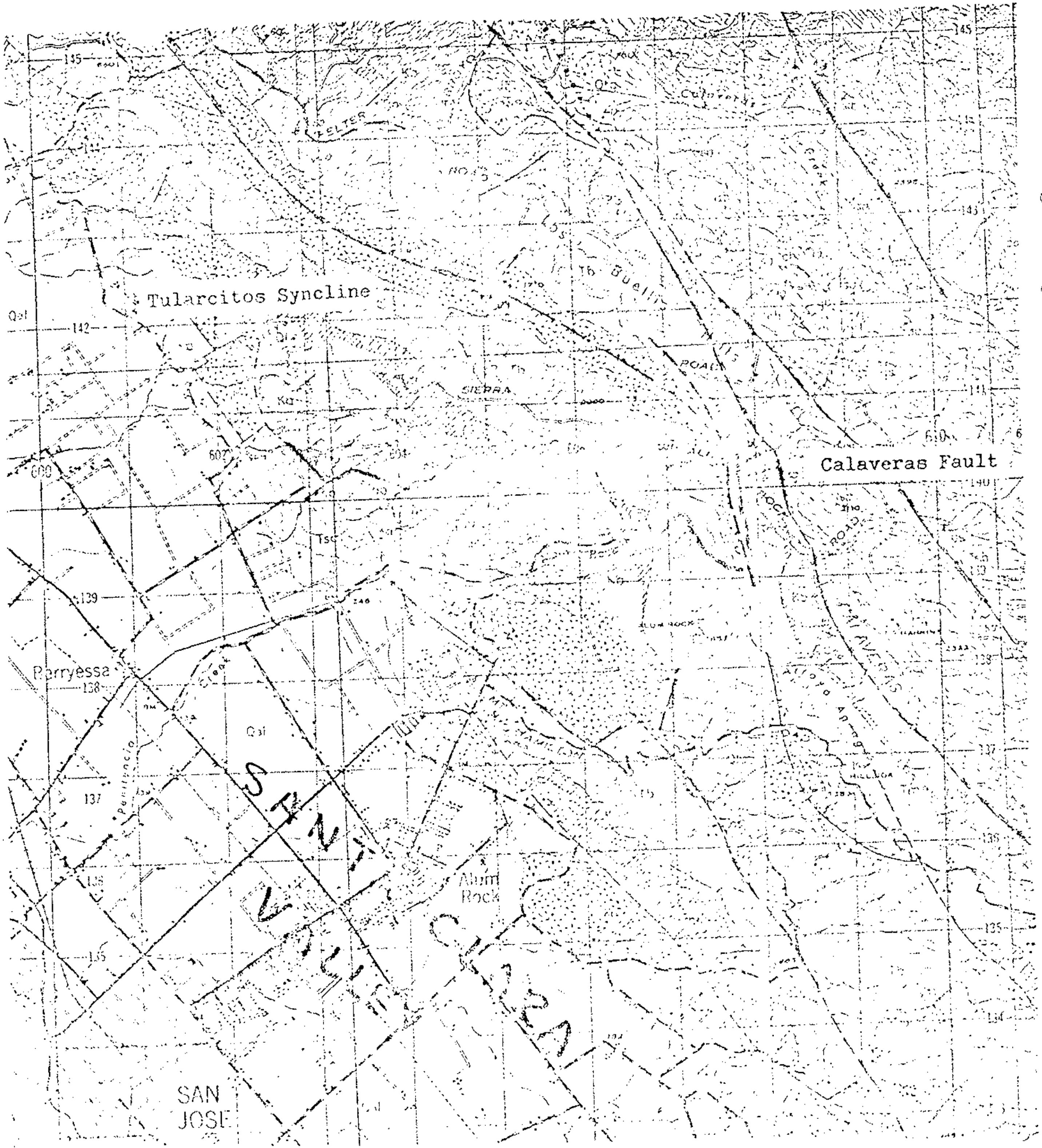
General Geologic Setting: the geology of the San Jose-Mount Hamilton area has been studied in detail by Max D. Crittenden. The rocks in Alum Rock Park consist of conglomerate, siltstone, sandstone, shale, and unconsolidated gravel and clay ranging from lower Cretaceous to Tertiary-Quaternary in age. Outcrops of Tertiary aphanitic rhyolite and Jurassic serpentine of limited extent are present in the Park. To the east and southeast, extensive outcrops of Jurassic Franciscan schist, greenstone, arkosic sandstone, and siltstone also occur. At the same locations, black silty shales and thin-bedded sandstones of the Jurassic Knoxville Formation may be observed. The overturned Tularcitos syncline lies several miles to the east of the Park, and a second syncline has been mapped farther to the east and is exposed in the Franciscan Formation. Two major fault systems have been mapped in the area, the Calaveras and the Hayward faults (Lewis, 1967). The Calaveras-Sunol fault, which cuts through Calaveras, Halls, and San Felipe valleys, divides the region into two areas, which are almost geologically distinct. The ridges on the two areas are principally synclinal, and the valleys anticlinal or fault valleys, with the exception of the Santa Clara, which appears to be a great syncline (Templeton, 1913). Numerous faults of much lesser extent have also been mapped.

A geologic map of the Alum Rock Park area was prepared by using M.D. Crittenden's geologic map of the San Jose-Mount Hamilton area (Fig. 1). The reproduced map was field checked on the 15th of March 1972 and found to be fairly accurate.

Stratigraphy

1. Oakland (?) Conglomerate. Distribution and Thickness: the Oakland conglomerate extends northwest across lower Alum Rock Canyon. For much of the distance, it is covered by landslides and the Santa Clara formation (Crittenden, 1951). The trend of the adjacent rocks indicates a fairly steep dip to the east beneath the landslides (Lewis, 1967). The thickness appears to be variable, and the lack of visible bedding makes accurate measurements uncertain. In the one place, near the Kuhn Ranch southeast of Evergreen, where the base and top are exposed, it is estimated to be 2,700 feet thick.

Lithology: the Oakland conglomerate commonly consists of subrounded to well-wounded cobbles with some boulders in a matrix of coarse sand. It is generally massive, the bedding being very obscure or completely lacking. In large exposures, some faint imbrication of the pebbles is detectable, but most commonly their orientation is completely haphazard. The lithology is fairly uniform over large areas, pebbles consisting mostly of the same porphyries and quartzites found in the conglomerates of the Franciscan formation. A count of 82 pebbles was made in the cliffs at the mouth of Alum Rock Canyon, showing the following distribution of rock types:



EXPLANATION

Sedimentary Rocks

- Quaternary
  - Landslides
  - Santa Clara formation
- Tertiary
  - Orinda formation
  - Briones formation
  - Berryessa form.
- Lower Cretaceous
  - Oakland conglomerate

Igenous Rocks

- Tertiary
  - Alum Rock rhyolite
- Jurassic
  - Serpentine

Metamorphic Rocks

- Tertiary
  - Silica-carbonate rock

SYMBOLS

Contact
(Dashed where inferred, dotted around recent sediments.)

Fault

Axis of syncline

Axis of overturned syncline

Axis of anticline

(after M.D. Crittenden)

Figure 1.

Black chert.	32
Porphyry (dark groundmass)	25
Black quartzite.	11
Coarse-grained recrystallized sandstone.	3
Gray limey shale	2
Dark-gray fine-grained limestone	2
Granitic rocks	1
Vesicular porphyry	1
Red chert.	1
Vein quartz.	1
Green porphyry	1
Aphanitic igneous rock	1

Age and Correlation: fossils were reported from two localities in the massive conglomerate by Crandall. Near the mouth of Berryessa Creek a clam, *Aucella piochii* Gabb was found in both the pebbles and the matrix of the conglomerate. An ammonite, *Phylloceras knoxvillense* Stanton, is also reported. In Alum Rock Canyon, Crandall reports a belemnite *Belemnites* sp. and *Aucella piochii* Gabb from rocks now mapped as Oakland conglomerate. A recent search failed to disclose additional material from either of these localities, but the clam, *Aucella crassicolis*, was found in a thin bed of pebbly sandstone enclosed in sandstone and shale in a new road-cut east of the San Jose Country Club. The beds may be Berryessa formation but are believed to be interbedded with the Oakland conglomerate. The fossil evidence cited above indicates a Lower Cretaceous age for the beds mapped as Oakland conglomerate in this area.

2. Berryessa Formation. Name, Occurrence, and Thickness: the name Berryessa formation is introduced here to designate the sandstone, siltstone, and shale between the Lower Cretaceous Oakland conglomerate and the Tertiary Monterey formation. Rocks assigned to the Berryessa formation crop out almost continuously along both sides of the Tularcitos

syncline. One band extends across Alum Rock Canyon and is covered by a large landslide on the north side of the canyon. The thickness of the Berryessa formation is variable, and nowhere has it been determined with great accuracy. In the western limb of the Tularcitos syncline, it is about 1600 feet thick at Alum Rock Canyon.

Lithology: the Berryessa formation includes siltstone and shale that weather to olive drab, thin-bedded micaceous sandstone, and particularly in the east limb of the Tularcitos syncline, massive, thick-bedded sandstone. Brown wrinkled biotite occurring in large conspicuous flakes in the sandstones and as fine particles throughout the siltstone and shale is a characteristic feature of most exposures. It is usually oriented parallel to the bedding and can be used to determine the attitude of small outcrops of massive sandstone. It is also of assistance in distinguishing these sandstones from sandstones of the Franciscan formation, which generally contain smooth pearly flakes of muscovite instead of the wrinkled biotite. Carbonized wood fragments and plant remains are abundant in many places, and often are quite large.

Age and Correlation: only a few fossils have been found in the beds designated here as Berryessa formation. Lacking more complete fossil evidence, the accurate correlation and age of the Berryessa formation is impossible. It should be pointed out that the rocks mapped as Berryessa formation in the western limb of the Tularcitos syncline may not all be the same age as those in the east limb near the Calaveras Reservoir. Moreover, there is the possibility that part of the beds mapped as Berryessa near the southeastern corner of the mapped area may actually be Eocene in age.

3. Monterey Formation. The term "Monterey Formation" is here applied, following Bramlette and Woodring, to the middle and possibly upper Miocene rocks characterized by an abundance of siliceous sediments. The fact that they do not include the same lithologic units mapped by Lawson in the San Francisco folio has also prompted the use of this term rather than Lawson's "Monterey group".

Occurrence and Thickness: the strata of the Monterey formation crop out on both sides of the Tularcitos syncline. In the west limb, the Monterey emerges from beneath the Santa Clara formation southeast of Warm Springs and extends without interruption across Alum Rock Canyon. It is faulted off about a mile south of Alum Rock Canyon, but reappears for a short distance, dipping east at moderate angles, toward the axis of the syncline. Beginning near the mouth of Alum Rock Canyon and extending southeast for 4½ miles near the edge of the valley is a down-faulted block of Monterey which is nearly flat-lying and may locally dip either east or west. In Alum Rock Canyon, though poorly exposed, it forms a thin bed between the Briones and Beryessa formations. The Monterey formation is thickest in Alum Rock Canyon and vicinity, but it is impossible even here to measure a continuous section. The best exposures are on the steep slopes of Alum Rock Canyon where the upper foraminiferal member was measured and found to be 350 to 400 feet thick. About 500 feet of the cherty middle member crops out below this, but the Monterey-Cretaceous contact is not exposed. The Monterey that is exposed in the west limb of the Tularcitos syncline is somewhat thinner to the north of Alum Rock Canyon, averaging 500 to 600 feet between Arroyo de los Coches and Calera Creek. It thins out abruptly just south of Alum Rock Canyon, but this may be partly the result of faulting.

Lithology: three distinct lithologic units can be distinguished in the Monterey formation west of the Calaveras fault. Beginning at the base, these are 1) a few feet of light gray to brown sandstone, more or less glauconitic, which may grade into gray or chocolate-colored shale, 2) thin-bedded opaline chert with very thin shale partings, usually a few hundred feet thick, 3) pale buff foraminiferal siltstone with some platy sandstone and massive silty sandstone. The lower sandstone unit has been identified in only a few places, where exposures are unusually good. The typical Monterey chert of the middle member in general crops out well, and can be recognized readily by float where it does not actually crop out. The upper member is rather soft, and crops out well in places, but not at all elsewhere. The middle member of the Monterey formation is well exposed around the sulfur and soda springs in Alum Rock Park. It consists of rhythmically bedded pale cream-colored opaline chert and cherty shale characteristic of the Monterey formation throughout the Coast Ranges. The bands of chert are from one inch to several inches thick, and most of them show some thin banding within each bed. The individual chert beds are separated by partings of shale an eighth to a quarter of an inch thick. Irregular beds and lenses of dense limestone are common near the base and the top of this member, and weather out as distinctive yellow ocherous masses. The cherty part of the Monterey formation shows strong local crumpling and may be intricately folded, even though the beds above and below show only broad open folds. The thin-bedded cherts grade upward into the shale, siltstone, and fine-grained sandstone of the upper member, which is best exposed on the north rim of Alum Rock Canyon. When fresh, the rocks are dark gray and massive, but in weathering, the massive beds commonly disintegrate, yielding soft punky or sandy debris. Foraminifera are abundant in many parts of the member, and are readily visible in many specimens.

Age and Correlation: the age of the lowest beds of the Monterey formation of the Tularcitos syncline has not been determined. Neither megafossils nor foraminifera were found in the thin glauconitic sandstone at the base. Though foraminifera are very abundant in the upper member, they are poorly preserved, and the following were identified by R.M. Kleinpell in a rather small collection from this member:

Bolivina aff. marginata Cushman.	rare
Bolivina aff. tumida Cushman..	rare
Nonion costiferum (Cushman).	few
Nonionella miocenica (?) Cushman	rare
Virgulina californiensis Cushman	abundant

This assemblage is regarded by Kleinpell as "not higher than uppermost Luisian. In this area, this would indicate a correlation with the bulk of the upper Claremont or the lower Tice at San Pablo. It is definitely older than the bulk of the Tice." On the basis of these data, it is probably that the Monterey formation as mapped in this area falls within the upper middle Miocene.

4. Briones Sandstone. Occurrence and Thickness: the Briones sandstone is here applied to a thick series of massive coarse-grained fossiliferous sandstones and sandy shales which unconformably overlie the Monterey formation. The unit crops out almost without interruption for the entire length of the Tularcitos syncline. Throughout the west limb is rests on the Monterey formation, but in the east limb it rests for considerable distances on the Cretaceous Berryessa formation. The Briones sandstone varies considerably in thickness. It is 3400 feet thick in Alum Rock Canyon.

Lithology: the Briones sandstone forms the most conspicuous and distinctive outcrops of any of the Tertiary formations. These are particularly evident on Monument Peak and the Los Buellis Hills where the steeply dipping beds crop out as narrow "reefs" which resemble rock walls or fences running straight over hills and valleys. Most of these reefs are massive sandstone beds 1 foot to 6 feet thick filled with shells and shell fragments and thoroughly cemented by calcium carbonate. Between the reefs, the hills are grassy and relatively smooth, and are underlain by less well cememted parts of the formation. The sandstone of the Briones is dominantly massive, thick-bedded, medium- to coarse-grained, light colored when fresh, gray or buff when weathered. Plant and wood fragments are abundant in certain beds. Cross-bedding is well developed locally and is particularly well exposed on the smooth worn outcrops in the bed of Penitencia Creek in upper Alum Rock Canyon. Conglomerate layers noted at several places near the middle of the formation contain many pebbles and cobbles of yellowish limestone from the Monterey formation, large fragments of oyster shells, and more rarely some banded Monterey chert and pre-Franciscan porphyry. Interbedded with the massive, well-cemented sandstones are beds of friably siltstone and fine-grained sandstone. The typical fresh, massive Briones sandstone is a medium-grained, well-sorted arkosic sandstone cemented by carbonate.

Mineral Analysis of Typical Briones Sandstone:

Light minerals	
Quartz.	25
Feldspar.	28
Carbonate	10
Rock fragments and composite grains	37
	100

Heavy minerals	
Green hornblende	49
Brown hornblende	11
Leucoxene	9
Magnetite-ilmenite	6
Apatite	5
Hematite?	4
Sphene	3
Zoisite	3
Garnet	3
Carbonate	2
Zircon	1
Chlorite	1
Tourmaline	<1
Glaucophane	<1
Rutile	present
	99

Age and Correlation: although fossils are extremely abundant in parts of the Briones, only a few poor specimens were obtained by breaking the massive sandstones. These include three kinds of clams:

Tivela merriami Trask (?)
Spisula selbyensis Packard (?)
Pecten propatulus Conrad

Large faunas from this area and adjoining parts of the Pleasanton quadrangle are listed by Templeton and Trask, and the status of the unit was summarized in detail by Trask after study of collections at both the University of California and at Leland Stanford Jr. University. He concludes that the Briones is Upper Miocene. The progressive overlap of the upper members of the Monterey group by the Briones in the southern part of the Pleasanton quadrangle and its ultimate overlap onto the Cretaceous in the San Jose-Mount Hamilton area give ample evidence of the persistent unconformity between the two. Worn pebbles of Monterey which appear in the middle of the Briones further emphasize the degree of uplift and erosion involved.

5. <u>Orinda Formation</u>. <u>Occurrence and Thickness</u>: beds mapped as the Orinda formation are exposed in the center of the Tularcitos syncline which is exposed at the eastern end of Alum Rock Park. They are tightly folded, overturned in part, and rest unconformably on the Briones. In the Alum Rock Park area, the Orinda is estimated at about 750 feet thick.

<u>Lithology</u>: the Orinda formation consists of red, maroon, green, or gray conglomerate, conglomeritic sandstone, silt, and clay. Recent excavations on the point between Arroyo Aguague and upper Alum Rock Road have exposed maroon and greenish clay in a narrow zone in a sharply folded and faulted part of the Tularcitos syncline.

<u>Age and Correlation</u>: the correlation of the beds mapped in the San Jose-Mount Hamilton area with the Orinda formation is based on lithologic similarity and stratigraphic position. The stratigraphic range of the Orinda in the San Jose is unknown, and it can only be tentatively designated as Mio-Pliocene in age. The Orinda formation overlies the Briones sandstone with slight angular unconformity. A discordance in dip of as much as 30 degrees appears at places. The Orinda is the youngest formation exposed in the Tularcitos syncline.

6. <u>Santa Clara Formation</u>. <u>Distribution and Facies</u>: unconsolidated sediments of the Santa Clara formation crop out almost continuously along the east edge of the Santa Clara Valley from Warm Springs south to Alum Rock Canyon. From Warm Springs to Alum Rock Canyon, the formation shows reasonably constant character. Where exposed in recent cuts, it is obscurely bedded, poorly sorted, pebbly sandstone, siltstone, or clay. The strike of the beds throughout this distance is relatively constant,

N. 30-40° W.; the dip ranges from 10° to 30° E. The formation is incoherent and has been so affected by sliding that little of the original bedding is visible in natural exposures. In fact, from Arroyo de los Coches to Alum Rock Canyon, the outcrops of the formation are virtually outlined by the features of multiple and continued sliding.

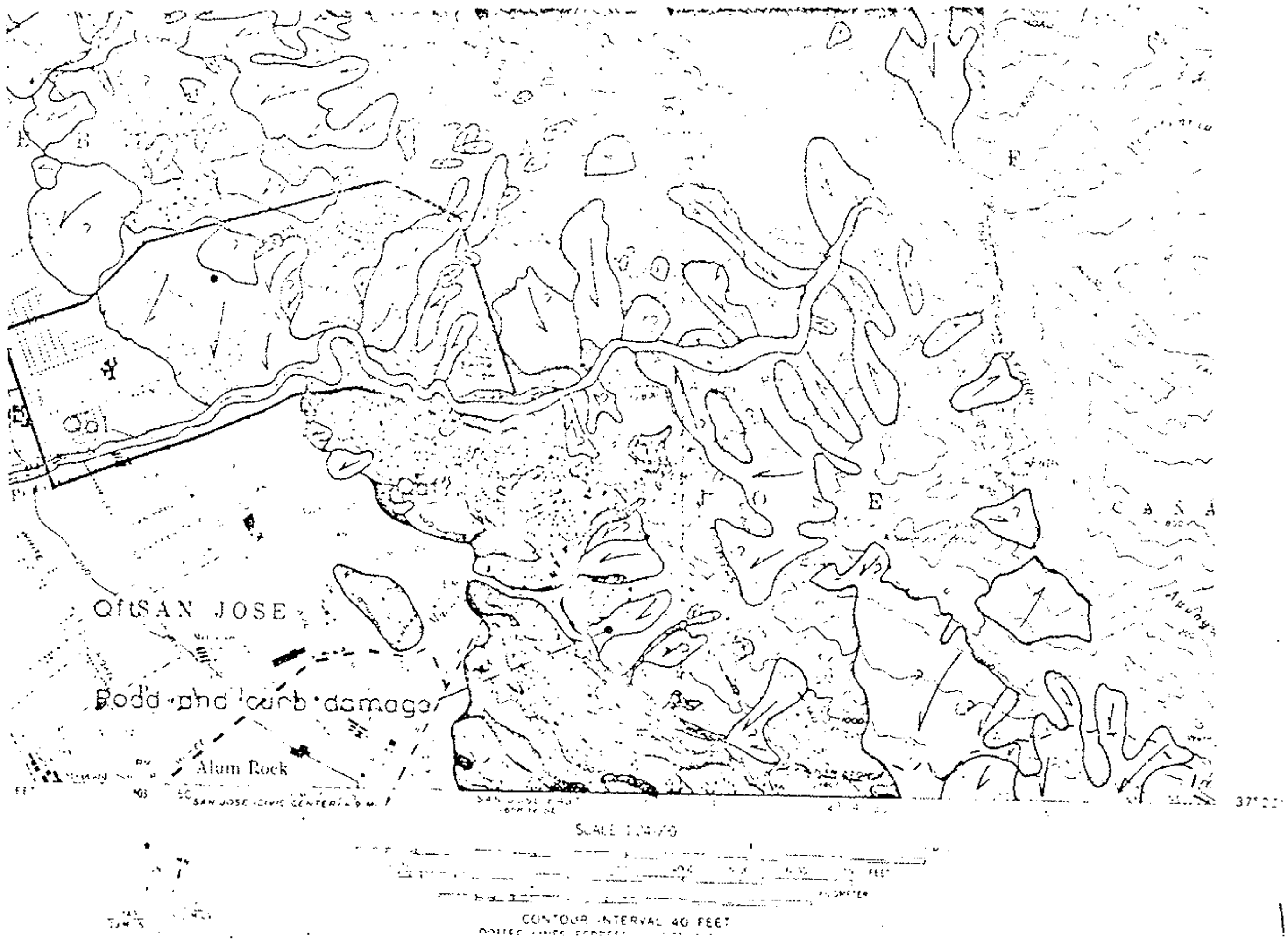
Age and Correlation: the Santa Clara formation has generally been regarded as Plio-Pleistocene, but no diagnostic or abundant evidence of its age was found in the San Jose area. Recently, a large vertebrate fauna was discovered in a northward extension of the formation near Irvington; this has been designated Lower Pleistocene.

Landslides

Alum Rock Landslide: a large and important slide occurs on the north slope of Alum Rock Canyon just west of the Alum Rock rhyolite. It is a heterogenous mass of soft bluish serpentine muck, intermixed with silt and gravel of the Santa Clara formation, and a few large boulders and blocks of Franciscan. It came from well up the north slope, and filled the canyon to at least the height of the railroad cut on the north end of the high cliffs of Oakland conglomerate at the mouth of the canyon. The stream probably cut rapidly through and removed all the finer material, leaving the larger boulders stranded. Such boulders, up to 15 feet in diameter, are exposed along the road and in the railroad cuts at the north end of the conglomerate cliffs, and were at first mistaken for exposures of bedrock in place. One such boulder consisted of manganese oxides, and was for many years believed to be a meteorite. Similar boulders in the landslides resting on conglomerates can be seen in the road cuts about a quarter of a mile farther up the canyon, just west of the steep narrow canyon which cuts through the rhyolite. On a narrow point across the creek northwest of the cliffs of conglomerate, there is a slide mass consisting of sheared soapy serpentine which rests on cross-bedded gravel and silt, and broken weathered Oakland conglomerate. Other landslide deposits have been mapped by T.H. Nilsen and E. Brabb (1971) and are shown in Figure 2.

Igneous Rocks

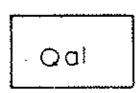
Alum Rock Rhyolite: the Alum Rock rhyolite is a body of intrusive igneous rock about 1000 feet wide and 400 feet long which crops out in the lower Alum Rock Canyon. The most conspicuous exposures are in cliffs and talus slopes on the north side of the canyon opposite the Alum Rock Avenue entrance. It also forms the steep cliffs above the bridge where that road first crosses Penitencia Creek. It is intruded into the Cretaceious Oakland conglomerate and the Berryessa formation but a thin wrapping of serpentine has been carried up along the contact and locally has been altered to silica-carbonate rock. Although much of the contact is covered by landslide and talus, this relationship is visible in several places, and is particularly well exposed in the railroad cut at the extreme southern end of the mass. The rhyolite is bordered by silica-carbonate rock which grades outward into sheared green serpentine adjoining the conglomerate and shale. Northwest of this exposure the contact continues diagonally up the slope, marked by a low rib of silica-carbonate rock which continues until covered by the talus from the higher cliffs. The rhyolite is mostly a strongly jointed fine-grained rock more or less silicified and stained by limonite. Fresh surfaces range in color from nearly white to



Landslide deposits

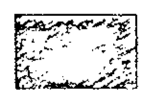
Arrows indicate general direction of downslope movements, queried where identification is uncertain

Debris composed of fresh and weathered fragments derived from rocks, sediment, soil, and artificial fill, or any combinations thereof, that have been transported downslope by [illegible] sliding, rotational slumping, or flowing. Landslide deposits smaller than approximately [illegible] feet in longest dimension are not shown on the map. [illegible] landslide deposits, which result from combinations of different types of downslope movement, are perhaps the most common type of landslide deposit in the Bay region. In particular, materials near the head of landslide deposits [illegible] move in a different manner than materials at the toe. The landslide deposits shown on this map have not been classified according to either type of movement or type of material of which the deposit is composed. The deposits vary in appearance from [illegible] discernible, [illegible] unweathered and uneroded topographic features to indistinct, highly weathered and eroded features, recognizable only by their characteristic topographic configurations. The time of formation of the mapped landslide deposits ranges from possibly a few hundred thousand years ago to [illegible], with no landslide deposits formed since [illegible] shown. The thickness of the landslide deposits probably varies from about [illegible] feet to perhaps several hundred feet, being in general greater in the larger deposits; many of the small landslide deposits may be very thin and involve only surficial materials.



