Southwestern Monuments

MONTHLY REPORT · MAY · 36 ·

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SOUTHWESTERN MONUMENTS
MAY, 1936, REPORT
INDEX

CONDENSED GENERAL REPORT

REPORTS FROM THE MEN IN THE FIELD

HEADQUARTERS STUFF

THE SUPPLEMENT

SOUTHWESTERN MONUMENTS
PERSONNEL

HEADQUARTERS, Southwestern Monuments, Coolidge, Arizona: Frank Pinkley, Superintendent; Hugh M. Miller, Acting Assistant Superintendent; John H. Diehl, Associate Engineer; Robert H. Rose, Assistant Park Naturalist; Dale S. King and Charlie R. Steen, Junior Park Naturalists; Millard Singerman, Clerk-Stenographer; Luis Castellum, ECW Clerk.

GENERAL FIELD MEN: Charles A. Richey, Resident Landscape Architect; J. B. Hamilton, Associate Engineer; J. M. Torres, Chief Engineering Aide; Andrew Clark, Topographer; Carl Schmidt, Rodman.

FIELD STATIONS:

1. Arches---Moab, Utah. J. M. Turnbow, Custodian.
2. Aztec Ruins---Aztec, New Mexico. Johnwill Faris, Custodian; Robert W. Hart, Ranger-Archeologist.
3. Bandelier---Box 639, Santa Fe, New Mexico. Earl Jackson, Custodian; J. W. Hendron and Alfred Peterson, Temporary Rangers.
4. Canyon de Chelly---Chin Lee, Arizona. Robert R. Budlong, Custodian; Doug Harritt, Temporary Ranger.
5. Capulin Mountain---Capulin, New Mexico. Homer J. Farr, Custodian.
6. Casa Grande Ruins---Coolidge, Arizona. M. J. Winter, Custodian; J. Donald Erskine, Park Ranger.
7. Chaco Canyon---Crownpoint, New Mexico. Thomas C. Miller, Custodian.
8. Chiricahua---Willcox, Arizona.
9. El Morro---Ramah, New Mexico. E. Z. Vogt, Custodian.
10. Gila Cliff Dwellings---Cliff, New Mexico. No Custodian.
11. Gran Quivira---Gran Quivira, New Mexico. George Boundey, Custodian.
12. Hovenweep---Cortez, Colorado. No Custodian.
13. Montezuma Castle---Camp Verde, Arizona. Martin Jackson, Custodian; Frank L. Fish, Ranger.
14. Natural Bridges---Blanding Utah. Zeke Johnson, Custodian.
15. Navajo---Kayenta, Arizona. John Wetherill, Custodian; Milton Wetherill, Trail Foreman.
16. Pipe Spring---Moccasin, Arizona. Leonard Heaton, Acting Custodian.
17. Rainbow Bridge---Rainbow Lodge, Arizona. No Custodian.
18. Saguaro---Tucson, Arizona.
19. Sunset Crater---Flagstaff, Arizona. J. W. Brewer, In Charge.
20. Tonto---Roosevelt, Arizona. Woodrow Spires, In Charge.
21. Tumacacori---Box 2225, Tucson, Arizona. Louis R. Caywood, Custodian; Martin G. Evenstad, Ranger.
22. Walnut Canyon---Flagstaff, Arizona. Paul Beaubien, Ranger.
23. White Sands---Alamogordo, New Mexico. Tom Charles, Custodian.
24. Wupatki---Flagstaff, Arizona. J. W. Brewer, In Charge.
25. Yucca House---Cortez, Colorado. No Custodian

CONDENSED REPORT

Coolidge, Arizona
June 1, 1936.

The Director
National Park Service
Washington, D. C.

Dear Mr. Director:

The Condensed Report for Southwestern Monuments for May, 1936:

TRAVEL

	May, 1936	May, 1935	May, 1934
Aztec Ruins	1,172	960	669
Bandelier	833	735	330
Capulin Mountain	1,500	1,500	700
Casa Grande	2,274	2,443	1,740
Chaco Canyon	496	340	235
Canyon de Chelly	136	25	---
Chiricahua	462	---	---
El Morro	---	---	---
Gran Quivira	575	596	318
Montezuma Castle	775	1,400	984
Natural Bridges	---	---	219
Navajo	---	154	---
Pipe Spring	392	414	632
Sunset Crater	253	248	---
Tonto	365	398	---
Tumacacori	705	1,281	1,033
Walnut Canyon	648	600	---
White Sands	11,880	---	---
Wupatki	136	125	9
Yucca House	---	---	---
Actual Reported Registration	22,682	10,997	6,921

The 14 monuments which reported both in 1935 and 1936 showed a decrease from 10,863 to 10,340---523 visitors, or 4.8%

The ten monuments which reported both in 1934 and 1936 showed an increase from 6,702 to 8,886---2,184 visitors, or 32%.

Last May's estimates for travel to Montezuma Castle and Tumacacori were too liberal. This fact, in addition to a count shortened by two days due to an earlier report deadline, would lead to the surmise that May, 1936, as a travel month was somewhere between 10 and 20% better than the same month in 1935; more than 30% better than May, 1934.

000 GENERAL

920 GENERAL WEATHER CONDITIONS

Very dry and warm conditions have prevailed throughout May generally in the Southwest. Only two monuments, Chaco and Capulin, report moisture enough to insure adequate range and forage. Dust has proved a nusiance at Bandelier and Gran Quivira, but is less prevalent than usual in north eastern New Mexico in the neighborhood of Capulin Mountain.

100 ADMINISTRATION

121 MONUMENT INSPECTIONS BY SUPERINTENDENT PINKLEY

Tumacacori: With Chief Engineering Aide Tovrea May 18 concerning architectural matters. See Supplement, page 375.

122 MONUMENT INSPECTIONS BY SPECIAL FIELD REPRESENTATIVES

H. E. Bailey, botanist from Berkeley, Calif., offices: At Montezuma Castle two days making collections.
A. E. Borell, regional wildlife technician: at Gran Quivira May 6; at Chaco Canyon May 14, et seq, on rodent control. See page 351.
J. H. Diehl, park engineer: at Chiricahua May 2; at Gran Quivira May 20; at White Sands May 21. See page 366.
J. B. Hamilton, associate engineer: At Headquarters, Wupatki, Walnut Canyon, Aztec Ruins, Chaco, and Montezuma Castle. See page 367.
A. C. Kuehl, resident landscape architect: At Chiricahua April 29; at Tumacacori, April 30.
Harry Langley, resident landscape architect: Walnut Canyon, Hqrs.
Chas. Richey: resident landscape architect: Walnut Canyon, Hqrs.
J. H. Tovrea: Tumacacori, Walnut Canyon, Wupatki, chief engineering aide.
V. W. Vandiver, regional geologist: Walnut Canyon

150 NEW EQUIPMENT

Chaco Canyon: New 1½-ton dump truck arrived May 15, and was immediately put to work hauling water, maintaining fence, etc., see 352.

180 CIRCULARS PUBLICITY

Headquarters: Prepared 100 Southwestern Monuments Special Reports No. 4, "The Tumacacori Choir Loft Problem," by Frank Pinkley and J. H. Tovrea; also 250 SWM Special Report No. 5, "Geological Report on White Sands National Monument," by Vincent W. Vandiver, regional geologist.
Wupatki: Southwest Tourist News carried small article on Wupatki, taken from informational leaflet which is distributed at that monument.

200 MAINTENANCE, IMPROVEMENTS, NEW CONSTRUCTION

310 MAINTENANCE, UNUSUAL

Aztec Ruins: Museum trim painted green. See page 349.
Casa Grande: Much time still being wasted maintaining make-shift sewer system which is a possible menace to health. See page 341.
Tumacacori: Three buttresses constructed to brace wall of old building now being used as office. Also house painting and cleaning. See page 331.

220 IMPROVEMENTS

Wupatki: Trail work progressing satisfactorily. Back dirt being used to construct a ramp which eliminates dangerous steps and to save prehistoric wall. See page 344.

230 NEW CONSTRUCTION

Bandelier ECW (See page 354).
Quarters No. 1 completed and ready for occupancy. Some landscaping yet to be finished.
Quarters No. 2 Masonry at door and window height. Timber crew has delivered 100 logs from Santa Fe National Forest which will be shaped for vigas and lintels for Quarters No. 2 and Residence Area Equipment Shed.
Construction of Park Refuse Burner started on north mesa near Canyon rim. Base poured and forms in place.
Flagstone floor material quarried and delivered to Museum Building. All wall, ceiling, roof, and portal construction complete on Museum. With completion of floors, building will be ready for cases.
Small amount of maintenance on Rio Grande trail.
Planting of small shrubs along entrance highway and around Headquarters area continued.
Usual rock quarry project continued through month.
Canyon de Chelly (See page 346).
Water line complete from well to reservoir and from reservoir to within 20 feet of house. Pumping started and water found to be slightly cloudy but of good taste and quite soft. Remaining line and sewer connections will be ready in two days.
Chiricahua ECW (See page 338)
1500 feet completed on Echo Trail, making total of 7,500 feet. Will reach Echo Point June 1.
All material on ground for Headquarters-Portal telephone line. Eight and three quarters miles of poles set, and all will be in place by first week in June.
Excavations for Utility Buildings 90% complete but were delayed by large amount of blasting necessary.
Topographical survey project continued. Is within about two months of completion.

230 NEW CONSTRUCTION (CONT.)

Gran Quivira: Pumping plant and new pump house completed. See pp 333.
Pipe Spring ECW (See page 355).
Eight-man camp re-started road work May 21. Grading, gravelling to be done first.
New grade laid out.
CCC swimming pool finished.

300 ACTIVITIES OF OTHER AGENCIES IN MONUMENTS

320 COOPERATING GOVERNMENT AGENCIES

Chaco Canyon: Soil Conservation Service work progressing satisfactorily. Have built new earth dikes near proposed headquarters area, revetments around Pueblos de Arroyo and Kin Kletsoi. 2,000 Parasela shrubs were planted for bank protection. See page 351.

320 AGENCIES OTHER THAN GOVERNMENT

Chaco Canyon: University of New Mexico pushing their Headquarters Building to completion by June 15. See page 352.
Wupatki: Coconino County Highway Department very kindly loaned truck on three occasions. See page 344.

350 DONATIONS AND ACCESSIONS

Pipe Spring: Mrs. Maggie Heaton of Moccasin, Arizona, donated a combined "bullet mold -copper, and loader." Promises Indian pottery when monument has a safe place to keep it. See page 355.

400 FLORA, FAUNA, NATURAL PHENOMENA

400 ETHNOLOGY

Wupatki: Exhibit hogan and "shade" for Navajo exhibit June 6 and 7 finished by Navajos. Photographs and notes at different stages of construction were acquired by monument. Exhibit promises to be worth while. See page 345.

420 MUSEUM SERVICE

Aztec Ruins: Custodian Faris and Ranger-Archeologist Hart each prepared layout plans for proposed addition to Museum. These plans will be coordinated by Headquarters Naturalist staff and forwarded through regular channels. See page 349.

460 BIRDS

General: Due to heat and arrival of nesting season, monument bird.

460 BIRDS (CONT.)

banding stations were much curtailed in function. A total of 129 birds were banded, bringing the total for the fiscal year 1936 to 1,466. Pipe Spring turned in a good record concerning banding of migrating Gambel Sparrows, which gives hope of obtaining future returns for this species. Tumacacori added three interesting species to the banded list: Vermillion Flycatcher, Baird Bewick Wren, and Verdin. See page 410.

Gran Quivira: Large flocks of birds; Custodien claims they drink six gallons of water in four hours. See page 332.

Navajo: See page 337 for April bird list.

Wupatki: See page 344 for May bird observations.

470 ANIMALS

Wupatki: Three antelope seen on two occasions. Rattlesnake specimen obtained; harmless snakes occasionally discourage visitor travel on trails. See page 345.

500 USE OF MONUMENT FACILITIES BY PUBLIC see page 325)

530 NEWSWORTHY VISITORS

Aztec Ruins: Earl Morris, noted archeologist.

Bandelier: J.E.Kell, state parks division; J.J.McIntee, assistant ECW director; J.A.Chase, commander Albuquerque CCC district; Frank C.W. Pooler, regional district forester; C. C. Balcomb, F.H.Flint, Marley J. Helm, J.C.Campbell, C.B.Sandberg, of Soil Conservation Service; Frank Andrews, Santa Fe National Forest Supervisor; R.A.Livingston, Shiloh National Military Park; Mrs. Lansing Bloom, wife of noted U. of New Mexico historian; Paul Kirkhart, superintendent of schools of Protection, Kansas.

Casa Grande: Roy Kopping, brother of Guy Kopping of General Grant National Park; Ranger Charles Hutchins of Carlsbad National Park.

Chaco Canyon: F. D. Matthews and Engineers Fife and Slattery of Soil Conservation Service; W.W.Postelthwaite, W.H.Drea, and Paul Boucher of Colorado College. Stanley J. Milford inspected University of New Mexico's building. State Highway Engineers Dwyer, Sumner, and Starky studied blow sand north of Escavada Wash. W.G.Proper and Jack Snow, Soil Conservation Service photographers; Lionel Palmer, superintendent of schools of San Juan County.

Tonto: Jugo-Slavian war minister; Mrs. Jack Whitehead of Southwestern Arboretum and brother, Phillip Thomas; Ruth and Millard Henning.

Tumacacori: Mr. Underwood of Underwood and Underwood; Mr. and Mrs. H.J.Henning of San Francisco; Mr. and Mrs. H.T.Getty and Dorothy Greiner of University of Arizona faculty. Dr. John M. Provinse of University of Arizona Department of Anthropology.

White Sands: Lyman Cooley, lecturer; Lawrence Brundell, petroleum geologist from Australia; Wm. B. Mitchell, reclamation bureau; Col.

550 MISCELLANEOUS VISITORS, White Sands (Cont.)

Porterfield, Silver City, N. M.; J.C.O'Leary, Silver City, N. M. Wupatki: Dr. and Mrs. A.E.Douglass, Dr. Waldo Glock, Harry Getty, Mr. Schulman, all dendro-chronologists; Dean Cummings and Gordon Baldwin of University of Arizona; Dr. Harold S. Colton, Miss Katharine Bartlett and L.F.Brady of Museum of Northern Arizona; R.A.Livingston of Shiloh National Military Park.

600 PROTECTION

620 FIRE PROTECTION

Bandelier: Snag fire May 20; location, north rim of Alamo Canyon in Section 21; Foreman and crew of 10 cut down burning snag, built 135 feet of fire line. Subsequent patrol proved suppression work effective. See page 356.

640 DESTRUCTION OF PREDATORY ANIMALS

Chaco Canyon: Soil Conservation Service controlling rodents around dikes. A. E. Borell, regional park service wildlife technician, in charge. Using Karbo Killer and carbon bisulphide gas. See page 351.

900 MISCELLANEOUS

MAIL COUNT

Incoming:		
Government	1,316	
Personal	793	
Total incoming		2,109
Outgoing:		
Government only	1,762	1,762
Telegrams:		
Outgoing	32	
Incoming	54	
Total telegrams		86
Grand Total		3,957

Cordially,

Frank Pinkley

Frank Pinkley,
Superintendent.

REPORTS FROM MEN IN THE FIELD

TUMACACORI

By Louis R. Caywood, Custodian

Due to the change in time of sending in the Monthly Report our visitor record is lower than it normally would be - at least according to registration for the same month last year. Five hundred and sixty visitors were shown through the Mission on guided trips, and 145 used the facilities offered by the monument, making a total of 705.

The weather is quite hot, the afternoons lately have been cloudy and sultry. For the last two days we have had rain around us, but so far it hasn't paid us a personal visit. We have had enough wind thrown in to keep our tank filled, which is very much appreciated.

Noteworthy visitors for the month include Mr. Underwood of Underwood and Underwood the beginning of May. Mr. and Mrs. M. J. Henning of San Francisco, Southwestern Monuments enthusiasts, spent the 6th and the 8th at the Mission. We certainly enjoyed their visit and hope to have them with us again soon. They plan to visit all the Southwestern Monuments this trip, so I am sure they will be more enthusiastic than ever about our monuments when they have seen them all. On May 9, Mr. and Mrs. H. T. Getty and Miss Dorothy Greiner of the University of Arizona faculty and staff were overnite visitors. Dr. and Mrs. John H. Provinse of the University faculty visited the Mission on the 10th.

Park Service visitors were Mr. A. C. Kuehl, San Francisco, on April 30. Al said he liked the Mission and saw possibilities for architectural study. We hope he pays us another visit soon and plan our proposed Museum Building. May 18 the Boss and Tov had another "architectural bull session" here at the Mission. Martin and I learned some new architectural terms and some very fine points about the Mission. We are looking forward to another visit from the MAE (Mission Architectural Experts) next month.

House repairs and painting were done on the 4th and 5th.

Three buttresses of adobe were built against the leaning wall of the building adjoining the Mission which I have converted into an office. This was done in hope there will be an end to the tendency for a fallen wall rather than just a leaning wall. The use of buttresses and heavy piers in mission architecture seems to have been common. Wherever extra strength was needed or where a strain developed either buttresses or piers were built. Three very fine buttresses were added to San Ignacio de Caborca because of strains developing after the walls were completed.

Speaking of other missions - Winnie and I took two accumulated days off to see some of the closer missions in Mexico. After getting the necessary permits we traveled by automobile to Hermosillo one day, returning the next after seeing all the missions and churches along the way. San Ignacio, one of the Kino Missions, was the most interesting that we visited and several hours were spent taking pictures and visiting with the caretaker of the Mission.

Bird banding activities for the month were not very heavy. Seventeen new bands were used in banding the following:

Baird Bewick Wren	3
Vermilion Flycatcher	2
House Finch	2
Western Mockingbird	5
Western Horned Owl	2
Cactus Wren	2
Verdin	1
Total	17

Several new varieties will be noted in the above list.

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GRAN QUIVIRA

By George L. Boundey, Custodian

Visitors for the month totalled 575.

The county singing societies held one of their yearly meetings at Gran Quivira and we had 355 visitors on May 10.

Our visitors are all very much interested as the roads are bad and they have made long dusty drives to reach us.

They tell us up here we are having our summer weather but woolen blankets are just as necessary now as they were in the winter time at Tumacacori.

We have had much high winds and dust during the month with scarcely any rain.

We have set up three sewer pipes with water containers on the top so that the birds may drink. I measured the water in one container and the birds drank six gallons in four hours. They come in great flocks and many are making nests in the vicinity.

They tell us up here that after the July rains both birds and

flowers are at their best, but we are noticing new blossoms nearly every day and if the land scapers acquiesce we mean to have a flower garden with only native blossoms.

Mr. Gipe has the pumping plant and pump house completed and will be leaving in a few days for Canyon de Chelly. We are going to miss Mr. and Mrs. Gipe very very much.

Mr. and Mrs. Borell paid us a visit on the 6th. It was their first visit to this monument, and they were much interested in our rattlesnake neighbors, but not one did we find for their collection. They had not been gone but a short time when one member of a party killed by far the largest rattler I had seen so far.

Mr. Diehl stopped here on the 20th and inspected the pumping plant.

Have been trying for a long time to get visitors to park at the parking ground instead of driving up into the ruins; signs did little good, so I put up a flag pole in the parking place and am having no more trouble; the minute they see old glory they just naturally swing about and stop.

Mr. Smith, recently retired as custodian here, is making a trip back to his old home in Arkansas. He had me make for him a map of Gran Quivira drawn according to scale and will give some talks on Gran Quivira to his friends in the south. We made the drawing on cloth 4 by 6 feet.

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TONTO

By Woodrow Spires, In Charge

With this report I bring to a close one of the most interesting months which I have thus far encountered at Tonto. The visitor count was much lower than expected but to offset this they have been of unusually high quality. The only way I can account for this sharp decline is the leaving of the winter visitors for the East.

Excepting a slight snow storm on the Sierra Anchas May 6, we have enjoyed a typical Arizona spring month.

The following figures are derived from SWM Stencil No. 16:

Total visitors at the Monument	365
Total time guiding	4320 minutes
Total visitors taking field or ruins trip	179
Total time field or ruins trips	3295
Total number of field or ruins trips	49
Average time field or ruins trips	67 minutes
Average group field or ruins trip	3.6

Total visitors museum trips	205
Total museum trips	61
Total time museum trips	1025 Minutes
Average time museum trips	16.8 "
Average group museum trip	3.3

Trips to the upper ruin were so few that they were included in the regular field or ruins trip.

The following newsworthy visitors have registered during the month:

May 1, War Minister of Jugoslavia and party.

May 1, Mrs. Jack Whitehead of the Arboretum and brother Philip Thomas.

May 3, Mrs. Hugh Miller and party from Coolidge had a (enjoyable?) picnic sharing the shade tree with two other groups of picnickers.

May 9, Ruth and Millard Henning arrived at the Monument, leaving May 13.

May 23, Ruth and Millard Henning paid a return visit on their way to Las Cruces.

Tonto solved one problem for the Hennings. They wondered if the rangers spent all their spare time thinking up the so-called dumb questions which are reported, but during their stay two elderly women came to the cabin, walked into the kitchen, and looked around, and in all sincerity asked "Is this the cliff dwelling?"

Tomorrow I expect to get started bracing the walls in the Lower Ruin which apparently is going to be rather a tedious job.

General cleanup work has occupied most of my spare time.

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PIPE SPRING

By Leonard Heaton, Acting Custodian

Received the May Broadcast yesterday. The first things I look for are the instructions, requests and orders that you give to us in the field to help make our outfit the best in the Service. Accordingly, here is my report on the 22nd, instead of the 24th, as I have been in the habit of sending it out.

Visitors this month have fallen off some from that of April. Those who have come have been very interested in the place and expressed themselves as wanting to come and see the Fort when it is completed as to

restoration of the pioneer relics, and furniture.

Travel figures were as follows:

May guided trips:	16	Present	81,	Local	275,	Lecture CCC	36
April " "	20	"	96,	"	530	" none	
Decrease	4		15		255	Increase	36

Total for May 392 April 626

Have had another relic donated to the monument by Mrs. Maggie Heaton, Moccasin, Arizona. It is a combined bullet mold, copper and loader. It is so rusty that I have not been able to determine the make or size. Mrs. Heaton promised to give us some Indian pottery when we have some place to keep it.

On the 24th of April a CCC boy turned in a cartridge of unusual make; it was found in the bottom of the pool in the meadow when it was being cleaned out for swimming. The measurements of the cartridge are as follows: Length over all, 1-5/8 inches; Shell, 1-3/16 inches; Head across, 5/16 inch; center fire; and is marked W.R.A. Co. 22, W.C.F.

(Ed Note: Send it to Headquarters; our gun expert, Jack Winter, will identify it.)

With the collection of all the small relics I have (and I am not displaying very many of them) I am wondering if I could not get some show cases in which to put these articles.

Yesterday a crew of eight men started to work on the monument projects. Have started them on the west end of the road through the monument, and intend to finish up the road work first getting all grading and graveling done as soon as we can. Then will work on the other projects if we have funds to purchase material.

Tried to get an engineer in last week but couldn't; consequently, I called the Boss and asked him to send one in, but he wanted to know if I could not line the road up and give it a grade with my eye. I told him surely. He said "Go ahead and I will back you up on it." I got my tape and pegs and went to work with the help of a CCC boy. Think the road will be about where Mr. Cowell surveyed it in 1934 as I found four of the stakes he put in. At any rate, you will not be able to tell if the road is out an inch or two when traveling over it in a car.

The CCC boys finished their swimming pool May 20 and turned in the water that night, but it is not filling up as fast as they thought it would. It will take at least four and maybe five days to fill. There is a dance planned tonight to celebrate the filling of the pond; also some swimming was planned, but that is out.

The bird banding has been very interesting this month. In trapping the Gambel Sparrows I have noticed that they only stay here about five days and then move on, as some days I would catch 10 or more and the next few days most of my catches would be repeats; then a new bunch would come in and very few of the first bunch would be among my catches.

There have been very few catches the last few days. There are many tree birds here, and I would like to get some of the two-compartment traps to use if there are any to be had.