Alluvial deposits

Irregularly stratified, poorly consolidated deposits of clay, silt, sand and gravel deposited in stream and river beds and on adjoining flood plains. Alluvial deposits less than about [illegible] feet in width, common along smaller streams, have not generally been mapped; where colluvial deposits are adjacent to such narrow strips, the alluvial deposits have been included within them.



Colluvial deposits and alluvial fan deposits

Colluvial deposits: unstratified or poorly stratified, unconsolidated to poorly consolidated deposits, composed of fresh and weathered fragments derived from rock, soil, sediments, or irregular mixtures of these materials, that accumulate by the slow downslope movement of surficial material [illegible] mainly by the action of gravity, but assisted by running water that is not concentrated into channels. Colluvial deposits have been mapped only where they form a distinct [illegible] near the base of slopes or fill and flatten canyon, ravine, and valley bottoms. Colluvial deposits are probably [illegible] on almost every slope in the Bay region; however, only the thicker and more extensive accumulations that are recognizable on aerial photographs have been mapped. In some narrow stream valleys, colluvial deposits include alluvial deposits. Colluvial deposits may move downslope along the axes of ravines and form fan-shaped deposits where they emerge onto more gently sloping valley floors.

Alluvial fan deposits: irregularly stratified, unconsolidated to poorly consolidated, fan-shaped accumulations of water-laid sediment formed where narrow canyons emerge onto more gently sloping valley floors. The fan sediments are composed of clay, silt, sand and gravel deposited by streams and thin water-rich mudflows. These deposits commonly grade upslope into colluvial deposits, and may be interbedded with them.

Note: because of the difficulties in distinguishing fan deposits from fan-shaped colluvial deposits on aerial photographs, the two units have not been distinguished on this map.

Figure 2 (by T.H. Nilsen and E. Brabb, 1971) brownish red or purple. Phenocrysts of albite up to 2 millimeters across occur in some phases of the rock. There are no ferromagnesian minerals. The entire rock when fused yields a glass with a refractive index of 1.485±, indicating a silica content of nearly 80 percent. Quite a different rock is exposed in the extreme northwest end of the body, where it is cut through by the steep gully, and in a few other places around the margin. This is a soft yellowish or greenish vesicular rock which contrasts strongly with the hard cliff-forming rhyolite. The general appearance suggests that it is a more basic rock than the rhyolite.

Serpentine: serpentine is sheared green rock with a greasy luster. It is usually an alteration product of some magnesium silicate. In addition to the soapy variety, one alteration product of serpentine has also been observed in the large slide mass in lower Alum Rock Canyon. Here, soft and chalky botryoidal nodules of hydromagnesite occur in a soft friable greenish-gray mass.

Metamorphic Rocks

Silica Carbonate: Crittenden has described the silica carbonate rock found in Alum Rock Park as follows: "The most widespread product resulting from the alteration of serpentine is the distinctive and colorful silica-carbonate rock. This unusual and characteristic material occurs as lenticular masses or narrow bands along fault zones and around the borders of some bodies of serpentine. Its bold rugged outcrops consist of yellowish-brown ocherous masses whose texture is diverse. It is most commonly slaggy or cavernous, but much of it is gnarled, knotted, and brecciated. Weathered outcrops are heavily stained with limonite.

The fresh rock, where found at some depth, usually consists of greenish- or brownish-white coarse-grained carbonates, commonly dolomite with some ankerite, veined by quartz, chalcedony, and rarely, opal.

"The development of silica-carbonate rock by hydrothermal alteration of serpentine is no longer questioned, and in the Coast Ranges its association with Tertiary or younger quicksilver deposits has led to the conclusion that the hydrothermal solutions are genetically related to Tertiary or Quaternary volcanism. It is seldom possible, however, to demonstrate their association with a particular igneous body but such an association does occur in the Alum Rock rhyolite has intruded shale and conglomerate of Cretaceous age. Although the wall rocks at the level now exposed are all of Cretaceous age, a thin discontinuous wrapping of serpentine has been carried up around the plug itself. Detailed examination reveals that this has been altered to silica-carbonate rock at several places along the contact with the rhyolite. This alteration and the still active thermal and chalybeate springs nearby, suggest strongly that the silica-carbonate rock here was formed by solutions which are genetically related to the Alum Rock rhyolite."

Structural Geology

The Alum Rock Park area lies within a complicated zone of folds and faults which form the western margin of the Diablo Range. Crittenden (1951) designated this area as the Tularcitos block, which is a narrow block of folded Tertiary and Cretaceous sediments. The boundaries of the block are the Hayward fault, which lies beneath the alluvium of the Santa Clara Valley to the west and the Calaveras fault which lies to the east of Alum Rock Park (Fig. 1). The dominant fold in the block is the Tularcitos syncline, whose axis lies at the eastern boundary of the Park. The greater part of this syncline is overturned and in places has been offset by recent movements on the Calaveras fault system.

Calaveras fault system: the dominant fault near the Park is the Calaveras fault. Where the fault crosses Alum Rock Canyon, it has been found to have a steep easterly dip. Seismic studies by Louderback in 1937 indicated clearly that it is one of the active faults in the area. Although no displacements have occurred in historic time, evidence for Pre-Miocene Post-Cretaceous vertical displacement was recognized by C.F. Tolman and F.P. Vickery. The next movements were Post-Miocene.

Folds: the block of Tertiary and Cretaceous sediments between the Hayward and Calaveras faults is dominated by a single fold, the Tularcitos syncline (Fig. 3). In the vicinity of Alum Rock Canyon, the axis of the syncline approaches the Calaveras fault zone, and the east limb has been partly obliterated by the thrust.

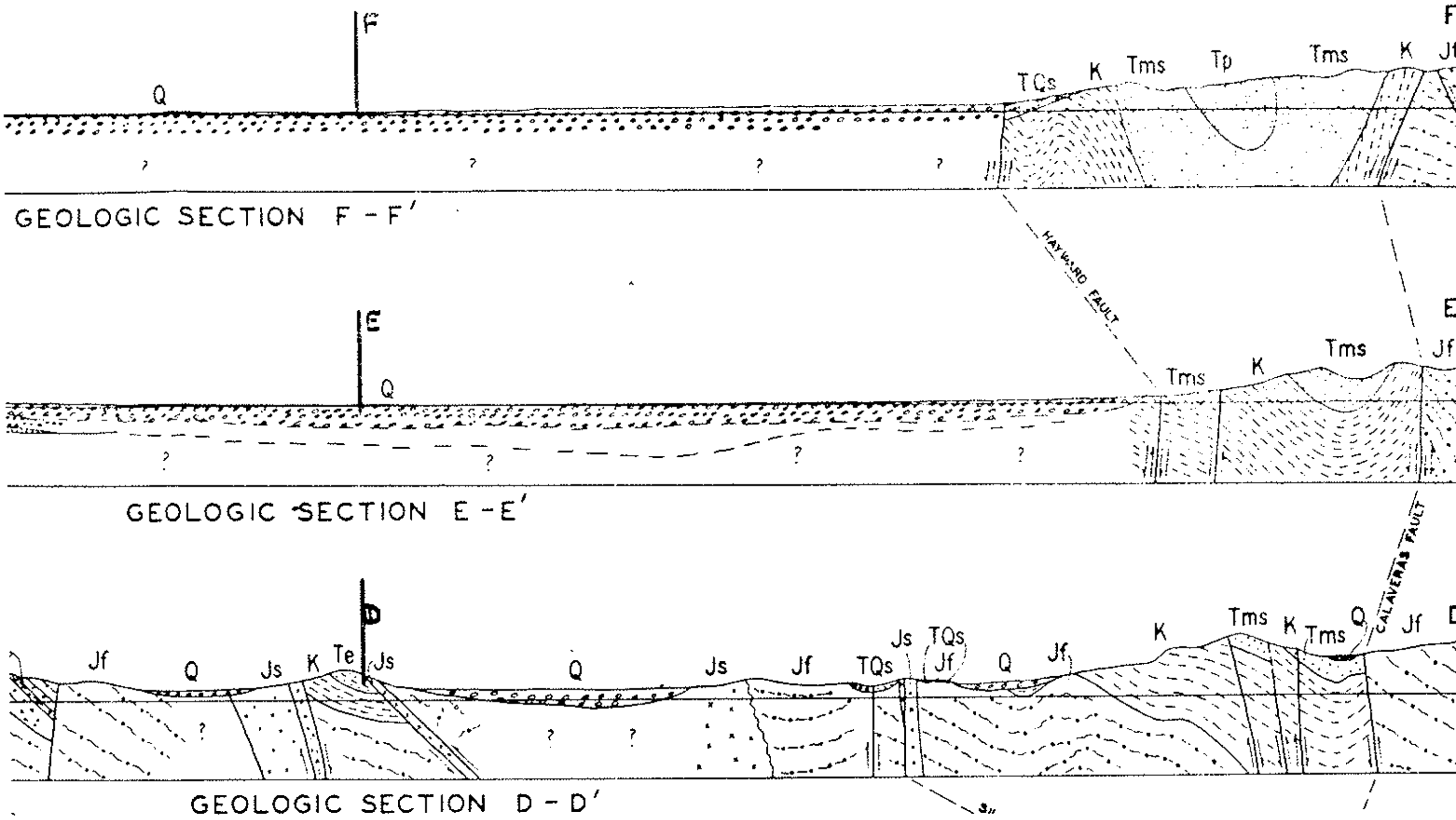
Rocks and Minerals

A description of the rocks in Alum Rock Park has already been given in the stratigraphy section of this report. Therefore they will only be listed along with the minerals which also occur in the Park (Table 1). A discussion of the minerals, however, should be added since they are very significant to the Park's history.

Alum vs. Thenardite: Alum Rock Park derived its name from a white powdery coating on the rocks near the mineral springs. This coating


Alum Rock Park
SAN JOSE
SANTA CLARA
SUNNYVALE
MOUNTAIN VIEW
MILPITAS
ALVISO
LOS GATOS
EVERGREEN
FAULT
DIABLO
Calaveras Reservoir
Guadalupe Reservoir
Almaden Reservoir
Coyote
Creek
GUADALUPE
E
F
D

Figure 3a.



LEGEND

SEDIMENTARY ROCKS

- Q — ALLUVIAL AND TIDELAND DEPOSITS
- TQs — SANTA CLARA, PACKWOOD, AND SAN BENITO FORMATIONS
- Tp — PURISIMA AND ORINDA FORMATIONS
- TMs — MONTEREY GROUP, SANTA MARGARITA TEMBLOR, VAQUEROS FORMATIONS, ETC
- To — SAN LORENZO GROUP
- Te — HOOVER VALLEY FORMATION, UNNAMED FORMATIONS IN PALO ALTO AND LOS GATOS QUADRANGLES
- K — CHICO FORMATION, BERRYESSA FORMATION, OAKLAND (?) CONGLOMERATE
- Jf — FRANCISCAN AND KNOXVILLE FORMATIONS

IGNEOUS ROCKS

- TQv — PLIO-PLEISTOCENE BASALT AND TUFF
- TMv — MIOCENE BASALT AND TUFF
- Js — SERPENTINE

Figure 3b. (from Santa Clara Valley Investigation, 1955)

Table 1

Minerals

Calcite, $CaCO_3$	Dolomite, $CaMg(CO_3)_2$
Opal (Hyalite), SiO_2-NH_2O	Pyroxene (Diallage), $CaMg(Si_2O_6)$
Pyrolusite, MNO_2	Talc, $Mg_3(Si_4O_{10})(OH)_2$
Quartz, SiO_2	Feldspar (a mineral group)
Magnesite, $MgCO_3$	Antigorite, $Mg_6(Si_4O_{10})(OH)_8$
Gypsum, $CaSO_4$-$2H_2O$	Asbestos (Chrysotile), $Mg_6(Si_4O_{10})(OH)_8$

Rocks

Igneous
- Porphyry (Rhyolite)
- Pyroxenite
- Felsite (probably Rhyolite)

Metamorphic
- Serpentine
- Soapstone
- Quartzite

Sedimentary
- Travertine
- Conglomerate
- Sandstone
- Shale
- Chertyshale
- Fossiliferous Sandstone
- Chert

Unconsolidated Materials
- Sand
- Gravel
- Landslide
- Silt
- Clay
- Alluvium

(List modified by Dr. Wayne Kartchner, CSU,SJ) was originally thought to be alum (potash alum, a hydrous potassium aluminum sulfate) which actually has never been found in the Park (Dolloff, oral communication). Instead, the coating is thenardite, which is composed of sodium sulfate, Na_2SO_4, and is a widespread constituent of saline deposits formed by the evaporation of salt-bearing solutions (Maddock, oral communication).

Alum Rock Meteorite: a second significant mineral occurrence within the Park was the Alum Rock "Meteorite". The "meteorite", which was not an actual meteorite, was described by R.A. Grippen, Jr. (1951) as follows:

> More unusual mineral species are known from Santa Clara County than from any other bay area county. The remarkable assemblage of manganese minerals found in a single great boulder in Alum Rock Park is still one of the mineralogical mysteries of California. For many years the boulder was thought to be a meteorite, and it was one of the Park's attractions. It was sacrificed in 1918 to the critical need for manganese ore, of which it made several tons. At that time, Dr. A.F. Rogers of Stanford University identified several manganese minerals in the broken ore, which were not previously known from California, and described a new mineral, kempite (manganese oxychloride). No similar material has been found, and it is presumed that the boulder, constituting all of one unique deposit, was part of some rock mass now completely eroded away.

The mining of the large so-called meteorite produced 39 tons of high-grade manganese ore averaging about 52 percent manganese. A.F. Rogers studied and described minerals from the boulder (Table 2). Crittenden believed the boulder was carried up with the serpentine along the borders of the Alum Rock rhyolite.

Geologic History

The geologic history of the San Jose-Mount Hamilton area has been stated by Max Crittenden as follows:

> Cretaceous. The lowest Cretaceous deposits are the massive coarse Oakland conglomerate, which gives evidence of strong local uplift of part of the area contributing sediment to the Coast Range geosyncline. With the wearing down of this

Table 2

Alum Rock Meteorite

- Tephroite, $Mn_2(SiO_4)$
- Hausmannite
- Rhodochrosite, $MnCO_3$
- Barite, $BaSO_4$
- Pyrochroite
- Psilomelane, $BaMn^{2+}Mn^{4+}{}_8O_{16}(OH)_4$
- Ganophyllite
- Alabandite
- Kempite, $Mn_4Cl_4O_6 \cdot 3H_2O$

(After Rogers)

source, sediments again became finer, and the sandstone and shale of the Berryessa formation were deposited. The existence of Upper Cretaceous deposits in this area is uncertain.

Cretaceous-Miocene Interval. The absence of deposits of Eocene age makes it impossible to outline in detail the events which took place during this interval. There was strong uplift of the western margin of the Diablo Range by faulting; and from evidence in adjoining areas, one or more periods of folding are known. The western edge of the Diablo Range may have been exposed during much of this time because the entire sequence of Knoxville and Cretaceous rocks was stripped off by middle Miocene time.

Miocene. The middle Miocene seas appear to have transgressed across the trough from the west, depositing the chert and foraminiferal siltstones of the Monterey formation. At their maximum, the seas extended across the present Calaveras fault onto the edge of the Diablo Range. Between middle and upper Miocene, the area was uplifted and the middle Miocene deposits were exposed and eroded from the Cretaceous locally. Upper Miocene seas transgressed farther across the area inundated earlier, and deposited the Briones sandstone on both the Monterey and the Berryessa formations. Abundant fossils and conglomeratic sandstones indicate a persistent shallow marine environment. Heavy minerals suggest a possible admixture of Sierran as well as Coast Range sources.

Post-Briones Orogeny. Strong folding, uplift, and erosion of large areas of Franciscan were initiated at this time. It seems probable that both the Diablo Range and the San Francisco Bay block may have been elevated.

Mio-Pliocene. The maroon, purple, or green conglomerate, sand, and clay of the Orinda were deposited under floodplain conditions. Its rapid variation and diversity suggest that sources were local and erosion rapid. There is a marked increase in the amount of Franciscan debris.

Post-Orinda Orogeny. After the deposition of the Orinda, the convulsive orogenic episode began, which destroyed the Pliocene basins, and resulted in tight or overturned folds, and strong elevation of older mountain blocks by outward thrusting over adjoining basins. Uncertainty concerning the age of the Orinda, and absence of younger beds makes it impossible to fix the age of this deformation more closely than sometime within the Pliocene. Evidence from nearby areas indicates that it may have had several phases extending over much of that period, possibly into earliest Pleistocene.

Pleistocene. During the Pleistocene the newly uplifted areas were rapidly eroded, and the thick heterogenous Packwood gravels were dumped in orogenic troughs. Faulting continued, and the overthrusting of these gravels by older rocks. Uplifting of the Diablo Range and Berkeley Hills continued, and downwarping of the San Francisco Bay block and the Santa

> Clara Valley basin. Mountain blocks were eroded to low relief, and the older alluvium was deposited in Santa Clara Valley basin. Horizontal displacement began on Hayward and Calaveras faults. Renewed uplift of Diablo Range occurred, and the Santa Clara formation was deposited in the Santa Clara Valley basin. Uplift, which initiated the present cycle of erosion, took place.

A similar series of events can be generalized specifically for the Alum Rock Park area. Professor Norman Dolloff of California State University at San Jose has summarized the Park's geologic history as follows: "Sandstones, shales, etc., were laid down by seas in the Alum Rock area (Fig. 4, part A). The presence of sea-shell deposits show that 15,000,000 years ago, Alum Rock Park was a beach or near beach environment similar to the present California Coast. Then as water receded and the hills were uplifted, Alum Rock Park, as we know it today, was formed. Much later, volcanic action caused igneous rock to be thrust upward breaking through layers of sandstone near the surface (Fig. 4, part B). Erosion broke down and transported the sandstone exposing the igneous rock (Fig. 4, part C). Eventually a large portion was exposed--such a feature is known as a volcanic plug. Alum Rock and Eagle Rock represent such structures."

Land Subsidence

Although land subsidence has been a problem in Santa Clara Valley, where up to 17 feet of subsidence has occurred in some areas due to groundwater withdrawal, it has not been a problem in Alum Rock Park, which is underlaid mainly by consolidated rocks (Figs. 5 and 6).

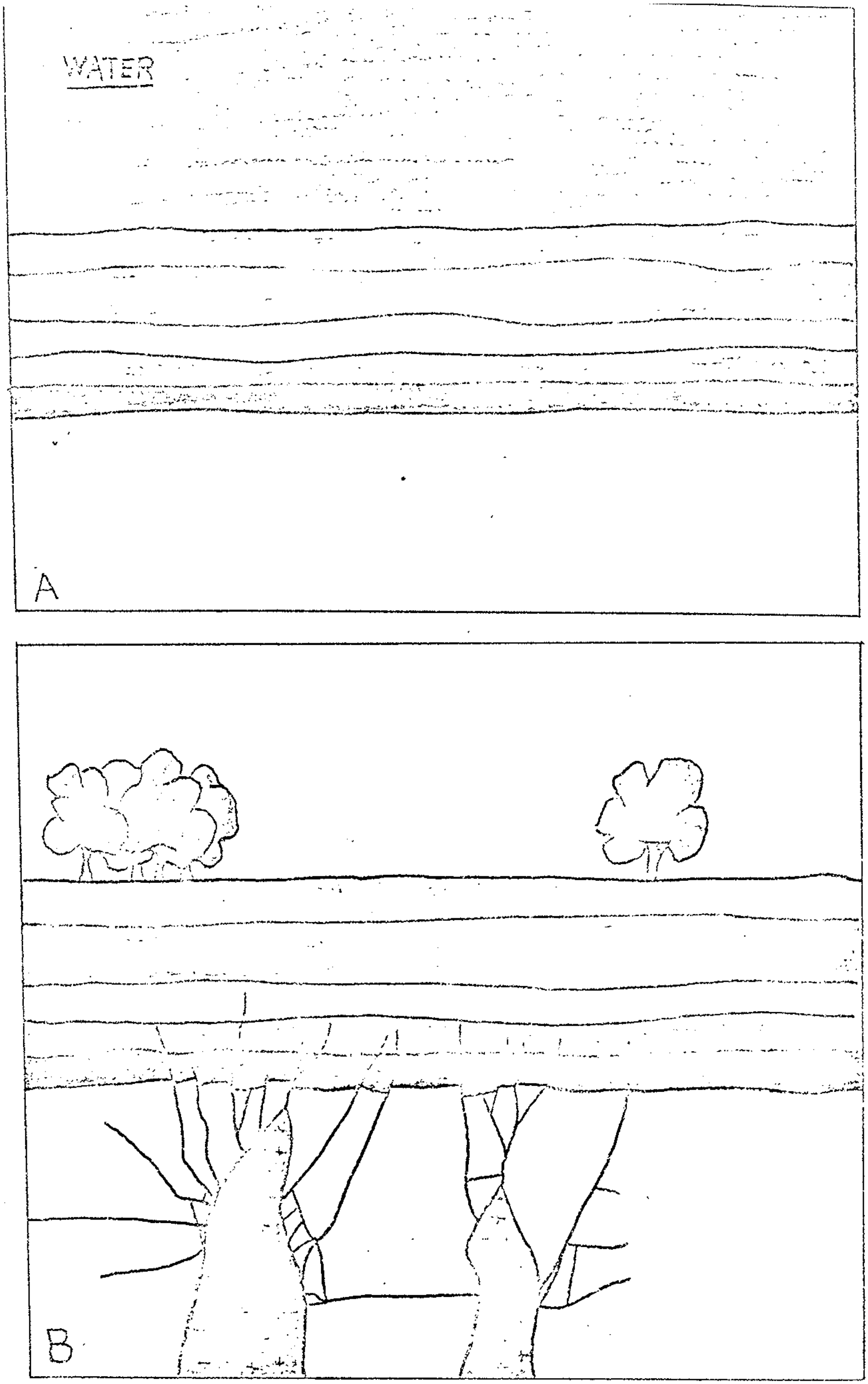
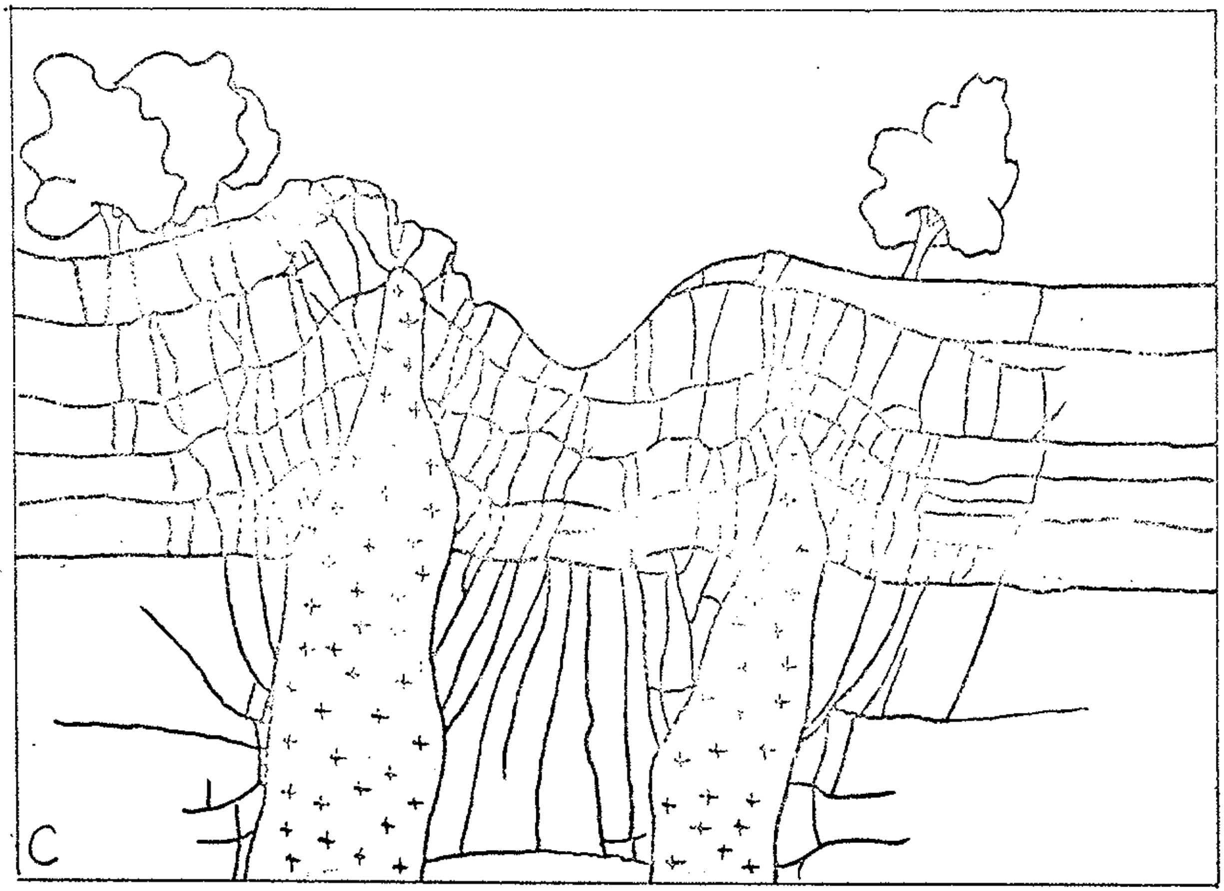


Figure 4



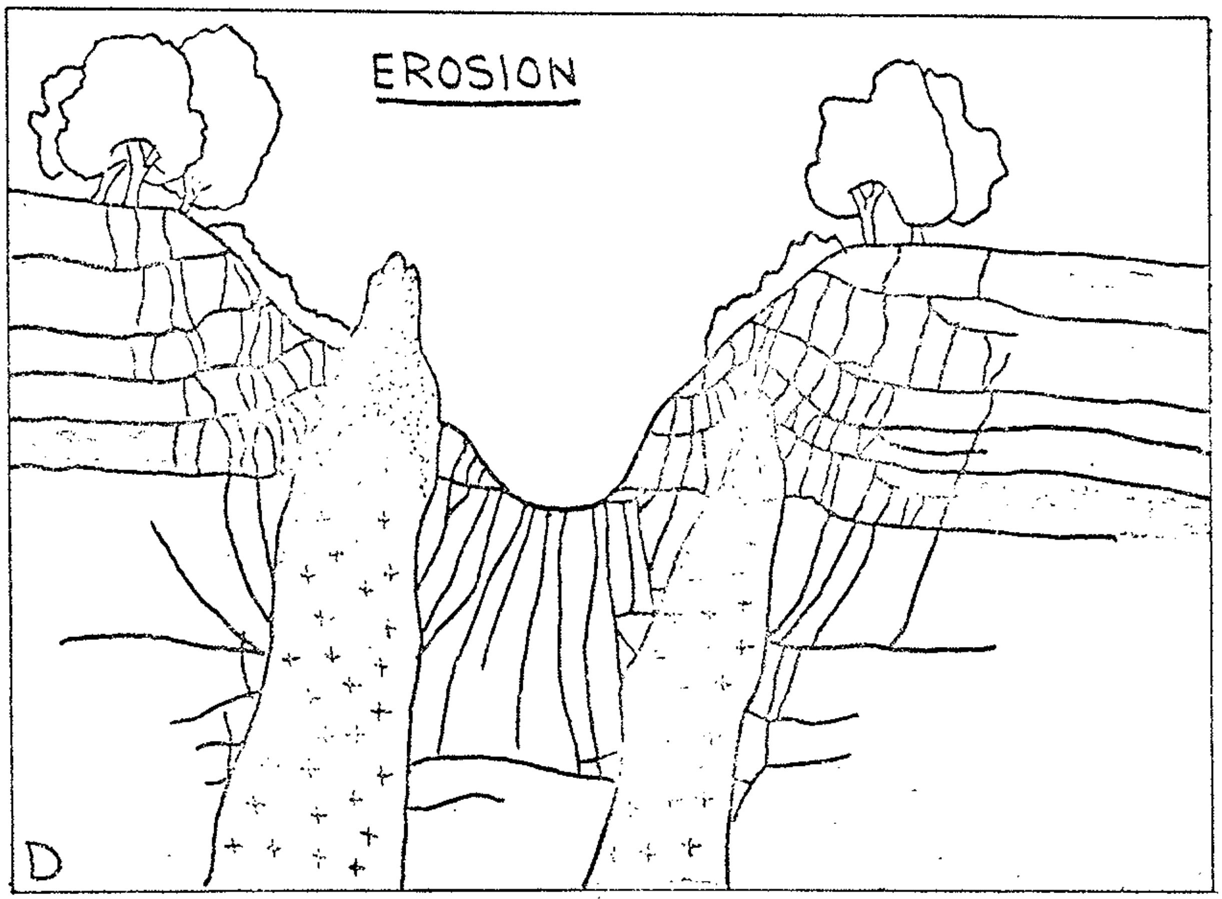
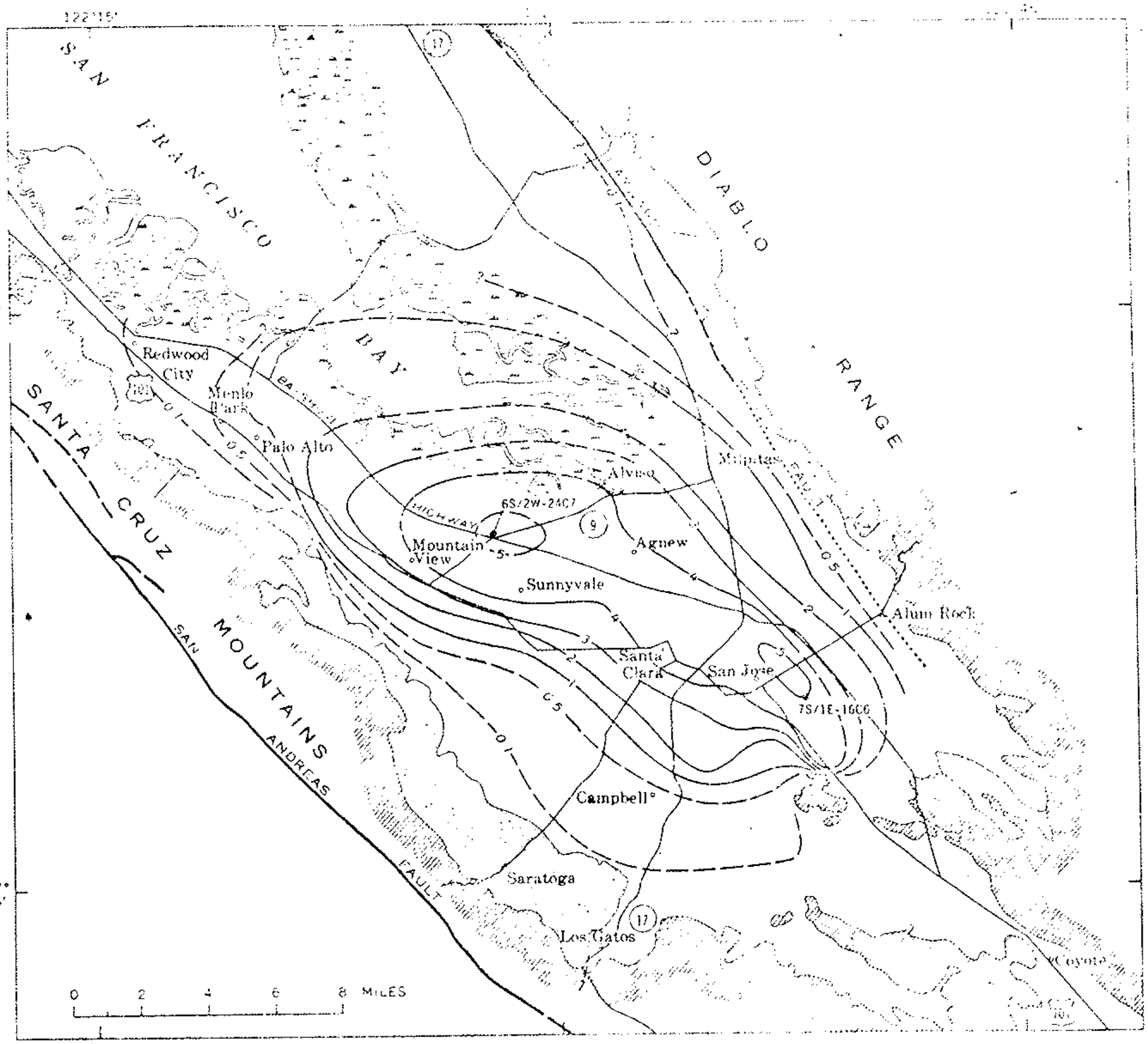


Figure 4

PROPERTIES OF WATER-BEARING DEPOSITS IN CENTRAL CALIFORNIA



EXPLANATION

Alluvium and bay deposits

Santa Clara Formation
Semiconsolidated deposits

Consolidated rocks
Undifferentiated igneous, metamorphic, and consolidated sedimentary rocks

Fault
Dashed where approximate; Dotted where concealed

0.1
Line of equal subsidence
Interval 1, 0.5, and 0.1 foot, dashed where poorly controlled. Compiled from leveling of U.S. Coast and Geodetic Survey

7S/1E-16C6
Core hole and identification number

Figure 5. Land subsidence, 1934–60, and location of core holes in the Santa Clara Valley. Compiled by J. H. Green

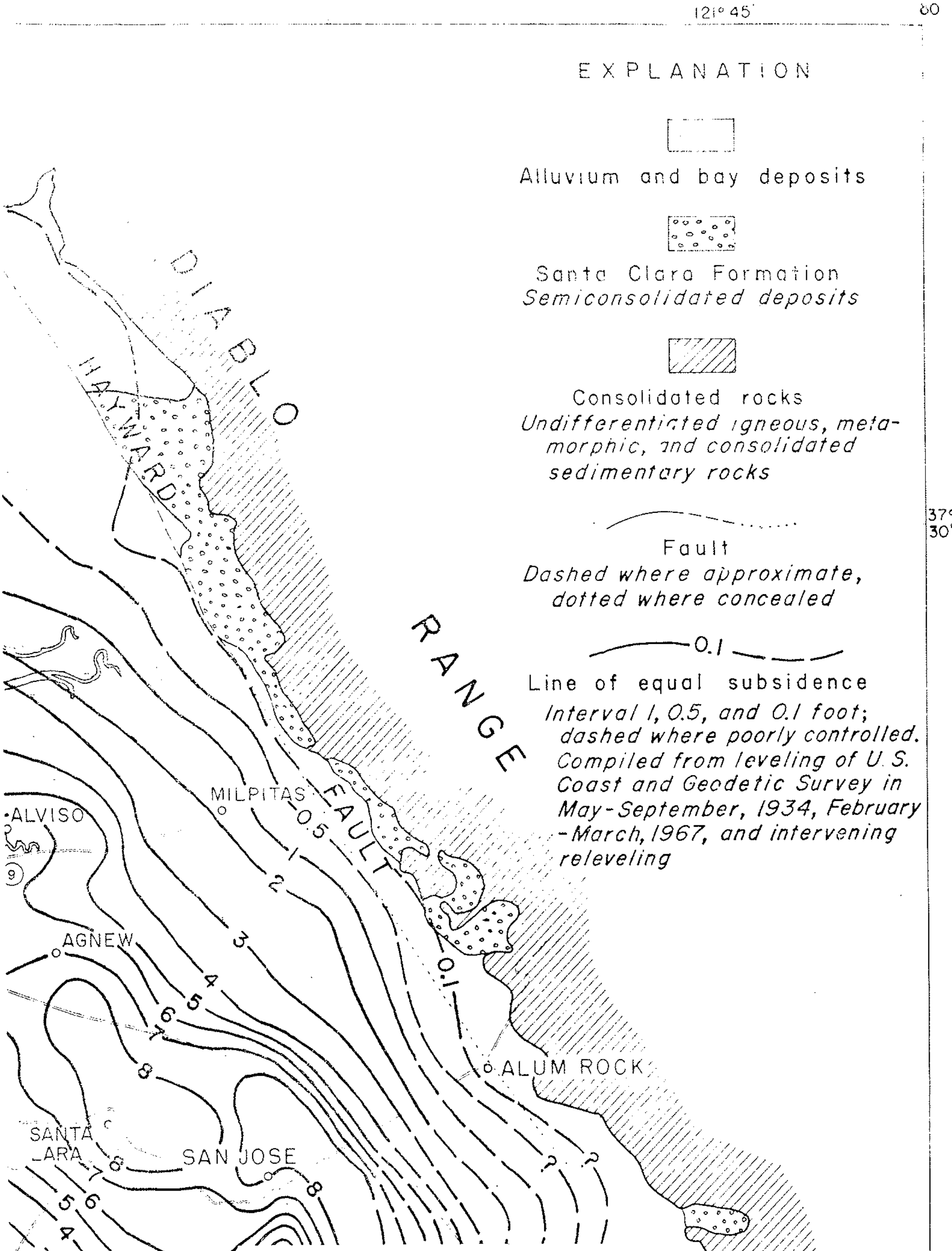


Figure 6. (by J.F. Poland, 1971)

References Cited

Bowen, O.E. "Road Guide to the Geology of the Bay Area Counties," Geologic Guidebook of the San Francisco Bay Counties. Calif. Div. of Mines Bull. 154, p. 377, 1951.

Crippen, R.A. Jr. "Unusual Minerals of the Bay Area," Geologic Guidebook of the San Francisco Bay Counties. Calif. Div. of Mines Bull. 154, p. 313, 1951.

Crittenden, M.D. Jr. Geology of the San Jose-Mount Hamilton Area, California. Calif. Div. of Mines Bull. 157, pp. 7-65, 1951.

Dolloff, N.H. Professor of Geology, San Jose -- California State University, oral communication, 1972.

Hill, C.A. Santa Clara Valley Investigation. Bull. 7, State Water Resources Board, pls. C-1, C-4, 1955.

Hurlbut, C.S. Jr. Dana's Manual of Mineralogy. John Wiley and Sons, 17th Ed., New York, pp. 263, 264, 359, and 369.

Johnson, A.I., Moston, R.P., and Morris, D.A. Physical and Hydrologic Properties of Waterbearing Deposits in Subsiding Areas in Central California. U.S. Geol. Survey Prof. Paper 497-A, p. 71, fig. 6, 1:316, 800, 1968.

Kartchner, W. "Materials to be found on field trip to Alum Rock," a handout. Professor of Geology, California State University -- San Jose, N.D.

Lewis, B. Resistivity Study of Land Near Alum Rock Park, San Jose, California. Unpublished masters thesis, California State University -- San Jose, 1967.

Maddock, M. Professor of Geology, California State University -- San Jose, oral communication, 1972.

Nilsen, T.H. and Brabb, E. Preliminary Photointerpretation and Damage Maps of Landslide and Other Surficial Deposits in Northeastern San Jose, California. U.S. Geol. Survey Open File map, 1971.

Poland, J.F. Land Subsidence in the Santa Clara Valley, Alameda, San Mateo, and Santa Clara Counties, California. San Francisco Bay Region Environment and Resources Planning Study, technical report 2, 1971.

Rogers, A.F. The Crystallography of Hydromagnesite. Am. Jour. Sci., 5th ser., Vol. 6, pp. 37-47, 1923.

________. Kempite, a New Manganese Mineral from California. Am. Jour. Scil, 5th ser., Vol. 8, pp. 145-150, 1924.

Templeton, E.C. General Geology of the San Jose and Mount Hamilton Quadrangles (abstract). Geol. Soc. America Bull., Vol. 24, 1913.

Vickery, F.P. The Structural Dynamics of the Livermore Region. Jour. Geology, Vol. 33, pp. 608-628, 1925.

Soils

The purpose of this portion of the report is to describe the major soils found in the Park. Inclusions of other soils may occur within each mapping unit. These inclusions are noted in the series descriptions.

Soil management is not discussed in this portion of the report. However, the two major concerns as related to management would be protection from fire and the damage caused by heavy and almost continuous use by people.

In "Soils of Santa Clara County," published in 1968, no attempt was made to delineate small areas (5-10 acres) from the major mapping unit where the principle land use was of the more extensive type such as rangeland, watershed, or recreational use. The soils of Alum Rock Park were mapped as Gaviota gravelly loam, 30-75% slopes, severely eroded (GhG3).

In this report two areas have been delineated from the major mapping unit GhG3. A portion of the north slope adjacent to the Park headquarters is described as Maymen fine sandy loam, 15-50% slopes, eroded (MeF2). A few hardwoods are found in this area. The soil identified as Madonna loam 2-5% slopes (MbE2) generally found in the headquarters area should be described as Madonna-like because of its position on the landscape. The true Madonna soils are found on ridge tops.

Small areas of mapping units AcE2 Altamont clay, RnG Rock land and LhG Los Gatos-Gaviota complex are found within the main park area.

These units are not described in this report. These soils are of limited extent and are very similar to the major mapping units GhG3 and MeF2.

It is estimated that Gaviota (GhG3) makes up 70% of the soils in the Park, Maymen (MeF2) 25%, and Madonna-like (MbE2) 5%.

Gaviota Series: the Gaviota series consists of well to somewhat excessively drained soils, underlain by hard sandstone and shale bedrock at depths of 6 to 19 inches. The soils formed on strongly sloping to very steep uplands. Vegetation is annual grasses and forbs, oak trees and brush. Elevations range from 500 to 4000 feet. Mean annual rainfall ranges from 15 to 30 inches; mean annual air temperature is about 58° to 60°F. The growing season is about 200 to 250 days. Vallecitos and Los Gatos are the principal associated soils.

Surface soil averages 1 to 7 inches in thickness and is a pale brown, slightly acid loam. Subsoil is a slightly acid, light yellowish brown gravelly loam ranging in thickness from 4 to 12 inches. The substratum is hard sandstone and shale bedrock. In places, the surface soil is a gravelly loam, and there are rock outcrops.

Gaviota soils are most extensive in the area and are used for dryland hay, pasture and range. The eroded areas are used mostly for wildlife, recreation and watershed.

Gaviota loam, 30 to 75 percent clopes (GcG). This soil is on steep to very steep slopes, averaging about 60 percent. Geographically, it occurs on exposed south and east slopes in areas of 20 to 30 inches of rainfall and also on north and south slopes in drier areas of 15 to 20 inches. Representative profile: on a south facing hillside above

Mount Hamilton Road, about 3 miles above the Kincaid Road intersection at road stake number B-8 70; in the N.W. 1/4 of the N.W. 1/4 of Sec. 9, T. 9 S., R. 3 E., Santa Clara County, California:

A11 0 to 5 inches, pale brown (10YR 6/3) loam, dark brown (10YR 3/3) moist; moderate medium and fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; abundant very fine roots; many very fine interstitial, common very fine and a few medium tubular pores; slightly acid (pH 6.5); clear wavy boundary (1 to 7 inches thich).

A12 5 to 19 inches, light yellowish brown (10YR 6/4) gravelly loam, dark yellowish brown (10YR 3/4) moist; massive; slightly hard, friable, nonsticky and nonplastic; few very fine roots; many very fine and a few medium tubular pores; slightly acid (pH 6.5); clear wavy boundary (4 to 12 inches thick).

R 19 inches, yellowish brown hard fractured sandstone bedrock.

Surface soil color is pale brown or light brownish gray, but maybe grayish brown and brown. Reaction is slightly acid to neutral and changes little with increasing depth. Color of the subsoil is light yellowish brown or pale brown. A few percent of fine to coase gravels are occasionally found in the upper surface soil. Rock fragments in the subsoil consist mostly of coarse gravels but some fine to medium gravels and a few stones may be present. Depth to bedrock ranges from 10 to 19 inches. There are occasional shallow gullies in draws and small cat slips, but in general, there is little evidence of sheet erosion.

Included in mapping this soil are areas of Vallecitos loam 15 percent; and a few areas of Rock land.

This somewhat excessively drained soil holds 2 to 3 inches of water plants can use. Fertility is low. Permeability is moderately rapid and the surface runoff is rapid to very rapid. Erosion hazard is high to very high. Rooting depth is shallow.

This soil is used for range, wildlife, recreation and watershed. Vegetative cover is annual grasses and open growth of oak trees; very little brush is present. Capability unit VLLel (15) pasture and range site shallow loamy, very steep phase.

Gaviota gravelly loam, 30 to 70 percent slopes, severely eroded (GhG3). This soil is typically very steep but includes some steep and extremely steep slopes. Past sheet erosion has removed most of the surface soil. Depth to sandstone is 6 to 12 inches. Fertility is very low and average water holding capacity is 1/2 to 1 inch. Otherwise, this soil is similar to Gaviota loam, 30 to 75 percent slopes. In mapping this soil, areas of Rock land and Vallecitos loam are included.

This brush covered soil is used for wildlife, recreation and watershed. Capability unit VIIIsl (15).

Madonna Series: the Madonna series consists of well drained, medium textured soils underlain by strongly acid sedimentary bedrock, at an average depth of 25 inches. These soils formed on moderately sloping to very steep uplands. Vegetation is mostly oak trees, some brush, grasses and forbs. Elevations range from 1500 to 3500 feet. Mean annual rainfall is 35 to 50 inches; mean annual air temperature is about 55° to 56°F. The growing season is about 200 to 250 days. Maymen, Ben Lomond and Los Gatos are the principal associated soils.

The surface soil ranges from 2 to 10 inches in thickness and is a pale brown, medium acid loam. The subsoil is a brown, medium acid loam, ranging in thickness from 12 to 18 inches. The substratum is strongly acid, moderately hard coarse grained sandstone.

Madonna soils are used for dryland orchards, hay, pasture, range, Christmas trees, recreation and watershed.

Madonna loam, 30 to 50 percent slopes (MbF). This soil occupies steep uplands with slopes averaging about 35 percent.

Representative profile: on a west-facing slope 50 feet from intersection of old Watsonville Road and Summit Road, just below the fence, Santa Clara County, California:

A11	0 to 7 inches, pale brown (10YR 6/3) loam, dark brown (10YR 4/3) moist; moderate medium and fine granular; hard friable, nonsticky and nonplastic; abundant very fine roots; many very fine interstitial and tubular pores, also, a few medium tubular pores; medium acid (pH 5.6); clear wavy boundary (2 to 10 inches thick).
B	7 to 25 inches, brown (10YR 5/3) loam, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; hard, friable, nonsticky, nonplastic; few very fine roots; many very fine interstitial and tubular pores; also a few medium tubular pores; few thin clay films on peds and in pores; medium acid (pH 5.6); clear wavy boundary (12 to 18 inches thick).
R	25 inches, light yellowish brown (10YR 6/4) strongly acid sandstone.

Surface soil color may be pale brown, light brownish gray or brown. A few areas are grayish brown in the surface 4 inches. Reaction is medium acid. Texture is a coarse loam or fine sandy loam. Subsoil color may be pale brown, brown, light yellowish brown and very pale brown. Reaction is medium to strongly acid. Texture is a coarse loam or fine sandy loam. Depth to strongly acid hard sandstone bedrock is about 25 inches, but ranges from 20 to 28 inches.

Included in mapping this soil are areas occurring along the ridge crests of Maymen rocky fine sandy loam 15 percent; small areas of moderate to severe sheet erosion, and areas of rock outcrop.

This well drained soil has moderate fertility and holds 3 to 4 inches of water plants can use. Permeability is moderate. Surface runoff is rapid and the erosion hazard is high. Rooting depth is moderately deep to bedrock.

This soil is used for range and watershed. Capability unit VIe8 (4); pasture and range site loamy, steep phase.

Madonna loam, 5 to 30 percent slopes, eroded (MbE2). This soil occupies moderately sloping to moderately steep uplands mainly on the tops of round, broad ridges or on the footslopes. Average slope is about 15 percent. Because of past sheet erosion, depth to sandstone ranges from 14 to 24 inches. Runoff is medium, erosion hazard is moderate; average water holding capacity is 2 to 3 inches. Otherwise this soil is similar to Madonna loam, 30 to 50 percent slopes. Included in mapping are areas of rock outcrop and severely eroded areas, about 20 percent of the acreage.

This soil is used for dryland prunes, apples, hay, pasture and growing Christmas trees. Capability unit IVe8 (4); pasture and range site loamy.

Maymen Series: the Maymen series consists of somewhat excessively drained, medium textures soils, underlain by acid hard sedimentary rock, at depths of 11 to 16 inches. They formed on moderately steep to very steep uplands. Vegetation is mainly brush or hardwoods with a dense brush understory. Elevations range from 1600 to 4000 feet. Mean annual rainfall ranges from 30 to 50 inches; mean annual temperature is 55° to 56°F. The growing season is about 200 to 250 days. Los Gatos and Madonna are the principal associated soils.

The surface soil averages 1 to 4 inches in thickness and is a brown, medium acidic fine sandy loam. The subsoil is a light brown, strongly acid, fine sandy loam, ranging in thickness from 10 to 15 inches. The substratum is hard acid sandstone.

Maymen soils are used for dryland hay, range, wildlife, recreation and watershed.

Maymen rocky fine sandy loam, 50 to 75 percent slopes, eroded (MfG2). This soil occurs on very steep uplands and the average slope is about 60 percent.

Representative profile: on ridge between Eastman and Murphy Canyon 2 miles east of Mt. Madonna Road in the S.W. 1/4 of S.W. 1/4 of sec. 15, T. 10 S., R. 2 E., Santa Clara County, California:

O1 — 1 to 0 inches, undecomposed leaves, pine needles and twigs; lower boundary abrupt smooth.

A1 — 0 to 3 inches, brown (10YR 5/3) fine sandy loam, dark brown (10YR 3/3) moist; moderate fine granular structure; soft, loose, nonsticky and nonplastic; few fine and very fine roots; many very fine interstitial pores; medium acid (pH 5.6); abrupt smooth boundary (1 to 4 inches thick).

B2 — 3 to 14 inches, light brown (7.5YR 6/4) fine sandy loam, brown (7.5YR 5/4) moist; weak medium and fine subangular blocky structure; soft, loose, nonsticky and nonplastic; few fine, medium and coarse roots; many very fine interstitial, few medium and fine tubular pores; strongly acid (pH 5.1); clear wavy boundary (10 to 15 inches thick).

R — 14 inches, very pale brown strongly acid hard fractured sandstone.

Surface soil color may be brown, pale brown or yellowish brown, reaction is medium to strongly acid. Texture is fine sandy loam, loam or sandy loam. About 5 to 10 percent of the surface area is covered by rock outcrop. Erosion will vary from moderate to severe. Depth to hard, acid sandstone and shale will range from 11 to 16 inches, but the average is about 14 inches.

Included in mapping this soil are 15 percent areas of Los Gatos gravelly loam; areas of Rock land and a few slopes that range to 80 percent.

This somewhat excessively drained soil holds about 1 to 2 inches of water that plants can use. Fertility is low because of the shallow soil depth. Subsoil permeability is moderately rapid. Runoff is very rapid and the erosion hazard is very high.

This soil is used for wildlife, recreation and watershed. The vegetation is mostly brush with a few trees near the drainage channels or on north slopes. Capability unit VIIIsl (15).

Maymen fine sandy loam, 15 to 50 percent slopes, eroded (MeF2). This soil occurs along ridge tops where the average slope is about 35 percent. Rock outcrops cover less than 2 percent of the surface. Rooting depth is shallow, 13 to 19 inches. Runoff is medium to rapid and water holding capacity is 1 to 3 inches. Erosion hazard is high. Otherwise, this soil is the same as Maymen rocky fine sandy loam, 50 to 75 percent slopes, eroded. Included in mapping are 10 percent areas of Madonna loam and 5 percent Ben Lomond fine sandy loam.

This soil is used mainly for limited range, wildlife, and watershed. A few acres have been cultivated to grain hay, and a number of summer cabins and mountain homes have been built. Capability unit VIIe4 (15); pasture and range site Shallow Gravelly Loam, steep phase.