The birds banded for May are:

Gambel Sparrow.....	55	Repeats	46
Green Tailed Towhee	2		
Long Tailed Chat	2		

Total for May 59; April 44; Grand totel 103.

I haven't done anything with the lizards this month. I have been working on some traps to catch them in. Will let you know the types of traps used after I have tried them out and the success I have with them.

The weather has been very windy and dry. It has been cloudy but have had no storms. The plant life is beginning to show the lack of moisture, and the stock watering holes are getting very low. In some places the stock are being driven to other places for water.

Thanks for the botany blotters, but I think I shall not need them a great deal this summer, as there are very few flowers coming out, and those are of the perennial kind as the seeded ones did not get enough moisture to keep them growing. Those that I have collected are few and the specimens are not of the best.

I was oing to say this is about all when I happened to think that I am now wearing one of the regulation Park Service Belts. When my wife saw it she said it must belong to the "Pink Pants" class. The buckle is okay, solid brass, with gun blue finish, but the GREEN, I don't think it fits at all.

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NAVAJO

By John Wetherill, Custodian

I am enclosing report for April and also birds banded by milton. We have had some very bad weather the last month, which has limited the travel to just a few of the most adventurous. We are in hopes that we can give you a better report this month.

Mrs. Wetherill and I are out here in Berkeley "dodging cars and people" the most of the time. We may get over our fear of them in the

course of time. The desert for me is like the Texan that went to Utah. Everything in Texas was bigger and better than anything in Utah. A bunch of the boys thought they would teach him not to brag so they put a turtle in his bed. When he went to bed that night he found it. They told him it was a Utah bed bug. After sizing it up, he said, "Huh! it must be a young one." Even the noise on the desert is bigger and better than it is here.

--

By Milton Wetherill, In Charge

Enclosing report No. 16, birds seen and noted also birds banded to date.

The first part of April quiet, probably due to the windy weather, that we had at that time. The middle of the month fair, while the last few days have been partly cloudy and windy.

Have collected a few insects and plants, but they seem to be slow coming. The insects are not as plentiful as last year. Flowers are just starting to bloom. The Aspen and Birch are in leaf, with the oaks starting to swell buds.

The hill coming this way out of Shanto has been cut down about 15 feet, which will make it easier coming this way.

April bird list is as follows:

Audubon Warbler
Western Wood Phoebe
Western Gnatcatcher
Woodhouse Jay
Red-shafted Flicker
Red-nape Sapsucker ?
Canyon Wren
Gray-headed Junco
Junco oreganus ?
Tit-mouse
Mountain Chickadee
Broad-tailed Hummingbird
Sharp-shinned Hawk
Raven
Western Tanager
Black-throated Gray Warbler
Mourning Dove
Bush-tit
Robin
Pinyon Jay
White-breasted Woodpecker
White-breasted Nuthatch
White-throated Swift
Shufeldt Junco
Spurred Towhee
Say Phoebe
Ruby-crowned Kinglet
Red-tailed Hawk
Turkey Vulture
Arkansas Kingbird
Western Warbling Vireo

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CHIRICAHUA

By Wm. Stevenson

I herewith submit the following travel report for the month of May.

During the month 462 visitors arrived in 102 cars. Seventeen states and Mexico were represented.

Many visitors are now stopping at the Ranger's residence to express their appreciation of the camp ground, bathouse, and our trail system.

Echo Trail is "selling" all the visitors who can be persuaded to take the walk.

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CHIRICAHUA E.C.W.

By Wm. Stevenson, Project Sup't.

I herewith submit the following ECW report for April:

Work has progressed well on Echo Trail this month. 1,500 feet were completed during the month, and the crew will be working on Echo Point June 1. Total trail now complete on Echo is 7,500 feet.

All materials are now on the ground for the Headquarters-Portal telephone line. Eight and three quarters miles of poles have been set this month. All remaining poles will be set by the end of the first week in May.

Excavation for the buildings in the utility area is 90% complete. This project has gone slower than expected due to large quantities of rock which have had to be blasted.

Work has continued throughout the month on topographic survey.

Forty enrollees are due May 27, which will bring the company strength to 192.

Visitors for the month - Al Kuehl, landscape architect, April 29; Jack Diehl, park engineer, May 21.

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WHITE SANDS

By Tom Charles, Custodian

The Lord still smiles on the Great White Sands.

It has been almost a year since our road crew started a campaign to get equipment to remove the sand which occasionally drifts across the road in about three places. When Chief Engineer Kittredge was here a few weeks ago, Ben Daugherty appealed to him for help. Ben knew he was

coming and had been praying for a windy day when the Chief was here. In my early days in Kansas I have seen wind storms take the four strands of a wire fence and wind them together into a solid rod; I have seen it blow fat hogs clear across the Republican River and lay them down gently on the other side; and I heard of a wind in a neighboring county that ran a crib full of ear corn out of a knot hole, shelling the corn as it went out. Leaving the grain on the inside and the cobs on the outside, so I am not a stranger to wind but I guess that Kansas never had much on the kind of a wind that Ben put on for Chief Kittredge the day he was here. Our whole force hopes that the demonstration was convincing and that it brings results.

I do not know where the story originated about a man catching a bear and not being able to turn him loose but I know just how the fellow felt, since I have gotten into this percentage business as applied to my travel count. When Barry Mohun came here six months ago, we started a count of visitors three days a week, eight hours a day. We took the percentage every way we could; the percentage that stopped along the road, that went into the monument, that went west or went east and the percentage each hour in the day. From the best of my recollection, Bob Rose put that percentage idea into our heads. It looked good and worked fine, but as time goes on the figures are a little staggering. I think they are correct and can see no reason to change them, but if this attendance keeps on climbing I am expecting a howl that I am "swelling the count."

From now on our attendance must be arrived at on percentages which we have established in the past six months count. For instance the count shows that the usual Sunday attendance compares to the week day attendance as 39 to 87; that is, every time we have one Sunday visitor we have had approximately 2-1/5 week day visitors. Our Sunday attendance for the past month has been: April 26 - 333; May 3 - 538; May 10 - 765; May 17 - 792; total Sunday attendance 2,433. Two and 1/5 times this Sunday count gives us 5,352 week day visitors. I am willing to cut that week day number in half, though some of the best informed say it is not too many. I give it to you as the result of established averages.

Here is our last month's attendance:

Sundays	2,433
Week Day visitors	5,352
Play Day	3,595
Special Parties	500
Total	11,880

The 500 listed as "Special Parties" is purely an estimate, but I know of over 20 school parties held at the Sands this month with an attendance of from 10 to 75 each. You may be interested in some of the schools and the distance which they are from the monument: Pedernal -

194 miles; Morarity - 210 miles; Ysleta - 110; Tatum - 201; Weed - 54; Eunice - 236; Anthony - 75; Las Cruces - 50; El Paso-100; Estancia - 195; Amarillo - 350; Loretta Academy - 100 miles. Amarillo sent 84 seniors who visited both the Carlsbad Caverns and the White Sands, but Eunice (and many of the others) brought their 16 young people the full 236 miles for White Sands Play day alone.

There have been very few nights during the last three weeks of school but that there was a party from some of the county or Las Cruces schools. These are among the 500 listed as Special Parties.

Speaking of parties, Boss, the one par excellent was the Annual Play Day. This is a party sponsored by the Alamogordo Chamber of Commerce, cooperating with approximately 100 teachers and in honor of 3,200 Otero County children. It was the second annual meeting and the response from every quarter and the unqualified success fixed it as an annual affair.

On account of the absence of shade at the picnic ground the committee on arrangements decided to hold the picnic as late in the day as possible and fixed the hours from 2 p.m. to 9 p.m. It is estimated that this late hour kept at least 500 children from the mountain districts away from the party. But what is 500 children, more or less, at a White Sands Play Day! There were plenty to stage four ball games, the track events, impromptu sports and the band concert, all at once and have a large crowd for each event. In the evening the Mescalero Indian Boy Scouts put on a camp fire dance at the foot of an exceptionally fine hill and hundreds of people sat in the soft, warm sand and cheered Charles Lindberg Shante-Boy and his brother scounts to an echo for the fine dances which they gave. After the Indian dances the entire assembly gathered around the fire and sang such songs as Old Black Joe, America, Oh Fair New Mexico, and others. It was some party, no accidents, no drunks, no discord of any kind.

I know that you will pardon a brief reference to a subject which we have discussed before; the matter of shade. And before we go into it, I want to thank you for your recommendation to the Director to spend $2,000 for shade at the Picnic Ground. I am delighted that you are doing what you can to provide this necessity; for I must admit that it leaves a sting to think that 500 mountain children were deprived of the opportunity to meet with the other children of their class in the annual picnic, for want of a little shade. And even the pleasant picture of 3,000 children romping on the snow white hills cannot efface the shame of the other picture of mothers digging holes under the modern, low-slung cars, and crawling in with their little tots to get away from the excessive heat. It is a condition that calls for an apology and is not on "peak days" alone but every day in the summer season and especially every Sunday.

Among our interesting visitors was Lymon Cooley, movie-man of the well-known lectures, "Rediscovering America;" Laurence Brundell, Shell

Petroleum Geologist from Australia; Wm. B. Mitchell, Reclamation Department, Washington, D. C., with a picnic party of about 25 of the Reclamation officers and families from El Paso; Colonel Porterfield, retired capitalist, Silver City, and J. C. O'Leary, President of the Silver City Chamber of Commerce and editor of the Silver City Enterprise. Mr. O'Leary followed his visit to the Sands with a half column editorial on the beauties and attractions of the Sands and full description on how to make a visit there a Sunday outing.

Just as we go to press Jack Diehl slips in for his farewell visit. It's nice for Jack to get a promotion, but it will be hard for the White Sands force to get along without his friendly, instructive visits.

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CASA GRANDE

By W. J. Winter, Custodian

Travel this month was 2,274. This included two large groups - a Texas state picnic of 300 people on April 26 and a Townsend Club picnic of 100 on May 17. April 26 we met Roy Hopping, brother of Guy Hopping, Superintendent of General Grant National Park. May 9 J. B. Hamilton, Engineer from Mesa Verde, came in. May 17 we greeted Ranger Charles Hutchins of Carlsbad Caverns. All other NPS visitors were for Headquarters only.

The weather has been a bit warm, the day temperatures running from 88 on the 8th to 107 on the 14th, and the night temperatures from 44 on the 6th to 68 on the 15th. Precipitation was zero.

The Monument is now entirely minus the services of Charlie Steen. So now Don Carlos is the Juniorest of the Junior Naturalists. We are glad of his promotion, though we hate to lose him.

Taking Charlie's place as Ranger is Don Erskine, who has been in charge at Walnut Canyon for several months. Don is accompanied by his charming wife, Marie, and they make a welcome addition to the Monument family. H.R.W.P. Marie had one of the worst introductions to Southwestern Monuments that I have seen, as she arrived at Walnut Canyon in snow, ice and mud, and then when the weather got warm they were shifted down here to the summer furnace. Other difficulties beside the weather were involved, such as quarters, so if the gal survives it all she rates a medal.

To ease the heat situation Don has had a home-made cooling system installed (at no expense to the government) at his house. It is a window set-up which involves drawing air through dripping water and blowing it into the room with a fan. These coolers became very popular throughout southern Arizona last year. The rest of us have looked it over with much interest, as it certainly cools off the place, and that will be something to think about when the thermometer hits 115. We are wondering if the

thing might not throw an excessive amount of moisture into the air, or if the natural air here is not dry enough that it could stand a little added moisture. Don't be surprised if more of these coolers are installed. Now, if someone would only think up a heating device equally simple and inexpensive, for the winter nights, there might be less cursing of the BOPADS.

As I write this I can hear our gasoline sewer pump running. It now takes over half an hour of Don's time or mine twice a day to pump the surplus water from the hole beside the septic tank. Over 30 hours a month plus time and expesne of servicing and repairing the motor and pump is an expenditure that should not be necessary. This and the reasons of sanitation mentioned in previous reports make us fervently hope that the powers that be will soon crack loose with funds for an adequate sewer system.

To get on a more pleasant subject, it was noticed that the say-phoebe in the east room of the Casa Grande hatched their second family of the season May 23. The three young owls in the same building are grown almost as big as the two old ones. The second rattlesnake of the season was seen last night in my back yard behind the garage. Three Gila Monsters have been noticed, one on the entrance road, one at the wood pile and one on the path to the ruins. These may have all been the same one, the Naturalist Division not having banded any of them yet so they can be told apart. A ground squirrel caused some amusement by his persistent be-deviling of a bull snake, nipping at the latter's tail until he took refuge in a hole. Not a bad idea on the part of the snake and one which we might adopt next winter when the visitors get too thick.

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WUPATKI

By James W. Brewer, In Charge

500 Use of Monument Facilities by Public

91 guests registered at Wupatki Pueblo; 106 at the Citadel Group; 31 names are duplicated, leaving a total of 166 registered visitors to this Monument in May, 1936; 1935, 125; 1934, 9.

Two parties of overnight campers found only an absence of Monument facilities for the public.

States were represented as follows: Arizona, 47; California, 32; Colorado, 16; New Mexico, 10; Michigan, 7; New York and Washington, 6; Minnesota, 5; Tennessee and Texas, 3; Illinois, Nevada, Iowa, 2 each; Massachusetts, Connecticutt, Ohio, Mississippi, Oregon, Arkansas, 1 each. (SWM Stencil 13 attached) The above figures were taken on the 22nd.

530 Newsworthy Visitors

On Tuesday, the 23th, Dr. A. E. Douglass with Mrs. Douglass, Dr. Waldo Glock, Harry Getty, Mr. Hale, and Mr. Schulman were visitors. As you know, Dr. Douglass made a study of Wupatki beams, and is at present interested in obtaining student material from here. Dr. Douglass and I climbed into the cavate rooms where the catalogued beams were stored and picked them over. Dr. Douglass selected a number of specimens, some of which he remembered as old friends.

On Wednesday the 29th Dr. Byron Cummings and Gordon Baldwin brought two students to the Pueblo. They stayed long enough to see the Pueblo thoroughly, the amphitheatre, ball court, pit house, and petroglyphs. All of which requires time few visitors can or will afford. I had a very pleasant afternoon.

Dr. Colton and Miss Katharine Bartlett escorted a party of A.A.A.S. members from the Grand Canyon to the Citadel on the 30th. As previously arranged, I met the caravan at the Citadel; here some turned back and three cars come on to Wupatki Pueblo. Because the cinder road from Wupatki to Sunset Crater was, and still is, so dry I advised against that proposed itinerary. I know some of the party were disappointed, but was afraid that someone's car might crowd up and delay the procession.

On May 1 Mr. L. F. Brady, Curator of Geology Museum of Northern Arizona, brought another caravan of A.A.A.S. I met this party at the Citadel also, and guided them through both units of Wupatki.

Mr. Brady returned with Mrs. Brady and their guest on the 6th.

100 Administration

123 Visits by NPS Officials

Mr. J. B. Hamilton of Mesa Verde National Park registered at the Citadel on the 12th, and to our regret did not come to the Pueblo.

I've been wondering ever since J. H. Tovrea's visit if our amphitheatre is an unfinished kiva.

Mr. and Mrs. R. A. Livingston of Shiloh National Military Park visited the Pueblo on the 22nd.

020 Weather

April 25th to May 1: high 90 degrees, on the 25th; low 41 degrees, on the 30th; precipitation, trace on the 26th; five cloudy days and one sunny day.

May 1 through 22nd: High 89 degrees, on the 13th and 15th; low 36 degrees, on the 7th; precipitation, traces on the 7th and 19th; two cloudy days and 20 sunny days.

We have not had a measurable rainfall since March 25. Fifteen consecutive sunny days from the 8th to the 22nd have retarded range conditions greatly. The cinders are hot, dry, and loose and their effect on the sheep's feet is pitiful.

180 Publicity

Southwest Tourist News, May 12, contains a brief article on Wupatki obviously taken from our mimeographed circular.

210 Maintenance, Improvements, New Construction

230 New Construction

We are using the back dirt from INA-excavated rooms to form a ramp. This change will eliminate the narrow hazardous CWA stepway and stop destruction of the prehistoric retaining wall, at the same time reducing the pile of back dirt.

300 Activities of Other Agencies in Monuments

320 Cooperating Agencies Other Than Government

On three occassions I borrowed a 1½-ton truck from the Coconino County Highway Department. These hauls were for hogen and shade material

On one trip we towed the Pueblo I pickup into Flagstaff, for repairs. Being Sunday (the only day the County truck is available to me) we did not leave the Pueblo until six p.m. We hurried along because the truck had no lights mounted on it; dusk overtook us at Camp Townsend, and we went in for a Coca Cola (Atlanta, Georgia, papers please copy). We were drinking and discussing our predicament when Mr. Townsend suggested calling the sheriff's office and getting a deputy to come out and pilot us in - which he did!

400 Birds

Very casual bird notes show that Townsend Solitaire has not been seen on the Monument since the 13th, at which time I saw two at the pipe line. Both were gasping like mother's canary used to in July. Other birds observed are: Poorwill; Desert Black-throat Sparrow; Rock Wren, (the Wrens and Sparrows are common about the Pueblo now, singing and chirping from the walls and nearby bushes) House Finch; Horned Lark; Pinyon Jay; Say Phoebe; Dove; White-rumped Shrike; Cowbird; Eagles are seen much less often than during April.

470 Animals

Three head of Antelope were seen between Wupatki and Sunset Crater on the 17th; one, on the slope of the Crater the 22nd.

On the 18th I started down the ladder early in the morning only to be halted halfway by the dry rattle of a side-winder. I climbed up and put a shot shell into the .22 and then on into the snake. Later I learned that at Walnut Canyon a live snake cage awaits me. The fine shot did not seriously damage the snake as a specimen and it is in alcohol now.

I have no personal objection to snakes, but feel that where visitors of all kinds are welcome, snakes of all kinds are not. A large non-poisonous snake recently met some visitors on the trail, after which the visitors' interest in the Pueblo seemed slightly dampened; we thought we might have to be firm with the snake about the use of trails, but he hasn't been seen since - probably none too pleased with the encounter himself.

Navajo Arts and Crafts Exhibit

Since the advanced date has been put on the Report we think it is possible that some readers may be in possession prior to the 6th and 7th. So we again extend a "come one, come all" invitation.

The hogan was finished yesterday and here are some figures: Height - 14 feet; Diameter - 18 feet (The Indians say it is the best hogan between Cameron and Leupp). 140 to 150 tree trunks were used in the frame work. 202.5 cubic feet of dirt were used in the mud covering. 445 gallons of water were required to make the mud and harden the floor. 457 red man hours were required to haul, peel, and erect the logs, mix and apply the mud. Clyde Peshlacai and Albert Cody were the longest contributors.

One brush type "shade" is partly constructed and all the timbers are on the roadside awaiting the truck tomorrow.

The shearing slowed things up a couple of days, and if insufficient time remains to build a sweat house it can be one of next year's "added attractions."

I have kept a pictorial step-by-step record of the hogan construction as well as "Some Notes on How to Build a Hogan," which I will forward to you, hoping you'll never want to build one.

The top soil is so loose and thin it is necessary to blast a hole for each verticale post used in the shelters. Other exhibits are coming in rapidly and together with the borrowed antiques will make an exhibition.

SUNSET CRATER

By James M. Brewer, In Charge

Two hundred eighty-three visitors registered at Sunset Crater National Monument this month; 1935, 248; 1934, no record.

States represented were: Arizona, 76; California, 47; Colorado, 18; Texas, 7; Michigan, 5; Missouri, Ohio, New York, New Mexico, Pennsylvania, 4; Indiana and Oregon, 3; Oklahoma, Minnesota, 2 each; Kansas, Montana, Washington, Rhode Island, Massachusetts, Wisconsin, Kentucky, Tennessee, and Illinois, 1 each.

From Sweden came two parties of visitors.

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CANYON DE CHELLY

By Robert R. Budlong, Custodian

Have just received the last copy of the "Broadcast" and note that reports must be in to Headquarters two days earlier than usual. Since the mail leaves in less than three-quarters of an hour, I must attempt to write a report in that time. I'm afraid it will be greatly condensed.

There were 158 visitors to this National Monument during the month of May, 1936. During the month of May, 1935, we had twenty-three visitors. This month our visitors totalled 29 parties; total time, 98½ hours; average time per group, 2.4 hours. There were 14 rim trips, 6 trail trips, 3 horseback trips within the canyons, and 7 trips within the canyons by car.

The canyons were passable for cars equipped with ordinary tires for only a week. Now warm weather and high winds have caused the wet sand to dry and form drifts, and only wide-tired cars may make the trip until we get more rain.

On May 11 we started completing the water line to the Custodian's Residence. At this writing the pipe line is laid from the well to the reservoir, the line completed from reservoir to a point 20 feet from the residence. One more day's work will complete all connections from well to house. We dug up 163 feet of pipe laid last year, and laid it to the new well. Last night we started pumping, using a light pump jack and 3 h.p. motor, and secured a fine flow of water. While it is slightly cloudy, not having been pumped for four months, it is of a good taste, and seems quite soft. Sewer connections will also be completed within two days.

We were greatly pleased to have Norman Jackson of Montezuma Castle make us a return visit this month. We took him into the canyons on horseback, and showed him a small part of a real National Monument. Our horseback trips here average about seven hours each; some go as high as ten

hours. We are thinking of carrying alarm clocks, so that when eight hours have elapsed the alarm will go off, and we can get off the horses and walk home. While we don't mind the long trips, we understand that some folks believe in eight-hour days, with a day a week off duty.

Nearly mail time. But I am reminded of real consideration on the part of two of our latest visitors: They were driving to the office when they noticed a large gopher snake lying across the road. The brakes were applied just in time to keep from running over the snake. Whereupon said snake crawled up under the hood of the car, around the engine, and our very considerate visitors spent the better part of half an hour trying to unwind the snake from the engine, insisting they didn't want it to get hurt, burned, or otherwise damaged. This is a real move in the direction of conservation of wildlife. We are justly proud of both our Monument and our visitors. Both are "the finest in the Southwest."

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WALNUT CANYON

By Paul Beaubien, Ranger-In-Charge

640 visitors registered this month, and 506 are listed as educational contacts. Park Service visitors were J. H. Tovrea, Mr. and Mrs. J. D. Hamilton, Harry Langley, Charles A. Richey, Mr. and Mrs. J. W. Brewer, Charles Steen, and Vincent Vandiver.

Mr. Vandiver has filled a long felt want as he has completed a summary of the geological aspects of Walnut Canyon.

The last snow fell the evening of May 6, but it disappeared quickly. This has been a dry spring and the Forest Service expects one of the worst first seasons in history.

Since the snow, there have been 26 overnight camping parties; with as many as four parties on three different occasions. With heavier traffic, warmer weather, and a water supply, a large camp ground would be needed here.

The County has recently graded the two approach roads to the monument besides doing some improvement work on the spur road to the cliff dwellings. The Forest Service has hauled one tank of water to the cistern, and seems willing to haul another if necessary.

A large pine fell across the phone line several weeks ago. Somebody removed about 150 feet of wire at the break and this has not been replaced to date. The Forest Service will send fire fighters out by truck should a fire start, so I'm not greatly concerned about not having phone connections with the fire "lookout."

Don Erskine left for Headquarters May 6. Probably he can add some

to this report as he contacted a large group from the A.A.A.S. meeting in Flagstaff besides having first-hand knowledge of a fatality at the railroad crossing.

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AZTEC RUINS

By Johnwill Faris, Custodian

All right, Boss, just to prove to you that we read the "Broadcast," we are submitting our monthly report two days early. February, March, April, and now May, all show decided increases over the same months last year, and May, like April, has been the best of corresponding months since 1930. Just as soon now as Dale gets our temporary museum in operation, we will start singing, "Happy Days are Here Again."

Visitors for the month total 1,172.

May has been an exceedingly interesting month. We have had more fun trying to take care of all the planting put in by the CCC, obtain views for the Ecology case in our temporary museum set-up, actually drawing up plans for this arrangement, and putting our story across, than you can possibly imagine.