CF-CONS-108a
12/69

U.S. Department o[illegible] culture
Soil Conserv[illegible] Service

Table 3

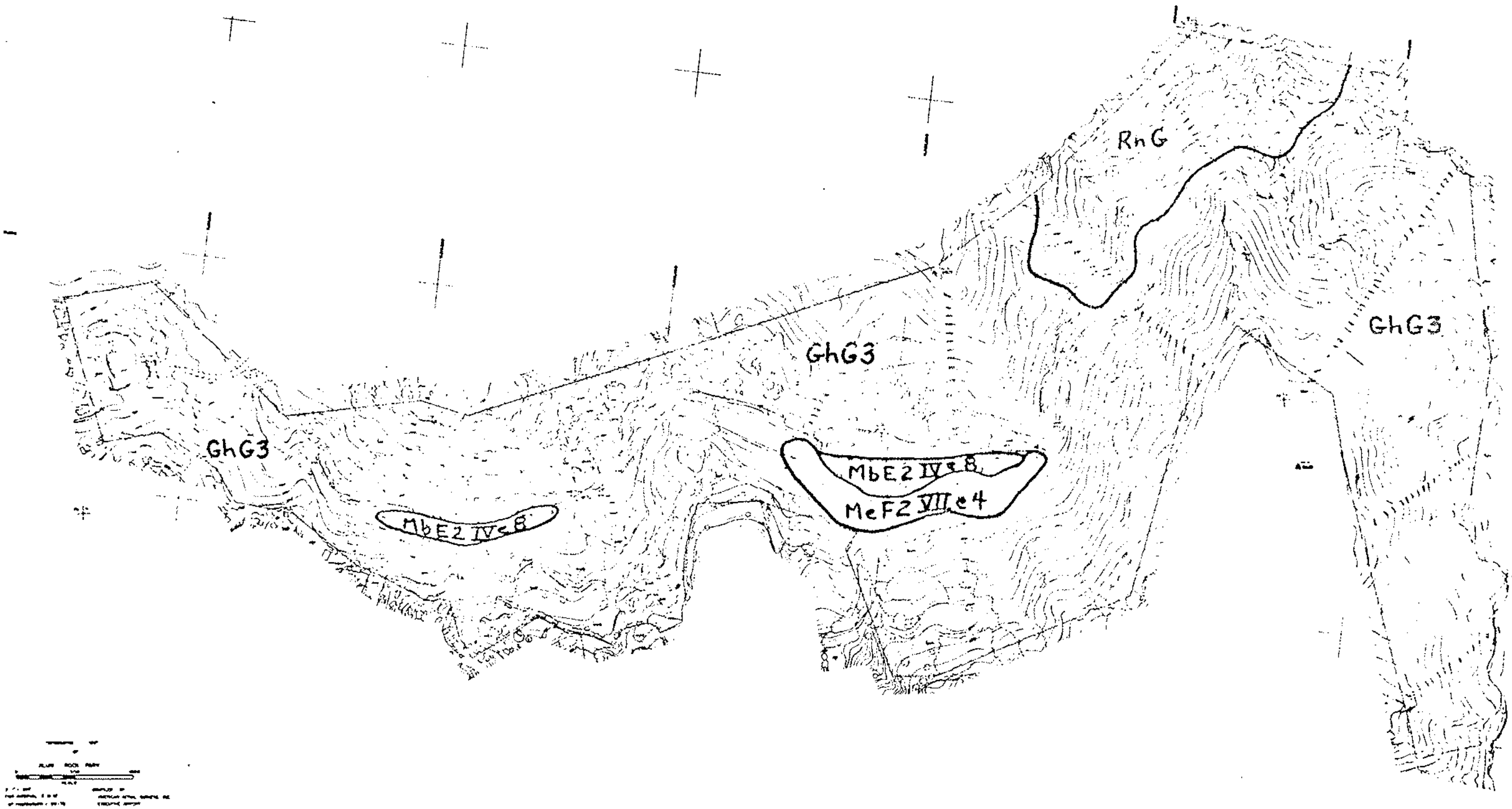
SOIL and CAPABILITY MAP SUMMARY

Cooperator: ALUM ROCK PARK

Date: 6-12-72

Land Capability Unit	Symbol on Map	Soil Name	Effective Depth	Soil Profile: Texture: Surface	Soil Profile: Texture: Subsoil	Soil Profile: A.W.C.* Inches	Average Slope in %	Erosion Status	Suitable Land Uses or Crops	Limiting Factors or Remarks
IVe8	MbE2	Madonna-like	14-24"	loam	loam	2-3	2-5	moderately eroded	recreation use, woodland	shallow soil, low AWC, bedrock within root zone
VIIe4	MeF2	Maymen	13-19"	fine sandy loam	fine sandy loam	1-3	50	moderately eroded	recreation use, watershed, wildlife	high erosion hazard if cover removed, very low AWC
VIIIs1	GhG3	Gaviota	6-12"	generally missing	gravelly loam	$\frac{1}{2}$-1	65	severly eroded	watershed, wildlife	very high erosion hazard when cover removed, steep slopes, shallow soil

*A.W.C. - Available Water Holding Capacity for the entire soil profile



SOIL AND CAPABILITY MAP

Soils Bibliography

Soil Conservation Service. Soils of Alum Rock Park. United States Department of Agriculture, Soil Conservation Service, Morgan Hill, California, 1972.

Hydrology

The area of the drainage basin of Penitencia Creek above the canyon mouth is estimated at 21.8 square miles, or 139,520 acres. The figures were derived by the Santa Clara County Flood Control and Water Conservation District. The terrain is mostly steep with shallow soils and common rock outcrops. This combination of factors permits rapid runoff of precipitation which is the major factor in the cutting of Alum Rock Canyon. Stream-flow is thus highly intermittent, with peaks during the winter and spring and extreme lows in late summer. Flood conditions have been recorded on numerous occasions since the establishment of the Park. The establishment of Cherry Flat reservoir, which is approximately 100 acre feet in capacity, has mitigated flooding heights to some extent, but has not prevented floods.

The design flow of Penitencia Creek below the mouth of Alum Rock Canyon is 5,600 CFS with a 1 percent chance that this flow will be exceeded in a given year. Such a flow would occur only at times of extremely intense precipitation, and the flow is generally much lower. During late summer in particularly dry years, the surface flow approaches zero CFS with virtually the entire flow being subsurface. Remnant pools are stagnant and are fed to a large degree by the numerous springs in the area. At such times, the amount of dissolved oxygen is undoubtedly low. The quantity of water deriving from the springs is unknown. Such irregularity of stream flow places severe limitations upon populations of many organisms normally found in fresh water streams.

The flood plain of Penitencia Creek within the Park is estimated at between 60 and 65 acres, or about 8 percent of the total Park, the remaining 92 percent of the land represented in slopes of varying degrees.

Subsurface water flow and soil moisture have been but little studied in the Park. Evidence of soil moisture availability is reflected in the presence of tree vegetation in several of the side drainage channels and in other areas where soil conditions permit the accumulation of subsurface flow of water. The most obvious variation in the vegetation is between the south-facing and north-facing slopes. South-facing slopes absorb the direct rays of the sun and are converted into heat energy which, in turn, affects the yearly soil moisture regime. According to Van't Hoff's Law, for every 18°F increase in temperature, there is roughly a doubled physical-chemical reaction potential, including the evapo-transpiration potential. Hence, the oblique rays of the sun striking the south valley wall permit a much greater population of trees there than on the south-facing canyon wall.

Natural gravitational flow of water supplies the soil of the flood plain over a considerable period of the year, permitting a riparian community of trees and shrubs to exist.

Springs

The mineral springs in Alum Rock Park were a factor in the development of the Park. They were generally ignored before the 1890's, and in fact, were not included in a listing of springs in the area in 1881 (5:39). Gilroy Hot Springs, Congress Springs, and others were well known at the time. It did not take long for the springs to be developed, though, and by 1887 at least fourteen were listed (12:85). The rapid development of the Park by the Commission between 1891 and 1902 included the placing of these springs in grottos, laying pipes to bring the waters to the bath-house area, and establishing some reservoirs for storage. A hot spring was discovered in 1896, which may have been the soda spring located across the creek from the Tea House area, (11:43). It was reported to issue from the hillside at a temperature of 98°F. Several sources indicate that there were sixteen developed springs between 1902 and 1912 (14:54, 9:8), and eighteen by 1916 (13:204).

The Chamber of Commerce reported 22 springs available at some time during the 1930's and '40's (8). Current statements place the number of available springs at 27. This figure is derived from various local newspaper articles quoting former Park Superintendant Roy West (6:8). The Park employees manual covering duties in the Park (written by Roy West and dated 24 March 1956) also states 27 mineral springs (on page 2). The location of all 27 springs is not presently known (if, in fact, there are 27), but limited observations indicate 21 that could be definitely identified.

The composition of the mineral waters has been tested at various times throughout the years. Types of waters available include: black sulphur (sulphide of iron), soda, magnesia, iron, white sulphur, and arsenic (2:123; 9:4, 27 Jul 1902; 7:4; 13:204).

An analysis of several springs was made by the state mineralogist William Ireland some years prior to 1916. His report stated that the waters showed a prevalence of soda, white sulphur, black sulphur, and iron. He indicated that they were "highly charged with sulpheretted hydrogen," (sic). He noted also that sulphates were practically absent, as was any notable quantity of carbonate of lime (13:204). Sometime between 1892 and 1902, eleven medical doctors from the area certified that the waters were beneficial and recommended them for "kidney and stomach troubles, rheumatism and malarial affections" (2:124 and 7:5).

Most of the various grottos and fonts were built during the 1890's or during the period 1912-1916. The earlier ones are indicated on the map. It is possible that some of those constructed in the 1890's were rebuilt in 1916.

Mineral springs which occur in Alum Rock Park are an interesting part of the Park's natural history. According to O.E. Bowen (1:377):

> The numerous mineral springs vary greatly in mineral content: some are salty, some carbonated, some high in sulfates, and many are sulfurous. The minerals are probably being leached from nearby Tertiary and Cretaceous marine sediments by groundwater.

Analysis of gases in the springs have revealed a 95 percent carbon dioxide content (3:oral communication). One other spring has been reported to contain arsenic in a great enough abundance to affect animal life in and near the spring. One possible natural source of arsenic could be the presence of the arsenic-bearing minerals orpiment (As_2S_3) and/or realgar (AsS). Such occurrences have been reported near Evergreen which lies approximately six miles south of the Park (4:oral communication).

During the course of the present study, an X-ray analysis was conducted of minerals collected from various springs in the Park. The locations of the samples are shown on the accompanying map and the minerals identified in the samples are shown in Table 4. The chemical composition of the minerals is a good indication of the elements contained in solution. Some of the minerals were probably derived from pre-existing rocks from which the precipitates were sampled. These are indicated by asterisks (*). The other minerals are all common to thermal spring areas. Other elements, such as arsenic, may be present in small amounts which would not be detected by this type of analysis. A spectroscope should be used to determine whether elements such as arsenic, mercury, etc., are present in small amounts; this was not done for this study.

Geology: a geological explanation of the presence of the springs is not clear. However, a reasonable explanation is possible (fig. 7). Within the Monterey formation are the alternating beds of shale and chert. Chert is a water-conductor while shale is not. When chert is sandwiched between shale a natural pipe is created. One thousand feet above the springs such a condition exists. Rainwater seeps into

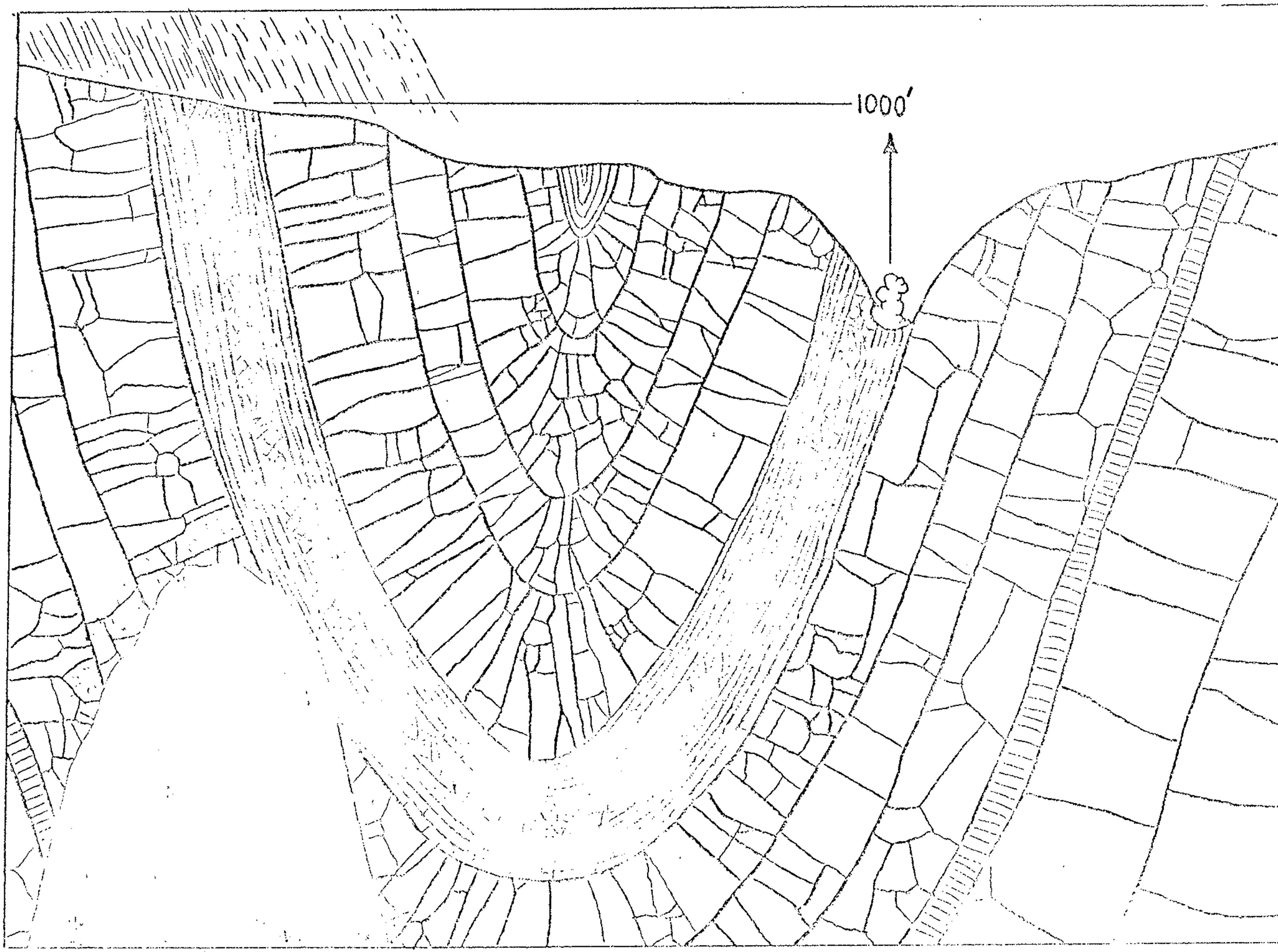
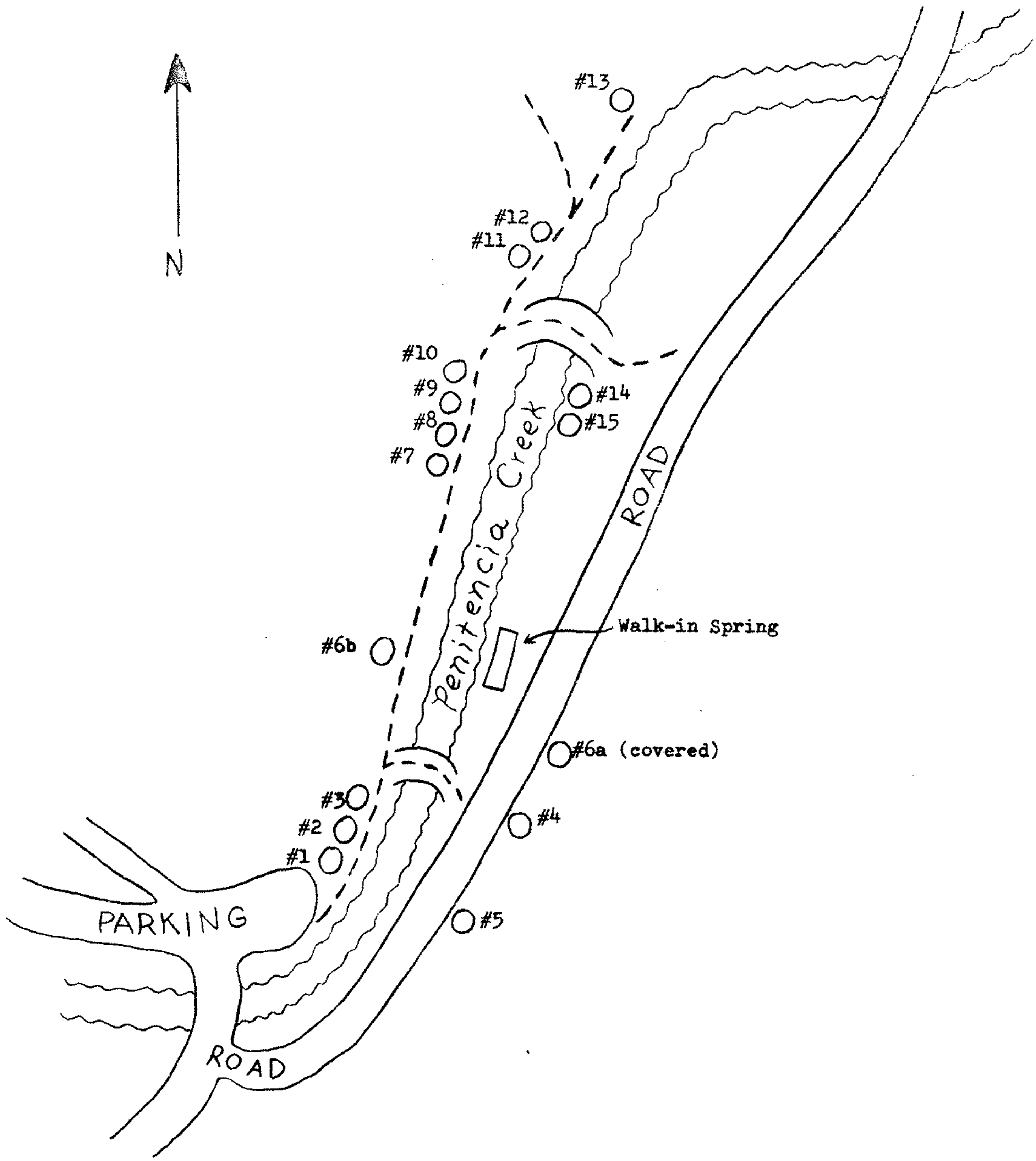


Figure 7



Mineral Springs of Alum Rock Park

Table 4

Mineral Springs of Alum Rock Park

Minerals precipitating from spring water:

Calcite, $CaCO_3$
Quartz, SiO_2
Gypsum, $CaSO_4 \cdot 2H_2O$
Jarosite, $KFe(OH)_6(SO_4)_2$
Dolomite, $CaMg(CO_3)_2$

Minerals from rock on which precipitates occur:

Muscovite, $KAl_2(AlSi_3O_{10})(OH)_2$
Albite, $Na(AlSi_3O_8)$-$Ab_{90}An_{10}$

Spring Number	Minerals
1 (sample 1)	Calcite
1 (sample 2)	Calcite, Quartz, *Albite
4 (sample 1)	Gypsum, Dolomite, Calcite
4 (sample 2)	Gypsum, Calcite, Quartz
6a	Quartz, Jarosite
6b	Calcite
7 (sample 1)	Calcite
7 (sample 2)	Calcite, *Albite
8	
10	Calcite
11	Gypsum, Calcite, Jarosite, *Muscovite or Illite

the chert layer and hydrostatic pressure is created which forces water out as springs at the lower elevations. The temperatures of the springs can be explained in two ways. Either the nearby rhyolite plug is still uncooled at depth and is heating the water, or the water is carried to sufficient depth to be heated by the earth's geothermal gradient--the increase of temperature with depth.

Arsenic Spring: There is considerable evidence that the water from one of the mineral springs in the Park at one time contained significant quantities of arsenic. An editorial in the 27 July 1902 issue of the San Jose Mercury called for testing and labelling the "dozen or more springs" in the Park and mentioned that at least one contained a decided trace of arsenic (10). A book published in 1903 (M.B. Carroll) refers to "...hot and cold sulphur, soda and magnesia springs, as well as mixtures of sulphur, soda, magnesia, arsenic, iron, etc., and their sulphates" (2) (probably quoted from the Carroll reference). In discussions of this subject with retired members of the Park staff it was mentioned that this spring became unsightly because it was often littered with the corpses of birds that had died after drinking its water, and so was sealed up and its grotto destroyed. But, supposedly, the arsenic content of the water was not enough to be serious to persons drinking it. There appears to be no analysis of this spring water that would support these conclusions, although there is no reason to doubt the reports. The remains of this grotto can be seen as a few steps apparently leading nowhere, immediately to the east of the last sulphur grotto on the wouth side of the canyon.

Mineral Springs: the major attraction and use of the mineral springs today appears to be as a curiosity. Few people passing the springs were ever observed to even taste the water, let alone drink any of it. The only place where tasting can be observed is at the mineral-water fountains near the Youth Science Institute Junior Museum building. This fountain now contains both soda and sulfur water that is piped in from the nearby springs. Primarily the water use at this fountain is for occasional tasting. About twice during the study, individuals were observed to be collecting water from the springs in some quantity. In one case a man was filling a quart jar. In one notable case a man was filling two gallon jugs at a soda spring. Upon engaging him in conversation it was found that he lives in San Francisco and has been using this spring water for drinking purposes for nearly 50 years. Whenever his supply runs low, he fills his station wagon with empty jugs and heads for Alum Rock Park. The trips must not be made very often, however; he appeared to have had about 20 gallons of water in his car. The man was not very willing to talk, but he did say that he was very disappointed with the deterioration of the Park in the last few years, and was happy to hear that the City plans to rehabilitate the springs and grottos.

Mineral Springs Bibliography

Bowen, O.E. "Road Guide to the Geology of the Bay Area Counties," Geologic Guidebook of the San Francisco Bay Counties. Calif. Div. of Mines Bull. 154, p. 377, 1951.

Carroll, Mary Bowden. Ten Years in Paradise. San Jose, Press of Popp and Hogan, 1903.

Doloff, N.H. Professor of Geology, California State University, San Jose, oral communication, 1972.

Maddock, M. Professor of Geology, California State University, San Jose, oral communication, 1972.

Munro-Fraser, J.P. (also spelled Munro-Frazer). History of Santa Clara County, California. San Francisco, Alley, Bowen & Co., 1881.

"Peninsular Living", weekly supplement to The Advance-Star and Redwood City Tribune, issue of 26 Sep 1970, Redwood City, California, Peninsular Newspapers, Inc., 1970.

San Jose and Santa Clara Railroad Co. Alum Rock Park, San Jose's Beautiful Resort. San Jose, San Jose and Santa Clara Railroad Co., N.D.

San Jose Chamber of Commerce. Alum Rock Park, "Little Yosemite". San Jose, San Jose Chamber of Commerce, N.D.

San Jose Chamber of Commerce. San Jose (San Hosay). San Jose, San Jose Chamber of Commerce, (1904? 1912? 1927?).

San Jose Mercury. Daily newspaper, San Jose, California.

San Jose Mercury. "Sunshine, Fruit and Flowers." San Jose, Press of Alfred C. Eaton, 1896.

Santa Clara County, California, Vol. 1, No. 1, Sep 1887. San Francisco, W.B. Bancroft & Co., 1887.

Sawyer, Eugene Taylor. History of Santa Clara County, California. Los Angeles, Historical Record Co., 1922.

Sunset, Vol. 9, No. 1, May 1902.

Water Quality in Penitencia Creek

Introduction. Penitencia Creek travels the length of Alum Rock Park in a generally westerly course. As the creek and its springs (sulfur, soda, iron and carbonated sulfur) are a focal point of the Park, they are a natural attraction to children who feel the universal urge to wade, throw rocks, splash around, perhaps swim and inevitably ingest some of the water. This raises the question, "How safe is the water?"

Many standards of quality exist for water used for various purposes, i.e. drinking water, swimming pools, lakes and rivers for swimming and water sports. Because this creek is small (averaging about 10 feet in width), shallow (a foot or so in depth), and subject to seasonal as well as day-to-day variations in temperature and volume, and because it is not a public drinking water source (water for Park visitors is piped from an uphill spring through a small treatment station), the strict application of drinking water standards would still seem to be inappropriate.

In order to determine the quality of the water in the creek, coliform bacteria counts, applying recreational water standards, were made at several points using Millipore Corporation's membrane filter "Field Monitors" and "Sanitarian's Kit".

Testing was intended to:

1. Determine the presence or absence of coliform bacteria.
2. Establish the magnitude of contamination as indicated by coliforms, if present.

3. Locate or identify sources of serious pollution, if any.

4. Indicate the relative safety of the creek water because of its potential use by people enjoying the Park. This was done by application of the limits recommended in "Standard Methods for the Analysis of Water and Waste Water".

Testing was initiated in January 1972 and concluded in May 1972. Four sampling sites were monitored during this time. The sites were representative of the upstream and downstream limits of picnic locations and the central region of the developed Park.

Methods and Procedures. After conducting preliminary sampling to determine the suitability of sampling sites and the magnitude of coliform populations present, the following procedures were established:

Four sampling sites were established:

Site #1 -- Big Leaf Maple picnic ground. Located at the upstream limit of developed picnic sites. Samples were taken from a pool about 14 inches deep. This site is more than 100 yards upstream from the nearest mineral spring and no rest rooms or other facilities are located above this area except the water purification building about 50 feet upstream on the north bank.

Site #2 -- Junior Museum. Samples were taken from a pool to the north of the Junior Museum.

Site #3 -- Bridge near Log Building. Pool under the bridge to the north of the Park headquarters and arcade buildings.

Site #4 -- Railroad Bridge. Samples taken from vicinity of Rustic Lands picnic ground about 200 yards downstream from the old bridge.

Certain other locations were spot checked for special purposes.

The basic sampling procedure used was to take 25 milliliter (25 ml.) samples in a stainless steel graduated cup. To this, 175 ml. of buffered water (autoclaved, hence free of bacteria) were added and mixed with the sample. Then 50 ml. of this dilution were filtered through a field monitor. A two-way syringe was used for this purpose. The field monitors are closed plastic containers similar to Petri dishes with inlet and outlet plugs, grid-marked filter with 0145 micron pores, and a culture medium pad on the back of the filter. The medium was added after filtering. The monitor was then sealed and incubated at 35°C for about 20 hours in a water bath incubator.

M-Endo Broth Medium used in these tests produces a green sheen on the pink stained background of the filter when bacteria of the coliform group occur. The broth, as well as the temperature of incubation, tend to supress growth of many non-coliform bacteria. Each pinhead sized colony is assumed to have developed from one bacterium. Colonies were counted with a magnifying lens and overhead incandescent light after the filter was removed from the monitor and dried. Counts are converted to 100 ml. sample value by the formula:

$$\frac{\text{number of sheen colonies}}{\text{mls. of sample}} \times 100 = \text{Bacteria per 100 ml.}$$

Results recorded on the graphs are the average of three samples in each case. Samples in these tests tended to be sufficiently close to justify averaging.