We started out the month with a bang, by showing 104 CCC boys from a Forest Camp at Dolores. They had wired us they would be here, so we were all ready for them, even to having an extra guide on the grounds that morning.

I have always contended, Boss, that there was not a reaon in the world for enlarging our Monument, but I am about to take that remark back. If our crowds continue to increase as they have of late, I am afraid that I am going to have to try and impose on my good friend in De Chelly and see if he will not lend me some area. If he will give me those sections containing Navvy Cave and possibly the White House itself, I might tack them on to the lower end of my Monument where not too many people will notice them, and thereby not detract from our reputation too much. It will have to be pretty high standard to even consider annexing, but I know that Bud would like to have some people see them, so I will let down the bars for his special benefit.

Following close on the heels of the CCC boys Jim and Mrs. Hamilton were in on their way to Coolidge. We are going to have to get busy on our parking area pretty soon or Jim will desert us entirely. And by the the way, Boss, all jokes aside, if we put off action on the parking area much longer, we might as well include plans for enlarging it. Right now on peak loads it bulges the cement wall around the area. The nice gateway on the east wall that leads into our picnic area, was just foresight on the part of Chuck Richey and will actually act as an entrance to our supplemental parking space which will be about twice the size of our present one. Thus, we will have the esthetic value of a very compact and

adequate area, while in actuality we will have a very picturesque overflow into an equally pretty setting. I tell you, you fellows down there do not really give Chuck the credit that is due him. I know that Jim has wondered all the time what the idea of that large opening was in the East wall, but I never did tell him.

We were very happy to have Earl Morris with us for a few minutes the early part of the month. He was kind enough to go over several of the cases and offer suggestions which we appreciated very much.

James F. Zimmermann, President of the State University, sent word that he would be in and see us on the 14th, but was delayed and did not get to stop with us. We regret missing his visit very much, and hope that he will get up this way again soon. He is in charge of this big celebration New Mexico is giving in 1940 honoring Coronado, and already his efforts are beginning to show fruit. I want to ask at this time for another ranger by 1940, and please, Boss, see that the addition is given our parking area and museum by then.

The regular Monument routine has been for the month normal. No trouble to speak of. The entire Administration Building has taken on a new appearance with its bright new coat of apple green paint on all the doors and windows. We try to do this every spring not only to improve the appearance of the building, but to protect the wood from the hot sun. Since we do not do it but once a year I think it deserves mention.

The blow that killed father this month was a letter from Dale King suggesting that we get out plans for a temporary museum set-up at Aztec. Bert and I all but tore out each others hair to fix up something for him, and are wondering now if he won't get busy and draw up a temporary plan for us. I think there is a limit to what even our educators can stand, and I bet Bert and I hit it with our plan. I dare say that he finds things in our plan that he never dreamed you would expect to find in a museum. Anyway, it was great sport and we enjoyed the faith he displayed in us a great deal. We are awaiting the action of our Educational Division in purchasing the cases needed for our displays, and in a short time now invite our colleagues to "Come and see us," and we will show them what our Coolidge and Berkeley fellows can really do when they start out to fix up a museum. We are becoming more proud of this Division every day.

One day was spent in taking pictures for the Ecology Case, and with the plan Dale wrote us about, we feel certain that this case will prove one of the most interesting at the Monument.

An official trip to Santa Fe, early in the month, constitutes the only trip out of this section. Bert Hart called on Budlong and Miller on his <u>days off</u>, and tells me they are fine. Gosh, Boss, I am almost scared to use those words, but anyway that was when he went so maybe I

can get by this time. Do not let Dale, Jack, or Martin see this part.

Well, this was interrupted by a party of 27, and if Aztec becomes any better known for an ideal picnic spot combined with a couple hours of mighty interesting ruins trip, I am going to need a spare ranger before 1940, and am going to be forced to make provisions for fireplaces in our picnic area.

May has been most interesting, and we leave it reluctantly, consoled only with the hope that June will be equally as pleasant. Please extend a special invitation to the Hennings for us, and we promise them a mighty happy surprise.

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CHACO CANYON

By Thomas C. Miller, Custodian

General

Approach road to the south has received some much needed maintenance this month. The Indian Service have been over the road several times with their grader. The approach road to the north was repaired and maintained by the State. The blow sand north of Escavada Wash was much improved and almost eliminated for a few days during the first part of the month. However, the first windstorm we had leveled the sand up, completely covering up our road. Since that time we have had a lot of trouble getting visitors out of that sand bed. That sand is sure giving this monument a bad reputation on roads. We are careful to explain that this sand bed is not a part of the Monument, but that does not help the visitors' feelings much. The visitors from the north are being discouraged about trying to get into this monument on account of roads. While our travel is under that of last month, we are not complaining about the number of visitors. We figure that just the very best ones get here, while the others get discouraged and turn back, so what we lack in quantity we surely make it up in quality.

Weather

Weather conditions have been excellent for the most part of the month. Weather statistics follow: Maximum temperature, 82 on the 3rd; minimum temperature, 28 on the 1st; precipitation, .50 inch was recorded for the month. The greatest in 24 hours was .28 inch on the 7th.

Range Conditions

Range conditions are very good. The grass, flowers and small shrubs are showing greater growth than ever before.

Travel

Registered by cars 496 people arrived in 162 cars, coming from 13

states. Museum and guide service was rendered to 109 people in 36 parties.

Special Visitors

F. D. Mathews, district manager, with Engineers Fife and Slattery inspected our Soil Conservation project May 1.

W. W. Postelwhaite, treasurer, W. H. Dree, dentist, Paul E. Boucher, professor of physics, all of Colorado College, Colorado, were interested visitors on the first. Dr. R. C. Fisher and Stanley J. Milford, Santa Fe, inspected work being carried on by the Univerity of New Mexico on their Headquarters buildings, on the first and second. State Highway Engineers Dwyre, Sumner and Starkey were here inspecting the blow sand north of Escavada Wash and made the ruins trip May 5. J. L. Petterson, formerly of this Monument, and party, arrived on the 16th and departed on the 17th. W. G. Proper and Jack Snow, Soil Conservation Service photographers, were here on business on the 19th. Mr. Lionel Palmer, Superintendent of Schools, San Juan County, and party, were interested visitors on the 20th.

National Park Service Officers

Associate Engineer Hamilton arrived and departed on the 5th. A. E. Borell, wildlife technician, arrived on the 14th. Mr. Borell will be with us for some time exterminating rodents around our dikes in this monument. Ranger Hart, Aztec Ruins National Monument, and party were here looking over some good ruins on the 18th.

Soil Conservation Service

This camp has proceeded in a satisfactory manner. New earth dikes were built near the proposed Headquarters area. Revetment work was continued around the ruins of Pueblo del Arroyo and Kin Kletsoi. At this time 20 laborers and two dump trucks are being used on the project. 2000 Parasela shrubs have been planted for bank protection during the month.

Rodent Control

Trapping of rodents around the earth dikes constructed by the Soil Conservation Service in this monument began on the 15th. One Karbo Killer pump and 15 gallons carbon bisulphide gas arrived on the 16th. The pump was put in use Monday, the 18th. To date we have used 7½ gallons of the gas; it seems fairly effective. However, on porous places we have to repeat several times to kill all of the rodents. We are working long hours to complete this work as soon as possible. Mr. Borell is certainly working hard and putting in long days on this work. The Custodian has assisted in this work as much as possible. The Soil Conservation Service donated two Navajos and a biologist to assist in the work. A full report on rodent

control will be made by Mr. Borell when the job is finished.

University of New Mexico

Their Headquarters building is looking more like a house every day; they are pushing the work as fast as possible to completion by June 15, when their Archeological Field School is scheduled to start.

New Equipment

The new 1½-ton dump truck was received on the 15th. It is a good looking job and we are very proud of it. It was immediately put to work hauling water, maintaining fence,etc.

Bird Banding

Set one bird trap April 27; caught several birds and banded two. The others I did not have the heart to burden with bands on their legs, so turned them loose. I learned that you cannot trap birds with out frightening them, causing some of them to hurt their heads, so I decided I would just study the birds in other ways. No doubt I will be hearing from our Naturalist on this but that is the way I feel about bird banding. The birds banded were two Russet-backed Thrush, Hylocichla ustulata ustulata (Nutall). Band numbers 202801, 202310.

(Ed. Note: If Custodian Miller will read Paragraph 3, Page 1, and Paragraphs 2 and 3, Page 7, of his Bird Banding Manual, he will discover that his mentioned objections are ones solved several years ago by the application of proper methods which are there detailed. Our experience at Headquarters is that birds are invariably frightened at the first capture, become very tame later. Many of our "chronic offenders" have been captured 50 or more times, apparently regard the handling as the not-too-unpleasant aftermath of an easily obtained meal. "Burdening the birds with a band" is a slight overstatement, inasmuch as a recent reference in an ornithological magazine brought out the point that a band on a bird has relatively the same weight as a bracelet on a lady.)

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BANDELIER

By Jerome W. Hendron, Ranger-in-Charge

Visitors

Visitors numbered 833, arriving in 224 cars, from 35 states and the District of Columbia, Australia, Holland, China, Canada, Scotland, England, Nova Scotia, Switzerland, Italy, Mexico, Belgium, France, and Africa. Twenty-eight states were represented by cars.

The six highest states in order by visitor count were: New Mexico,

463; California, 51; Colorado, 40; Texas, 37; Kansas, 30; and New York, 20.

Visitor attendance for this month shows an increase of 98 or 13.19% over that of May, 1935, and an increase of 91 over last month. Travel has been much heavier over week ends than during the week.

Since May 15, there have been 24 return visitors either by themselves or with friends or relatives.

Weather and Roads:

Days partly cloudy	22	
Days cloudy	1	
Maximum temperature	83	May 3.
Minimum temperature	32	May 7.
Mean Maximum	75	
Mean Minimum	45.4	
Precipitation	.91	Against 1.79 for May, 1935.
Snowfall	.40	melted snow, May 7.
Rain and sleet		May 4, 15, 17, 18, 19, 23.
Dust storms		Slight, May 18, 20, 22, 23.

Weather has been good in general with the exception of a few slight rains, and a few dust storms; the heaviest one occurring on May 23, lasting most of the day.

Roads have been exceptionally good with the exception of a few corrugated places.

Visitor Trip Chart

Fifty-nine parties were conducted through the ruins, numbering 346 people. The average time per trip was 63.38 minutes. Five parties, numbering 23 people, were given talks without ruins trips or with only partial ruins trips, averaging 57 minutes per party. Several special talks were given at the hotel during the lunch hour, and also in the camp ground.

Special Visitors

May 9 - Mr. and Mrs. Chuck Richey were in, accompanied by Mr. and Mrs. J. E. Kell. Mr. Kell is connected with the State Parks Division. Chuck remained only a short while and then rushed off to Mesa Verde. May 10 - J. J. McEntee, Assistant ECW Director, was in the canyon on an inspection tour, accompanied by J. A. Chase, Commander of the Albuquerque CCC district, Frank C. W. Pooler, regional district forester, C. C. Dalcomb, F. H. Blair, Harley J. Helm, V. C. Campbell, all of the Soil Conservation Service in Albuquerque, Q. B. Sandberg of the Soil

Conservation Service, Washington, D. C., and Frank Andrews, Santa Fe National Forest Supervisor.

R. A. Livingston, Superintendent of Shiloh National Military Park, was in for lunch with his family. Mr. Livingston is making a tour of national parks and monuments.

May 13 - Mrs. Lansing Bloom paid us a short visit with a party from Santa Fe. Mrs. Bloom is the wife of Professor Lansing Bloom, of the University of New Mexico History Department. Professor Bloom is recognized as an authority on Southwestern History.

May 21 - Paul Kirkhart, Superintendent of the High School of protection, Kansas, was in with a group of his students. Mr. Kirkhart makes a trip each year with his senior class visiting a few National Monuments and other important sites. This was his fourth time in Frijoles Canyon; his last visit was in 1934.

May 23 - J. E. Koll, ECW State Park Regional Inspector, was in with J. T. Roberts of State Parks, R. D. Morgan, Superintendent of CCC Camp SP-33-T, Marathon, Texas, and W. H. Anderson, Superintendent of Camp SP-14-T, Canyon, Texas.

General

It seems pretty lonesome out here without Earl, but I heard indirectly the other day that he is going to get well soon. Here's hoping that he will soon be back with us again. He will, though, because he has the grit and determination or whatever it takes to get along, and too, he has Betty so you can bet your boots that he isn't going to let this illness keep him down.

We had what might have been a real forest fire the other night. It was about three and a half miles from here over the Alamo Canyon way. Forester Jim Fulton left early the next morning and had everything under control in a few hours. Jim likes forest fires; then he has an excuse for being tired.

I have a 5 o'clock trip to make around the ruins so this will be all 'til next month.

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BANDELIER E.C.W.

By H. B. Chase, Project Sup't.

Quarters No. 1 in the residence area was completed this month and is now ready for occupancy. Some landscape and planting work yet remains to be done on the grounds surrounding the building.

The walls of Quarters No. 2 are now constructed to door and window

height. The placing of lintels and vigas will start immediately. The timber crew has this month delivered approximately one hundred logs from the Santa Fe National Forest to the building sites of quarters 2 and Residential Area Equipment Shed for use in construction of these buildings. Hewing and shaping of this timber into vigas and lintels will start immediately.

Construction of the Park refuse burner was started this month on the north mesa near the rim of the canyon; at this time the base has been poured and all forms in place for the pouring of the structure proper.

Flagstone floor material has been quarried and delivered to the building site for construction of floors in the museum building project. All wall, ceiling, roof and portal construction has been completed and upon completion of floors this building will be ready for museum case installation. Recent preliminary case plans indicate interior plastering of this building will not be performed until the cases have been installed.

A small amount of trail maintenance work on the trail from headquarters to the Rio Grande River has been completed. Considerable work will be necessary near the lower end of this trail.

The planting of small shrubs along the entrance road and around the headquarters and residence areas has been in progress by the landscape crew.

The usual busy rock quarry operation has been in progress all month.

On May 10 this camp was visited by Mr. J. J. McEntee, Assistant to ECW Director Fechner. Mr. McEntee was accompanied on his inspection trip by Mr. Frank Pooler, Regional Forester of Albuquerque, Major J. A. Chase, District CCC Commander of Albuquerque, and Mr. K. D. Balcomb, representative of Soil Conservation Service of Albuquerque, together with other members of both the Soil Erosion Service and Forest Service. Mr. McEntee and his party inspected the entire camp and then the major technical service projects, both those now in progress and those completed in previous periods. After inspection of the entire ECW activities the party took the trip through the ruins under the guidance of the Acting Custodian, Mr. Hendron.

On April 16 the writer visited the other Southwestern Monuments' camp, located at Chiricahua National Monument, spending two days at this monument with the Project Superintendent, Bill Stevenson, going over the monument interests and project activities. This was a very enjoyable visit as well as instructive by viewing the activities of other camps. After the stay in Chiricahua I went to headquarters at Coolidge, spending two days with headquarters officials discussing Bandelier projects

and problems. En route back to Bandelier I visited Wupatki, Sunset Crater, and Walnut Canyon National Monuments, out of Flagstaff. All of them I found very interesting. This entire trip held many interests throughout and I enjoyed particularly the cordiality shown by Project Superintendent Stevenson and Mrs. Stevenson, Superintendent Pinkley and his Assistant, Hugh Miller, and staff in headquarters, and Jimmie and Mrs. Brewer at Wupatki National Monument.

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BANDELIER FORESTRY

By James Fulton, Forestry Foreman

During the first week of this month, my time was spent painting the interior of Quarters No. 2. Just before I acquired the title of Forester-Painter, the painting reached its closing stages.

Since the painting, I had charge of a timber-cutting operation. At this writing there are 100 logs containing about 11,700 F.B.M. cut, peeled, and delivered to Frijoles Canyon. This material was cut off the right-of-way of a new road the Forest Service is building over the top of Sawyer Mesa.

Maintenance of the lower Frijoles trail is a project I am just commencing. This year the trails are in much better condition than they were last year. Opening the drains last fall probably had a lot to do with this.

This is the beginning of fire season in this part of the country. We celebrated its opening by having a fire. On May 20 I used a crew of ten men to suppress a snag fire on the north rim of Alamo Canyon in Section 21. We left for the fire at 4:00 a.m., cut down the burning snag, built 135 feet of fire line, mopped-up, and arrived back at camp at 9:00 a.m. Subsequent patrol proved the suppression work was well done.

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MONTEZUMA CASTLE

By Martin L. Jackson, Custodian

As per your orders am getting this report out on the 23rd instead of the 25th as usual. The visitors were counted up to and including the 22nd. As you will see our count will be three days short this month, with on Sunday thrown in.

Total number of visitors registered for month were 773; total number that climbed the ladders, 343.

Roads leading in to the Castle are about the same as usual other than highway 79 which has been out for part the time during the month..

I understand that the contracts on this road are almost completed, that the road has beeen widened, the grades cut down and that it is really a pleasure to drive over it now. The road referred to above is state highway 79 between Jerome and Prescott, which has always been a very scenic drive.

Ranger Fish left on his vacation on the 15th. He said that most if not all his vacation would be spent in northern California. A letter from him since his arrival there says everything is lovely. Charlie Steen is relieving while Fish is on his vacation. Needless to say that Charlie took over the duties and went ahead without any interruption in service. You will no doubt recall that Charlie was with us a part of the summer of 1934. So it was more like coming back home than a new job.

Steen visited Tuzigoot Pueblo during the past week; says he enjoyed it very much, and that he could appreciate the work done there under the supervision of Messrs. Spicer and Caywood. However, he saw one thing there that he could not understand. Why should a wheelbarrow that had a hole worn in the bottom of the bed be patched with a Montezuma Castle "road sign." Was nicely bolted down and seemed to lend itself very nicely to that purpose. Would say in passing that I have been wondering for some time where some of our road signs went. Is it possible that this is the solution?

Park Service Visitors

Mr. and Mrs. Watt N. Dodge, ranger from the Grand Canyon, were in on the 7th.

Mr. and Mrs. H. E. Bailey, botanist from the Berkeley office, were with us for a couple of days during the month. They were gathering specimens on the monument, and we expect much good to come from their visit. To my knowledge Mr. Bailey is the only one that has studied the flora of the monument to any extent.

Mr. and Mrs. J. B. Hamilton from Mesa Verde paid us a visit on the 11th.

For the past two or three years an old White-Wing Dove has made himself rather conspicuous around the museum in that he had seemingly appointed himself as a committee of one to administer a beating to all the other White-Wings, Mourning Doves, and Quail. He disappeared during the past winter and we were all mourning his death. But on looking out the museum window on the morning of the 4th, we saw a very familiar looking White-Wing. We were all wondering if it could be the old' whitey' that we had known in the past. We only had to wait until another dove appeared on the scene. He immediately drove it away, then came back to the door of the museum and made a funny kind of a cooing noise peculiar

CAPULIN MOUNTAIN

By Homer J. Farr, Custodian

I would say that about 1,500 visitors to the Monument this month, although there is a possibility that we would have had several hundred more had the road been in first-class condition. The custodian has been doing a small amount of rock removing and cleaning on the road the past week and this has been of some benefit. The trails remain in very good condition. There is a large strip of U. S. 64 and U. S. 87 under construction between Capulin and Raton at the present time and this is expected to divert considerable of the potential traffic that we might have to the Monument this summer; then when the road is completed of course we expect to get much more as all between Raton and Des Moines is expected to be paved.

Weather has been peculiar, some rain the latter part of the month and a very heavy rain in a small strip on the sixth, and a general rain on the 16th approximately .77 inch all over the County. There is plenty of high wind, but the dust is not so bad as other springs.

At this writing we are having colder weather than we have had for several months, and we have had more cloudy days during May than for many many months.

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HEADQUARTERS STUFF

BRANCH OF EDUCATION

By Robert H. Rose, Park Naturalist

The Educational Staff of Headquarters has consisted of Junior Naturalists Dale S. King and Charlie R. Steen, and Park Naturalist Rose. King has been on headquarters duty all month.

From May 1 through May 7, Steen was on visitor contact duty at Casa Grande while from May 8 through May 12, he completed the Tonto museum catalogue and made considerable progress on the geographic place names project. Leaving headquarters the following day, he has been on special assignments at Walnut Canyon and Montezuma Castle National Monuments during the remainder of the month.

The special assignment of Park Naturalist Rose to Rocky Mountain National Park, reported in April and outlined presently, continued into this month. Leaving Estes Park on May 13 he arrived Phoenix on May 15 and reached headquarters the same day

Headquarters and Field Personnel Changes

Effective May 1, Louis R. Caywood transferred from Junior Park

Naturalist, Southwestern Monuments, to the position of Custodian, Tumacacori National Monument.

Concurrent with the above transfer, Ranger Charlie R. Steen of Casa Grande National Monument was transferred to the Junior Naturalist position.

The status of ranger-historian, ranger, and other seasonal positions in the field is as follows:

1. Jerome W. Hendron entered on duty May 7 as seasonal ranger at Bandelier National Monument. During a period of sick leave for Custodian Jackson, Mr. Hendron has assumed responsibility for the educational program of the Monument.

2. Appointment papers are submitted for the second seasonal ranger position at Bandelier.

3. Doug Harritt, seasonal ranger at Canyon de Chelly last summer, will return to his same old job in the near future. We are glad that Doug who served so successfully last season is again with us.

4. The ranger-historian position at Casa Grande will remain vacant until some time next winter. Contrary to the situation in nearly all national parks and most national monuments, the heavy travel season for southern Arizona and New Mexico national monuments occurs in the winter.

5. Under special arrangement, ECW provides a number of student technician positions. One of these positions has been allowed for educational work in the Naturalist Office and at Casa Grande National Monument. Approval of appointment is now pending in Washington.

6. The position of ranger-historian, Chaco Canyon National Monument, has been established in lieu of the seasonal ranger position of previous seasons. Appointment to this position should materialize within a few days.

7. Evon Z. Vogt, Jr., entered on duty at El Morro as acting ranger during the latter part of the month.

8. Deric Nusbaum is to fill the new position of Travelling Ranger for the "four corners" region designated as seasonal ranger, Yucca House National Monument.

9. Zeke Johnson began duty May 1 at Natural Bridges in his same old position.

10. A seasonal ranger-historian position is provided at Navajo, and appointment should materialize in the near future.

11. Filling the Tonto seasonal ranger position is now under way.

12. Paul Beaubien has been on duty at Walnut Canyon during the month as seasonal ranger.

13. Jimmie Brewer is being taken up on seasonal ranger status at Wupatki.

Detail at Rocky Mountain

Leaving Headquarters, Southwestern Monuments, on April 15 I arrived at Rocky Mountain National Park at 12:30 p.m. on April 18. While on this assignment the following work was done relative to getting the educational work in condition for their travel season:

1. The Headquarters and the Moraine Park museums were given a thorough cleanup. Tools, office supplies, lantern slides, books, pamphlets and relief models were segregated. The shelves and cabinets were cleaned and the floors were swept. Materials were placed in order in various places where they belonged.

2. The Arapaho Group in Moraine Park Museum, damaged considerably by pack rats, was cleaned up and such repair work done as could be performed with the materials at hand.

3. A segregation of pamphlets and separates was made and a temporary alphabetical file prepared. This file will need further improvement and breakdown but it at least affords a convenient place where pamphlets can be found.

4. Thousands of general information booklets were stored in space prepared beneath the stair steps. Approximately 50 mail sacks were cleaned and returned to the Post Office.

5. A file of cuts from Nature Magazine and used in Nature Notes was started a few days prior to my arrival. During the course of the Moraine Park Museum cleanup another mass of these cuts was found. Catalogue cards were prepared for these and identifications were made of as many as could be found in the incomplete Nature Magazine file.

6. Some time was taken for the preparation of an illustrated talk on the Southwest which was given on May 7 before the Estes Park Rotary Club.

7. About half of a lot of some 40 books, pamphlets, etc., classed as "lost" was found by searching the library and in the course of the cleanup work.

8. A scheme was worked out for a permanent mount for the labels belonging to the habitat groups in the Headquarters Museum. En route to Arizona I stopped in the E. W. Robinson Company in Denver, outlined

the type of mounts desired, and placed the order for nearly twenty of them of various sizes. The manufactured mounts should be in keeping with the excellent quality possessed by the cases and the exhibits themselves.

9. Questionnaire to CCC enrollees was prepared for the purpose of determining special talents for certain educational work. Distribution was delayed until nearer the time of the travel season.

10. A list was prepared of some $35.00 worth of books to be ordered for the park library.

All in all, as much work as possible was done toward getting the museums and the educational department generally, ready for the coming season. On May 13, in company with Superintendent Rogers, I went to Denver to take the train for home. Arriving Phoenix at 9:30 May 15, I reached headquarters the afternoon of the same day.

Administration, Clerical, Personnel

Due to Park Naturalist Rose's absence on the detail referred to above, the Educational Contacts records for April were not tabulated and published. For that reason the tabulations for both April and May will be found in the closing pages of this Division report.

Results have been received on the Visitor Question Survey which was started during March. These results were published in the April Monthly Report. Further reports on this survey are to be found in the May Supplement.

Among other items accomplished are: (1) Continuation of the enlargements file; (2) complete cleaning and tabbing of nearly 200 colored lantern slides of the Kino Missions; (3) preparation of personnel papers for various positions; (4) preparation of memoranda and general instructions in various positions; and (5) handling several items of general correspondence.

Gifts and Accessions

During the months of April and May the following gifts and accessions have been received:

(1) Three sets of enlargements of the Kino Missions pictures from the Field Division of Education.

(2) A consignment of about 200 colored lantern slides on the Kino Missions and general southwestern scenes from Field Division of Education.

(3) A consignment of University of Arizona Bulletins from the University

of Arizona Press.

(4) The publications of interest to us put out by the Colorado Museum of Natural History.

(5) About 500 fillers for a photograph album from Field Division of Education. These are being used in the preparation of a Kino Missions Album for Tumacacori National Monument.

Outside Contacts

(1) On May 7, Park Naturalist Rose gave an illustrated talk before the Estes Park, Colorado, Rotary Club; attendance about 35; subject, "Archeological and Historical Background of the Southwest."

(2) Using El Morro and Tumacacori National Monuments as the central theme of interest, Park Naturalist Rose gave an illustrated talk on the evening of May 25 before CCC Camp SCS 15-A at Tucson; attendance, 200.

Activities along other lines will be covered in the reports of Naturalists King and Steen which follow:

Report of Junior Naturalist Dale S. King:

OFFICE WORK

10 days on April Monthly Report
Wrote 46 letters
14 hours cataloging and filing library material
Sent botanical supplies to Pipe Spring, Wupatki, Navajo, and Chaco Canyon.
Sent bird-banding supplies to Tumacacori and Wupatki.
Mimeographed 500 natural history observation file cards
Three hours on Broadcast.

NATURALIST WORK

Prepared two Gambel Quail skins for study collection.
Renewed napthalene in storage cases.
Ordered trail labels for Walnut Canyon from Berkeley.
Kept botanical master file current.
Six hours on fiscal year report of bird banding for Biological Survey
Kept bird banding file current (personal time).

MUSEUM PLANNING

Completed plans for Case 2 (Physical Anthropology), Bandelier Museu, and forwarded them to Berkeley for preparation.

MISCELLANEOUS

Irrigated transplanted mesquite trees. Three hours government time, three hours personal time. Spent approximately nine hours personal time enlarging basins, replacing screens with finer-meshed ones to better protect from small rodents.

Report of Junior Naturalist Charlie Steen

May 1 - 7 - Guide duty at Casa Grande National Monument, with exception of two days sick leave.

8 - 11 - At Headquarters, Southwestern Monuments, completing the catalogue of the Tonto collection and mailing maps for designation of place names.

13 - Left Headquarters for Walnut Canyon National Monument.

14 - Spent the morning at Walnut Canyon and then left for Montezuma Castle where I relieved Ranger Frank Fish who then left on annual leave. Fish intends to return about June 26.

At Walnut Canyon I bragged a bit about my new camera and Paul suggested that we take some pictures of the artifacts which he recovered last winter at Tumacacori. My claims for the camera were substantiated by the results; some fine photos were obtained; these Paul intends to use in his report. I have also taken a number of pictures of articles in the museum here at the Castle.

With Norman Jackson five new birds were banded: two female Gambel Quail and three juvenile Say Phoebe.

VISITOR CONTACT RECORDS

By Robert H. Rose, Park Naturalist

Due to the absence of Park Naturalist Rose the visitor contacts tabulations for April were held over and appear in this report together with statistics for May. Following are observations:

1. For the travel period beginning with October, 1935, travel for May represents a new "high" of 22,833 visitors; April with 18,830 was second; March with 15,379, third; and January at 14,044 was fourth.

2. Visitor contacts termed "education contacts" for the same period show 14,204 for April as the "high"; 14,087 for January as second; 12,824 for March as third; and 12,785 for March as fourth. Visitor contacts of 10,556 for May are the lowest for the eight month

STATISTICAL SUMMARY ON EDUCATIONAL CONTACTS FOR APRIL 1936

SOUTHWESTERN NATIONAL MONUMENTS

MONUMENT	EMPLOYEES		GUIDED TRIPS					MUSEUM LECTURES					MUSEUM UNATT'D		LECTURES OUTSIDE		MISC		TOTAL EDUCN CONTACTS	TOTAL TRAVEL
	PERM	TEMP	NO	ATT	TIME	AV ATT	AV TME	NO	ATT	TIME	AV ATT	AV TME	NO	ATT	NO	ATT	NO	ATT		
ARCHES	1/165	0																	(NO REPORT)	
AZTEC	2	0	118	571	4371	4.9	37	110	579	1723	5.3	16	5	12					1,162	701
BANDELIER	1	0	76	308	4425	4.1	58										17	56	364	742
C.DECHELLY	1	0	7	22	1515	3.0	216												22	22
CAPULIN	1/165	0	1	6	90														6	600
CASA GNDE	2	0	378	3251	13294	8.6	38	242	2163	5290	8.9	22	180	1088					6,502	5,436
CHACO CYN	1	0	29	211	2550	7.3	88	29	175	870	6.1	30							387	791
CHIRICAHUA	0	1	18	77	3480	4.3	160												77	550
EL MORRO	1/5	0	10	42	300	4.2	30												42	42
GILA CLIFF	0	0																	0	(NO REP)
GRAN QUIV.	1	0	53	239	2230	4.4	53												239	229
HOVENWEEP	0	0																	0	(NO REP)
MONTEZUMA	2	0	144	902	6929	6.3	46	173	916	3153	5.3	18.2							1,818	1,054
MT. BRGS	0	0																	(NO REPORT)	
NAVAJO	1/165	0	7	36	720	5	103												36	(NO REP)
PIPE SPGS	1-lab	0	20	96	432	4.8	22												96	96
RAINBOW BR	0	0																	0	(NO REP)
SAGUARO	0	1	144	489	5490	3.5	38												489	1,200
SUNSET CR.	0	0																	(NO REP)	289
TONTO	0	1	90	546	5515	6.1	61	88	476	1375	5.4	16							1,022	876
TUM.N.CORI	2	0	276	1542	9226	5.6	33												1,542	1,700
WALNUT CYN	0	1	100	343	3125	3.4	31										8	23	366	647
WHITE SNDS	1/5	0																	(NO REP)	5,709
WUPATKI	0	1	16	44	878	2.8	55												44	146
YUCCA HSE	0	0																	0	(NO REP)
HDQTRS																				
TOTALS	13.4	5	1486	8714	64609			642	4310	12411			185	1100			25	79	14,204	18,830

*12 full time permanent custodians and rangers; 1-acting custodian; 2c ranger naturalists; and 2-temporary rangers; others on miscellaneous assignments.

STATISTICAL SUMMARY ON EDUCATIONAL CONTACTS FOR MAY 1936

SOUTHWESTERN NATIONAL MONUMENTS

MONUMENT	EMPLOYEES		GUIDED TRIPS					MUSEUM LECTURES					MUSEUM UNATT'D		LECTURES OUTSIDE		MISC		TOTAL EDUCTN CONTACTS	TOTAL TRAVEL
	PERM	TEMP	NO	ATT	TIME	AV ATT	AV TME	NO	ATT	TIME	AV ATT	AV TME	NO	ATT	NO	ATT	NO	ATT		
ARCHES	1/165	0																	(NO REPORT)	
AZTEC	2	0	147	853	5200	5.8	37	138	854	2682	6.2	19.5	4	7					1,714	1,172
BANDELIER	1	1	59	546	3741	9.9	64										5	23	369	833
C. DECHELLY	1	0	22	120	4830	6.0	220												120	158
CAPULIN	1/165	0	3	14	180	5.0	60												14	1,500
CASA GRNDE	2	0	301	1867	8971	6.2	30	194	1099	3820	5.7	20	135	766					3,734	3,234
CHACO CNYN	1	0	36	189	2951	5.3	82	33	166	498	5.0	15							355	496
CHIRICAHUA	0	2	25	130	4790	5.3	192												130	462
EL MORRO	1/5	0																	(NO REPORT)	
GILA CLIFF	0	0																	0	(NO RPT)
GRAN QUIV.	1	0	61	575	2965	9.5	49												575	575
HOVENWEEP	0	0																	0	(NO RPT)
MONTEZUMA	2	0	121	602	4478	5.0	37	127	690	2357	5.4	19							1,292	773
NATL. BDGS	0	1	6	25	1040	4.0	240								2	260	22	133	418	151
NAVAJO	1/165	0																	(NO REPORT)	
PIPE SPOS	1-lab	0	16	81	400	5.0	25								1	32			112	392
RAINBOW BR	0	0																	0	(NO REP)
SAGUARO	0	0																	0	(NO REP)
SUNSET CR.	0	0																	(NO REP)	283
TONTO	0	1	49	179	3295	3.6	67	61	205	1025	33	17							384	355
TUMAC GORI	2	0	155	560	4255	4.2	32												560	705
WALNUT CYN	0	1	95	338	3080	3.6	33	61	206	1450	3.4	24							546	648
WHITE SNDS	1/5	0																	(NO RPT)	11,880
WUPATKI	0	1	19	93	1165	5.2	93												93	166
YUCCA HSE	0	0																	0	(NO RPT)
HDQTERS															2	235			235	
TOTALS	13.4	7	1095	5972	52341			614	3222	11841			139	775	5	531	27	156	10,656	22,833

*12-full time permanent custodians and rangers;1-acting custodian; no ranger naturalists;
2-temporary rangers; and others on miscennaleous assignments.

period except for the "low" of 3,492 contacts for December.

3. The visitor contacts "low" for May (next to lowest) contrasts with the visitor travel "high" for the same month. This contrast is partly due to the following factors: (a) Due to the illness of Custodian Tom Charles, some 1500 contacts usually made for White Sands are not included; (b) Casa Grande travel drop of about 1,200 in May below the April count causes a drop of about 2,000 in contacts; (c) There is a drop of 800 to 1,000 contacts for Tumacacori; and (d) with a few exceptions, travel has decreased for monuments having museums and increased at those not having museums. This operates to cause contacts to fall off because in monuments having museums a given number of visitors accounts for upwards of double that number of contacts whereas this is not the case in monuments without museums.

CCC Assistance in Visitor Contacts:

An arrangement has been worked out at Bandelier and Chiricahua for CCC assistance in visitor contact work. Following are reports for these monuments:

	April, 1936	May, 1936
Bandelier	40 man-days	40 man-days
Chiricahua	20 man-days	40 man-days
TOTALS	60 man-days	80 man-days

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BRANCH OF ENGINEERING

By John H. Diehl, Park Engineer

Called at Alamogordo on the 2nd and visited the May Day celebration at White Sands, where not only the school children but also adults present were enjoying themselves playing and tumbling all over the sand dunes. The festivities were attended by school children and people from homes as far distant as Amarillo, Texas. Needless to say, the scars of the day were completely erased with the first light wind.

On May 20 another visit to Alamogordo was made to discuss matters with Mr. Charles and Mr. Happer pertaining to the White Sands and the work project.

May 19 at Gran Quivira I found the pump house practically finished. Foreman Gipe has done a good job with the materials at hand and the

EIGHT MONTHS TABULATIONS SUMMARY
OCTOBER 1935 - MAY 1936 INCLUSIVE---

MONTH	FIELD TRIPS		MUSEUM LECTURES		MUSEUM UNATT'D		LECTURES OUTSIDE		MISC		TOTAL EDCATNL CONTACTS	TOTAL TRAVEL
	NO	ATT	NO	ATT	NO	ATT	NO	ATT	NO	ATT		
OCTOBER	1045	6760	389	2805	175	1481	1	115	313	1157	12,318	12,698
NOVEMBER	1072	6354	295	1859	171	1365	7	485	156	584	10,647	11,309
DECEMBER	926	4769	284	1508	30	1793	1	20	70	402	8,492	8,525
JANUARY	964	6568	461	3008	128	1072	20	2283	289	1156	14,087	14,044
FEBRUARY	1141	7200	474	3369	81	711	11	1084	96	460	12,824	13,859
MARCH	1274	7348	535	3474	85	691	7	341	174	931	12,785	15,379
APRIL	1486	8714	642	4310	185	1100			25	79	14,204	18,830
MAY	1095	5972	614	3222	139	775	5	531	27	156	10,656	22,833
TOTALS	9003	53685	3694	23555	994	8988	52	4859	848	4925	96,013	117,387

EIGHT MONTHS TABULATIONS SUMMARY BY MONUMENTS
OCTOBER 1935 - MAY 1936 INCLUSIVE

MONUMENT	FIELD TRIPS		MUSEUM LECTURES		MUSEUM UNATT'D		LECTURES OUTSIDE		MISC		TOTAL ED. CNTCT	TOTAL TRAVEL
	NO	ATT	NO	ATT	NO	ATT	NO	ATT	NO	ATT		
ABOHES											(NO REPORTS)	
AZTEC	710	4256	681	4255	11	24	3	600			2,125	4,942
BANDELIER	361	1824							156	533	2,557	3,827
C.CHELLY	76	279					1	350	1	4	633	532
CAPULIN	13	85									85	5,950
CASA GDE	2588	19640	1417	11421	983	8964	1	100			40,125	21,409
CHACO C.	240	965	81	420					55	225	1,610	3,852
CHIRICAH	43	207									207	2,307
EL MORRO	46	264							3	9	273	267
GILA CLFF											0	(NO RPT)
GRAN QUIV	135	1750	15	78							1,828	2,151
HOVENWEEP											0	(NO RPT)
MONTEZUM	712	3907	888	4364					4	31	8,302	5,228
NATL. BR.	6	25					22	1750	31	233	2,008	276
NAVAJO	7	36							16	40	76	(NO RPT)
PIPE SPG	151	810					5	99			909	2,095
RAINBOW											0	(NO RPT)
SAGUARO	415	1478							1	200	1,678	6,000
SUNSET C									20	61	61	781
TONTO	571	2981	553	2819							5,600	4,622
TUMACAC.	1821	9534									9,534	10,260
WALNUT C	375	1437	61	208					104	384	2,029	3,431
WHITE SD	396	3672					2	400	738	3121	7,193	38,727
WUPATKI	107	486					2	130	27	84	720	848
YUCCA HS	2	10									10	52
HDQTERS							16	1410			1,410	
TOTALS	9003	53645	3694	23555	994	8988	52	4859	1156	4925	95,073	117,377

*Three radio broadcasts and two showings Park Service films during period.

shortage of funds, but the outside appearance of the masonry will be criticized by the landscape inspector. However, it was essential that a house for protection of the pump be constructed, and with lumber materials and transportation so costly it was considered preferable to build the masonry house.

May 21 at Chiricahua National Monument the bank sloping project was covered quite thoroughly with ECW Superintendent Stevenson, and a report has been made covering this problem.

The evening of the 21st I arrived at Casa Grande National Monument where matters in general pertaining to the Southwestern Monuments have been covered with Superintendent Pinkley.

The morning of the 26th, in company with J. H. Tovrea, it was necessary to say "So Long" on my way to Oklahoma City.

A. E. Clerk and Carl Schmidt have been busy all month at Chiricahua continuing the topographic survey of the monument.

The conditions are rough and slow so that Andy estimates that two months more at least will be required to complete the work.

J. H. Tovrea, engineering aide, has spent most of the month on office work and taking care of detail assignments.

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By J. B. Hamilton, Associate Engineer

Mrs. Hamilton and I left Mesa Verde National Park the afternoon of May 6 and drove to Aztec Ruins National Monument and stayed with Johnwill and Lena Faris overnight.

Bert Hart, his wife and mother, dispensed hospitality of the true southern brand at dinner that evening.

Considerable change has taken place at Aztec Ruins since last I saw it, November 30 of last year. Johnwill has gotten a lot of useful work out of the CCC contingent he had from the Durango camp last winter. At the southwest corner of the ruins the homely old shed, which looked so out of place there, is gone. All about the Headquarters Area much planting of native shrubs and trees has been done. If they live, and they should with the care Johnwill is giving them, they will make a lasting improvement in appearances. The newly planned sewer system has been installed so as to care for the Monument needs for years, I believe. An adobe brick stucco covered wall has been built across the front of the residential area.

The seventh we drove to Chaco Canyon National Monument. It started

snowing on the way. When I struck the sand at Escavada Wash I did not know where I was, the dunes had shifted so much during the winter and visibility in the falling snow was poor. I followed some recent tracks and thanks to my semi-air wheels got through. Cal Miller tells me several tourists have wrecked cars in that sand stretch lately. He expects the Indian Service will cover the sand with shale soon.

In spite of slippery roads at Chaco we managed to see some of the work being done by the Soil Conservation Service. The temporary cattle guard, the sand filled permanent cattle guards, and the rods installed for marking the movement of Threatening Rock, if any. I also helped Cal Miller check the location of a newly excavated ruin on Monument land.

After lunch with the Millers, all six, we drove to Gallup. I had to wear chains from Crownpoint to Thoreau.

On the morning of the eighth I talked with Vogtie and tried to get to El Morro. The roads kept getting worse so I gave up about nine miles out from Gallup.

We drove that night to Roosevelt Dam, stopping for a few minutes at Petrified Forest on the way. We cut across country from Winslow through Pine and Payson, good dirt or gravel roads the whole distance.

The morning of the ninth we stopped at Tonto National Monument, where I met Woodrow Spires. We went through the lower ruins. He was wondering how to keep two tottering walls from falling with $20. I told him how I would attempt it if I had more money. One wall especially presents a difficult problem. Built on rubbish it looks as if it might fall if touched by a repair crew.

That afternoon we arrived at Casa Grande National Monument. We had the honor of having the story of the Monument told by the Boss himself. And a wonderful story it is as he told it. Talked some about problems at Canyon de Chelly and other monuments in my territory.

The tenth, Sunday, everyone at the Monument put in a hard day getting out the six-year program. I checked the El Morro steps account against Hugh Miller's books and sent the final construction report on that job. I also checked the Chaco Fencing account but could not prepare a final as there are some unsettled obligations.

Monday, the 11th, we drove via Phoenix and Prescott to Montezuma Castle National Monument. After a quick dash through the "best preserved ruin in the Southwest" and a few minutes talk with Custodian Jackson and his wife, we drove to Flagstaff via Oak Creek Canyon. That is a beautiful drive in the late afternoon.

That evening we went to Walnut Canyon, met Paul Beaubien, and from

the lookout gazed across the canyon just before dark.

The next morning, the twelfth, we drove out route 89 to the "Citadel." I should have gone on to the main Wupatki group of ruins but I wanted to make Mesa Verde that evening, just like any other tourist.

We continued through Cameron and Tuba City and had lunch at Keyenta. Was sorry to find none of the Wetherills at home. Aside from a few sandy stretches near Red Lake the road is good.

Continuing we drove down through Bluff, Blanding, Montecello, and Cortez to the Mesa, arriving at 10:10 p.m. That trip through Monument Valley and along the San Juan, between Mexican Hat and Bluff will long be remembered. I have seen worse roads and more interesting scenery, but not much worse nor more interesting.

At Blanding happened to see Zeke Johnson so stopped and chatted a few minutes. Sorry we could not have stayed longer.

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NATURAL BRIDGES

By Zeke Johnson
(Last minute arrival)

I just came in from the Monument this noon. I have been sticking pretty closely to the job out there, and we are having by far the best travel for this month. Thirty-seven were out to the monument in April and 114 this month. It was May 20 before a car got in here a year ago.

Everything is lovely---lots of flowers and grass in the canyons. Water is very good, but we are badly in need of some rain, and it looks right now as if we were going to get some, for it is showering all around and looks as though it may settle down and give us a good rain.

The roads are about as usual, as is also the case with the trails. The trails are much better marked, however, than ever before, but only about one half the visitors see the Awanchomo (Edwin) Bridge. Just can't get them to hike over to Sipapu (Augusta). Only the more sturdy or good hikers will do it, but it's not bad when people will take plenty of time. I left camp this morning 20 minutes before seven with two young ladies from the East. We went to all three bridges, took plenty of time to take many pictures, and were back to camp 20 minutes before noon. There we ate our lunch and were in Blanding at 3:20 p.m. It seems to me that people are more lazy than they used to be.

I am sending, under separate cover, data for the folder you so kindly offered to print for me. I answered 156 requests for more information about the Bridges as a result of my little broadcast - representing 22 states in the United States, 5 provinces in Canada, and from old Mexico.

People are going to come, Frank, and I must be prepared to take care of them as best I can.

You ask me to make suggestions regarding the six-year budget. I wish I could have that one-half mile of road made that Mr. Hamilton surveyed several years ago. It is surely a sore eye to the monument. I have done all I can to make it better, but the sand on the two steep hills is so bad that lots of cars have trouble and there is no shale that I can get to put on them. If I had that ½-ton truck or pickup that you are going to get me I could easily fix it and many other places on that one-half mile road. I would much rather have that pickup than anything else.

Wood is getting scarce and a long way for people to carry it, and I would be willing to furnish it if I only had a pickup.

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CLOSING

You would think twenty-two thousand visitors would keep the boys out of mischief for the month, wouldn't you, Chief? That is a little increase over the eighteen thousand we had last month so it looks like we are headed for a busy summer, though, looking back at January and February with about fourteen thousand and March with over fifteen thousand, I can't say we were loafing then. We are picking up a few of the old hands: Hendron, Peterson and Doug Harritt showing up in this month's Personnel Sheet, and more of the summer men will come on next month. Unless we get an unexpected peak in visitors this summer we will be in better condition to handle them than we have ever been before; not that we will have all our holes properly covered at all, just that there won't be so many of them open to vandalism and we will be able to reach a little larger percentage of the visitors who come and answer their questions.

We in the field have of course been more or less on edge during the month with the prospects of the proposed regionalization; how far it is going to reach, how effective it will be, how much stuff can we get decisions on out of the district or regional office, who will fill these regional offices and will they be worth a whoop in the way of giving us action when they do fill them, and so on ad infinitum. We are for these boys so far as we have heard who they were up to the time of this writing. Our Jack Diehl goes up to the regional office; our Chuck Richey goes into the Santa Fe district office; our Dick Sias, who used to argue with us down at Chiricahua, becomes our District Inspector, and so on. Of course, the handsome George Collins, who will head up the District ECW at Santa Fe, hasn't had the benefits of a course in Southwestern Monuments, but he is a likely lad and willing to learn and he has done the next best thing, he has served at the Grand Canyon.

CLOSING (CONT.)

From the field standpoint we want you to believe that we are anxious to help any way we can to make this regionalization work. We are expecting it will mean more paper work for us and we are willing to deliver it if it means more action and faster action on our stuff. We have broken in enough new machinery in our time to know that this new set-up will take a little time to work in and get going, and we are willing to withhold judgment for a couple of months until they can get into their stride. Here's to them and the new system, and may both make good with a bang! They are our personal as well as our business friends and we certainly wish them well and will do everything we can to cooperate with them.