Sites #1 and #2 were sampled six times between 26 January and 15 April. Site #3 was sampled once on March 1st, then discontinued since its central location was so much similar to Site #2. Site #4 was sampled 1 March and 27 March. Water temperatures were taken with each sample.

It should be noted that sampling, although procedurally simple required from 20 to 30 minutes per site.

Sites #1 and #2 were sampled in the usual manner on 2 March and simultaneously a second series was sampled doubling the dilution from 25:175 ml. to 25:375 ml.

The City test using the MPN (most probable number) procedure indicated an unusually high count of 460 coliforms per 100 ml. at site #1. The corresponding membrane filter was very crowded with non-sheen colonies. It was decided to sample site #1 and site #1A (150 feet upstream) on 15 April. Since the water treatment building is located between sites #1 and #1A, a sample of drinking water from the fountain near the Junior Museum (site #2A) was also taken for testing, along with site #2 on 15 April.

On 27 April a sampling from site #2 was used to get a plate with sheen colonies which was used to make a gram stain slide. The bacteria in the sheen colonies proved to be small, Gram-negative non spore-forming rods.

Finally a series of tests were run by collecting water from site #1, autoclaving the sample to kill bacteria present, but retain the mineral and particle content. This water was seeded with known quantities of the bacterium Escherichia coli (the intestinal coliform most common to humans) in concentrations of 2.1×10^3 and 2.1×10^2 per 100 ml. Klett tubes and a colorimeter were used to estimate these concentrations. The purpose of this test was to determine whether or not the appearance of known coliform colonies was similar in appearance to the green sheen colonies occurring during routine sampling, to determine whether or not crowding will alter nutrient utilization enough to prevent sheening, and to evaluate the quantitative reliability of the membrane filter system.

Results. The graphs for sites #1 through #4 show the total plate counts (not intended to suggest total bacteria count) and the green sheen colony count (Tables 5, 6 and 7).

Site #1 had a count of 267 per 100 ml. on 26 January. In February this dropped to 32 and 43, and no sheen colonies appeared in March, while 16 appeared on 15 April. Site #1A (upstream) had 17 colonies on 15 April.

Site #2 had counts of 32 on January 26th, 11 and 0 in February, 24 and 11 in March, and 107 on 15 April. Site #2A (drinking fountain) had no sheen colonies and a small number of clear colonies.

Site #3 had no sheen colonies on March 1st.

Site #4 had no sheen colonies on either date tested.

Site #5 (upstream above the footbridge) had 64 sheen colonies on 27 March.

Site #6 (footbridge) had no sheen colonies, but was crowded with non-sheen colonies, on 27 March.

The 2 March experiment, halving the dilutions, produced no appreciable difference in final, adjusted counts or in colony appearance. Site #1, 25:175 dilution, no sheen colonies.

Site #1, 25:375 dilution, no sheen colonies.

Site #2, 25:175 dilution, 1.5 sheen colonies.

Site #2, 25:375 dilution, 1.0 sheen colonies.

Table 5

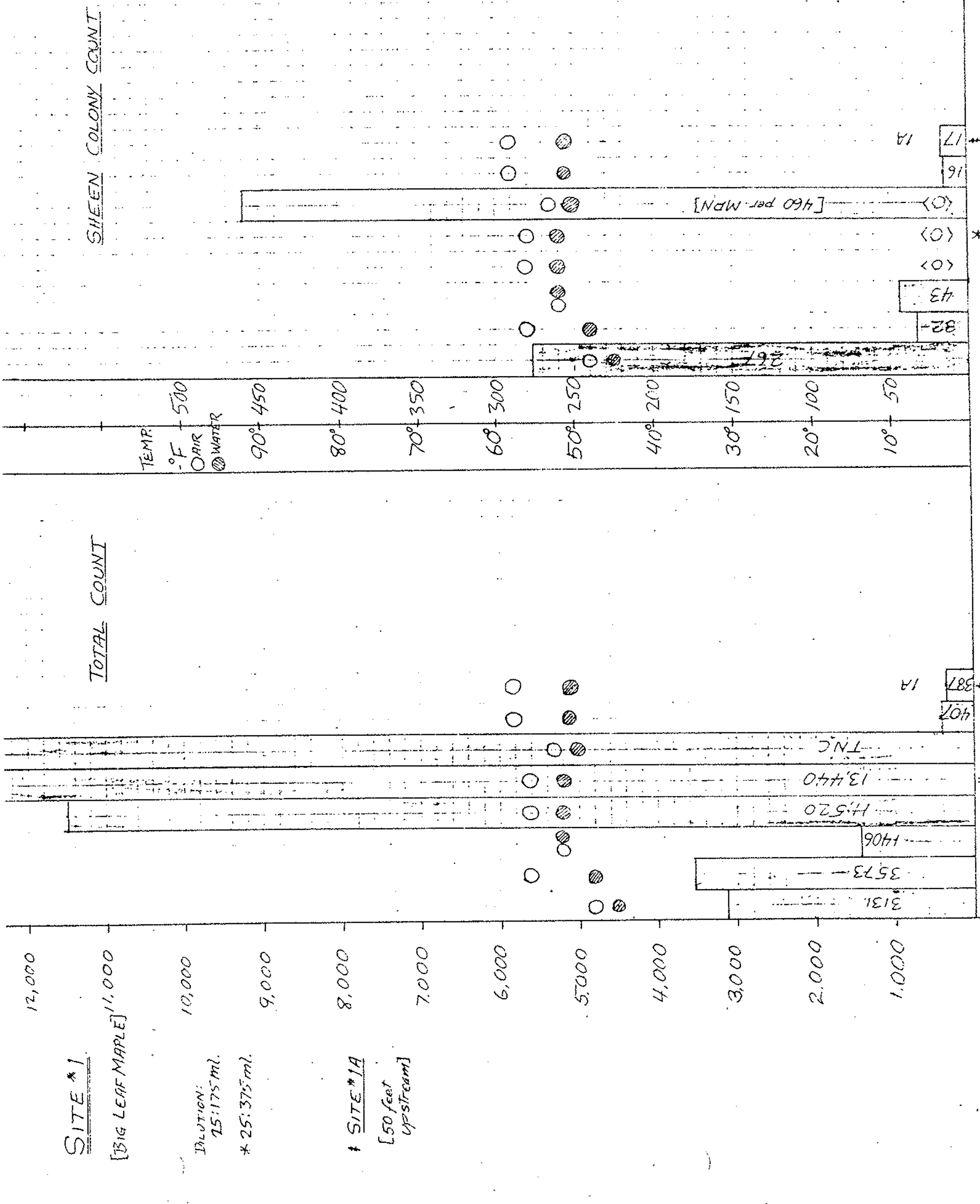
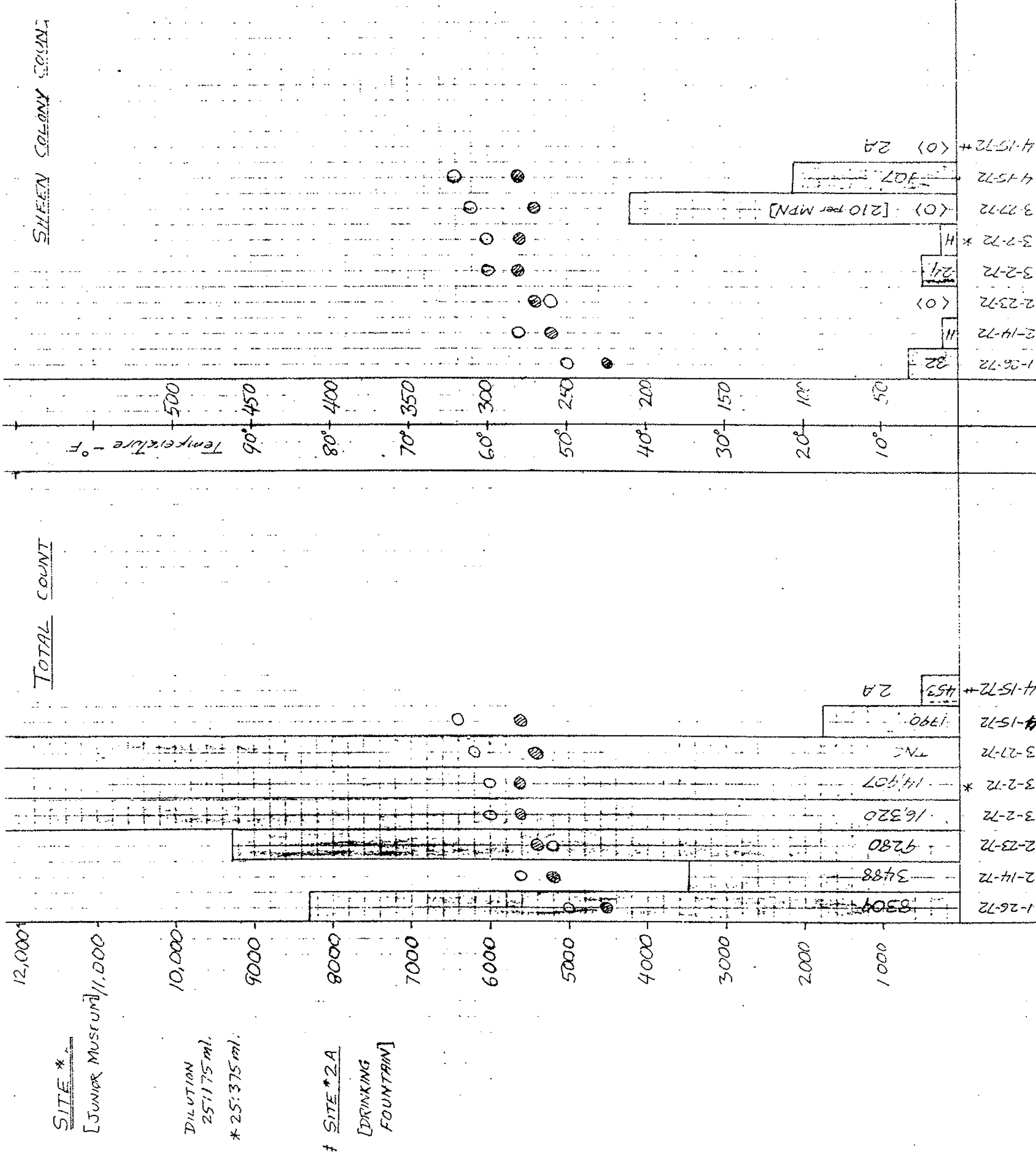
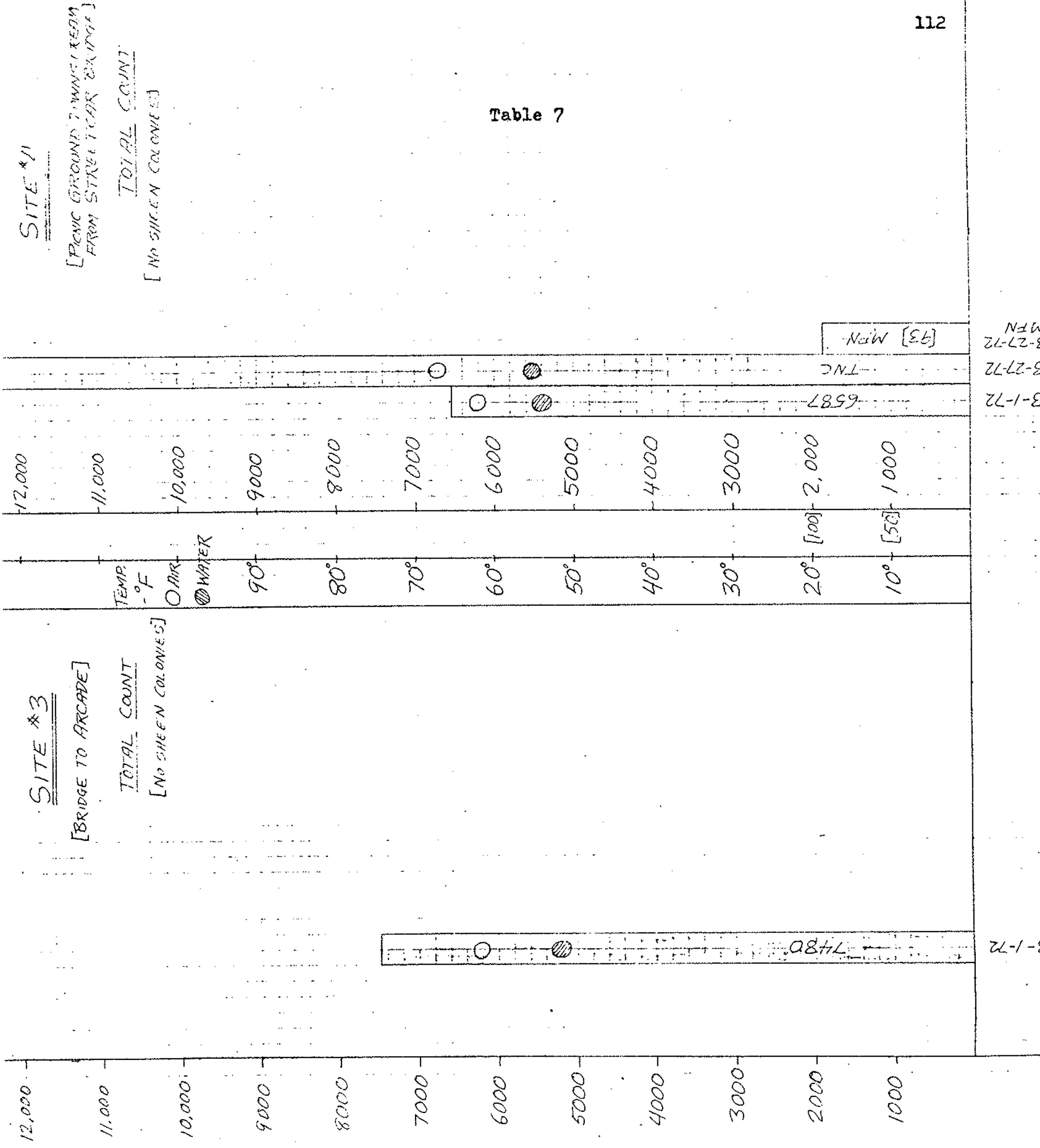

SHEEN COLONY COUNT
TOTAL COUNT
TEMP. °F
○ AIR
● WATER
10° 20° 30° 40° 50° 60° 70° 80° 90°
50 100 150 200 250 300 350 400 450 500
1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000 9,000 10,000 11,000 12,000
17
1A
16
[460 per MPN]
<0>
<0>
<0>
43
32
267
387
1A
407
TNC
13,440
11,520
1406
3573
3131
SITE *1
[Big Leaf Maple]
Dilution: 25:175 ml.
* 25:375 ml.
† SITE *1A
[50 feet upstream]

Table 6



SITE *
[JUNIOR MUSEUM]
DILUTION
25:175 ml.
* 25:375 ml.
‡ SITE *2A
[DRINKING FOUNTAIN]
TOTAL COUNT
SHEEN COLONY COUNT
Temperature – °F
12,000
11,000
10,000
9000
8000
7000
6000
5000
4000
3000
2000
1000
90°
80°
70°
60°
50°
40°
30°
20°
10°
500
450
400
350
300
250
200
150
100
50
8304
3488
9280
16,320
14,907
TNC
1790
453
2A
32
11
<0>
24
4
[210 per MPN]
307
1-26-72
2-14-72
2-23-72
3-2-72
3-2-72 *
3-27-72
4-15-72
4-15-72 ‡
3-7-72 *

Table 7


SITE #1
[PICNIC GROUND DOWNSTREAM FROM STREETCAR BRIDGE]
TOTAL COUNT
[NO SHEEN COLONIES]
[93] MPN
TNC
6587
TEMP. °F
AIR
WATER
SITE #3
[BRIDGE TO ARCADE]
TOTAL COUNT
[NO SHEEN COLONIES]
7480
12,000
11,000
10,000
9000
8000
7000
6000
5000
4000
3000
2,000
1,000
[100]
[50]
90°
80°
70°
60°
50°
40°
30°
20°
10°

The City of San Jose Water Pollution Control Plant MPN tests compare with the membrane filter tests, both collected 27 March, as follows: (MPN, most probably number, deduced from fermentation tube)

Site	MPN per 100 ml.	MF sheen per 100 ml.
#1	460	0
#2	210	0
#4	93	0
#5	21	64
#6	43	0

The seeding of autoclaved creek water indicated that crowding above concentrations of 2.1×10^3 could result in non-sheen colonies developing. The counts on the plates did not correspond directly with the known numbers of bacteria.

Discussion: Sites #1, #2 and #4 were settled on as the most meaningful for sampling because they represent the upstream limit, middle and downstream limit of the established picnic facilities.

The Millipore Corporation membrane filter field monitor system appears to be the most practical method available for coliform testing since results are available about 24 hours after sampling. This is approximately one third of the time required for the basic MPN test. Numerical precision, while not quantitatively reliable, is, according to Environmental Protection Agency studies, more accurate than the fermentation tube method, and the results are reproducable.

Coliforms are an inclusive, heterogeneous group of bacteria of many species and variants. According to "Standard Methods for the Examination of Water and Wastewater", the coliform group includes all of the aerobic and facultative anaerobic, Gram-negative, non-spore-forming, rod shaped bacteria which ferment lactose with gas formation within 48 hours at 35°C.

The coliform group is used as a basic indicator of water quality because the absence of coliform bacteria is evidence that water is probably free of contamination by human wastes. Coliforms are sufficiently durable that if pathogens are present coliforms are bound to be present. Coliform persistance in water make them the most obvious bacterial indicator of contamination.

Should a sufficient number of coliforms occur to cause concern, tests can be made concurrently for fecal coliforms, or fecal streptococci. Ratios may be used to try to contrast human with other warm-blooded animal pollution. These additional tests were not attempted for this study because the levels of coliforms encountered were below the level of 1000 per 100 ml. recommended as safe for non-swimming pool swimming by "Standard Methods".

The main limitations to consider with the coliform testing which was performed are that large numbers of bacteria, coliform or others, can cause poor sheen colony formation and occasional sheen colonies are produced by non-coliforms.

Total bacteria counts were not attempted because they are virtually impossible to achieve. Each culturing technique and medium is in some way selective and a variety of different tests may still exclude certain bacteria. Different tests probably would not balance with each other quantitatively either.

It is, therefore, most practical to begin with a total coliform count, which was done. If the results indicate acceptable levels of bacteria (2.2 per 100 ml. for potable water and 1000 per 100 ml. for lake or river swimming per "Standard Methods") then no further tests are necessary from a public health standpoint.

The levels of coliform counts in Penitencia Creek were never in excess of 500 per 100 ml. during these tests and were generally much lower. This suggests that the possibility of pathogens occurring in the water is most unlikely since they would usually be less persistant than the coliforms.

The MPN test performed by the City indicated 460 per 100 ml. as the presumptive count at site #1 on 27 March. This was twice the count of site #2, and about ten times the magnitude of sites #4, #5, and #6. The corresponding membrane filters indicated no sheen colonies, but did show extremely high total counts which could result from crowding. Site #2 did have 11 colonies per 100 ml. and 210 on the MPN.

On 15 April, site #1A, 150 feet upstream of site #1, was tested along with site #1. The resulting counts were 16 and 17. Both acceptable levels. The presence of the Park water purification and treatment building between sites #1 and #1A gave rise to some question of contamination, but a subsequent test suggests that the high count of 27 March was due to some temporary phenomenon, such as an animal eliminating wastes at about the time and place of the sampling. The drinking fountain tested showed no coliforms and a low incidence of other bacteria. No doubt about the quality of the potable water in Alum Rock Park should arise from these tests.

When dealing with a small rapidly changing creek, the tests performed must be recognized as meaningful only at a precise time and place. For example, fecal contamination by man or other animals might cause a high coliform count on one day and be gone the next at any given place. This contrasts to some extent with larger bays, lakes and rivers where pollution may have cumulative properties due to the relative stability of a mass of water.

The mineral springs were not seen to affect the temperature or bacteria populations of the water during the course of these tests. Sampling was conducted above and below the springs, but not at the vicinity of the springs.

Conclusions. In accordance with U.S. Public Health Service Standards as recommended in "Standard Methods for the Examination of Water and Wastewater", Penitencia Creek could not be considered "safe" for drinking, but was within acceptable limits of coliforms for swimming and water sports during the period tested. These tests should not, however, be construed as a substitute for formal monitoring by local health agencies, which should be done on a regular basis.

Tests further indicate that the membrane filter technique is well-suited to this type of water sampling and, while not sufficiently accurate for quantitative analysis, is as accurate as or more so than the fermentation tube, MPN, test. The field monitors are simple to use, small, light, and results are obtained in about 24 hours, as compared to 72 hours with the MPN.

The Gram stain and seeded water tests served to rule out the possibility of false positive reading or of gross misinterpretation.

On the basis of these tests it may then be concluded that the incidental recreational use of Penitencia Creek by children is reasonably safe provided that monitoring at regular intervals, i.e. weekly or bi-weekly, be conducted by competent authorities.

Water Quality Bibliography

References Cited:

American Public Health Association. Standard Methods for the Analysis of Water and Waste Water, 13th edition, N.Y., 1971.

Environmental Protection Agency. Bacterial Examination of Drinking Water. EPA, Water Quality Office, Training Branch, Cincinatti, Ohio, 1971. (Note: training course manual not generally available.)

General References:

Geldreich, E.E. Applying Bacteriological Parameters to Recreational Water Quality. Journal of American Water Works Association, 62:2, 1970.

Geldreich, E.E. Fecal Coliform Concepts in Stream Pollution. Water and Sewage Works, Ref. no. 1967; 1967.

Harvey, H.T., Hartesveldt, R.J., and Stanley, J.T. Wilderness Impact Study Report. Sierra Club Outing Committee, 1972.

Millipore Corporation. Biological Analysis of Water and Waste Water. Application Manual AM 302, Bedford, Mass., 1972.

Climate

Alum Rock Park lies within the Mediterranean type climate of California. The climatic type is characterized by having relatively low rainfall, which comes in winter, and dry summers. Although no known long-term weather records are reported from the Park, it is probably receiving about 15 to 20 inches of rain per year. Average July temperature is probably 67°F, while average January temperatures are about 48°F.

In as much as the Park is in the lower foothills of the Hamilton Mountains, some effect of orographic precipitation is probable. Thus it is estimated that the upper reaches of the Park may receive the higher precipitation, i.e. around 20 inches per year. The obvious difference in vegetation on the various slopes is not due as much to differences in precipitation as to differential heating and evaporation. Based on nearby date, the Park is probably in an area of evaporation that is about 40 inches a year. Thus a net loss of 20 inches could be expected in the area. This, coupled with the fact of runoff from the steep canyon sides, produces a patchiness of vegetation, typical of hilly regions. There is a pattern, however, to this mosaic of vegetation that is climatically induced: that is the effect of north-facing versus south-facing slopes.

Slope exposure has a profound effect on which organisms can persist on which slopes. South-facing slopes at Alum Rock Park are known to be warmer than north-facing slopes by several degrees. For example, soil temperatures taken in the spring averaged 81°F on the south-facing slope while those on the north-facing slope averaged 73°F at the same time. One study of maximum and minimum air temperatures during April and May of 1971 indicates that the south-facing slopes in the Park show greater daily variation in temperature than the north-facing slopes. The south-facing slope was consistently 10 to 15 degrees warmer during the study period, but it was also 5 to 10 degrees colder at night. Heat loss is probably greater on south-facing slopes due to the lack of a thick "blanket" of vegetation. South-facing slope temperatures varied as much as 50 degrees while north-facing slopes varied only 25 degrees.

In response to the higher temperatures on south-facing slopes, evaporation is greater. One study in the Park indicates that during the spring, four to five times as much water evaporates from south-facing slopes as from north-facing slopes. As one would expect, this higher evaporation induces lower soil moisture values for the south-facing slope. The few studies of this area show consistently the soil moisture on south-facing slopes to drop lower and more quickly after a rain than on north-facing slopes.

Thus, in summary, Alum Rock Park is a relatively arid place with dry summer weather. However, this is modified by the canyon topography to produce runoff in the form of Penitencia Creek which supports a riparian biotic community. The north-facing slopes are relatively cool and moist and in many places support a mixed woodland community which requires a relatively high availability of moisture.

Snowfall: sometime in January 1972 there was a fairly heavy snowfall in the higher portions of the Park and back in the canyons. This reportedly amounted to about four inches of wet snow that caused widespread damage to trees in the more remote areas of the Park. A hike up the Aguague Creek Canyon on 18 February 1972 revealed many trees, primarily oak and bay-laurel, that had been broken by the weight of the snow. The hillsides and creek bottom were fairly well-littered by broken branches and uprooted trees. Some of the broken branches were 8 to 10 inches in diameter and a few showed signs of having been twisted off rather than snapped. It would seem that a great deal of weight would be required to do this to an 8 inch oak branch. Another tree that showed the effects of this snowfall in many places was the Digger Pine. These appear to have been in most cases flexible enough to resist breaking, but a few were uprooted and others were bowed over until they leaned against the sheer hillsides, where they remained. The Park maintenance crew reported that the snow had resulted in many broken branches across the roads, especially the Cherry Flat Dam Road, that had to be removed. This occurrence of snow is relatively rare, but can be expected in the higher areas of the Park every few years. It is doubtful that the usual snowfall in this area is either in such quantity, or of such a high moisture content, as was this instance.

Vegetation and Wildlife

Introduction

While the unique setting of Alum Rock Park in terms of its geology, soils, climate and mineral springs should be sufficient to make the Park an attractive and informative place to visit, it is doubtful that these attributes are major attractions. The primary use of the Park is for a variety of recreational activities that are inseparable from the living things in the Park. The trees provide food, shade and shelter for a wide variety of birds and other animals, all of which contribute to the enjoyment of the Park. Many of the species present, both plant and animal, are not native to the area, but all the living things in the Park interact to some extent to form a unique biotic, or living, community. In order to fully appreciate the value of the Park as it stands today it is helpful to know something of the life forms that exist within it. In the sections that follow are the inventories of the living plants and animals made within the Park. Again, this section opens with a historical discussion of this area.