My only field trip of the month was the one to Tumacacori with Mr. Tovrea. It was a pleasant trip, as the ones to Tumacacori usually are, and productive of some results which are incorporated in the Supplement of this report. We are putting out a separate of this paper as one of our Special Reports in order to get it into the hands of the technicians and others who ought to be kept in touch with the problems of this most interesting of missions.

We are also including in the supplement for this month, a technical paper on the White Sands by Regional Geologist Vincent M. Vandiver. We are putting out 350 copies of this paper as a separate, the greater part of which we will send over to Mr. Charles to be used in answering his more interested visitors who write to him asking how the white sands are formed. He has always had a steady demand from the more intelligent type of visitor for just such information. For the general visitor we are furnishing him with a single sheet leaflet giving general directions as to how to reach the sands and what to see there and containing an appeal for leaving the place clean for future visitors, etc.

Zeke Johnson writes us that he has had about 250 inquiries out of his last radio talk from interested listeners who want to know how to reach the Natural Bridges National Monument and we are getting out a short information sheet for him so he may be prepared to take care of future questions.

It must not be assumed from the above that we contemplate any general distribution in large numbers of these informational sheets; such is not the case. They are intended to be used in answering direct questions either by mail or in person and in such use will prove very valuable.

The month has been a busy one in the office as well as in the field and we are looking forward to an even busier month of June due to the natural peak of work which comes with the end of the fiscal year.

This report is not so bulky as some we have put out and we have been promising ourselves to try to scale our monthly reports down somewhat, but with twenty-five reservations scattered over four states it

seems a lot of things happen in the course of the month. We have tried to make the report as usable as possible by putting in an index page at the front, which allows any report for the month to be found instantly; putting in a Condensed Report, occupying six pages, which gives the highlights for the month with ready reference to the individual report concerned where further information can be gained in a moment; and at the end of June and December, giving a complete index of writers and subjects for the previous six months so that continuity of any subject can be traced through the six months period in a few minutes. The theory is that if you are in a hurry, and we presume you generally are, you can read the six pages of the Condensed Report and get the gist of what has happened during the month; they are supposed to be complete in themselves although of course condensed. If you are not in a great hurry you might care to run over the individual reports and see what this and that one is doing at greater length. As for ourselves, the condensed report does not cover our needs and we keep three copies of the Monthly Reports around the offices for ready reference and it would surprise you to see how much they are used.

We like to think, too, that these reports have a historical value and that a future historian will be able to get a good cross sectional view of life in the Southwestern Monuments during the years covered by these reports.

And so we turn this into the mail and go back to the job of making history for the June Report.

Cordially,

Frank Pinkley

Frank Pinkley,
Superintendent.

EL MORRO

By E. C. Vogt, Custodian

(Last moment News from El Morro.

Just as we are ready to begin gathering these sheets, we pick E. Z. Vogt's report out of the mail and give it space here without being able to allude to it in the Condensed Report. It is spot news and by next month will grow old, so we crowd it in, but hereafter, Evon, speed it up two days!)

In company with his son Evon and Daughter Pattie your custodian spent a half day leisurely inspecting El Morro. No visitors came tho some 150 had registered during May including one D. D. Dibo from Alaska, a large group of Boy Scouts from Eager, Springerville, and St. Johns, Arizona. New sheets were placed by us in the register as nearly every visitor coming here likes to leave his name and address.

No damage except the very slow and gradual wearing of wind erosion on the inscriptions was noticeable. Good moisture in the ground was bringing up ample protection of the filled-in area thru growth of weeds and grass. Dry Russian thistle of last summer's growth were also doing fine work to prevent soil movement. Some settling was apparent directly over where the great arroyo had been filled with dirt but no dangerous settling nor washing was taking place.

The union to be placed shortly in the syphon pipe from the water reservoir at the head of the valley will make camp water available for visitors without any need for driving up to the dam thus damaging the soil coverage.

Under the Oñate and Basconzelos inscriptions a three foot rattlesnake was asleep under the partial shade of a broad leaf yucca. He attempted to scare us off with the threats of his rattles. With sticks Evon, Jr., and Pattie contrived to get him coiled over my sombrero so that I was able to snap a picture of him directly under the three century-old inscriptions. Two other views were taken of this, the first rattler I have ever encountered near the cliff wall.

Birds were active with cliff swallows, turtle doves, blue birds and the "chinchontie" or mocking bird putting on a merry vaudeville. Near the poetic Manuel de Silva Nieto inscription of 1629 our eagle which nests high overhead had done some widely scattered spring white washing over the surface of the mesa.

The Bee-weed is in bud, the narrow leaf yucca about to burst into fragrant bloom. Piñon cones promise some crop of nuts but not so general or ample as was at first reported.

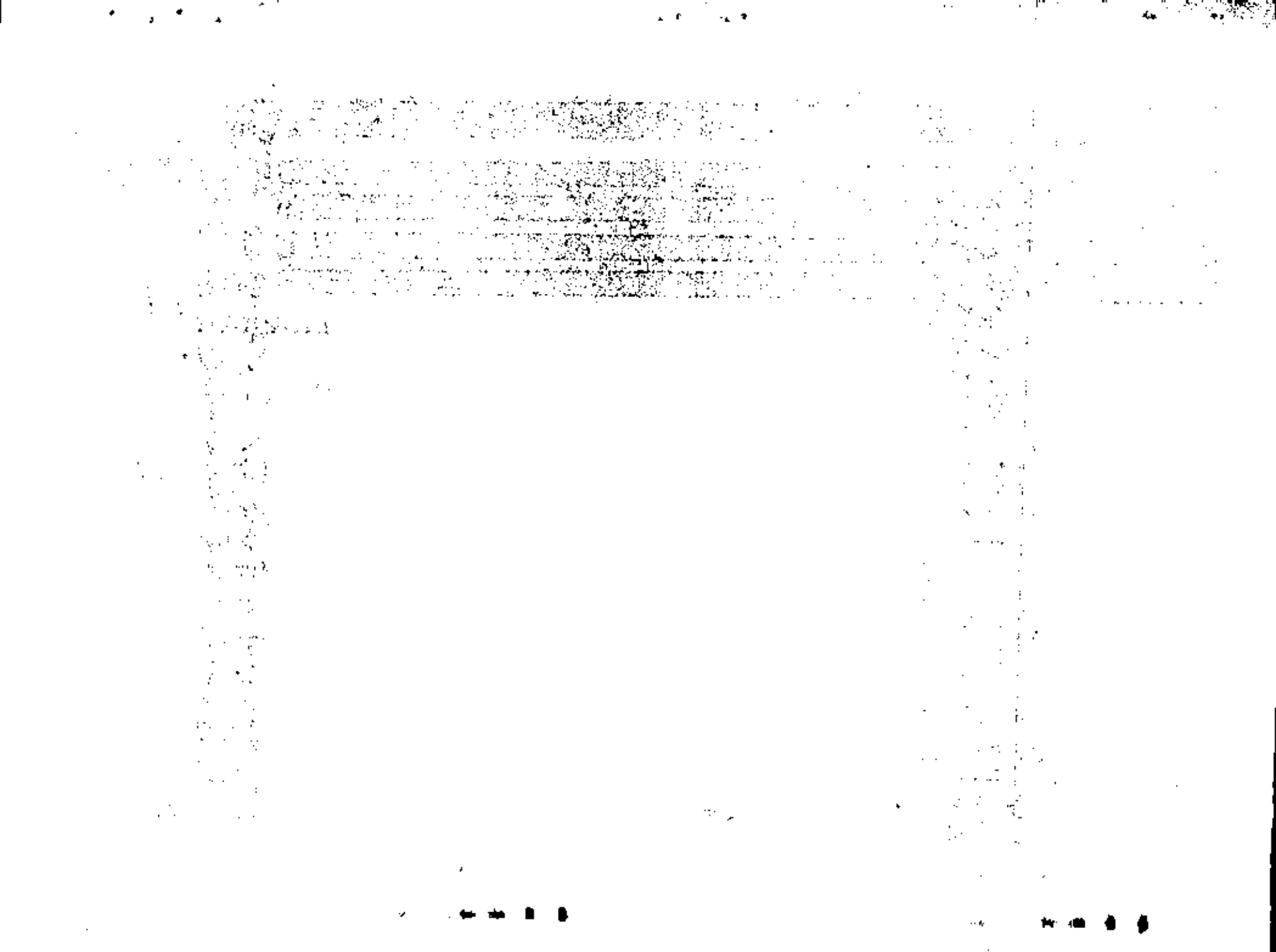
Roads are in fair condition from Gallup and Ramah though not to be recommended from Grants.

General feeling among ranchmen and farmers was good. Early crop showing, good green grass for sheep, cattle, and horses, gave hope for a good year while prices which have greatly improved for wool and lambs had a good effect on the entire community.

Indians, both Zuni and Navajo, were somewhat confused in the trend of government help but busy with their work of stock raising.

As I drove down from the Summitville, Colorado, mine thru the Mesa Verde country, I stopped to chat with the ranger at the entrance, learned of the transfer to Santa Fe of Engineer Hamilton and Mr. Richey, Near Towoac I was unable to wait for a Spear Dance in progress among the Utes. The friendliness and fusing of the Utes and Navajos was apparent here in the gathering of so many Indians.

THE Supplement



THE TUMACACORI CHOIR LOFT PROBLEM

By Frank Pinkley and J. H. Tovrea

A most interesting theory has recently been developed in connection with studies of the mission at Tumacacori National Monument. It is given here for what it may be worth and we freely admit that it may not check out when more evidence turns up. As the evidence now stands, this theory accounts for some facts which have been puzzling us for the past twelve or fifteen years.

That there have been changes of plan in the construction of Mission San Jose de Tumacacori can be shown, we think, beyond the least question of a doubt. The evidence also points strongly to the fact that there was reconstruction after certain parts of the building had been erected; that is, not only was the plan itself apparently changed here and there before the actual construction of some parts of it had been effected, but certain changes of plan were made which entailed tearing out and rebuilding some portions of the structure. At some future date, after the publication in these pages of Mr. Beaubien's report on his excavations of 1935, an extensive report will probably be prepared which will cover a complete study of all these changes. Working, however, under our regular policy that as soon as we get a new theory or fact we might as well pass it along for criticism and suggestions, we are offering here one of the details which later may be more completely developed and incorporated in the study of all the changes which are indicated in the mission walls.

We believe that Mission San Jose de Tumacacori was under construction for many years longer than the present written records would indicate and was, as a matter of fact, never completed. The modern method of putting large gangs of expert workmen on a construction job and pushing it through to speedy completion was not in use in the old days at Tumacacori. This was due in part to the time and country. The men who worked on this job were undoubtedly drawn from the local community and must be allowed time off to attend to their own work, such as planting, handling and harvesting their crops. The work might also have been stopped at various times and for considerable periods by financial difficulties. The Apache Indians, with their constant menace of raids and forays, no doubt caused their share of delays. We can also turn to the experience of the California Missions where we find many of the present structures took from six to ten years in the building. This factor of an extended period of construction would account for revision of plans and changes in the work during the erection of the church such as might not occur in our present times, and we must, therefore, be willing to look for such changes and make allowance for them.

The present study deals with the right hand or east wall of the church as one enters the front door, and covers and distance from the

front wall some twenty-five feet to the north, and from the floor to the roof. The present condition of this wall is shown in Plate 2. The view is from the west side of the room looking east and shows the large buttress to the east of the entrance doorway at the right side of the picture. To the left of this buttress can be seen the entrance archway to the Baptistery and further to the left is the pilaster which once carried a choir loft arch. Above the archway to the Baptistery is a doorway opening from a second story passage in the tower on what was once the choir loft floor.

The choir loft arch was standing as late as 1809 and we have a picture of it taken that year from a point about under the triumphal arch at the front of the nave. Above and a little to the left of this pilaster will be seen a peculiar curved effect in the wall construction where the plaster has broken away enough to expose it. Closer inspection will show that this curve is roughly centered on the curve of the Baptistery archway. From the high point of this curve, a little below the choir loft doorway, a horizontal line can be seen running to the left and meeting a vertical line which falls vertically parallel to a tangent to the left end of the curve. This triangle, if you will pardon the slightly inaccurate expression, has been the source of hours of study, worry and conjecture on our part. It was originally filled with a grouting of lime mortar, stones and an occasional brick bat. About half of this filling has long ago broken away and disappeared, the remainder is still embedded in the wall. It is totally different from any of the wall construction near it and lies in what appears to have been a plain piece of wall. An examination of the opposite wall of the church discloses the same condition on that side although the plaster, being in a much better condition, covers most of the triangle.

Mr. Beaubien's report on his excavations of 1935 will disclose the plan of foundations which he discovered under the present floor of the church. (See Plate 1.) One of these foundations occurs on each side of the room directly under each of these triangles.

The facts as stated above caused us to begin this study on the possibilities of the church having had two choir lofts or having been planned for a choir loft which was never built, the plan having been changed to a smaller loft whose arch was still standing in 1889, and which we shall refer to hereafter as the "late loft."

We note that the foundations under the floor are adequate to support a much heavier choir loft arch than the late one. The indicated width of the old loft pilaster along the church wall, too, is much greater than the late pilaster. The indications are, then, that the old loft arch was heavier and that the pilaster was thicker from front to back and probably extended further from the wall than the late arch.

We believe the curved line on the wall will explain this for we

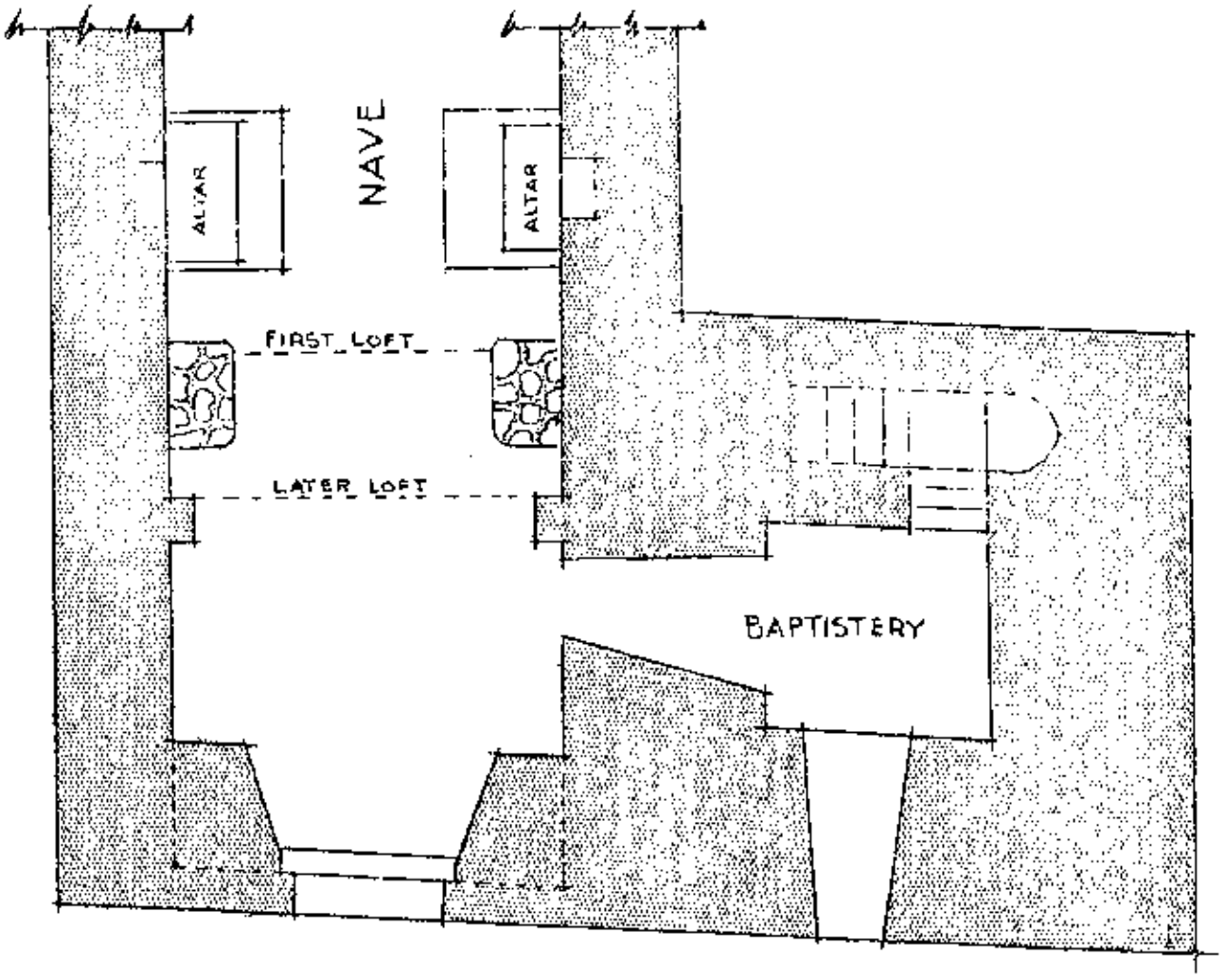


PLATE 1-PLAN

Tov.

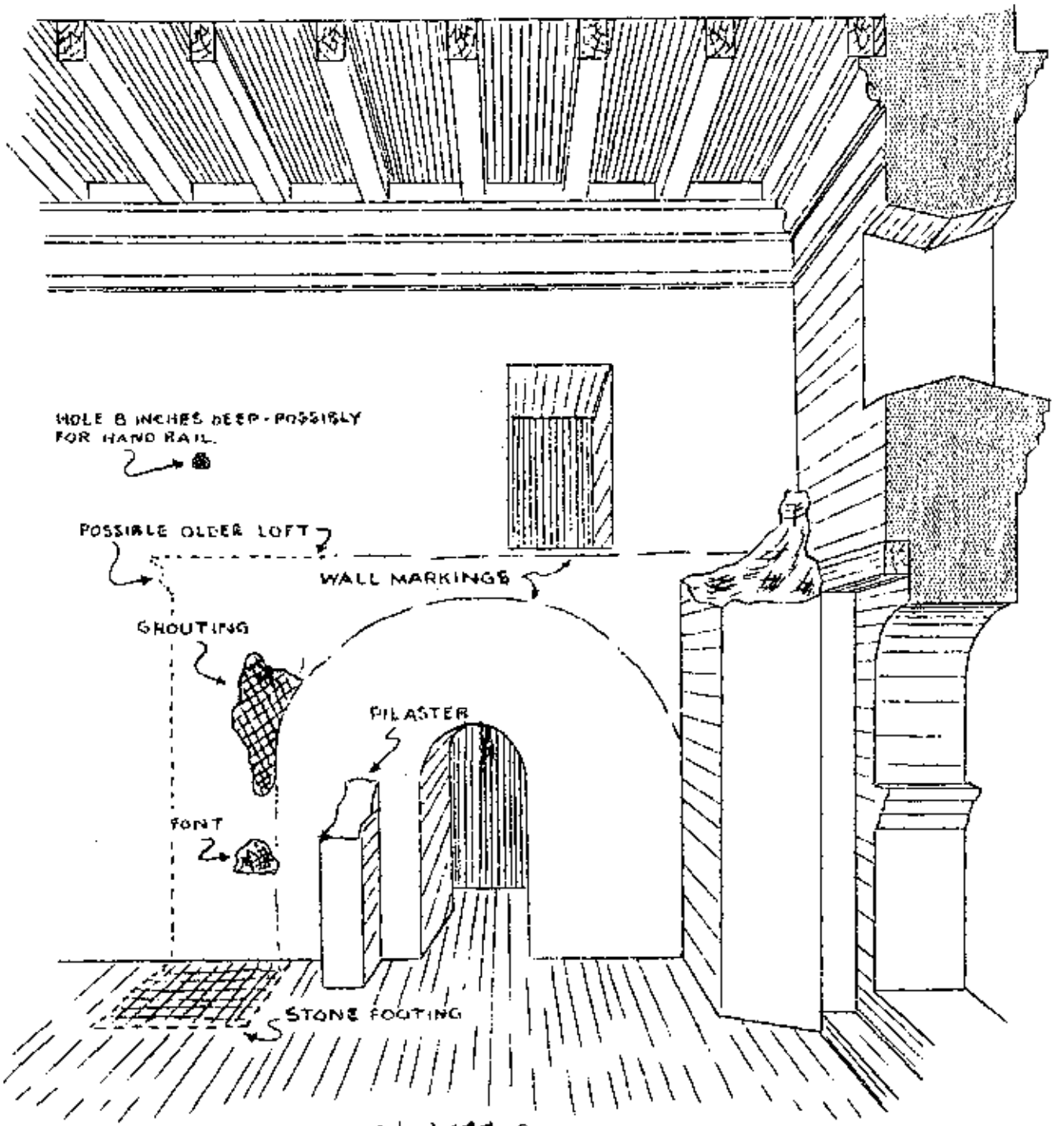


PLATE 2.

EAST WALL.

Tov.

think it indicates the line of vaulting of a groin vaulted choir loft. Groin vaulting would account for the extra thickness of the choir loft arch, because there would be a thrust against it and its thickness would help to keep it from overturning. This would also account for the two large buttresses in the south corners of the nave, for they would help to carry the thrust of the vaulting against the front wall of the church. Groin vaulting would likewise account for the grouting of lime mortar and stones remaining in the triangles in the walls of the church, for the vaults might have been formed of lumber and filled with the grouting, not unlike we would handle the job with concrete today, in which case the builders might have dug back into the church wall in order to give this grouting a chance to key into the wall, thus getting a better hold against the corner thrust. They might at the same time have keyed the grouting into the choir loft arch itself and when that arch was destroyed or taken down a section of this grouting fell out, accounting for the missing piece which is now gone from the church at the front of the loft.

It will be noted on the plan shown in Plate 1 that the axis of the passage into the Baptistery is not centered on the Baptistery. The inside end of the passage is centered on the axis of the Baptistery but the outside end is not centered between the present pilaster and the corner of the church, but is centered between the supposed older choir loft pilaster and the corner of the church as is shown in Plate 3. This, to us, is strong evidence for an older choir loft. It would be hard, with the labor then at hand, to build an arched passageway, keyed with adobe bricks, having a large arch at one end and diminishing to a small arch at the other. It would have been considerably harder to move the outer end of the passage a foot or more to the left and then bring the arched ceiling through, diminishing from a large end to a small end on that warped line. Yet they went to this extra amount of trouble and care. We think the desire to center the outer end of the passage on the center of the transverse vault of the choir loft while leaving the inside end centered on the axis of the Baptistery, is the only possible cause for this peculiarly shaped passageway.

Assuming that we have guessed the intent of the builders, the next question is, was it ever carried out? There is a possible theory that one builder planned a future reconstruction of the inside of his church when he should have better skilled workmen or more funds to make it possible and planted the two foundations and the two groutings in the wall for the future larger and heavier choir loft arch to rest against, covered them with his church floor and finish plaster and never afterward found the opportunity to use them. This would also entail his warping the passageway as described above and which would then not be symmetrical with the shorter choir loft which he would then build. We do not believe this theory but offer it here as one possibility.

Another theory would be that the longer and heavier choir loft was planned while the building was under way and the warped passage was

built to fit that plan; that the attempt at the groin vaulted arch failed and the padre, finding that he could not execute it because of lack of skill or funds, tore out the pilasters;left the foundations and groutings in the walls to puzzle us these hundred odd years later; gave up the groin vault entirely; moved his choir loft arch back to the right a few feet, thus decentering his Baptistery entrance; and, with a much lighter arch than was first planned, built a beamed floor in his choir loft. The pilasters of the later loft are not bonded to the walls which would check with this theory.

Another theory would be that the present walls are older than we think they are; that they are the walls which were unroofed in the raid of 1765 and re-roofed in 1781. This theory would suppose that the burning roof crashing in in 1765 bore down the groin vaulted choir loft; that in the reconstruction of 1781 they had not the means or skill to rebuild the vaulted loft and so, clearing away the debris of the old loft, they erected the new as their best effort.

This last theory in itself is a fine one, but we cannot square it with the entry in the burial record in 1822 where the transfer of the bodies of the two priests from the old church to the new, which would certainly indicate that the "new" church, which was still unfinished in 1822, could not have been the "old" church which was re-roofed in 1781.