Historical Listings

A Chamber of Commerce brochure, written sometime between 1932 and 1946, lists the following plants in the Park (4:1):

Flowers (Native):

Wild onion	Mariposa tulip	Wild hyacinth
Soap plant	Fairy bells	California poppy
Wind poppy	Goldenrod	Columbine
Wild broom	Lupines	Baby blue eyes
Indian paint brush	Pink paint brush	Monkey pansy
Ladies' slipper	Wild portulaca	Gilia
Wild buckwheat	Pennyroyal	California saxifrage
Woodland star	Hen & chickens	Blue-eyed grass
Clarkia	Farewell-to-spring	California fuschia
Wild hollyhock	Blazing star	Shooting star
Buttercups	Larkspur	Jack-in-the-pulpit

Trees:

Western sycamore	Arroya willow	Red willow
Big-leaf maple	White alder	Blue elderberry
California buckeye	Horse chestnut	Valley oak
Weeping oak	Maul oak	Golden oak
Coast live oak	California black oak	Laurel or bay
Digger pine	Madrona	Holly-leaved cherry

Shrubs:

Snow berry	Chamiso	Wild rose
Toyon (Xmas berry)	Groundsel-tree	California coffee redberry
Manzanita	Sticky monkey-flower	Sagebrush
Red-stemmed arrowwood		Wild gooseberry

Two other historical references to flora found in the Park were located. The first, a short listing of pressed plants by the society reporter for the local paper at the turn of the century, is as follows: bird foot fern, gold-backed ferns, adiantum, red trillium, dandelion, malvas, claytonias, yellow oxalis, white spiraea, collinsia, zauschneria, and mentzelia (1:52, 56).

Second, Stephen Child, in the 1929 revision of his development plan (2:21), lists the following as a partial list of the flora of the Park:

Tress:

Western sycamore (Platanus racemosa)
Arroyo willow (Salix lasiolepis)
Red willow (Salix laevigata)
Big-leaf maple (Acer macrophyllum)
White alder (Alnus rhombifolia)
Blue elderberry (Sambucus glauca)
California buckeye (aesculus californica)
Valley oak, weeping oak (Quercus lobata)
Maul oak, golden oak (Quercus chrysolepis)
Coast live oak (Quercus agrifolia)
California black oak (Quercus kelloggii)
Laurel or bay (Umbellularia californica)
Digger pine (Pinus sabiniana)
Madrona (Arbulus menziensii)
Holly-leaved cherry (Prunus ilicifolia)

Shrubs:

Snow-berry (Symphoricarpos racemosus)
Chamiso (Adenostoma fasciculatum)
Wild rose (Rosa californica)
Toyon, Christmas berry (Heteromeles arbutifolia)
Groundsel-tree (Baccharis pilularis)
California coffee (Rhamnus californica)
Redberry (Rhamnus crocaca, var. ilicifolia)
Manzanita (Arctostaphylos tomentosa)
Sticky monkey-flower (Diplacus glutinonus)
Sagebrush, artemisia (Artemisia californica)
Red-stemmed arrow-wood (Cornus californica)
Wild gooseberry (Grossularia californica)

Vines and Climbers:

Clematis (Clematis lasiantha)
Wild honeysuckle (Lonicera hispidula)
Violet nightshade (Solanum zanti)
Blackberry (Rubus ursinus)
Wild morning-glory (Convolvulus lutcolus)
Wild cucumber, chilicothe (Echinocystis fabacea)

Other Plants:

Wild onion (*Allium unifolium*)
Mariposa tulip (*Calochortus venustus*)
False solomon's seal (*Smilacina sessilifolia*)
Brodiaea, wild hyacinth (*Brodiaea capitata*)
Ithuriel's spear (*Brodiaea laxa*)
Soap-plant (*Chlorogalum pomeridianum*)
Fairy-bells (*Disporum Hookeri*)
California poppy, copa de oro (*Eschscholtzia californica*)
Wind-poppy (*Meconopsis heterophylla*)
California goldenrod (*Solidago californica*)
Groundsel (*Baccharis douglasii*)
Golden yarrow (*Eriophyllum confertiflorum*)
Everlasting flower (*Gnaphalium decurrens*)
Common sunflower (*Helianthus speciea*)
Sunshine (*Baeria gracilis*)
Mule's ears (*Wyethia glabra*)
Indian paint-brush (*Castilleia foliolosa*)
Common monkey-flower (*Mimulus luteus*)
Scarlet moneky-flower (*Mimulus cardinalis*)
California bee-plant (*Scrophularia californica*)
Owl's clover (*Orthocarpus erianthus*)
Pink paint-brush (*Orthocarpus purpurascens*)
Baby blue-eyes (*Nemophila insignis*)
Small-flowered nemophila (*Nemophila heterophylla*)
Lupine (*Lupinus albifrons*, *Lupinus densiflorus* var. *menziesii*, *Lupinus succulentus*, *Lupinus formosa*, *Lupinus bicolor* var. *tridentasus*)
Wild broom, deer-weed (*Lotus scoparius*)
Columbine (*Aquilegia truncata*)
Blue larkspur (*Delphinium* sp.)
Northern scarlet larkspur (*Delphinium nudicaule*)
Common buttercup (*Ranunculus californicus*)
Shooting-stars (*Dodecatheon meadia*)
Blazing star (*Mentzelia lindleyi*)
Wild hollyhock (*Sidalcea malvaeflora*)
California fuschia (*Zauschneria californica*)
Farewell to spring (*Godetia amoena*)
Clarkia (*Clarkia elegans*, *Clarkia concinna*)
Blue-eyed grass (*Sisyrinchium bellum*)
Hen-and-chickens (*Cotyledon laxa*)
Woodland star (*Lithophragma affinis*)
California saxifrage (*Saxifraga californica*)
Pennyroyal (*Monardella villosa*)
Wild buckwheat (*Eriogonum nudum*)
Gilia (several species)
Wild portulaca (*Calandrinia caulescens*, var. *menziesii*)
False lady's slipper (*Epipactis gigantea*)
Yellow pansy (*Viola pecunculata*)

Ferns:

Shield-fern (*Polystichum californicum*)
Coastal wood fern (*Dryopteris arguta*)
Gold-back fern (*Gymnogramme triangularis*)
Maidenhair fern (*Adiantum capillus veneris*)
Poly Pody (*Polypodium vulgare*, var. *intermedium*)

Also native grasses, including melic-grass, (*Melica imperfecta*).

The same Chamber of Commerce publication (4) mentions the zoo that was there until a few years ago, when the animals were moved to Kelley Park. Mostly it was composed of deer in the paddock, although they did have an elephant which was kept in a cage that still stands near the concession building. The elephant, incidently, grew too big for the cage, and was either sold or given to the Knowland Park Zoo in Oakland, where it was a big hit with the kids.

The Chamber of Commerce's list mentions the Aviary, which held canaries, parakeets, parrots, macaws, Australian doves, Amherst pheasants, silver pheasants, golden pheasants, Mongolian pheasants, ring-neck doves, valley quail, and peacocks (4).

Reptiles to be found wild in the Park were listed as two-lined racer, Pacific bull snake, Pacific ring-necked snake, western garter snake, Boyles king snake, long-tailed plated lizard, and the Pacific swift (4).

The claim was made that 111 different birds could be seen in the Park from time to time, including the following:

Pied-billed grebe
Green-winged teal
Mallard
Bufflehead
White-tailed kite
Cooper hawk
Golden eagle
Desert sparrow hawk
Coot
Great yellow leg
Western sandpiper
Great blue heron
Pintail
Baldpate
Turkey vulture
Sharp-skin hawk
Western redtail hawk
Prairie falcon
Valley quail
Wilson snipe
Least sandpiper
Band-tailed pigeon

- Mourning dove
- Barn owl
- Pacific horned owl
- White-throated swift
- Woodpecker (several types)
- Swallows (several types)
- Crow
- Titmouse
- Western mockingbird
- Western bluebird
- Meadowlarks
- Goldfinch (3 types)
- Roadrunner
- Screech owl
- Whippoorwill
- Kingfisher
- Robin red breast
- Jay (several species)
- Chickadees
- Wren (several species)
- Thrush (numerous varieties)
- Blackbird
- Finches (several types)
- Sparrows (more than ½ doz. types)

The escarpment called "Eagle Rock" was named for the many families of eagles that lived there. They have long since disappeared, being gone before World War I (6:203). Back in the 1860's, the Canyon was a favorite place to hunt for rabbit, quail, coyotes, deer, and an occasional grizzly bear (3:100). Bears bring an occasional mention, and there was reported to have been a bear den on the hillside across from the deer paddock where a so-called good natured brown bear resided in 1916 (6:204). It was reported that during 1830's or 40's, Don Antonio Bernal held a bear at bay all night in a rough canyon with only his riata, but there is no evidence that it was in Alum Rock Canyon (5:46, #54).

Flora and Fauna Historical Bibliography

Carroll, Mary Bowden. Ten Years in Paradise. San Jose, Press of Popp and Hogan, 1903.

Child, Stephen and Robinson, Charles M. A Plan for the Development of Alum Rock Park (Reservation) at San Jose, Calif. San Francisco, N.P., 1912, revised 1916 and 1929.

James, William F. and McMurray, George. History of San Jose, California. San Jose, Smith Printing Co., 1933.

San Jose Chamber of Commerce. Alum Rock Park, "Little Yosemite". San Jose, San Jose Chamber of Commerce, N.D.

San Jose News. "When San Jose Was Young". San Jose, San Jose News, (article series 1-99), 1916-1917.

Sawyer, Eugene Taylor. History of Santa Clara County. Los Angeles, Historical Record Co., 1922.

Vegetation

The following is a discussion of the vegetation to be found in the Park today, including plant listings both by vegetation community, or type, and by family.

The vegetation types which are described are the ones designated by the U.S. Forest Service and the U.S. Department of Agriculture. Among other references these descriptions appear in W.B. Critchfield's paper, "Profiles of California Vegetation", U.S.D.A. Forest Service Research Paper PSW-76/1971 (2). This system of vegetation types was selected because it was found to describe most accurately the associations found in Alum Rock Park, and because it is a widely used system.

1. Grassland: uncultivated areas with vegetation of grasses and associated low herbaceous plants. Also included here are meadows and vegetation dominated by a wide variety of non-woody plants.

2. Sagebrush: associations of thinly branched shrubs with soft, brittle wood. Characteristic genera are *Artemisia*, *Salvia*, *Eriogonom*, and *Baccharis*.

3. Chaparral: dense associations of thickly branched, hard-wood shrubs. Characteristic genera are *Arctostaphylos*, *Ceanothus*, and the shrubby species and forms of *Quercus*.

4. Woodland Chaparral: open stands of broad-leaved trees and digger pine with intervening spaces occupied by shrubs of the chaparral types; includes both uniform mixtures of woodland and chaparral, and mosaic-areas of the two types too small to map.

5. Woodland Sagebrush: open stands of broad-leaved trees and digger pine with intervening spaces occupied by species of the sagebrush type; includes both mixtures and mosaics, . . .

6. Woodland: stands of broad-leaved trees, digger pine, or both, forming a closed or nearly closed canopy; includes riparian woodland.

The grassland occurs predominantly on level terrain and gentle slopes, but also on steep south-facing slopes. It occurs infrequently, or not at all, on steep north-facing slopes. The dominant species are introduced forms such as Avena barbata, A. fatua, and Bromus mollis. In the spring a group of nongrass annuals, or forbs, punctuate the grassland with colorful blossoms. The most common members of this group are Lupinis bicolor, Brassica sp., Eschscholzia californica, and Sisyrinchium bellum. In the fall another group of forbs appears in the grassland, including Trichostema lanceolatum, Corethrogyne californica, and Hemizonia luzulaefolia.

The dominant species in the sagebrush are Artemisia californica, Baccharis pilularis, Mimulus aurantiacus, and Rhus diversiloba. Sagebrush occurs on both north-and south-facing slopes.

The chaparral which also occurs on both north-and south-facing slopes is dominated by Heteromeles arbutifolia, and Prunus ilicifolia.

The woodland occurs mainly in the bottom of the canyon and by small tributaries to the creek, and on north-facing slopes. The dominant species are Acer macrophyllum, Aesculus californica, Alnus rhombifolia, Quercus agrifolia, Salix sp., and Umbellularia californica. Aesculus californica is found most frequently in association with sagebrush and chaparral, while Alnus rhombifolia and Salix are nearly always found in the creek bed.

Both the Woodland Sagebrush and the Woodland Chaparral vegetation types are made up of Woodland species that form only a partial canopy, the intervening spaces being occupied by either sagebrush species or chaparral species. When members of the sagebrush were intermixed with members of the chaparral underneath and between woodland species it became difficult to distinguish Woodland Sagebrush from Woodland Chaparral. This situation occurs frequently on the north-facing slope east of Inspiration Point and above 700 feet in elevation. The most common species involved in this area were Artemisia californica and Baccharis pilularis of the Sagebrush, and Heteromeles arbutifolia and either Prunus ilicifolia or Rhamnus californica Ssp. tomentella of the Chaparral. The solution to this difficulty would be to estimate whether the chaparral species or the sagebrush species were more abundant. Since in many areas it was not possible to make a valid estimate, these areas were designated 7. Woodland Sagebrush Chaparral on the map.

Following is a list of California native and naturalized plants growing in Alum Rock Park:

Grassland:

Dominant Species:

Slender wild oat	Avena barbata
Wild oat	Avena fatua
Soft chess	Bromus mollis
Ripgut grass	Bromus rigidus
Foxtail chess	Bromus rubens
Filaree	Erodium sp.

Subdominant to Frequent Species:

Bracken fern	Pteridium aquilinum var. pubescens
Malpais bluegrass	Poa scabrella
Nodding stipa	Stipa pulchra
Yellow mariposa	Calochortus luteus
White or butterfly mariposa	Calochortus venustus
Narrow saitas or ookow	Brodiaea congesta
Triplet lily or common triteleia	Brodiaea laxa
Slender-tubed iris	Iris macrosiphon
California blue-eyed grass	Sisyrinchium bellum
Coast larkspur	Delphinium patens
California buttercup	Ranunculus californica
Johnny-jump-up or yellow pansy	Viola pedunculata
California poppy	Eschscholzia californica
Black mustard	Brassica nigra
Winter-cress	Barbarea vulgaris
Shepherd's purse	Capsella bursa-pastoris
Wild buckwheat	Eriogonum sp.
Scarlet pimpernel	Anagallis arvensis
Shower linanthus or common linanthus	Linanthus androsaceus
Meadow nemophila	Nemophila pedunculata
Popcorn flower	Plagiobothrys sp.
Turpentine weed or vinegar weed	Trichostema lanceolatum
Hill star	Lithophragma heterophylla
Lindley's annual lupine	Lupinus bicolor
Burr-clover	Medicago hispida
Tree clover	Trifolium ciliolatum
Tomcat clover	Trifolium tridentatum
Hayfield tarweed	Hemizonia luzulaefolia
California corethrogyne	Corethrogyne californica
Common yarrow or milfoil	Achillea millefolium
Everlasting or cudweed	Gnaphalium sp.
Yellow star thistle	Centaurea solstitialis

Chaparral:

Dominant Species:

Holly-leaved cherry	Prunus ilicifolia
Toyon or Christmas berry	Heteromeles arbutifolia
California coffee berry	Rhamnus californica sp. tomentella
Holly-leaved buckthorn	Rhamnus crocea

Subdominant to Frequent Species:

Coffee fern	Pellaea andromedaefolia
Birds foot fern	Pellaea mucronata
Goldenback fern	Pityrogramma triangularis
Chaparral clematis	Clematis lasiantha
Blue witch	Solanum umbelliferum
Sticky monkey flower	Mimulus aurantiacus
Pennyroyal or coyote mint	Monardella villosa
Horse chestnut, buckeye	Aesculus californica
Pacific poison oak	Rhus diversiloba
Climbing bedstraw	Galium nuttallii
Elderberry	Sambucus caerulea
Valley manroot or wild cucumber	Marah fabaceus
Dwarf chaparral broom	Baccharis pilularis
Shrubby butterweed	Senecio douglasii

Woodland:

Dominant Species:

Sycamore	Platanus racemosa
White alder	Alnus rhombifolia
California live oak	Quercus agrifolia
California bay or laurel	Umbellularia californica
Horse chestnut or buckeye	Aesculus californica
Big-leaf maple	Acer macrophyllum
Digger pine	Pinus sabiniana

Subdominant or Frequent Species:

Bracken fern	Pteridium aquilinum var. pubescens
Goldenback fern	Pityrogramma triangularis
California maidenhair fern	Adiantum jordani
Western sword fern	Polystichus munitum
Coastal wood fern	Dryopteris arguta
California polypody	Polypodium californicum
California brome	Bromus carinatus
Torrey's melica	Melica torreyana
Annual beard grass	Polypogon monspeliensis
Beard grass	Polypogon interruptus
Prairie bulrush	Scirpus robustus
Amole or soap plant	Chlorogalum pomeridianum
White globe lily or white fairy lantern	Calochortus albus
Fat solomon or western solomon's seal	Smilacina racemosa amplexicaulis
Coast larkspur	Delphinium patens
Chaparral clematis or virgin's bower	Clematis lasiantha
Wind poppy	Stylomecon heterophylla
Mouse-ear chickweed	Cerastium viscosum
Miner's lettuce	Montia perfoliata

Madrone	*Arbutus menziesii*
Western hound's tongue	*Cynoglossum grande*
Blue witch	*Solanum umbelliferum*
Monkey flower	*Mimulus nasutus*
Purple-and-white Chinese houses	*Collinsia heterophylla*
Indian paintbrush	*Castilleja latifolia*
Rigid hedge nettle	*Stachys rigida*
Coast boykinia or brook foam	*Boykinia elata*
Currant	*Ribes* sp.
Sticky cinquefoil	*Potentilla glandulosa* ssp. *reflexa*
Pacific blackberry	*Rubus vitifolius*
California rose	*Rosa californica*
Holly-leaved cherry	*Prunus ilicifolia*
Toyon or Christmas berry	*Heteromeles arbutifolia*
Cream bush or ocean spray	*Holodiscus discolor*
Common pacific pea	*Lathyrus vestitus*
Vetch	*Vicia benghalensis*
Interior live oak	*Quercus wislizenii*
California white oak or California valley oak	*Quercus lobata*
Blue oak	*Quercus douglasii*
California black oak	*Quercus kelloggii*
Willow	*Salix* sp.
Hoary nettle	*Urtica holosericea*
Elegant clarkia	*Clarkia unguiculata*
Holly-leaved buckthorn	*Thamnus crocea*
California coffee berry	*Rhamnus californica* ssp. *tomentella*
Pacific poison oak	*Rhus diversiloba*
Gambleweed	*Sanicula crassicaulis*
Wood sweet cicely	*Osmorhiza chilensis*
Goose grass or bedstraw	*Galium aparine*
Climbing bedstraw	*Galium nuttallii*
Elderberry	*Sambucus caerulea*
Creeping or trailing snowberry	*Symphoricarpos mollis*
Rosilla or sneezeweed	*Helenium puberulum*
California mugwort	*Artemisia douglasii*
Western coltsfoot	*Petasites frigious palmatus*
Douglas' baccharis	*Baccharis douglasii*

Sagebrush:

Dominant Species:

Sticky monkey flower	*Mimulus aurantiacus*
Pacific poison oak	*Rhus diversiloba*
Dwarf chaparral broom	*Baccharis pilularis*
California sagebrush	*Artemisia californica*

Subdominant to Frequent Species:

Birds foot fern	*Pellaea mucronata*
Wild buckwheat	*Eriogonum* sp.
Foothill penstemon	*Penstemon heterophyllus*
Indian paintbrush	*Castilleja latifolia*

California fuschia	*Zauschneria californica* ssp. *agustifolia*
Blue witch	*Solanum umbelliferum*
Deerweed or California broom	*Lotus scoparius*
Valley manroot or wild cucumber	*Marah fabaceus*
Climbing bedstraw	*Galium nutallii*
Canyon dodder	*Cuscuta subinclusa* (epiphyte on *Baccharis*)
Yellow yarrow	*Eriophyllum confertiflorum*
Coastal isocoma	*Haplopappus venetus*
Shrubby butterweed	*Senecio douglasii*
White everlasting	*Gnaphalium microcephalum*
California brickellia or brickellbush	*Brickellia californica*

Woodland Chaparral:

As far as can be determined, all dominant to frequent species which occur in the woodland, and all dominant to frequent species which occur in the chaparral, also occur in the woodland chaparral. Further, the dominant species in the chaparral and the dominant species in the woodland are collectively the dominant species in the woodland chaparral. Therefore a list of dominant species for the woodland chaparral is composed of the woodland dominants plus the chaparral dominants. Likewise the list of subdominant to frequent species for the woodland chaparral is composed of woodland species plus chaparral species.

Woodland Sagebrush:

In a manner similar to the woodland chaparral, a list of dominant species for the woodland sagebrush is composed of woodland dominants plus sagebrush dominants. Also the same is true of the subdominant to frequent group.

The following is a phylogenetic listing by families of California native and naturalized vascular plants that grow in Alum Rock Park:

Pteridaceae

Bracken fern	Pteridium aquilium var. pubescens
Coffee fern	Pellaea andromedaefolia
Birds foot fern	Pellaea mucronata
Goldenback fern	Pityrogramma triangularis
California maidenhair fern	Adiantum jordanii

Aspidiaceae

Western sword fern	Polystichum munitum
Coastal wood fern	Dryopteris arguta

Polypodiaceae

California polypody	Polypodium californicum

Pinaceae

Digger pine	Pinus sabiniana

Gramineae

California brome	Bromus carinatus
Soft chess	Bromus mollis
Ripgut grass	Bromus rigidus
Foxtail chess	Bromus rubens
Pine or malpais bluegrass	Poa scabrella
Torrey's melica	Melica torreyana
Rye grass	Elymus sp.
Big squirreltail	Sitanion gubatum
Squirreltail barley	Hordeum stebbinsi
Italian or Australian ryegrass	Lolium multiflorum
Slender wild oat	Avena barbata
Wild oat	Avena fatua
Annual beard grass	Polypogon momspeliensis
Beard grass	Polypogon interruptus
Nodding stipa	Stipa pulchra

Cyperaceae

Prairie bullrush	Scirpus robustus

Liliaceae

Amole, soap plant	Chlorogalum pomeridianum
Yellow mariposa	Calochortus luteus
White or butterfly mariposa	Calochortus venustus
White globe lily or white fairy lantern	Calochortus albus
Fat Solomon or western Solomon's seal	Smilacina racemosa

Amaryllicaceae

Narrow saitas, ookow	Brodiaea congesta
Common triteleia, grass nut, Ithuriel's spear, triplet lily	Brodiaea laxa

Iridaceae

Ground or slender-tubed iris	Iris macrosiphon
California blue-eyed grass	Sisyrinchium bellum

Typhaceae

Cat-tail	Typha sp.

Lauraceae

California laurel, bay	Umbellularia californica

Ranunculaceae

Coast larkspur	Delphinium patens
California buttercup	Ranunculus californica
Pubescent-fruited buttercup	Ranunculus hebecarpus
Chaparral clematis or virgin's bower	Clematis lasiantha

Geraniaceae

White-stemmed or musk filaree	Erodium moschatum
Red-stemmed filaree	Erodium cicutarium

Violaceae

Johnny jump-up, yellow pansy	Viola pedunculata

Papaveraceae	
California poppy	Eschscholzia californica
Wind poppy	Stylomecon heterophylla
Cruciferae	
Black mustard	Brassica nigra
Winter-cress	Barbarea vulgaris
Shepherd's purse	Capsella bursa pastoris
Caryophyllaceae	
Mouse-ear chickweed	Cerastium viscosom
Portulaceae	
Miner's lettuce	Montia perfoliata
Polygonaceae	
Wild buckwheat	Eriogonum sp.
Curly or yellow dock	Rumex crispus
Dock	Rumex sp.
Chenopodiaceae	
Redscale	Atriplex rosa
Primulaceae	
Scarlet pimpernel	Anagallis arvensis
Plantaginaceae	
Ribwort, English plantain, or buckhorn	Plantago lanceolata
Ericaceae	
Madrone	Arbutus menziesii
Polemoniaceae	
Shower or common linanthus	Linanthus androsaceus

Convolvulaceae

Field bindweed, orchard morning glory	Convolvulus arvensis

Cuscutaceae

Canyon dodder	Cuscuta subinclusa

Hydrophyllaceae

Common fiesta flower	Pholistoma auritum
Meadow nemophila	Nemophila pedunculata
Imbricate phacelia	Phacelia imbricata

Boraginaceae

Western hound's tongue	Cynoglossum grande
Popcorn flower	Plagiobothrys sp.
Fiddleneck	Amsinckia sp.

Solanaceae

Small-flowered nightshade	Solanum nodiflorum
Blue witch	Solanum umbelliferum
Tree or Mexican tabacco	Nicotiana glauca

Scrophulariaceae

Monkey flower	Mimulus nasutus
Sticky monkey flower	Mimulus avrantiacus
Foothill penstemon	Penstemon heterophyllus
Beard-tongue	Penstemon sp.
California bee-plant	Scrophularia californica
Purple-and-white Chinese houses	Collinsia heterophylla
Indian paintbrush	Castilleja latifolia

Verbenaceae

Vervain	Verbena scabra

Labiatae

Turpentine weed, vinegar weed	Trichostema lanceolatum
Common or white horehound	Marrubium vulgare
Rigid hedge nettle	Stachys rigida
Pennyroyal, coyote mint	Monardella villosa
Giraffe head	Lamium amplexicaule

Saxifragaceae

Coast boykinia, brook foam	Boykinia elata
Hill star	Lithophragma heterophylla
Currant	Ribes sp.

Rosaceae

Sticky cinquefoil	Potentillia glandulosa ssp. reflexa
Pacific blackberry	Rubus vitifolius
California rose	Rosa californica
Holly-leaved cherry	Prunus ilicifolia
Oso berry	Osmaronia cerasiformis
Toyon, Christmas berry	Heteromeles arbutifolia
Cream bush, ocean spray	Holodiscus dicolor

Leguminosae

Dense-flowered platycarpos	Lupinus densiflorus
Lindley's annual lupine	Lupinus bicolor
Burr-clover	Medicago hispida
White sweet clover	Melilotus albus
Tree clover	Trifolium ciliolatum
Tomcat clover	Trifolium tridentatum
California broom, deerweed	Lotus scoparius
Common Pacific pea	Lathyrus vestitus
Vetch	Vicia benghalensis

Platanaceae

Sycamore	Platanus racemosa

Betulaceae

White alder	Alnus rhombifolia

Fagaceae

Interior live oak	Quercus wislizenii
California live oak	Quercus agrifolia
California white of valley oak	Quercus lobata
Blue oak	Quercus douglasii
Maul or canyon oak	Quercus chrysolepis
California black oak	Quercus kelloggii

Urticaceae

Hoary nettle	Urtica holosericea

Salicaceae

Fremont's cottonwood	*Populus fremontii*
Willow	*Salix* sp.