We have asked Custodian Caywood to do some ring growth research on the headers of the various openings in the present church and see if we can get any time factor along that line of study.

In the meantime we are putting this problem of the choir loft of Tumacacori into the record on the evidence we have and leaving the question open to argument.

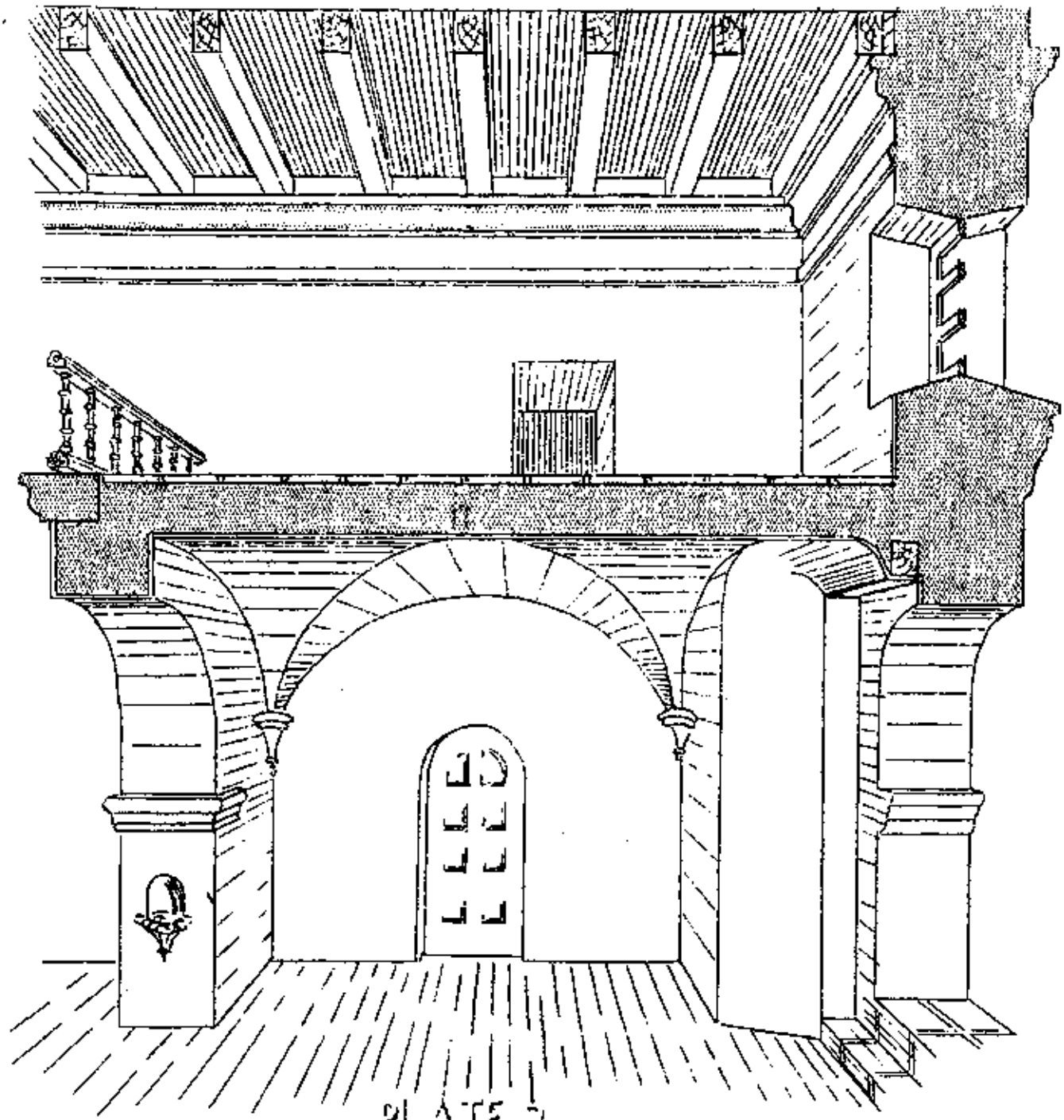


PLATE 3.

THEORETICAL GROIN VAULTED CHOIR LOFT

Tav.

I N D E X

PLATES:

GEOLOGICAL REPORT ON WHITE SANDS NATIONAL MONUMENT

By Vincent W. Vandiver, Regional Geologist

INTRODUCTION

The White Sands National Monument is rapidly becoming one of the prime centers of interest among the Southwestern Monuments. It is estimated that approximately 34,000 people visited the area during the past year. I was informed that Mr. Gilbert Grosvenor, editor of the National Geographic Magazine, stated during his recent visit that he had observed three of the natural wonders of the world in the course of a few days; namely, Grand Canyon, the Carlsbad Caverns, and the White Sands. The inspirational features of the sands cannot be denied and this fact together with its being the only occurrence of gypsum sand in the world of much magnitude may eventually warrent the area being given consideration as a national park.

It is due to this increased interest in the White Sands and the fact that several theories have been advanced by geologists as to the source of the gypsum that I visited the area, in an effort to relate the best geological picture possible. There is considerable geological information in the literature on the Tularosa Basin and with this data at hand combined with the field studies made there appears to be little doubt as to the source of the main portions of the gypsum comprising the sands. Since only a short time was spent at the monument the following pages are necessarily largely a compilation, however, the data assembled is in the main from the publications of the United States Geological Survey and since this type of material was available there appeared little reason for spending time duplicating field studies completed previously.

LOCATION AND EXTENT

The Tularosa Basin, of which the National Monument is a part, lies between two of the most prominent mountain ranges of New Mexico, the San Andreas mountains on the west, and the Sacramento mountains on the east. This elongated synclinal basin is approximately 150 miles in length, has a minimum width of 60 miles, and covers an area of approximately 6,000 square miles. The most spectacular feature of the area is the granular gypsum comprising the White Sands, situated some 12 miles west of Alamogordo, in south central New Mexico.

Approach to the heart of the sands is over State Highway No. 3 which extends in a northeast-southwest direction connecting the towns of Alamogordo and Las Cruces. North-south U. S. Highway No. 80-85 to Albuquerque and El Paso is available at Las Cruces. U. S. Highway No. 54-70, running in the same general direction, may be had at Alamogordo for El Paso as well as points north. The Southern Pacific at Alamogordo is the nearest

approach by rail to the White Sands.

The deposit of gypsum is about 27 miles in length from north to south and averages around 10 miles in width, the greatest width being about 15 miles. (See Plate I for aerial extent.) Over 500 square miles are covered by the gypsum sands which probably average 50 feet or more in thickness. It has been estimated (9) that the deposit contains 15,000,000,000 tons by using 60 pounds to the cubic foot of gypsum, with much of the material containing no more than 2 or 3 per cent of impurity. It is interesting to note that the gypsum sands proper occupy only about 5 per cent of the total area of the Tularosa Basin.

The White Sands National Monument was created in January, 1933, and was formally opened to the public by Mr. Tom Charles, resident custodian, in April, 1934. The area comprised in the monument is 143,145.91 acres and negotiations are now being concluded for an extension to the southeast covering 1,640 acres, including a 200-acre lake, which is to be used primarily for a migratory bird refuge. The total area will therefore be approximately 225 square miles.

Roughly 40 per cent of the total deposit of gypsum in the basin is contained within the boundaries of the reserve area. On this basis and in consideration of the above estimate for the total amount of gypsum present there are 5,200,000,000 tons of almost pure gypsum within the monument leaving an estimate of 7,800,000,000 tons outside for public exploitation as desired. The average gypsum mined yearly in the United States for the five year period 1927-1931 amounted to approximately 4,300,000 tons (14). Should all sources be closed in this country and the consumption of gypsum required for domestic purposes be taken from the White Sands outside of the National Monument it is calculated that there is a supply available to meet the needs for over 1,800 years. Botkin (5) states that if all of the gypsum mines and mills in the United States were shut down for 1,000 years, a normal supply could be obtained in the sands' area outside of the monument.

HISTORIAL

The Tularosa Basin is rich in historical interest. The coming of the Spaniards in the sixteenth century and their contacts with the Pueblos and Apaches form many exciting chapters. The main route of travel in the early days was along the Rio Grande, the valley to the west, and that the desert, because of its lack of water and Apache depredations, made a deep impression upon the early travelers is certain since it was known as the Jornada del Muerto, or "Journey of the dead." Evidence still remains of the extension of the rule and religion of the Spaniards at Manzano and Gran Quivira. Gold placers and salt found in the alkali flats were early attractions to this area. Heavy wooden wheels of ox-carts and irons with which the oxen were shod have been observed along the old trails. The first real development in the area was the establish-

ment of Fort Stanton in 1855. The range wars of the 80's and the bloody events surrounding the activities of Billy the Kid all lend much to a fascinating historical picture.

PHYSIOGRAPHY

West of the Great Plains of New Mexico and Texas is a region of isolated mountain ranges with alternating plains or broad open valleys. The Pecos and Rio Grande rivers flow through several of these valleys, but in the region between these rivers there are valleys which are entirely inclosed by higher ground, thus having no drainage outlets. The Tularosa Basin, of which the White Sands is a part, is a typical example of such an inclosed basin.

A variety of topographic features occur in this elongated basin. Probably the most prominent to the average visitor are the buttes Cerrito Tularosa, a few miles southwest of the town of Tularosa, and Tres Hermanos Peaks, near the southeast boundary of the monument. Fault scarps and innumerable shore line features are in evidence. Stream built slopes, terraces, alkali flats and an enormous exposition of dune building all contribute much to the attractions of the area to the observing person. In addition, along the northern portion of the basin are volcanoes and lava beds of intense interest and scientific importance.

Generally speaking the reserve within the boundaries of the National Monument consists of equal areas of gypsum sand dunes and alkali flats. In the southwestern portion there is an alkali lake covering six or eight square miles. The majestic peaks of the San Andreas and Sacramento Mounteins, which limit the basin on the west and east respectively, rise to elevations of over 9,000 feet above sea level. The almost sheer vertical wall extending along the flanks of these mountains drops most abruptly in elevation for a distance of almost a mile to the plain level of the valley floor. The lowest altitude is in the vicinity of Lucero Lake with an elevation of around 3,000 feet above sea level.

CLIMATE

Meinzer (1) states that the climate of the Tularosa Basin is typical of the arid southwest. Generally the sky is clear and the atmosphere is dry and rare. In the main for both summer and winter the days are warm and the nights cool. Most of the rain is produced by condensation from local ascending currents of air and accordingly falls in a few heavy storms in midsummer.

The basin has a wide range of temperature, owing partly to differences of latitude, but chiefly to differences in altitude. The United States Weather Bureau reports that Alamogordo, with an elevation of 4,338 feet, had a maximum temperature over a period of nine years of 109°, a minimum temperature of 0° and an average annual temperature of

61°. These figures are in contrast to those of Cloudcroft with an elevation of 8,650 feet. Averages over a period of seven years for this point indicate a maximum of 83°, a minimum of -10° and an annual average of 43.2°.

Of considerable interest are the maximum and minimum temperatures taken in the sands area during April and July by Emerson (11) and have been recorded as follows:

Table I. Maximum and Minimum Temperatures

Dates	Position	Maximum °F.	Minimum °F.	Temp. Range °F.
April 2	Air	78	44	34
April 3	6" in Sand	56	48	8
April 4	Air	74	36	38
July 2	Air	100	58	42

As a supplement to these records comparative temperatures of sand and air were taken in both the alkali flat and the dunes on July 1 with the following results:

Table II. Temperatures in dunes and alkali flat in mid-summer

Location	Hour	Air °F.	In sun; on sand °F.	1 In. deep °F.	7 In. deep °F.
Alkali Flat	10:00 a.m.	93	108	93	77
Dunes	4:30 p.m.	99	108	99	81

Meinzer (1) summarizes the records of precipitation as follows: In the interior plain south of the lava bed the average annual precipitation is probably less than ten inches; near the margins of the plain it is approximately ten inches; in the mountain chain on the east side it increases with altitude, and near the crests of the highest ranges it exceeds 20 inches; in the mountain chain on the west side it also increases with the altitude but is on the average less than in the mountains to the east. The principal rainy season is in mid-summer, generally beginning near the close of June or in the first half of July and continuing into September. From 55 to 60 per cent of the precipitation occurs during this period.

The prevailing southwest winds are an important factor in the present location of the sands. Much has been written about the movement of the dunes in a northeast direction and one writer at least has gone so far as to estimate the date at which the gypsum sands will encroach upon the towns of Alamogordo and Tularosa. Unless one visits the area during one of their periodic dust storms it is difficult to appreciate the tremendous abrasive effects of the powerful wind currents and the enormous amounts of material carried in this manner.

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VEGETATION AND ANIMAL LIFE

Studies of the vegetation of the White Sands were made in the spring and summer of 1934 by Emerson (11) and a summary of his findings are as follows:

2. Plants seem to be in the process of migrating from outisde sources into the dunes with the possible exceptions of two endemics that may have originated within the area. Some species have entered only a short distance while others have migrated several miles.

2. No seedlings establish themselves except in the flats, between the moving dunes.

3. In the flats soil water is near the surface, the water table being between 2 and 3 feet deep with moist sand reaching almost to the surface.

4. Roots must absorb water from a saturated solution of calcium sulphate.

5. Even in the most luxuriant stands of plants there is a very slight concentration of nitrates and nitrites, thus raising the question of methods of nitrogen assimilation.

6. Seven species have the power to grow upward rapidly enough to survive encroaching sand. All of these produce adventitious roots when covered. At least 55 species are limited to the flats because they cannot elongate when covered.

The white color adaptation of the limited animal life of the White Sands presents an interesting story for study by the zoologist.

GEOLOGY

General

The sedimentary rocks of the Tularosa Basin consist of deposits of Cambrian, Ordovician, Silurian, Devonian, Mississippian, Pennsylvanian, Permian, Triassic, Cretaceous and Quaternary. Formations are present representing all ages of the Paleozoic sequence. (see Plate II). Igneous rocks are in evidence in widespread outcrops along the east flank of the San Andreas mountains and to a lesser degree along the west escarpment of the Sacramento mountains. They consist of pre-Cambrian granites and schists. Tertiary dikes and sills occur in isolated localities. Two lava flows of Quaternary age are a prominent feature in the northern part of the basin.

Cambrian

The basal formation of the Paleozoic in southern New Mexico is known as the Bliss sandstone of Upper Cambrian age. From the type locality in the Franklin mountains of Texas the formation things out and is only six feet in thickness in the northern portion of the San Andreas Mountains. In the southern portion of this range the thickness averages around 100 feet. The limited exposure in the Sacramento Mountains shows a few feet of sandstone separating the granite from the El Paso limestone above. In the main it is a gray to brown sandstone, in part quartzitic, with upper slabby members in part glauconitic. The formation is unconformable on the granite or schist and grades into the El Paso limestone above.

Ordovician

The strata of this age is composed of the El Paso limestone, of Lower Ordovician, and the Montoya limestone of Upper Ordovician age. The El Paso limestone grades downward into the Bliss sandstone but is separated from the Montoya limestone by a break in sedimentation, representing Middle Ordovician time.

The El Paso limestone forms a prominent outcrop along the east front of the San Andreas mountains, where it is 300 feet in thickness in the southern part, decreasing to around 150 feet in the northern part of the range. It is a massive gray limestone, slabby in part, and containing considerable sand in the lower portions. Fossils are scarce.

The Montoya limestone is variable in thickness due to erosion and thins out in the southern part of the Oscura Mountains. In the San Andreas it consists of two members, an upper member containing alternating thin beds of limestone and chart, from 30 to 75 feet in thickness; and a lower member of dark massive limestone around 100 feet in thickness. Locally there is present a basal deposit of sandstone. In the Sacramento Mountains, southeast of Alamogordo, the two members mentioned above have been observed. Richmond fauna (Upper Ordovician) are present throughout the upper member.

Silurian

A small part of Silurian time is represented by the Fusselman limestone containing fossils of Niagara age. It ranges upward to around 200 feet in thickness in the San Andreas range and rests with an erosional unconformity on the Montoya limestone. Generally two members are present, an upper bed of hard dark massive limestone, and a lower bed of compact fine-grained limestone.

WHITE SANDS GEOLOGICAL REPORT (CONT.)

Sedimentary formations in the Tularosa Basin and Adjoining Ridges

AGE	FORMATION	CHARACTER	THICKNESS FT
QUATERNARY	Wind blown deposit	Gypsum sands, dust and quartz sands.	0 to 50' Ave.
	Stream deposits and other valley fill.	Chiefly red clay, gypsum, sand and gravel	100-1000 ±
UPPER CRETACEOUS	Mesa Verde (?) formation	Sandstone and shale, coal bearing.	630
	Mancos (?) shale	Shale; some sandstone; limestone in lower part.	900
	Dakota (?) sandstone	Sandstone, massive, hard, gray to buff.	150
TRIASSIC		Red sandy shales with layers of brown sandstones and limy concretions.	340
PERMIAN*	Chupadera formation	Upper part limestone and gray sandstone; lower part gypsum, soft red sandstone, then limestone and gypsum	1200-1600
	Abo sandstone	Brown red sandstone and red sandy shales; thins towards the south	500-900
PENNSYLVANIAN	Magdalena group	Limestone with beds of shale and sandstone; several sandstone beds in lower part.	2200-2500
MISSISSIPPIAN	Lake Valley Ls.	Coarsely crystalline limestone and limy shale.	0-150
DEVONIAN	Percha shale	Gray shale	0-125
SILURIAN	Fusselman Ls.	Limestone, massive, dark above weathers white below.	0-200
ORDOVICIAN	Montoya Ls.	Massive limestone, cherty above, dark below, sandy at base.	0-200
	El Paso Ls.	Limestone; weathers light gray; slabby in part.	0-350
CAMBRIAN	BLISS Sandstone	Sandstone, massive, gray	0-125
PRE-CAMBRIAN		Granites and schists	

*The two formations of the Permian in this area comprise the Manzano Group.

Note: The stratigraphy as above indicated is from Winchester (9) with slight additions.

Devonian

A widespread deposit of black shale, known as the Percha shale, of late Devonian age, is present in southern New Mexico. Breaks in sedimentation separate it from the overlying and underlying formations. The formation consists of lower beds of fissile shales and upper beds of gray shale containing some lirg beds with many fossils. These shales thin out in the northern part of the San Andreas mountains. They range in thickness upward to 125 feet.

Carboniferous System

It is the rocks of this system which we are primarily concerned since they contain thick beds of gypsum. They are widespread in this region occupying all parts of New Mexico except the higher portions of some of the uplifts, and here they have been removed by erosion.

Mississippian

The thick succession of limestones of the Magdalena group forms a prominent outcrop in the Sacramento and San Andreas Mountains. It is predominantly limestones, but interbedded sandstones and shales are present in all sections. In this area the thickness ranges upward to 2,500 feet. Locally the group may be divided into several formations, some apparently separated by unconformities, although as yet no faunal distinctions have been observed. In nearly all localities fossils occur in abundance.

Permian

The Permian is represented in the Tularosa Basin by the Manzano group comprising a thick succession with the lower member known as the Abo sandstone and the upper member represented by the Chupadera formation.

The Abo sandstone is made up of red beds of sandstone and sandy shale and ranges in thickness from 500 to 900 feet. The formation thins out in the southward extension of the Sacramento range and the Chupedera and Magdelena formations join in this direction in the vicinity of the Hueco Mountains. The Abo sandstone is apparently unconformable with the underlying Magdalena. In the western part of the state there are thin limestone beds near the base which have yielded fossils establishing the age of the formation as Permian. It is considered to be the equivalent of the Supai formation of the Grand Canyon section.

The Chupadera formation, so named from the Chupadera mesa in eastern Socorro county, is the uppermost formation of the Manzano group. It is generally separable into two members, the San Andreas limestone above and the Yeso formation below. These thick limestone beds with interbedded

deposits of gypsum and anhydrite attain thicknesses of 2,500 feet on the east slope of the Sacramento Mountains and this thickness is even greater to the south. It is from 1,200 to 1,600 feet thick in the Tularosa area.

The San Andreas limestone contains not only limestone but gray sandstones as well and to the south deposits of gypsum, anhydrite and salt, which become very thick in the south-central and southeastern sections of the state.

Representative sections of the Chupadera formation as indicated by Darton (8) are shown on the following plate III. The large amounts of gypsum present in this formation may be observed and this is a significant factor in any study of the White Sands. Many fossils are present in the Chupadera, which was originally regarded as late Pennsylvanian in age, but is now classed as Permian.

Triassic

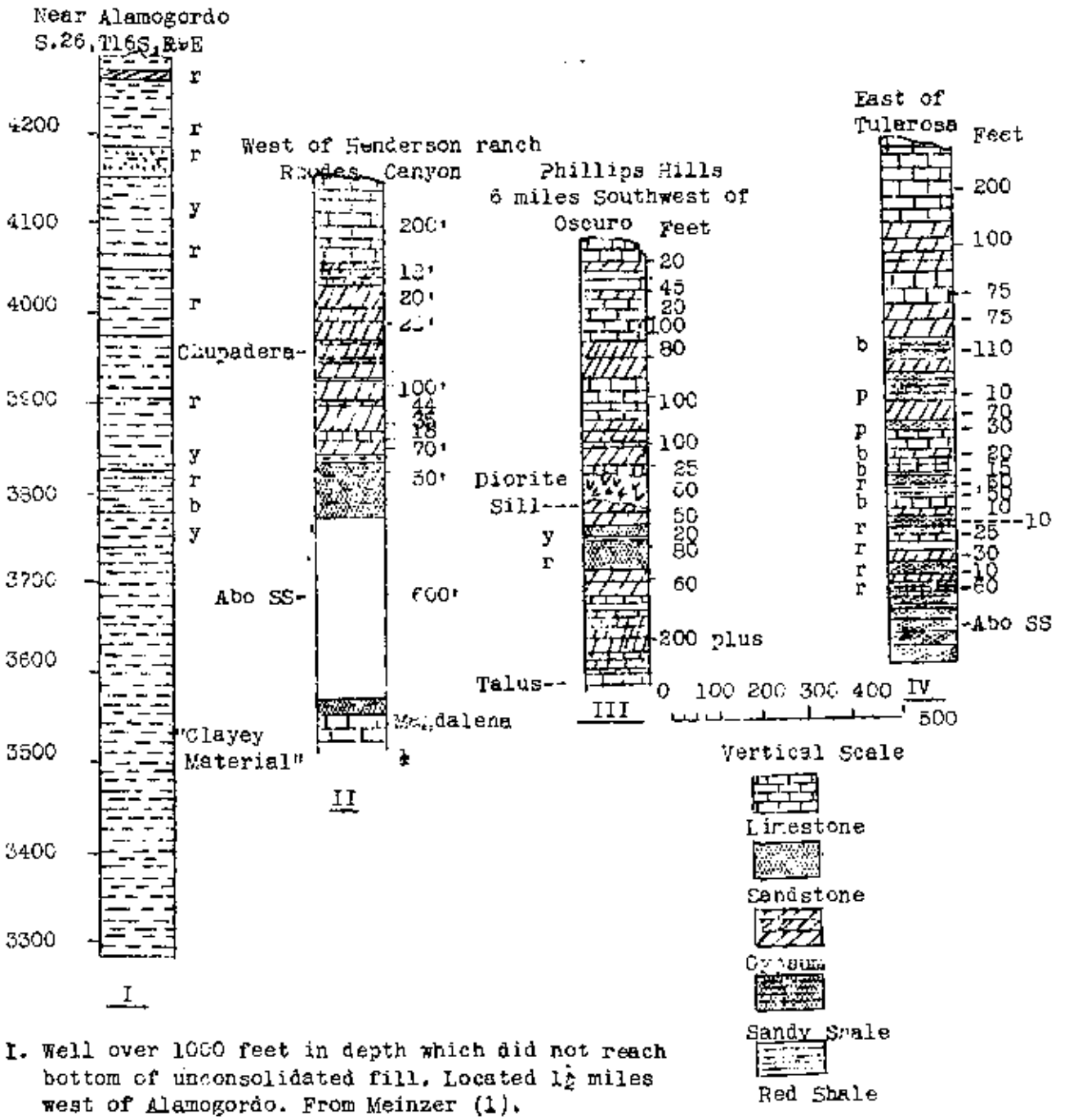
The southern limit of the Triassic rocks in south-central New Mexico is not known. They have been traced southward to the vicinity of Tularosa but are absent under the Cretaceous outcrops 10 miles north of Organ. Thicknesses have been measured ranging upward to 340 feet in the Tularosa Basin. They are composed of red sandy shales with layers of brown sandstone and limy concretions.