Onagraceae

California fuschia	*Zauschneria californica* ssp. *augustifolia*
Panicled willow herb	*Epilobium paniculatum*
Elegant clarkia	*Clarkia unguiculata*

Rhamnaceae

Holly-leaved buckthorn, red berry	*Rhmnus crocea*
California coffee berry	*Rhmnus californica* ssp. *tomentella*

Hippocastanaceae

Horse chestnut, buckeye	*Aesculus california*

Aceraceae

Big-leaf maple	*Acer macrophyllum*

Anacardiaceae

Pacific poison oak	*Rhus diversiloba*

Umbelliferae

Gamble weed	*Saricula crassiculis*
Wood sweet cicely	*Osmorhiza chilensis*
Rattlesnake weed	*Daucus pusillus*
Sweet fennel	*Foeniculum vulgare*

Rubiaceae

Goose grass, bedstraw	*Galium aparine*
Climbing bedstraw	*Galium nuttallii*

Caprifoliaceae

Elderberry	*Sambucus caerulea*
Creeping or trailing snowberry	*Symphoricarpos mollis*

Dipsacaceae

Wild teasel	*Dipsacus sylvestris*

Cucurbitaceae

Valley manroot, wild cucumber	*Marah fabaceus*

Compositae

California helianthella	*Helianthella californica*
Cockle burr	*Xanthium strumarium* var. *candense*
Gum weed	*Grindelia camporum*
Hayfield tarweed	*Hemizonia luzulaefolia*
Rosilla or sneezeweed	*Helenium puberulum*
Yellow yarrow	*Eriophyllum confertiflorum*
Blow-wives	*Achyrachaena mollis*
Coastal isocoma	*Haplopappus venetus*
California corethrogyne	*Corethrogyne californica*
Dwarf chaparral broom	*Baccharis pilularis*
Douglas' baccharis	*Baccharis douglassii*
Common yarrow or milfoil	*Achillea millegolium*
California sage, old man	*Artemisia californica*
California or Douglas mugwort	*Artemisia douglasii*
Shrubby butterweed	*Senecio douglasii*
Western coltsfoot	*Petasites palmatus*
White everlasting	*Gnaphalium microcephalum*
Everlasting or cudweed	*Gnaphalium* sp.
California brickellia or brickellbush	*Brickellia californica*
Yellow star thistle	*Centaurea solstitialis*
Slender sow-thistle	*Souchus tenerrimus*
Golden thistle	*Scolymus hispanicus*

Vegetation References

Abrams, L. and Ferris, R.S. Illustrated Flora of the Pacific States, 4 vols. Stanford University Press, Stanford, California, 1923-60.

Critchfield, W. Profiles of California Vegetation. USDA Forest Service Research Paper PSW-76/1971, Forest Service, P.O. Box 245, Berkeley, California, 1971.

Jepson, W.L. A Manual of the Flowering Plants of California. University of California Press, Berkeley and Los Angeles, 1970.

McMinn, H.E. and Maino, E. An Illustrated Manual of the Pacific Coast Trees. University of California Press, Berkeley and Los Angeles, 1969.

Munz, P.A., in collaboration with D.D. Keck. A California Flora. University of California Press, Berkeley and Los Angeles, 1968.

Insects

In terms of numbers, insects are the world's most successful group of animals with nearly 7000,000 species now classified. Likewise, in Alum Rock Park insects are the most abundant animal organisms present. It is estimated that there may be as many as 650 species to be found within the Park, and the current list contains approximately 500 species. Because of its length, the insect inventory will be submitted as a separate entity.

The inventory was made from the insect collection at California State University, San Jose, over a period of 40 years, and has involved a total of about 5,000 persons, both faculty and students. Some 19 orders and 191 families of insects are represented and are tabulated below:

Order	No. families represented
Thysanura (silverfish)	2
Collembola (springtails)	2
Ephemeroptera (may flied)	2
Odonata (dragonflies and damselflies)	3
Orthoptera (grasshoppers, crickets, roaches)	6
Isoptera (termites)	3
Plecoptera (stone flies)	3
Dermaptera (earwigs)	2
Embioptera (web-spinners)	1
Thysanoptera (thrips)	1

Hemiptera (true bugs)	21
Homoptera (cicadas, hoppers, aphids)	10
Neuroptera (lacewings, ant-lions, dobsonflies)	7
Coleoptera (beetles and weevils)	42
Mecoptera (scorpionflies)	1
Trichoptera (caddisflies)	6
Lepidoptera (butterflies, moths and skippers)	14
Diptera (true flies)	41
Hymenoptera (bees, wasps and ants)	24

The tabulation includes for the commoner insects a commentary about form, size, habitat, feeding habits, and other useful information.

Fish

A study of the fish populations of Penitencia Creek was carried out over a three and one-half month period from late March through mid-July 1972. Forty-three sections of stream were sampled extending from the mineral spring area deep inside the Park to the vicinity of the gravel quarry at the west end of the Park. The sampling areas were twenty feet long and were selected so as to include all types of stream habitat from the shallow, fast water to the deep, quiet pools. Of the forty-three stream sections studied, twenty-four were fished once and nineteen were fished ten times, each in an attempt to determine fish population fluctuations with the onset of the summer and the accompanying reduced water levels and rising temperatures.

The method of sampling was to place a fine net across the stream and drive all fish in the adjacent twenty feet of stream into it. The net was then closed and the captured fish transferred into a bucket for identification and counting. In all, 4230 fish were captured in this manner and released after identification.

The fish species and their approximate ratios remained essentially constant during the period of the study. There was a reduction of overall numbers, however, probably due to the fact that reduced water levels tended to limit the fish to fewer pools and much less water area. The species identified, and their approximate ratios, were as follows:

(1)	Common minnow	(Cyprinidae)
(2)	Fresh-water sculpin	*Cottus cottus*
(9)	Common roach	*Hesperoleucus symmetricus*

Although trout are reported from the creek, and a few possible individuals were observed, none was captured and no positive identification made.

While the common roach is by far the most abundant fish in the creek, the sculpin is the most common fish in the deeper pools, often by a ratio of four to one. The minnows are common in some areas but less so in others; no apparent reason for this variation was identified.

All of the fish identified are small and hardy. They are able to survive under harsh and variable conditions. The fact as mentioned above, that the water level falls in the summer, thus reducing both the quantity of water and the availability of rapids and shallow water areas, limits the number of fish species that can survive in the creek. The added problem introduced by fluctuating water temperatures further reduces the number of kinds of fish that can live here as most fish have very low tolerance for temperature changes. But while this habitat is rigorous, and the species adapted for survival in it few, it is a good place for the species that have adapted. This is reflected by the large numbers of fish captured, but the few species.

It should be noted, as a point of interest, that early in the spring a school of approximtaely 20 goldfish (*Carassius auratus*) was observed to be inhabiting the pool immediately below the paved-road crossing into the Quail Hollow picnic grounds. Many of them were fairly large (up to 6" long) and they appeared to be well established and healthy. Later visits to the site during the summer and fall failed to produce evidence that they were still there. As they were wary and tended to stay out of sight in a mass of submerged tree roots, it is entirely possible that they are still there. At this point it is not known if they are well established or were merely a recent release and have since died. These fish are not native to the area and are unlikely to survive for any length of time if released in such a hostile area, but it is possible that this group of fish have managed to survive for some time.

Mammals, Reptiles, and Amphibians

Following is a check list of the mammals, reptiles and amphibians that can be expected to be found in Alum Rock Park. The asterisks indicate those animals that are commonly seen. The others, either because of their nocturnal nature, secretive habits or because of their scarcity, may be present but not easily observed.

The most logical way to group these animals into different wildlife habitats is to follow the previously described vegetational patterns. In the listing, the numbers following the names indicate the plant communities in which they are most commonly found, as listed below:

1. Grassland
2. Sagebrush
3. Chaparral
4. Woodland Chaparral
5. Woodland Sagebrush
6. Woodland
7. Woodland Sagebrush Chaparral

Complete descriptions of these plant communities are found in the vegetation section of this report.

Grassland: the mammals that are most commonly found in the grassland areas of the Park are the black-tailed deer, beechey ground squirrel, gray fox and several species of small rodents such as mice and shrews. Of the mammals the most easily seen are the Beechey ground squirrel which will often be observed, with its spotted coat and narrow tail, as it ducks silently into a convenient burrow. In some areas they have become very common. A common mammal, that is seen less often, is the large black-tailed deer. They are far more abundant in the Park than might be thought, but are wary of man and usually know where he is long before he sees them. Many times they can be seen just about daybreak or dusk in or around the Park, and aften they may have a fawn or two with them. Deer are naturally shy and tend to stay in the more remote or inaccessible areas during the day.

Reptiles are common in the grasslands, but are often difficult to locate. One exception to this is the western fence lizard that can seemingly be found sunning itself on many of the rocks in the Park. But while they are easy to see they are quick and almost impossible to catch when they have had a chance to warm up in the sun. Other lizards, such as the sagebrush lizard, coast horned lizard, or alligator lizard, will also be seen here from time to time. Of the snakes, one could expect to find a large gopher snake or a very fast racer, both of which are quite harmless. Less harmless is the western rattlesnake that may be found here as well as in all other areas of the Park. Although the rattlesnake is not too common and will tend to speed silently away at human approach, it is best to take care when climbing anywhere or turning over rocks or logs. Never attempt to harm or capture any reptile in the Park.

A few amphibians may also be found in the grasslands but they are not common. The most likely would be the western toad as it does quite well in dry areas. Also possible, in damp ravines or near pools, would be the red-legged frog or the Pacific tree frog.

Sagebrush/Chaparral: Some of the same mammals that are found in the grasslands are common in the sagebrush and chaparral areas. The black-tail deer often retreat to these bushy areas for cover during the day. In some areas the brush is so thick that even dogs would be unable to drive them out, and unfortunately, there are from time to time, a few dogs that make sport of chasing and killing the Park's deer. The ever-busy Beechey ground squirrel may be seen here also during the day. It might be pointed out that it is best never to touch or handle any of the squirrels in the Park. A squirrel that appears to be friendly, or even one that is dead or injured, can carry organisms that harbor the deadly bubonic plague. These animals should be watched and enjoyed from a distance, but never handled. Here, too, you might see a jackrabbit (which is really a hare), or another of the common rabbits that inhabit these areas.

At night other animals appear, including the gray fox and, occasionally, a coyote. These important predators feed mostly on mice and squirrels, and serve to keep these rodent populations under control.

The reptiles of the sagebrush and chaparral areas are probably the same as those found in the grasslands, but would tend to be more common. These would include the alligator lizard, coast horned lizard, western whiptail lizard, common kingsnake, and western rattlesnake.

Slender salamanders and western toad may be found, especially in the moist canyons and ravines or moving about during the wetter months.

Woodland: the woodland areas are the best place to look for amphibians in the Park. Especially in January or February after a heavy rain one may find many slender salamanders, ensatina salamanders, and black salamanders under rocks or damp logs, and even a few frogs hopping across the roads and trails. Tiger salamanders are often seen on the porch of the natatorium building after a heavy rain. It is important never to catch or disturb these amphibians as they are necessary to maintain the natural ecological balance in the Park. It is possible that some species of these interesting animals are disappearing from the Park because of people who catch them and take them home, where they usually die because of the difficulty of keeping them in their most optimum environment.

Woodrats, brush rabbits, striped skunks, raccoons, and western gray squirrels can be heard chattering high overhead in the oak trees. Woodrats are rarely seen, but their nest-mounds are scattered about the woods. They gather twigs and branches into a pile that may be three or four feet high and build their nests beneath the pile. They are seldom alone as these piles make convenient homes for snakes, lizards, mice, and even an occasional skunk or owl.

Not many reptiles are found in the woodland because of their preference for the warmer, more open, areas. The hard-to-find rubber boa is one snake that makes its home beneath the decaying leaves of the woodland floor. This small snake is a relative of the large boas of tropical areas, but is completely harmless and very shy. Another interesting snake that might be seen here is the western ringneck that has a bright red stomach and a tail that it coils up like a corkscrew when it is disturbed.

The last three vegetation types can be considered together when talking about the wildlife that lives in these areas. The woodland sagebrush, woodland chaparral, and the woodland sagebrush chaparral are enough alike in composition and in environmental characteristics that the animals found in one would also likely be found in the others. These areas are warm and dry enough to provide good homes for the reptiles. Western fence lizards are seen everywhere, and occasionally a racer may be seen "racing" off the trail. Alligator lizards are also common here; these lizards are capable of giving painful bites, so one should be careful.

Rodents are quite common in these areas; the California mouse makes tunnels in the grass while eating the leaf blades and seeds. These rodents serve as a main food source for the hawks and owls. Ground squirrels are also abundant in these areas, along with their holes you might find a slightly larger one, about eight inches in diameter. This is the home of the badger. Badgers like to feed on the ground squirrel, which they dig out, but are very uncommon in the Park and are seldom seen.

These areas are generally too dry for most amphibians although the western toad may be found here, and a few snakes. The western rattlesnake is, of course, found here too. This snake is the only harmful reptile in the Park, but should not be disturbed if seen. They are generally as wary of man as man is of him, and they are much more apt to attempt to escape than to bite. These snakes, like all other animals in the Park, are an important part of the balance of nature and should be left alone.

The foregoing descriptions are very general. Animals by their very nature are active and most of them move about considerably. Actually any of the above animals might be seen in any of the vegetation patterns, but have been assigned to the areas where they are most commonly found.

Very few amphibians (frogs and salamanders) were located during this study. The most abundant salamander appears to be the tiny slender salamander (Batrachoseps attenuatus). Probably the main reason for this lack of amphibians is due to their being captured and either killed or removed from the Park on a continuing basis, and it is possible that this process has nearly eliminated these creatures there. The slender salamander may have persisted because it is small and hard to find. It usually disappears during the drier periods, and does not make a very exciting find anyway. Efforts should be made to educate every person entering or using the Park to the importance of not picking up, disturbing, or harming any natural element of the Park.

There follows a list of animals that can be expected to occur in the Park. In order to improve the readability of the text we have used only common names, and have included both the common and scientific names in the lists that are included:

Animals Expected to Occur in Alum Rock Park

(* represents those actually observed)

	COMMON NAME	Vegetation types in which they are most common 1	2	3	4	5	6	7	SCIENTIFIC NAME
MAMMALS	*Black-tailed deer	x	x	x	x	x	x	x	Odocoileus hemionus
	Coyote	x	x	x		x			Canis latrans
	Cougar	x	x	x					Felis concolor
	Gray fox	x	x	x					Urocyon cinereoargenteus
	*Raccoon	x	x	x	x	x	x	x	Procyon lotor
	*Opossum	x	x	x	x	x	x	x	Didelphis marsupialis
	*Striped skunk	x	x	x	x	x	x	x	Mephitis mephitis
	Spotted skund						x		Spilogale putorius
	Ringtailed cat		x	x	x	x	x	x	Bassariscus astutus
	Badger		x	x	x	x		x	Taxidea taxus
	*Western gray squirrel			x	x	x	x	x	Sciurus griseus
	*Beechey ground squirrel	x	x	x	x	x	x	x	Citellus beecheyi
	Fox squirrel						x		Sciurus niger
	*Dusky-footed wood rat			x	x		x		Neotoma fuscipes
	Norway rat			x	x		x		Rattus norvegicus
	*Jackrabbit		x	x		x		x	Lepus californicus
	*Brush rabbit			x	x		x		Sylvilagus bachmani
	* House mouse	x	x	x	x	x	x	x	Mus musculus
	*Deer mouse	x	x	x	x	x	x	x	Peromyscus maniculatus
	*California mouse		x	x	x	x	x	x	Peromyscus californicus
	Pinyon mouse		x	x		x			Peromyscus truei
	Valley pocket gopher	x		x	x	x	x	x	Thomomys bottae
	Ornate shrew	x				x	x		Sorex ornatus
	Trowbridge shrew			x	x		x		Sorex trowbridgei
	California mole	x					x		Scapanus latimanus
	Longtail weasel		x	x	x		x		Mustela frenata
	*Leafnose bat	x	x	x	x	x	x	x	Macrotus californicus
	*Silver haired bat	x	x	x	x	x	x	x	Laslonycteris noctiuagans
	*Spotted bat	x	x	x	x	x	x	x	Euderma maculata
REPTILES	*Western pond turtle						x		Clemmys marmorata
	*Western fence lizard	x	x	x	x	x	x	x	Sceloporus occidentalis
	Sagebrush lizard	x	x	x	x	x		x	Sceloporus graciosus
	Coast horned lizard	x	x	x	x	x		x	Phrynosoma coronatum
	*Western skink	x	x	x	x	x	x	x	Eumeces skiltonianus
	*Western whiptail	x	x	x	x	x		x	Chemidophorus tigris
	Southern alligator lizard	x	x	x					Gerrhonotus multicarinatus
	*Northern alligator lizard	x	x	x	x	x	x	x	Gerrhonotus coeruleus
	Rubber boa						x		Charina bottae
	*Western ringneck snake	x		x		x			Diadophis amabilis
	Sharp-tailed snake						x		Contia tenuis
	*Racer	x	x	x	x	x	x	x	Coluber constrictor
	*Gopher snake	x	x	x	x	x	x	x	Pituophis catenifer
	*Common kingsnake	x	x	x	x	x	x	x	Lampropeltis getulus
	Calif. mountain kingsnake						x		Lampropeltis zonata
	*Western garter snake (both terrestrial & aquatic)			x			x		Thamnophis elegans
	*Common garter snake	x	x			x	x		Thamnophis sirtalis
	*Western rattlesnake	x	x	x	x	x	x	x	Crotalus viridis

	COMMON NAME	1	2	3	4	5	6	7	SCIENTIFIC NAME
		Vegetation types in which they are most common							
AMPHIBIANS	Tiger salamander	x					x		*Ambystoma tigrinum*
	Pacific giant salamander						x		*Dicamptodon ensatus*
	*Ensatina			x	x		x		*Ensatina eschscholtzii*
	*Calif. slender salamander			x	x		x		*Batrachoseps attenuatus*
	Arboreal salamander			x	x		x		*Aneides lugubris*
	Black salamander						x		*Aneides flavipunctatus*
	Western spadefoot toad	x	x			x	x		*Scaphiopus hammondi*
	*Western toad		x	x		x			*Bufo boreas*
	*Pacific tree frog						x		*Hyla regilla*
	*Red-legged frog	x					x		*Rana aurora*
	Yellow-legged frog						x		*Rana boylei*

Mammals, Reptiles and Amphibians Bibliography

Ingles, L.G. Mammals of California and Its Coastal Waters. Stanford University Press, Stanford, 1956.

Stebbins, R.C. Amphibians and Reptiles of Western North America. McGraw-Hill, New York, 1954.

Williams, J.C. and Monroe, H.C. The Natural History of the San Francisco Bay Area. McCutchan Publishing Corp., N.C., 1967.

Yocom, C. and Dasmann, R. The Pacific Coastal Wildlife Region. Naturegraph Publishing Co., Healdsburg, California, 1957.

Birds

The approximately 700 acres comprising Alum Rock Park contains more habitats than is normally found in an area of this size. The vegetation section of this report discusses seven vegetational types, but actually includes eight, if the streamside, or riparian, habitat were to be separated from the mixed woodland. In many areas it is difficult to determine a boundary between these two vegetational types as they are often determined merely by relative abundance of common plant species. But the number of habitats is not limited to the number of plant communities present. It also depends on the variety of boundaries between these communities, and many other variables that are beyond the scope of this report. The point is that Alum Rock Park has several plant communities in many combinations and so a large number of habitats that can support a wide variety of bird species. Rather than attempt to discuss the birds in terms of all possible habitats, or even the seven (or eight) vegetational communities, the birds are listed with respect to four vegetational types in the Park, and one outside of the Park.

Generally for this portion of the report, the vegetation in the Park has been divided into four belts centering on Penitencia Creek. Following the creek is a riparian community, and above this, on both sides of the creek, is a narrow belt of mixed woodland. Above the wooded areas is a larger area of chaparral and brush. The fourth vegetative type is located above the brush and continues to the Park boundaries; it is comprised of grassland interspersed with scattered trees. These belts of vegetation are neither evenly spaced nor equally distributed, but give a general impression of what the Park is like. While this division of the vegetation differs from the vegetation types described in the vegetation section of this report, the difference is in grouping only, and was done to eliminate confusion and duplication of lists of birds.

This report will treat the various species of birds noted in Alum Rock Park in four general groups as they more or less conform, according to field ovservation, to the types of habitat found within the Park. These four broad habitats were chosen because they seem to be the most basic discernible habitats. One could divide the Park into many more habitats but then even more species of birds would be unclassifiable. As it is now, many of the birds are difficult to designate as to area because they do not seem to fall easily into one category or another, but range over wide areas utilizing more than one habitat. One additional habitat, the Cherry Flat Reservoir, is outside the Park but is included here as an area that could be added to the Park in the future.

Field trips into the Park for bird observation purposes were begun on January 20 and completed about October 1st, 1972. As the observations could not be continued for a full year it is possible that some migrant species that inhabit or pass through the Park in the fall and winter were not observed.

In the following listing the birds are grouped by the habitats as discussed above. This was done to facilitate future bird observation in Alum Rock Park and at the Cherry Flat Reservoir.

Riparian Habitat: the riparian habitat of Alum Rock Park corresponds exactly with Penitencia and Aguague Creeks. It includes the trees, brush, and other plants which require large quantities of water the year round. The nine species of birds first listed under this riparian habitat section were seen exclusively in the riparian habitat.

Black phoebe (Sayornis nigricans):

In Alum Rock Park the black phoebe is found almost anywhere along Penitencia Creek up to about Sycamore Flat. They have been seen on seven occasions along this creek. In Alum Rock Park the black phoebe is always associated with the creek.

Western flycatcher (Empidonax difficilis):

Western flycatchers were seen several times in Alum Rock Park, always within 50 meters of Penitencia Creek. They have generally been perched in an open area on the lower branch of a broad-leaved tree.

Rough-winged swallow (Stelgidopteryx ruficollis):

Of the swallows in Alum Rock Park, the rough-winged swallow is the most closely associated with water. On several occasions it was seen repeatedly flying low over the water catching insects. It has also been seen flying up and down the canyon at a higher altitude. Rough-winged swallows have been known to nest in the drain pipes along Penitencia Creek.

Dipper (Cindus mexicanus):

If one bird of Alum Rock Park were to be designated as the most water-associated bird it would be the dipper. It is seldom found more than a few meters away from water. Although the dipper was seen only on a few occasions during the early part of the study period, it has been frequently reported in the past.

House wren (Troglodytes aedon):

The house wren is not always assigned to a riparian habitat, but they have been seen on numerous occasions in Alum Rock Park, and they have always been near Penitencia Creek. Two active nest holes were observed, both in western sycamore (Platanus racemosa).

Canyon wren (Catherpes mexicanus):

As its name implies, the canyon wren is most frequently found in canyons. However, only one canyon sren was seen during the study period in Alum Rock Park, and that was in the dry creek bed below the falls on Penitencia Creek. It was foraging amongst the large boulders that comprise the creek bed.

Black-headed grosbeak (Pheucticus melanocephalus):

A common summer resident, the black-headed grosbeak can be frequently seen moving about the tall deciduous trees along Penitencia Creek, but nowhere else in the Park.

American goldfinch (Spinus tristis):

On the only occasion that the American goldfinch was seen in Alum Rock Park, a small flock of them was foraging amongst the brush along Penitencia Creek. Other birders agree that this is where they are generally found.

Song sparrow (Melospiza melodia):

Song sparrows were seen or heard on nearly every field trip to Alum Rock Park during the study period, and each time they have been in the brush and dense ground vegetation along Penitencia Creek. They seem to occur at any part of the creek where it is bordered by brush.

Rufous hummingbird (Selasphorus rufus):

The rufus hummingbird is found along woodland edges and openings, where the trees meet the stream.

Belted kingfisher (Megaceryle alcyon):

This bird is found both along Penitencia Creek and at the reservoir.

Tree swallow (Iridoprocne bicolor):

The tree swallow is found in open country that is near water, as along the stream in Alum Rock Park.

Swainson's thrush (Hylocichla ustulata):

This thrush is found in the same places as the house wren.

Yellow warbler (Dendroica petechia):

The yellow warbler is found in the trees and brush along the streams in Alum Rock Park.

MacGillivray's warbler (Oporonis tolmiei):

This warbler is found in shady, damp brush and low, dense undergrowth along streams.

Wilson's warbler (Wilsonia pusilla):

Very similar to the warbler above, and found in similar locations.

Mixed Woodland Habitat: the mixed woodland habitat of Alum Rock Park is those areas which are dominated by broadleaf trees, but not those areas accociated with the riparian habitat. This habitat would, then, include a large part of the Park. The mixed woodland habitat is located principally on north-facing slopes and in those areas in which similar conditions prevail. The greatest variety of bird species were observed in the mixed woodland habitat, probably because more niches are available.

Cooper's hawk (Accipiter cooperii):

The Cooper's hawk is a common, though infrequently seen, bird of wooded areas. They were observed twice during the study period, and both times it was in an area of mixed woodland hillsides. Because Alum Rock Park is relatively small, this bird could probably be seen in any part of the Park.

Sharp-shinned hawk (Accipiter striatus):

The habitat occupied by the sharp-shinned hawk is very similar to that of the Cooper's hawk. It can be seen in any area of the Park, but is most commonly seen in the more densely wooded areas.

Red-tailed hawk (Buteo jamaicensis):

The red-tailed hawk is a difficult bird to classify by habitat, because it can be seen almost anywhere, and Alum Rock Park is no exception. It was seen on almost every trip to the Park during the study period, flying high overhead. This hawk nests in woodlands and forages over open as well as wooded country.

Band-tailed pigeon (Columba fasciata):

In the early morning and in the late afternoon large flocks of band-tailed pigeons fly up and down the canyon searching for trees in which to roost. During the daytime these birds move in groups, foraging on berry-producing plants such as toyon (Heteromeles arbutifolia) and madrone (Arbutus menziesii).