Cretaceous

Outcrops of Cretaceous strata are present in the northeast portion of the basin, extending northward from Three Rivers, east of the lava flows. It is not unlikely that the Cretaceous underlies at least a portion of the basin to the south. Three formations have been tentatively identified as follows: The Dakota (?) sandstone, Mancos (?) shale and the Mesa Verde (?) formation. A maximum of almost 1,700 feet of Cretaceous section is exposed, composed of gray sandstone in the lower part, shale with some sandstone and limestone, followed above with sandstone and shale containing coal beds.

Quaternary

Sediments of this age are divided by Meinzer (1) into two groups, the Pleistocene and Recent. They consist of valley fill material and range upward to over 1,000 feet in thickness. The Pleistocene was deposited chiefly by streams, lakes and underground waters. It consists chiefly of red clay, gypsum, gravel and other sediments on the slopes. Gypsum was deposited at low levels, adobe clay at intermediate levels, and gravel and clay at high levels, with wind-blown gypsum and quartz sand present locally. Recent sediments consist of dunes deposited by the wind and consisting of gypsum sands and dust together with quartz



I. Well over 1000 feet in depth which did not reach bottom of unconsolidated fill. Located 12 miles west of Alamogordo. From Meinzer (1).

(From Darton) (8)

II. Representative section west of the Henderson ranch in the southern part of T12S.

III. Columnar sections of the Chupadera formation southwest of Oscuro.

IV. Columnar section of the Chupadera east of Tularosa.

PLATE III

sands.

Igneous Rocks

Pre-Cambrian granites may be observed in an almost continuous band along the foothills of the San Andreas Mountains. Minor outcrops of granite are present at the base of the western escarpment of the Sacramento Mountains.

Two beds of Quaternary basalt occupy the basin west of Carrizozo. Both beds form thin sheets, probably less than 100 feet in average thickness, but in the vicinity of the craters they are several hundred feet thick. The lava came from a crater in Township 6 South, Range 10 East, and flowed south for a distance of about 50 miles. The flows consist of basalt of similar appearance and like composition. They are mainly black but locally reddish or brownish. The bulk of the lava flowed some distance before solidifying, lost most of its gases, became relatively compact, though its vesicular texture near the surface, shows that it cooled before all of the gas bubbles escaped. It is likely that the lava and cones were erupted along fracture planes which had produced zones of weakness in the strata.

Meinzer (1) states that the younger lava flowed out upon the main body of valley fill (Pleistocene) and that it is clearly of less age than all except the most recently deposited parts of the fill. It was therefore erupted either in Recent time or very near the close of the Pleistocene. The older lava has been in existence several times as long as the younger but is much younger than the basin itself or the oldest valley fill. It was probably erupted late in the Pleistocene. The age of the younger basalt is at least several hundred years, but in all probability not more than a few thousand years; the age of the older basalt is probably at least a few thousand years and is perhaps several tens ofthousands of years.

Structure

The regional structure of the Tularosa Basin is probably synclinal although most of the surface is covered by sand, lava and wash with critical data available only along the margins or from scattered well records in the interior. Cross sections on Plate IV by Darton (8) illustrate the structural features in so far as they are known. A hypothstical section across the basin by Meinzer (1) is also shown on this plate. Minor anticlinal structures are no doubt present in this large syncline. The San Andreas Mountains form a huge anticlinal uplift broken on the east flank by extensive faulting. The Sacramento Mountains have likewise undergone considerable faulting but principally along the west flank. The dominant feature or the prominent western escarpment is due in the main to an anticline, faulted in its higher portions, rather than to major faulting which is in evidence along the San Andreas scarp. The primary consideration in the structure of the Tularosa Basin is that it

is a large down faulted block between the San Andreas and Sacramento Mountains which gave rise to an inclosed basin, without drainage outlet, thus forming an ideal reservoir for the concentration of saline residues and the resultant gypsum sands.

GEOLOGICAL HISTORY

The Paleozoic (formations of Cambrian to Permian inclusive) deposition was preceded by a long era of erosion in which great thicknesses of rocks were removed exposing the granites of pre-Cambrian age. Generally the region was worn down to a level country. Quartzites are present to the north and south indicating the presence of clastic beds which at one time covered the granites. This long period of erosion marks the widespread unconformity upon which the Paleozoic sequence was deposited.

Paleozoic formations of New Mexico include the lower part of a series of various kinds of sedimentary rocks which have been upturned along the flanks of the southern extension of the Rocky Mountains. They also form in some instances extensive plain and plateau areas. The close of the Paleozoic is likewise marked by a widespread unconformity, although the lithologic variation of succeeding formations is not great, there is a distinct break in faunal characteristics distinguishing these sediments from those of the overlying Mesozoic strata.

Our principal concern is with the Permian, which marks the close of the Paleozoic, since the Chupadera formation of this period contains the thick deposits of gypsum and is generally regarded as the original source of the gypsum contained in the present sand dunes.

Western Texas and southern New Mexico contain one of the greatest sections of marine Permian known in North America if not in the world. Interior shallow seas from the Gulf of Mexico entered across this region extending over western Oklahoma and most of Kansas as well. Great deltas later restricted the waters of this large embayment and in their retreat they remained longer in southern New Mexico and western Texas than in the central portion of the continent. Thus, the Permian in this region attains a maximum thickness of over 7,000 feet. The gradual retreat of the sea with its intervening advances resulted in the deposition of great thicknesses of limestones in which was laid down thick layers of salt and gypsum. Evidence prevails that the area gradually became so arid, with evaporation exceeding precipitation, resulting in a vast dead sea eventually covering the central portion of the basin. During the Permian and the period following, the Triassic, desert conditions were probably more widespread than at any other time other than the present. Salt beds extend from Kansas to New Mexico and it has been estimated that they contain 30,000 billion tons of salt and would require the evaporation of more than 22,000 cubic miles of sea water with a salinity like that of the modern ocean.

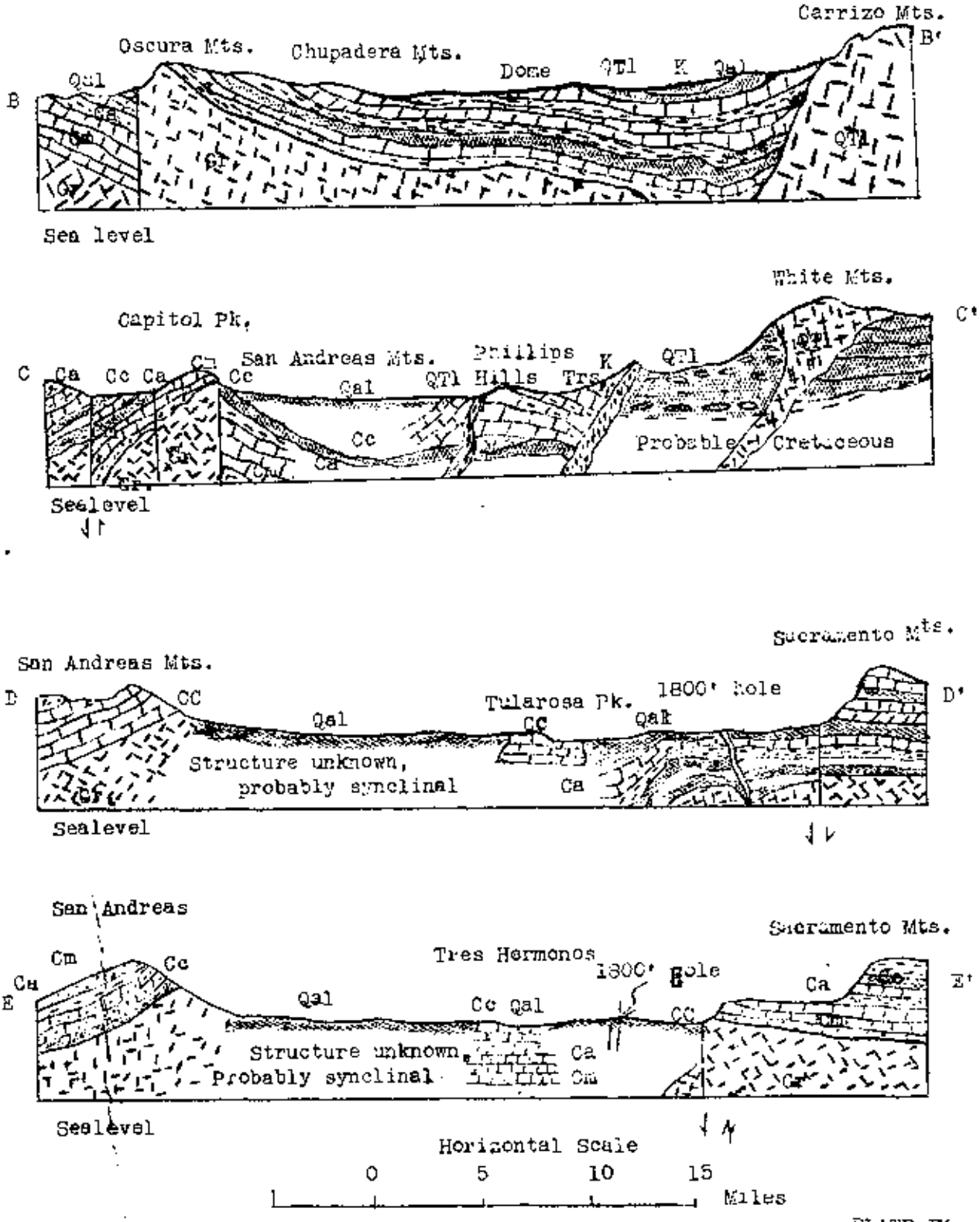
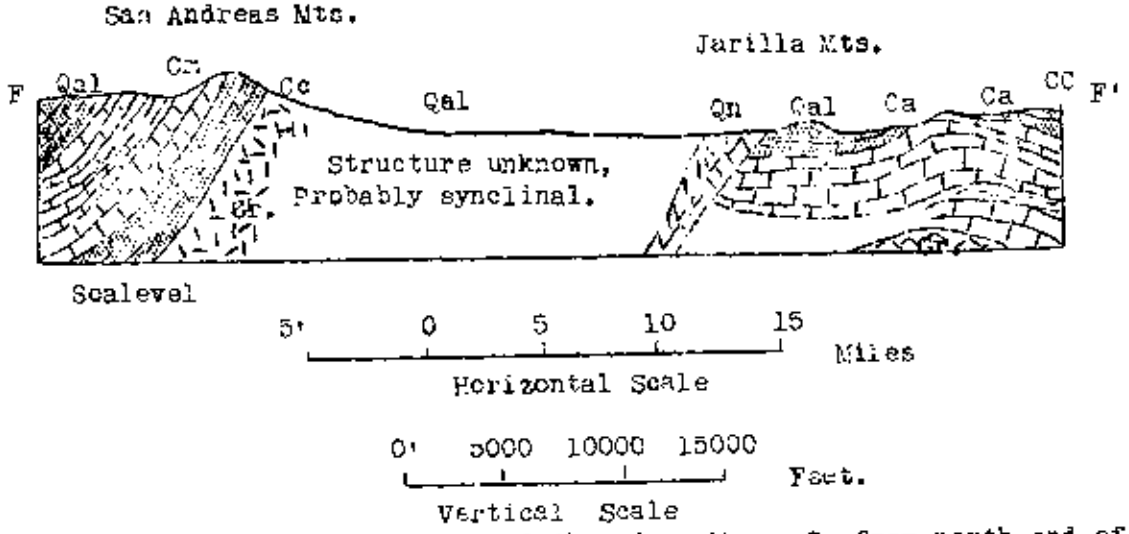

Carrizo Mts.
B'
Oscura Mts.
Chupadera Mts.
Dome
QTl
K
Jsl
B
Qal
Ca
Cc
Sea level
White Mts.
C'
Capitol Pk.
C
Ca
Cc Ca
Cc
San Andreas Mts.
Cal
QTl
Phillips Hills
Trs
K
QTl
Cc
Ca
Probable Cretaceous
Sealevel
Sacramento Mts.
San Andreas Mts.
D
CC
Qal
Tularosa Pk.
CC
Qal
1800' Hole
D'
Structure unknown,
probably synclinal
Ca
Sealevel
San Andreas
Sacramento Mts.
Cm
Cc
Ca
Tres Hermonos
1800' Hole
E
Qal
Cc Qal
Ca
E'
Structure unknown,
Probably synclinal
Ca
Cm
Sealevel
Horizontal Scale
0
5
10
15
Miles

PLATE IV



Sections across Tularosa Basin and Chupadera Mesa. B, from north end of Oscura Mts to Carrizo Pk; C, thru Capitol Pk., San Andreas Mts. to Sierra Blanca of the White Mts; D, from San Andreas Mts east thru Tularosa Pk; E, thru Lake Lucero and Tres Hermanos Butte; F, east from the south end of the San Andreas Mts. thru the northern part of the Jarilla Mts. QTl, Porphyries; Cc, Chupadera formation; Ca, Abo Sandstone; Cm, Lake Valley and Magdalena limestones; CC, Bliss sandstone, El Paso, Montoya, and Fusselman limestones and Percha shale. From Darton (8).

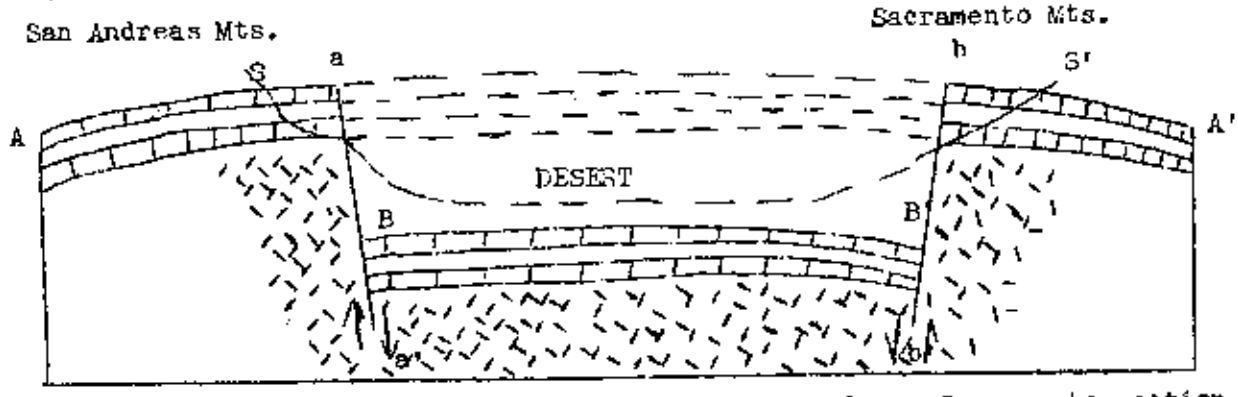


Diagram showing hypothetical structure of the San Andreas-Sacramento section. AA', including the broken lines, shows original structure of the arch; BB', present position of keystone part of the arch; aa' and bb' fault planes. Arrows show direction of movement; SS', present surface. From Meinzer (1).

PLATE IV CONTINUED

As the basin was finally filled to sea level, streams converged in the low lands, depositing hundreds of feet of red mud and sands. There are occasional zones of gypsum present in the red beds which are evidence of a temporary return of marine waters and of partial evaporation at least.

It is believed that a connection was maintained with the marine waters of the Gulf through most of the permian and that additional salt waters were supplied to the lagonnal areas as evaporation proceeded in depositing the saline residues. Such a supposition is almost imperative since Twenhofel (15) states that to precipitate a ten-foot bed of gypsum over the entire extent of a basin, water to a depth of 14,000 feet would be required. It would seem very improbable that waters of a basin so deep ever reached the degree of concentration that they deposited gypsum, and that upon consideration of the immense thicknesses of gypsum and salt beds, it becomes obvious that exceptional conditions made them possible. A thickness of 1,200 feet of anhydrite in a west Texas well may be used to illustrate the time element involved in deposits of this type. The anhydrite contained banded layers apparently marking seasonal deposition and suggests that from 150,000 to 300,000 years were required to form same.

The great Appalachian Mountain chain was formed during Late Paleozoic with the culminating movements occurring during the Permian. The important points to bear in mind in connection with the history of the Permian in southern New Mexico is the existence of a shallow sea in Early Permian, the partial inclosure and breaking up of this sea into lagonnal areas which produced larged saline deposits, and finally the deposition of the red beds by streams in shallow lakes over large sections.

Permian history is of much importance to the National Park Service in the southwest. The Carlsbad Caverns have been formed in limestone of this age. Kaibab limestone of the Permian forms the rim rock at Grand Canyon. Dune sands of the Permian make up the Coconino formation as exposed in Walnut Canyon and the erosional features of the Kaibab limestone above formed ideal homes for the cliff-dwellers. Gypsum formed during this period has now come to rest, or perhaps rather to migrate, in the beautiful White Sands.

In the Tularosa Basin area sediments of the Triassic and Cretaceous of the Mesozoic era were deposited on the Permian. They consist mainly of shales and sandstones and are widely distributed in the Rocky Mountains. At or near the close of the Cretaceous the great mountain making movements of the Rockies took place. The rocks were broken and faulted and the region generally was raised above the water. The basin began to assume a more definite character. During successive periods erosion on a large scale tended to reduce the ranges to a peneplain. Great thicknesses of Mesozoic and Carboniferous strata were removed. A regional upwarp during late Cenozoic (probably Pliocene) has given

the Rockies their present height and the differential erosion of the uplifted peneplain has brought about most of their rugged relief.

Above the Cretaceous in this area are the loosely consolidated sediments of the Quaternary. Valley fill deposits over 1,000 feet in thickness have been deposited by streams, lakes and underground waters. Much gypsum was certainly carried down from the overlying formations and concentrated in the inclosed Tularosa Basin. Saline residues were thus deposited, redissolved and redeposited over and over again, even up to the present this process is going on. The most recent deposit is the gypsum sand dunes which have been formed through the action of wind on the concentrations of this material in the alkali lake area.

Fossils

Fossil bones and teeth of a mammoth are said to have been found in Section 28, Township 14 South, Range 6 East. I visited the locality but was unable to find anything but some fragmentary bones. It would probably be well to later work over the entire alkali flat and along Salt Wash in an effort to determine if important fossil remains are present. If such is the case a connection might be made with the present monument area in order to include the fossil exhibit. The intervening land so far as is known at present is worthless.

What I have termed the external molds of plants are plentiful in the White Sands. My interpretation of this process, which I am not at all sure is correct, is that the gypsum crystallized around the plant forms and adhered to the structure and became more or less hardened, the organic material of the plant decayed leaving an internal core, thus forming the external molds now visible in the sands. Samples of this material have been forwarded the Washington office. These molds as I have termed them are to be sure very recent and in fact are being formed at the present time. They will make an interesting exhibit for the future museum of the White Sands.

GYPSUM

The evidence points, according to the writer's belief, that the original gypsum and salt deposits of the Chupadera formation are derived from precipitation in bodies of water, cut off from the sea or in embayment areas extending landward, or lakes or playas, with successive replenishment by waters flowing into same and consequent evaporation. Factors are present which indicate that in most cases such substances are precipitated under arid conditions. That evaporation takes place at a powerful rate in such areas is evidenced by the fact that 23 inches of water has been taken from the alkali lake during the month of July by this process.

Saline Residues

ANALYSES OF WATERS

	LAKE		NORTH OF FLATS	
	N. W. PART (Surface)	SOUTH SIDE (10' Hole)	NEAR SURFACE	NEAR SURFACE
	%	%	%	%
Total soluble matter	9.50			
Calcium (Ca)	.07	.06		
Magnesium (Mg)	.53	.00	1.22	2.46
Sodium (Na & K)	2.29	1.38	9.88	7.62
Carbonate (CO_3)	.01	.02		
Sulfate (SO_4)	2.54	1.76	2.87	4.25
Chloride (Cl)	5.29	.94	16.82	15.78

ANALYSES OF SURFACE MATERIAL

	LAKE EDDY PROSPECT (Surface)	FLAT AT NORTH END (Surface)	FLAT AT NORTH END (1-5 Feet)
	%	%	%
Total Soluble Matter	62.95	4.78	3.16
Calcium (Ca)	.49	.34	.12
Magnesium (Mg)	.40	.05	.03
Sodium (Na & K)	18.43	1.23	1.00
Carbonate (CO_3)	.02	.01	.01
Sulfate (SO_4)	40.27	1.27	.65
Chloride (Cl)	.60	1.72	1.35

Note: Tables are from Meinzer (1).

PLATE V

Some of the most important substances formed as saline residues are rock salt, gypsum and anhydrite. As water is evaporated the salts are precipitated and deposited. The least soluable salts are naturally precipitated first and these would include calcium carbonate and iron oxide if present. Gypsum separation follows and it is usually associated with anhydrite deposition. Sodium chloride (or common salt) is precipitated after the gypsum and following the bitter salts of sulphates and chlorides of potassium and magnesium, which are usually among the last to separate out of solution. The latter are so soluble that they are not always deposited when salt and gypsum are formed. It has also been observed that whenever these saline residues are precipitated they are likely to be redissolved unless they are protected against solution by water. When they are preserved muds and clays often form an impervious cover which serves as a means of protection.

Twenhofel (15) states that the chief processes involved in the formation of these saline residues is the evaporation of water in which constituent materials are dissolved, although some of them, as gypsum, may be precipitated by chemical reactions without evaporation, and some occurrences have resulted from the freezing of water. In some instances they are also formed through replacement of other substances, gypsum replacing limestone probably being the most common example. Also that so far as these substances are the result of the evaporation of water they develop either through the evaporation of sea water, the waters of lakes and playas, or of waters brought to the surface by springs or capillary action.

Saline residues commonly present in the lower portions of the Tularosa Basin, or the alkali flats, are sodium chloride (common salt), sodium sulphate (glauber salt, also called "ice" and erroneously called "soda"), magnesium sulphate (epsom salt), sodium bicarbonate (baking soda), sodium carbonate (washing soda), calcium sulphate (gypsum), and calcium carbonate (limestone). Plate V on a following page taken from Meinzer (1), shows the composition of water from the narrow portion of the lake and from a ten-foot hole on the south side; also, of the surface material at the Eddy soda prospect; and similar data on waters and soil at the head of the alkali flat about 35 miles further north. There is evidently a larger ratio of chlorides to sulfstes in both the waters and the surface materials at the north end of the flat than in the lower lake region. Possibly this may be accounted for by the fact that the drainage is in this direction and precipitation dies out to the south.

It is generally agreed that in humid regions soluble substances, which may be formed by the weathering of rocks, are quickly washed out of the soil passing into the drainage system and finally carried to the sea. In arid regions there is not sufficient rainfall to perform this function and in the case of an inclosed basin it would not be possible. The salts therefore remain in the soil, at times of rainfall they are dissolved into solution, and in times of dryness when water draws to

the surface, or is evaporated they are left, forming the white incrustations on the soil known as alkali, a common feature of the lower sections of the Tularosa Basin.

Varieties of Gypsum

Gypsum ($CaSO_4 \cdot 2H_2O$) occurs in several different forms. There is the amorphous or microcrystalline variety which includes anhydrite and is commonly known as rock gypsum or alabaster. This is the type that frequently occurs in thick beds. The microcrystalline variety of gypsum is known as selenite. It commonly occurs as individual crystals in clays and as veins and bands in the clay beds associated with rock gypsum. Gypsite is an earthy form of gypsum. Satinspar, a variety with fibrous structure, is commonly found in veins, but is not present in the White Sands area.