Pygmy owl (Glaucidium gnoma):

The tiny pygmy owl is another of the birds of Alum Rock Park that are rather common but are not seen frequently. In fact, only one was seen in a eucalyptus tree (Eucalyptus sp.) although it has been reported several times recently in oaks (Quercus sp.) and western sycamore (Platanus racemosa), along Penitencia Creek.

Red-shafted flicker (Colaptes cafer):

Probably the most commonly seen woodpecker in the Park is the red-shafted flicker. It can be found in any part of the Park that has trees. On ten occasions it was observed in digger pine (Pinus sabiniana), oaks (Quercus sp.) and in brush.

Nuttall's woodpecker (Dendrocopus nuttallii):

Another common woodpecker of Alum Rock Park is the Nuttall's woodpecker. It frequents any area that has trees or brush, although it is seen principally in the following trees: eucalyptus (Eucalyptus sp.), oak (Quercus sp.), and willow (Salix sp.).

Yellow-bellied sapsucker (Sphyrapicus varius):

It is much easier to see evidence of the presence of the yellow-bellied sapsucker than it is to see the bird itself. Many of the soft-barked trees, such as western sycamore (Platanus racemosa), have neat rows of evenly spaced holes made by this woodpecker. It has also been seen in pepper trees (Schinus molle) and elderberry (Sambucus sp.).

Downy woodpecker (Dendrocopus pubercens):

The small downy woodpecker is not as common as the other woodpeckers in Alum Rock Park. It was seen on several occasions, always foraging on the bark of trees.

Violet-green swallow (Tachycineta thalassina):

The violet-green swallow catches insects on the wing and therefore forages over a large area. In Alum Rock Park numbers of them are frequently seen flying high overhead in all parts of the Park, although most commonly over the wooded canyon.

Steller's jay (<u>Cyanocitta stelleri</u>):

If there is one bird the average visitor to Alum Rock Park will see and recognize, it is the Steller's jay. It is very abundant anywhere in the Park where there are deciduous trees. Its near relative, the scrub jay (<u>Aphelocoma coerulescens</u>) is usually found in the brushy, drier areas just above the deciduous tree belt along Penitencia Creek.

Common crow (<u>Corvus brachyrhynchos</u>):

The common crow nests and roosts in the deciduous trees and oaks (<u>Quercus</u> sp.) in the Penitencia Creek canyon. In the daylight hours it forages in nearby fields. During the studies, it was recorded on three occasions, each time in flight.

Chestnut-backed chickadee (<u>Parus rufescens</u>):

Broad-leaf trees are where one most commonly finds this chickadee in Alum Rock Park. This may be near Penitencia Creek or higher up on the wooded slopes. It has been seen foraging on holly-leaf cherry (<u>Prunus ilicifolia</u>).

Plain titmouse (<u>Parus inornatus</u>):

The plain titmouse is similar in its habitat to the chestnut-backed chickadee. In Alum Rock Park it can be seen in almost any area that has broad-leaf trees.

Brown creeper (<u>Certhia familiaris</u>):

The brown creeper was observed on two occasions, both times in oaks (<u>Quercus</u> sp.) mixed with other trees. It can probably be found throughout the wooded areas of Alum Rock Park.

Robin (<u>Turdus migratorius</u>):

Robins are frequently seen foraging on the lawns and open areas beneath trees in Alum Rock Park. They seem to require an open space free of brush or tall grass, but beneath or adjacent to trees. In the spring and fall large flocks of robins are commonly seen in the trees along South Ridge.

Varied thrush (<u>Ixoreus naevius</u>):

A close relative of the robin, the varied thrush is much less common in Alum Rock Park. It was seen three times, each in dense stands of trees on the south side of the canyon above the museum.

Hermit thrush (<u>Hylocichla guttata</u>):

Hermit thrushes were observed six times is Alum Rock Park, and on each of these occasions they were foraging in dense, moist brush beneath deciduous trees, or in the lower branch of the trees.

Ruby-crowned kinglet (Regulus calendula):

The ruby-crowned kinglet is found in broad-leaf trees in any part of Alum Rock Park. They are often seen in the trees along Penitencia Creek and in the trees on the higher slopes, and seem to prefer the oak (Quercus sp.)

Cedar waxwing (Bombycilla cedrorum):

Large flocks of cedar waxwings can be seen, generally in the winter and spring, feeding on berry-bearing shrubs such as toyon (Heteromeles arbutifolia) or holly-leaf cherry (Prunus ilicifolia). They were seen in two locations--in the trees and brush near Soda Springs, and on the ridge which terminates at the rock quarry at the lower end of the Park.

Starling (Sturnus vulgaris):

Starlings are rather common residents of Alum Rock Park. They are readily seen in the deciduous trees along Penitencia Creek between the Soda Springs and Sycamore Flats.

Warbling vireo (Vireo gilvus):

The warbling vireo was seen on only one occasion, and that was high on the South Ridge in the top branches of an oak (Quercus sp.). They are normally found in tall deciduous trees.

Myrtle warbler (Dendroica coronata):

The myrtle warbler is associated with deciduous trees and the brush commonly found beneath them. In Alum Rock Park they were seen in the thick vegetation along Penitencia Creek and on the slope adjacent to the creek on the south side.

Audubon's warbler (Dendroica auduboni):

The habitat of the Audubon's warbler is virtually identical with that of the myrtle warbler.

Bullock's oriole (Icterus bullockii):

A common summer resident of Alum Rock Park, the Bullock's oriole lives in the large deciduous trees in the more moist areas of Alum Rock Park. They may be seen in the willows (Salix sp.), and in western sycamores (Platanus racemosa) near Penitencia Creek.

Purple finch (Carpodacus purpureus):

The purple finch was observed but once, moving among the oaks (Quercus sp.) in a draw on the slope of the north ridge. Purple finches are found generally in higher elevations in mixed woodlands.

House finch (Carpodacus mexicanus):

The house finch is a common seedeater of a variety of habitats, but principally areas that have trees and brush in them. They are often seen in flocks foraging beneath eucalyptus (Eucalyptus sp.) and scattered groups foraging beneath various species of trees in wooded areas of Alum Rock Park.

Oregon junco (Junco oreganus):

The Oregon junco, a common ground-foraging bird of Alum Rock Park, seems to prefer the cover of overhead trees. We have seen juncos associated with deciduous trees in nearly every part of the Park.

Chipping sparrow (Spizella passerina):

Another ground-foraging bird, the chipping sparrow prefers areas of sparse grass under trees. The chipping sparrows observed in Alum Rock Park were foraging under trees along the edge of the mixed woodland on the slope of the south ridge.

Barn owl (Tyto alba):

This bird is almost universal in woodlands, particularly in wooded canyons and adjoining fields.

Screech owl (Otus asio):

The screech owl is similar to the barn owl in habitat, but is found mostly in the wooded areas.

Great horned owl (Bubo virginianus):

The great horned owl can be found in any of the Park's habitats, but is found mainly in wooded areas.

Hairy woodpecker (Dendrocopus villosus):

Hairy woodpeckers are found usually in woodland areas.

Western wood pewee (Contopus sordidulus):

The western wood peewee is found in open woodlands that offer raised perches.

Olive-sided flycatcher (Nuttallorinis borealis):

The olive-sided flycatcher is usually seen in the tops of tall woodland trees, particularly the upper branches of eucalyptus (Eucalyptus sp.).

White-breasted nuthatch (Sitta canadensis):

The white-breasted nuthatch is common in the wooded areas of the Park.

Winter wren (Troglodytes troglodytes):

The winter wren can be found in moist areas of thick woodlands, usually in the thickest brush.

Golden-crowned kinglet (Regulus satrapa):

The golden-crowned kinglet is usually found in conifers, but in the winter it can also be found in other trees in Alum Rock Park.

Solitary vireo (Vireo solitarius):

The solitary vireo is usually found in the tops of the oaks in the mixed woodland areas.

Townsend's warbler (Dendroica townsendi):

Townsend's warbler is found in the same habitats as the vireo, and can also be seen in the bay-laurel tree (Umbellularia californica).

Hermit warbler (Dendroica occidentalis):

The hermit warbler forages throughout most trees in wooded areas of the Park.

Western tanager (Piranga ludoviciana):

The western tanager's habitat is similar to the that of the hermit warbler (above).

White-throated sparrow (Zonotrichia albicollis):

The white-throated sparrow is usually found in the brushy undergrowth in the woodland areas of the Park.

Chaparral Brush Habitat: the majority of birds seen in chaparral and brush covered hillsides in Alum Rock Park seem to be fairly well restricted to that habitat. A large part of the Park is covered with chaparral and a smaller fraction is covered with a variety of brushy plants, such as California sagebrush (Artemisia californica), which is not actually classified as chaparral, but provide a habitat much like that of chaparral.

California quail (Lophortyx californicus):

This quail will forage in grasslands if there is brush nearby which it can use for cover. It also forages in brush as well, feeding on insects and seeds found on the ground. Frequently it uses nearby trees to roost in at night.

Anna's hummingbird (Calypte anna):

Each of the six occasions on which this bird was seen was in the chaparral areas of the Park. Although it can often be seen in the urban and suburban gardens, in the Park it seems to be restricted to the brushy slopes.

Allen's hummingbird (Selasphorus sasin):

This hummingbird is found part of the time in chaparral, as is the Anna's hummingbird, and part of the time in the open brushy areas located adjacent to the creek. It would appear to have a more varied habitat requirement than the Anna's hummingbird.

Scrub jay (Aphelocoma coerulescens):

One of the most ubiquitous birds of the Park, the scrub jay has been seen on almost every field trip to the Park. It is very common in oak (Quercus sp.) and brush that is located just above the beld of deciduous trees along the creek.

Wrentit (Chamaea fasciata):

The wrentit is a seldom seen, but frequently heard, bird restricted to the brushy areas of the Park. This includes the true chaparral as well as the drier dense thickets of sagebrush (Artemisia californica)found between the grassland and the riparian community along the creek.

Bewick's wren (Thryomanes bewickii):

This common wren occupies a microhabitat similar to that of the wrentit. It will generally be found in the brushy areas of the Park as well as in California sagebrush, and near the base of trees which are near brush.

Mockingbird (Mimus polyglottos):

A few mockingbirds occur in Alum Rock Park and may be found singing from a perch on the chaparral. Brushy dry country seems to be the preferred habitat for the entire family of mimids found in the United States.

California thrasher (Toxostoma redivivum):

Another chaparral and brushy area bird, the California thrasher forages generally on the ground and under cover. It frequently can be seen singing from a perch on brush covered hillsides.

Orange-crowned warbler (Vermivora celata):

This common summer resident was recorded on four occasions, always in or near brush. It was observed in willows (Salix sp.), along the creek, in poison oak (Rhus diversiloba), on the hillsides, and in trees just over brush.

Rufous-sided towhee (Pipilo erythrophthalmus):

This is another common chaparral bird that is invariably seen in brush or on the ground underneath brush. This bird was never seen in the open; it always seems to have tree foliage or brush overhead.

Brown towhee (Pipilo fuscus):

The brown towhee is another bird of the brush whose habitat is similar to that of the rufous-sided towhee but it is also distinctly different. The brown towhee is an edge bird; that is, it prefers to forage in the open but near brush, which it uses for cover. In the Park it can be seen on trails, in parking lots, on lawns, but always near cover.

Lark sparrow (Chondestes grammacus):

In Alum Rock Park this sparrow is most commonly seen in the California sagebrush (Artemisia californica) on the higher edges of the brushy areas, and in the adjacent grasslands. It is generally in small, loose flocks.

Rufous-crowned sparrow (Annophila ruficeps):

This bird frequents a habitat much like that of the lark sparrow--that is, scattered brush in grassland; although on both occasions when seen, it was on rather steep dry hillsides of scrubby California sagebrush.

White-crowned sparrow (Zonotrichia leucophrys):

All of the Zonotrichia seem to prefer brushy woodland margins. The white-crowned sparrows that were seen in the Park have generally been in brush or in the lower branches of overhead trees.

Golden-crowned sparrow (Zonotrichia atricapilla):

Another bird of the brushy areas, the golden-crowned sparrow seems to be less specific in its habitat requirements than the white-crowned sparrow. It was seen in California sagebrush, in weedy areas, in brush near the creek, and in oak.

Fox sparrow (Passerella iliaca):

One of the less frequently seen thicket and brush birds, the fox sparrow is easiest to see when perched on a conspicuous branch. It was seen on only one occasion in the Park, in chaparral.

Poor-will (Phalaenoptilus nuttallii):

This is a common night bird of brush-covered arid hills.

Lazuli bunting (Passerina amoena):

This bunting is found on dry brushy slopes with sagebrush.

Grassland and Oak Grassland Habitats: vast areas of the Mount Hamilton Range are primarily fields of grass dotted with oak trees. The ridges that parallel Penitencia Creek are fingers of these grasslands which extend down from the mountains to form the foothills. It is here that a variety of birds reside that will not be found in other habitats of Alum Rock Park. Grassland and oak grassland could be considered as separate habitats, but it was decided to combine them because many species of birds are found in both areas and only a couple of species are unique to one or the other habitat.

Turkey vulture (Cathartes aura):

This common scavenger is often seen flying over virtually every part of Alum Rock Park. It prefers to feed on carrion that lies in exposed, open areas, and for this reason is included in this section.

Golden eagle (Aquila chrysaetos):

Another bird of Alum Rock Park that may be seen flying overhead but is seldom seen on the ground is the golden eagle. It should be included here because its range in this area is a savannah-type habitat.

Sparrow hawk (Falco sparverius):

This small raptorial bird, although common in grasslands throughout the United States, was seen only once during the study period. It prefers open to semi-open country and preys on small rodents, birds, and insects.

Ring-necked pheasant (Phasianus colchicus):

Pheasants seem to be concentrated in the lower end of the Park, on the grassy slopes near the rock quarry. The tall grasses provide forage and cover, and the oaks are utilized as roosting areas and as a source of acorns.

Mourning dove (Zenaidura macroura):

Mourning doves are a common ground feeding bird of grassy areas. In Alum Rock Park they can be seen wherever the grass is sparse and the ground is exposed. The fire-breaks on the North Ridge and other such places are common feeding areas for the mourning doves.

White-throated swift (Aeronautes saxatalis):

White-throated swifts forage over large land areas, principally over ridges in Alum Rock Park. They seem to prefer to forage over dry habitats, whereas the other high-flying insect-foraging birds prefer to forage over more moist areas.

Acorn woodpecker (Melanerpes erythrocephalus):

This woodpecker has been seen many times during the study period. It is common throughout its range wherever there are oaks, either in open areas or in dense stands. In Alum Rock Park they can be found almost anywhere there are oaks, but particularly in the grassy areas.

Western kingbird (Tyrannus verticalis):

Although this flycatcher is generally found along streams with shade trees, it is included in the grassland, oak grassland section because this is where it was seen, and where it can often be found.

Horned lark (Eremophila alpestris):

In Alum Rock Park the horned lark can most often be found on the high grassy ridges on either side of the canyon, particularly where the grass is short. The over-grazed ridges and adjacent slopes are ideal for it.

Common bushtit (Psaltriparus minimus):

The brushy ecotone that exists between chaparral and the oak grasslands of the Park is where bushtits can generally be found. They frequent the oaks as well as the nearby brush, mainly California sagebrush and toyon.

Western bluebird (Sialia mexicana):

The western bluebird was seen only once in Alum Rock Park, perched on a fence wire on Sierra Road, and have been frequently seen in similar habitats in nearby areas outside of the Park. They seem to require a perch such as fences and oaks or other trees on grassy or open ground.

Loggerhead shrike (Lanius ludovicianus):

Shrikes are relatively uncommon birds in the park. Their preferred habitat is open grassland with someplace to perch. This might be a utility wire or an exposed tree branch or even a stout weed-stem.

Western meadowlark (Sternella neglecta):

The meadowlark is probably the most frequently seen or heard bird in its habitat. It was noted on every field trip into the grasslands. It can be found in either tall or short grasses. It will utilize a perch if present, but does not seem to require one, as they will sing from the ground.

Lesser goldfinch (Spinus psaltria):

This bird can be found in a habitat similar to its near relative, the American goldfinch (Spinus tristis), except that the lesser goldfinch's habitat is usually drier. Any open area where seed-bearing trees, grasses and weeds are found may be frequented by these birds.

Savannah sparrow (Passerculus sandwichensis):

Common, but difficult to distinguish from other sparrows, this sparrow is seldom found out of the grassland habitat in Alum Rock Park. It prefers those areas with short or sparse grass.

Grasshopper sparrow (Ammodramus savannarum):

This sparrow's habitat is very similar to that of the savannah sparrow. In this area it winters and summers in the same area. It can readily be found on either of the grass ridges, above the canyon, in the areas of short or sparse grass.

Lewis' woodpecker (Asyndesmus lewis):

This woodpecker is found in burned-over areas and oak savannah.

Ash-throated flycatcher (Myiarchus cinerascens):

This flycatcher is usually found in open oak woodland and on dry brushy hills.

Say's pheobe (Sayornis saya):

Say's phoebe is found on dry open hillsides dotted with brush, usually sagebrush.

Cliff swallow (Petrochelidon pyrrhonota):

The cliff swallow is found in open to semi-open wooded canyons and hillsides in the Park.

House sparrow (Passer domesticus):

This sparrow is common in open grassy areas, usually around inhabited areas.

Brewer's blackbird (Euphagus cyanocephalus):

This blackbird is commonly seen foraging in short-grass fields and lawns.

Brown-headed Cowbird (Molothrus ater):

This bird's habitat is same as the Brewer's blackbird above, but generally in the vicinity of livestock.

<u>Standing Freshwater Habitat</u>: (Cherry Flat Reservoir in Alum Rock Park provides a standing freshwater habitat.

Pied-billed grebe (<u>Podilymbus</u> <u>podiceps</u>):

This bird is common in this area on still, fresh water as well as on salt water.

Great blue heron (<u>Ardea</u> <u>herodias</u>):

Much the same as above. Not uncommon foraging in and along local lakes and reservoirs.

Mallard (<u>Anas</u> <u>platyrhynchos</u>):

This bird was seen dabbling on the east end of Cherry Flat Reservoir on two occasions.

Pintail (<u>Anas</u> <u>acuta</u>):

This bird is found in similar habitats to the mallard; also it was seen foraging on the shore of the reservoir.

Killdeer (<u>Charadrius</u> <u>vociferus</u>):

This bird is commonly seen foraging along the shore.

Spotted sandpiper (<u>Actitia</u> <u>macularia</u>):

Apparently this bird utilized the same feeding areas as the killdeer.

Greater yellowlegs (<u>Totanus</u> <u>melanoleucus</u>):

This bird can wade into a little deeper water than the above two birds. It is found in the same general areas.

Ring-billed gull (<u>Larus</u> <u>delawarensis</u>):

This full was seen flying over the reservoir. It is common on fresh water as well as salt water.

Red-wing blackbird (<u>Agelaius</u> <u>phoeniceus</u>):

This blackbird was commonly seen in the trees around the reservoir, as well as foraging in the fields and flooded areas bordering the reservoir.

Historic Birding

A limited literature survey was made to determine if any species of birds occurred in the study area that do not occur there now. This survey indicated that there are several species that have not been seen in recent years. These include: ferruginous hawk (*Buteo regalis*), prairie falcon (*Falco mexicanus*), road-runner (*Geococcyx californianus*), and the yellow-breasted chat (*Icteria virens*). None of these birds, except the chat, were ever common anywhere in their range.

The historic records used in this report are as follows:

Linsdale, J.M. and Rogers, T.L. Frequency of Occurence of Birds in Alum Rock Park, Santa Clara County, California. Condor 39:108-111, 1937.

Field notes of Gayle Pickwell and Emily Smith from the years 1927 to 1936.

Wrentits and Avocets. Published by the Santa Clara Audubon Society from the first issue to the present.

Interviews with various people who have birded in the Park over the years.

Bird List

Habitat Symbols:

F = fresh water
C = chaparral
G = grassland and oak savannah
W = mixed woodland
R = riparian

Season Symbols:

W = winter
S = summer
R = resident
V = vagrant

Habitat	Season		
F	V	Pied-billed grebe	Podilymbus podiceps
F	V	Great blue heron	Ardea herodias
F	V	Mallard	Anas platyrhynchos
F	V	Pintail	Anas acuta
G	R	Turkey vulture	Cathares aura
W	R	Sharp-shinned hawk	Accipiter striatus
W	R	Cooper's hawk	Accipiter cooperii
W	R	Red-tailed tawk	Buteo jamaicensis
G	R	Golden eagle	Aquila chrysaetos
G	R	Sparrow hawk	Falco sparverius
C	R	California quail	Lophortyx californicus
G	R	Ring-necked pheasant	Phasianus colchicus
F	V	Killdeer	Charadrius vociferus
F	V	Spotted sandpiper	Actitis macularia
F	V	Greater yellowlegs	Totanus melanoleucus
F	V	Ring-billed gull	Larus delawarensis
W	W	Band-tailed pigeon	Columba fasciata
G	S	Mourning dove	Zenaidura macroura
W	R	Barn owl	Tyto alba
W	R	Screech owl	Otus asio
W	R	Great horned owl	Bubo virginianus
W	R	Pygmy owl	Glaucidium gnoma
C	S	Poor-will	Phalaenoptilus nuttallii
G	S	White-throated swift	Aeronautes saxatalis

Habitat	Season		
C	R	Anna's hummingbird	*Calypte anna*
R	S	Rufous hummingbird	*Selasphorus rufus*
C	S	Allen's hummingbird	*Selasphorus sasin*
R	R	Belted kingfisher	*Megaceryle alcyon*
W	R	Red-shafted flicker	*Colaptes cafer*
G	R	Acorn woodpecker	*Melanerpes formicivorus*
G	R	Lewis' woodpecker	*Asyndesmus lewis*
W	W	Yellow-bellied sapsucker	*Sphyrapicus varius*
W	R	Hairy woodpecker	*Dendrocopus villosus*
W	R	Downy woodpecker	*Dendrocopus pubescens*
W	R	Nuttall's woodpecker	*Dendrocopus nuttallii*
G	S	Western kingbird	*Tyrannus vociferans*
G	S	Ash-throated flycatcher	*Myiarchus cinerascens*
R	R	Black phoebe	*Sayornis nigricans*
G	W	Say's phoebe	*Sayornis saya*
R	S	Western flycatcher	*Empidonax difficilis*
W	S	Western wood peewee	*Contopus sordidulus*
W	S	Olive-sided flycatcher	*Nuttallornis borealis*
G	R	Horned lark	*Eremophila alpestris*
W	S	Violet-green swallow	*Tachycineta thalassina*
R	S	Tree swallow	*Iridoprocne bicolor*
R	S	Rough-winged swallow	*Stelgidopteryx ruficollis*
G	S	Cliff swallow	*Petrochelidon pyrrhonota*
W	R	Steller's jay	*Cyanocitta stelleri*
C	R	Scrub jay	*Aphelocoma coerulescens*
W	R	Common crow	*Corvus brachyrhynchos*
W	R	Chestnut-backed chickadee	*Parus refescens*
W	R	Plain titmouse	*Parus inornatus*
G	R	Common bushtit	*Psaltriparus minimus*
W	R	White-breasted nuthatch	*Sitta canadensis*
W	R	Brown creeper	*Certhia familiaris*
C	R	Wrentit	*Chamaea fasciata*
R	R	Dipper	*Cinclus mexicanus*
R	S	House wren	*Troglodytes aedon*
R	R	Winter wren	*Troglodytes troglodytes*
C	R	Bewick's wren	*Thryomanes bewickii*
R	R	Canyon wren	*Catherpes mexicanus*
C	R	Mockingbird	*Mimus polyglottos*
C	R	California thrasher	*Toxostoma curvirostre*
W	R	Robin	*Turdus migratorius*
W	W	Varied thrush	*Ixoreus naevius*
W	S	Hermit thrush	*Hylocichla guttata*
R	S	Swainson's thrush	*Hylocichla ustulata*
G	R	Western bluebird	*Sialia mexicana*
W	W	Golden-crowned kinglet	*Regulus satrapa*
W	W	Ruby-crowned kinglet	*Regulus calendula*
W	W	Cedar waxwing	*Bombycilla cedrorum*

Habitat	Season		
G	R	Loggerhead shrike	Lanius ludovicianus
W	R	Starling	Sturnus vulgaris
W	S	Solitary vireo	Vireo solitarius
W	S	Warbling vireo	Vireo gilvus
C	S	Orange-crowned warbler	Vermivora celata
W	S	Yellow warbler	Dendroica petechia
W	W	Myttle warbler	Dendroica coronata
[illegible]	W	Audubon's warbler	Dendroica auduboni
[illegible]	W	Townsend's warbler	Dendroica townsendi
W	S	Hermit warbler	Dendroica occidentalis
R	S	MacGillivray's warbler	Oporornis tolmiei
R	S	Wilson's warbler	Wilsonia pusilla
G	R	House sparrow	Passer domesticus
G	R	Western meadowlark	Sturnella neglecta
[illegible]	R	Red-winged blackbird	Agelaius phoeniceus
W	S	Bullock's oriole	Icterus bullockii
G	R	Brewer's blackbird	Euphagus cyanocephalus
G	R	Brown-headed cowbird	Molothrus ater
W	S	Western tanager	Piranga ludoviciana
R	S	Black-headed grosbeak	Pheucticus melanocephalus
C	S	Lazuli bunting	Passerina amoena
W	R	Purple finch	Carpodacus purpureus
W	R	House finch	Carpodacus mexicanus
R	R	American goldfinch	Spinus tristis
G	R	Lesser goldfinch	Spinus psaltria
C	R	Rufous-sided towhee	Pipilo erythrophthalus
C	R	Brown towhee	Pipilo fuscus
G	R	Savannah sparrow	Passerculus sandwichensis
G	R	Grasshopper sparrow	Ammodramus savannarum
C	R	Lark sparrow	Chondestes grammacus
C	R	Rufous-crowned sparrow	Aimophila ruficeps
W	R	Oregon junco	Junco oreganus
W	S	Chipping sparrow	Spizella passerina
C	W	White-crowned sparrow	Zonotrichia leucophrys
C	W	Golden-crowned sparrow	Zonotrichia atricapilla
[illegible]	W	White-throated sparrow	Zonotrichia albicollis
C	W	Fox sparrow	Passerella iliaca
[illegible]	R	Song sparrow	Melospiza melodia

Total = 109 species