Anhydrite is an anhydrous calcium sulphate, $CaSO_4$, containing sulphur trioxide 58.8 and lime 41.2%. Crystals are rare but when observed are thick tabular and of the orthorombic system. It is characterized chiefly by its cleavage which is in three directions at right angles to each other. The hardness is 3-3½ and specific gravity is 2.9.

The hydrous calcium sulphate known as selenite, $CaSO_4 \cdot 2H_2O$, is composed of sulphur trioxide 46.6, lime 32.5, and water 20.9. It occurs in tabular or diamond-shaped crystals of the Monoclinic system. There is cleavage in three directions and with a hardness of 2 it may be scratched with the finger nail. Specific gravity is 2.3%. Luster is usually vitreous, sometimes silky. Ordinarily its color is white, gray; sometimes various shades of yellow, red, brown, etc., from impurities. This variety occurs along the west side of the lower alkali lake in great profusion. Various crystals were observed more than a foot in length and this probably represents the average although Talmage (6) mentions crystals reaching a maximum length exceeding four feet.

Gypsite is a massive granular earthy form of gypsum containing impurities. There is a belt of gypsite hills to the west of the White Sands proper. They appear to be old dunes that have been compacted and cemented through the action of water. Satin spar is fine and fibrous with a silky luster.

Origin of the White Sands

Sands are occasionally but rarely composed of gypsum. Deposits occur west of Duran, New Mexico, near a series of depressions or shallow lakes filled with gypsiferous materials. To the east of these lakes mounds of sand dunes occur of the same character as the White Sands. There is no known deposit of the same magnitude as the White Sands of Alamogordo, however.

Much has been written about the origin of the gypsum deposits at this locality. It is generally conceived that the original source of the gypsum is the Chupadera formations, but the question is to whether the gypsum came from the rocks as they were eroded from the ranges surrounding the basin, or if they were carried upward by waters under hydrostatic pressure from below and precipitated at the surface. From the vast quantities of gypsum that must have been washed into this basin and from various observation as processes which are at present in progress and which will be described later I am inclined to lean toward the former view, and see no reason to complicate the picture by elevating large quantities of gypsum, when a normal simple explanation is forthcoming.

It would seem well to mention some of the various opinions expressed:

Meinzer (1): The gypsum is derived from the gypsum beds in the Pennsylvanian rocks outcropping in the mountains. Since it is comparatively soluble it was brought to the low interior of the basin chiefly in solution in the surface and underground waters, and was re-deposited when these waters evaporated, either from desiccating lakes or from springs or wet areas fed from underground sources. The deposits thus formed have been altered and further transported by repeated resolution and redeposition and by wind work.

Botkin (5): According to this explanation, which differs from that heretofore given by geologists, an enormous deposit of large crystals was formed in sediments over a long period of time, the sands being a comparatively recent and rapidly formed product resulting from wind erosion and weathering of the materials of the dry lake bed. East of the lake outliers of coarse wind-blown crystals capped by vegetation show by their bedding that high dunes of this material recently existed in the region.

Talmage (6): Origin has been ascribed largely to the action of ground water bringing up gypsum in solution from beneath the valley. Field investigation shows: 1. The importance of ground water in transporting gypsum to the area where the active dunes exist has been overestimated. 2. That importance of ground water in the formation of the large selenite crystals and the importance of these crystals as the ultimate source of part of the White Sands has been underestimated. 3. Reworked by wind and weather, rather than ground water, has been directly responsible for material in the active dunes.

Russell (7): Underlying the Tularosa Basin are beds of Permian limestone and sandstone, between the layers of which are interspersed thick beds of gypsum. Boring made in recent _

years reveals that the gypsum is hundreds of feet below the present valley floor and that water is encountered at depths of a thousand feet or less.

The nature of the sedimentary rocks above the water bearing sands is favorable to upward seepage. As the water on its upward course passes through the gypsum deposits, it dissolves that material and carries a rather full load to the surface. The limestone through which the solution passes is not readily soluble; very little in addition to the gypsum is carried by the rising water. When evaporation takes place at the surface a fairly pure crust of gypsum is deposited, which, under action of the atmosphere, crumbles to form crystalline grains.

Hills and mountains surrounding the Tularosa Basin contain gypsum, and it is evident that some of the deposit is brought from this source by surface waters that feed it to the large natural evaporation pan at the south end of the sands. Whether the source is the deeply buried beds or the visible deposits in the mountains, the processes of evaporation, crumbling and drifting with the wind are the same.

Darton (8) and Winchester (9): The gypsum has been brought to the surface by a seepage of water, probably from the underlying Chupadera beds, and deposited on the surface in crusts, which have crumbled to sand and in the course of many centuries have been piled by the wind into great dunes covering many square miles.

Richard (12): The basin thus enclosed (Tularosa Basin) has no visible outlet and as evaporation exceeded precipitation we find the waters becoming loaded with the salts above innumerated. Into this great lake was poured the waste of mountains, rocks, gravel, mud, sand, etc. Centuries later the great abyss had been filled with these sediments made up principally of the detritus of the Permian formation or Red Beds, and highly impregnated with the salts of gypsum. At the time this great lake had practically been filled there were no White Sands.... The White Sands originated from the waters of this vast lake which lies to the west... As the wind sweeps rapidly over the surface of the saturated brine waters of the lake tiny wavelets are developed at the crests of which instantaneous crystallization of the crystal gypsum takes place; that is to say, a crystal of gypsum is born and this tiny crystal is at once swept eastward by the force of the wind and ledges on the shore. Thus there is in time built upon the shore a long line of crystals which in time develop into a larger quantity and finally become a white sand

dune... In order to prove the final theory of origin a small boat was pulled out into the lake from the East shore on a fairly windy day. A canvas tarp was so arranged to catch the particles of gypsum as they were crystallized from the crests of the waves and born forth by the wind. Examination showed these to be true crystals of gypsum and of course put the origin beyond all dispute and contention. (The latter point proves nothing to the writer as gypsum dust is prevalent everywhere when there is a strong wind blowing in the basin. I would not be surprised to see granules in the mechanism of a Brunton compass even though it be enclosed in a leather case upon passing through one of these storms.)

Brady (13): Describes the White Sands and region in general; associates the White Sands and dry climate with volcanic eruption. Lava is said to have diverted the assumed ancient river to another valley. Mentions Spanish legend that valley was "inhabited by prosperous people before the eruption destroyed river and brought about present desolation."

My idea as to the origin of the White Sands may be summarized as follows:

1. The Chupadera formation contains the only known source for the large quantities of gypsum now present in the Tularosa Basin.

2. Gypsum was precipitated from the evaporation of waters and deposited in thick beds in the Chupadera formation of Permian age. This process was made possible due to the prevailing arid conditions where bodies of water were cut off from the sea, probably by deltas, or in embayments extending landward, or in shallow lakes or playas, with the water supply being replenished periodically by successive advances and retreats of the sea.

3. Mountain making movements, at or near the close of the Cretaceous, with faulting and folding on a large scale, resulted in the formation of the Tularosa Basin somewhat as we see it today.

4. The Chupadera formation and overlying rocks were elevated around the margins of this Basin, thus being more susceptible to rapid erosional processes. In the Basin proper the Chupadera and overlying rocks were in a down-faulted block with several thousand feet of displacement. The Basin was probably not inclosed at this time which permitted great quantities of weathered materials to be carried away to the sea. Later movements closed the Basin and permitted no visible drainage outlet for the rock debris or saline substances carried in solution by the waters. A large lake was formed as is evidenced by the terraces which may be observed at the present time. Evaporation processes concentrated the waters and saline residues came into prominence under these ideal

conditions. The Chupadera formation was being rapidly covered by valley fill material until now it is over 1,000 feet below the valley floor in places.

5. As the shrinkage of this large lake took place great areas of the outcropping Chupadera was eroded on the margins (see sections Plate IV). The thick beds of gypsum were broken up and the material carried in solution to lower levels and deposited. At several periods at least crystals of selenite were forming on a large scale in this lake bed. Photos show the stratified gypsum laid down in this lake bed as well as the terraces containing the selenite crystals.

6. As the lake dried up and became an alkali flat, winds had an opportunity to start their work of transportation. The gypsum terraces and the selenite areas were subjected to weathering and as the material was broken up and reached the stage to be moved by the winds, the granules were carried to the east side of the lake and deposited, due to the prevailing southwest wind. The White Sands occur along the east side of the old lake bed and must have come mainly from the area once occupied by the lake. If the source is from the underlying Chupadera beds, which may barely be possible for a small percentage of the sands, then why do the sands not cover more of the basin as the Chupadera formation underlies most sections as evidenced by drill holes?

7. Various stages of this process of the formation of the sands may be observed at present. Since it can be seen I see no reason to resort to an underground source which process cannot be seen. There is a gradual gradation of materials between the old lake bed and the White Sands proper now present on the surface. Selenite crystals, gypsum terraces, coarse yellow crystals forming dunes with finer gradation eastward, intermingled with gypsite hills and some of the older dunes showing cross-bedding and now more or less cemented, and finally, the White Sands proper, free from fine silt which has been carried onward by the winds. The gradational zones mentioned are not sharply defined but overlap and intermingle and it is doubtful if they could be mapped to satisfaction without considerable time being spent in the area and even then test hole drilling would probably be necessary with considerable generalization as a final result.

8. Crystals now being precipitated in the flats forming crusts is a normal sequence since the whole area is saturated with gypsum, but it seems hardly probable that this could be a source for the large volume of gypsum sand and at the same time there must be a starting point since this feature was evidently not in progress until the dunes were well under construction and the area to the east of the old lake bed did become saturated with gypsum.

Movement of the Sand Dunes

I know of no proper records as to the rate of migration of the sand

dunes to the eastward. Now that the Park Service have made a National Monument in the area exact measurements should be made. MacDougal (4) mentions an advance of about one mile in 20 years. From local reports this estimate is much too large. At the southeast corner 10 to 20 feet per year is said to be more nearly correct. There is the possibility of correlating the rate of migration with the age of the yuccas. Richards (12) estimates that the sands will move into Alamogordo in 4097 A.D., and would reach Tularosa about 6101 A.D. I do not believe that he considered the amount of gypsiferous material remaining in the old lake bed to be transported or that the fact that the elder dunes become more or less cemented with transportation processes not so easily involved. At any rate the residents of the above mentioned towns have little to fear for some time nor need the Park Service take out protection in lands to the east in order to have White Sands for a monument in later years.

Road Building

I believe that present visitors are missing one of the most interesting features of the monument in that no road is available to proceed into the area of the old lake bed. In certain seasons travel may be made over most any section of the alkali flat. The road could easily be constructed along the west margin of the sands which would permit travel at all times. This would afford an opportunity for the public to obtain a better picture of the source of the gypsum now present in the White Sands. Mirages, a closer view of the San Andreas Mountains, etc., would lend much to the merits of such a development. These factors notwithstanding the idea that it would be pulling away from the "picnic practice" now prevalent in the scheme of things. The geological story could be related in a much more satisfactory manner after or during a visit to this area.

Tom Charles, resident custodian, is a live wire booster for the White Sands and is doing much good work for the Park Service. All possible assistance was supplied by him during my visit. Ben Daugherty and Barry Mohun, Jr., of the park staff, accompanied me on several trips and their presence was badly needed at times especially in the digging out process. Mr. Mohun, as well as Dr. Talmage, of the New Mexico School of Mines, supplied negatives for a number of the photos attached for which acknowledgement will be made later. White Sands is an area that the Park Service can justly be proud and my visit was indeed most delightful.

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AN INTERESTING ROOM AT WUPATKI

By James Brewer

By changing the old figure 8 trail that once encircled the two ends of Wupatki Pueblo a trailside feature has been added. The lowering of the east slope trail and raising of the west slope trail has also corrected the past common error of unguided visitors going over one part of the trail twice and not seeing the other side of the pueblo.

As now constructed, the east slope trail includes Room 43, excavated by C.W.A.

To me, this is a very interesting room and indicative of a thinking builder.

As shown by the accompanying plan, this was an "inside" room. Most of the rooms of Wupatki had two or more openings, usually so placed that fresh air would enter near floor level and smoke leave through a higher exit; in an inside room some other provision for ventilation would have been necessary.

In Room 43 ventilation was ingeniously provided.

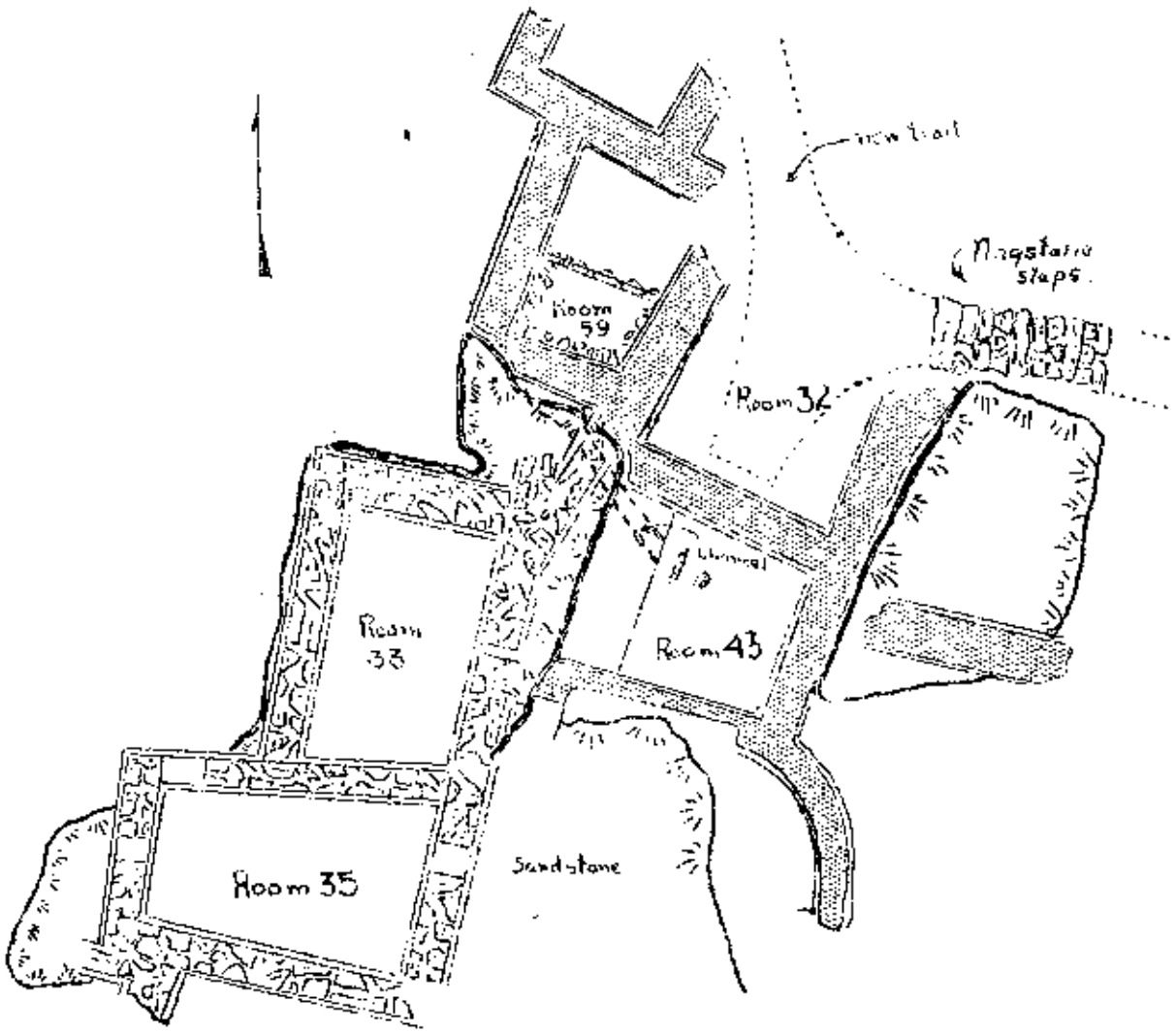
The room has the original firepit and deflector. The west end contains a raised platform; such platforms, not fully understood, are not uncommon in Wupatki Pueblo. As shown in the diagram, the entire west wall of Room 43 is a block of Moencopi Sandstone. The double line extending northwest of the deflector indicates the position of a slab-lined channel (once covered); the dotted line continuing through the groundstone indicates a natural crack in the lower part of the stone. This crack together with the covered channel was once used as a fresh air intake duct, as noted by R. Van Valkenburg in 1935; the outlet of the channel is through the eight-inch riser of the platform.

When Room 59 was constructed the north wall was built far enough from the sandstone block to preserve the down draft air intake of this channel.

Room 43 is one of the few rooms in which white plaster was sued. Possibly this was another compensation for an inside room, the white plaster naturally reflecting what light entered. The room adjoining on the east is a corner room and there red (moencopi) plaster was used.

The accompanying diagram was traced from the room plan map drawn by the Museum of Northern Arizona.

AN INTERESTING ROOM AT WUPATKI



The slab-lined channel in Room 43 connects with a natural crack in the sandstone to provide ventilation.

Note the space between the sandstone and the south wall of Room 59, left open for intake.

VISITOR RESEARCH

AT BANDELIER

March 18 to April 19, inclusive

Times asked	Questions numbered. Questions are given in descending order of frequency.
21	1. What is the altitude here?
9	2. Did the Indians live in all of these holes?
9	3. Do you charge for a guide?
9	4. How many visitors a year do you have?
9	5. How far up and down canyon de ruins extend?
7	6. Weren't they little people?
7	7. Were these built by the Indians? (Modern steps.)
7	8. Are these walls original? (In Community House.)
7	9. How far do we have to walk?
6	10. Do we have to register?
6	11. Wasn't that the kiva entrance? (Ventilator shaft.)
6	12. How many CCC boys are there in camp?
6	13. Did the Indians live in those little rooms?
6	14. How long is it since the Indians lived here?
5	15. How did smoke get out of the rooms?
5	16. Was this an old Indian trail?
5	17. What is that hole? (Shelf in kiva.)
5	18. How did the Indians stand erect in those low rooms?
5	19. Where does that trail lead to? (Back of Lodge.)
5	20. When was the road built into the canyon?
5	21. How many people lived in a room?
5	22. How long has this been a National Monument?
5	23. Did the Indians all go to cliffs in wartime?
5	24. Is there good fishing here now?
5	25. Do the Indians still live here?
4	26. How do you tell how high the walls were?
4	27. Do they find lots of arrowheads here?
4	28. Are all the ceilings blackened with smoke?
4	29. How long is the canyon?
4	30. Is this the original ladder? (A restoration.)
4	31. What makes all those holes in the cliff?
4	32. How did the Indians make a living?
4	33. Are there many rock carvings?
4	34. What was the population here?
4	35. What is the shortest road to Santa Fe?
4	36. What has the CCC camp done?
3	37. Were Indians living here when the Spaniards came?
3	38. How did they get in their houses?
3	39. What did they dig their caves with?
3	40. Why dod those poles stick out of the walls? (vigas.)
3	41. Do they all look like this? (Cave and Talus ruins.)
3	42. Do we have to walk through the ruins?

Times asked.	Questions numbered. Questions are given in descending order of frequency.
3	43. Did each clan have a kiva?
3	44. What obliteration work does Park Service propose here? (Removal of modern structures, etc.)
3	45. Who was the first white man in the canyon?
3	46. How long have you been here?
3	47. Do you stay here all year long?
3	48. Has any excavating been done here?
3	49. What makes the coloring on the rocks?
3	50. Why won't the Park Service let you dig?
3	51. How do you get to San Ildefonso?
3	52. What is that cable across the canyon for?
3	53. What is the difference between National Parks and National Monuments?
3	54. What restoration work is planned here?
3	55. What tribe of Indians lived here?
3	56. Do you have a museum?
3	57. Where did the Indians bury their dead?
2	58. Do we climb to the top of the cliff?
2	59. What kinds of grass do you have?
2	60. What kind of bird is that? (Raven.)
2	61. Weren't the Indians prehistoric?
2	62. Can I walk it in high heels?
2	63. Is Puye a National Monument?
2	64. Are all those weathered holes?
2	65. How do you get into this Service?
2	66. How did the Indians get out of the canyon before the road came in?
2	67. How do we get to Taos?
2	68. Are those talus houses restored?
2	69. How far back in the cliff do the rooms go?
2	70. Did the Indians have sheep?
2	71. Which has the most ruins - Frijoles or Puye?
2	72. Where did this volcanic material come from?
2	73. How do you know they did farming here?
2	74. Are you here all summer?
2	75. Does this rock weather away rapidly?
2	76. What are those poles for? (loom supports.)
2	77. Where does this creek come from?
2	78. What is the San Ildefonso Buffalo Dance like?
2	79. Do you have bad floods here?
1	80. How did a man qualify to enter kiva ceremonials?
1	81. Was that clay on the walls, or did the Indians put it on?
1	82. What is that bush? (Rabbit Brush.)
1	83. Is that the ocatillo? (Cane Cactus.)
1	84. Isn't that a porphyry? (A spotted river boulder.)
1	85. Will mineral dye last longer than vegetable dye?

Times asked	Questions numbered. Questions are given in descending order of frequency.
1	86. Don't they make gin out of Juniper berries?
1	87. What is this formation made of?
1	88. Will you pose for this picture, so I can have some native color?
1	89. Why don't you keep up the old trail?
1	90. Did they live in those small rooms too? (cists.)
1	91. Did CCC boys build that? (Community House.)
1	92. Do you see many robins here?
1	93. Did they keep the babies in those holes? (cists.)
1	94. Is Taos culturally independent from other pueblos?
1	95. Were those holes used for rafter supports?
1	96. What is the largest party you ever had through the ruins?
1	97. Do all kivas have tunnels?
1	98. When kivas are close together aren't they connected by tunnels?
1	99. Can you read Indian sign language?
1	100. What kind of timber are those rafters?
1	101. Why are there three kivas in Tyuonyi?
1	102. How old did a boy have to be to enter a kiva?
1	103. Did the Indians have a fort clear across the canyon?
1	104. Do men still do all the weaving?
1	105. Why is Tyuonyi thicker on one side than the other?
1	106. How did they build their fires?
1	107. Do all real cedars come from Lebanon?
1	108. Do you have lots of birds here?
1	109. What kinds of animals do you have?
1	110. Where did the Indians build their houses?
1	111. What kind of bird is that? (Jay.)
1	112. Where did they get their plaster clay?
1	113. Is this sage brush? (Salt bush.)
1	114. This is piñon pine, isn't it? (YP)
1	115. Was all weaving done in kivas?
1	116. Was the hatchway for entrance or a smoke vent?
1	117. What connection have these ruins with Taos?
1	118. Where is the old trail?
1	119. Were all men allowed to enter kivas?
1	120. Did the high-ups have better houses than the others?
1	121. Did the Mesa Verde people come here?
1	122. Were these people related to the Hopis?
1	123. Did they raise cotton here?
1	124. How many officers has the CCC camp?
1	125. Why have they got you doing this type work?
1	126. Do they let you go anywhere?
1	127. Are both CCC officers lieutenants?
1	128. Is the top of the cliff flat, or are there hills?
1	129. Is this stuff really sandstone? (rhyolite tuff.)

Times asked	Questions numbered. Questions are given in descending order of frequency.
1	130. Is this ash water deposited?
1	131. What kind of rock is that? (andesite.)
1	132. How are the weathered holes formed?
1	133. How old are the formations?
1	134. What causes hardening of cliff surfaces?
1	135. Is this finger nail coil pottery?
1	136. What is that? (new reservoir.)
1	137. Have you ever seen the ruins near Mexico City?
1	138. Are those the Officers' Quarters? (Comfort station.)
1	139. What was the Indian flute made of?
1	140. When was Tyuonyi built?
1	141. Which ruins are oldest? (cliff or community house.)
1	142. Don't you get tired answering silly questions?
1	143. Did they hang meat on that? (loom support.)
1	144. This is limestone, isn't it? (rhyolite tuff.)
1	145. What did they cover their doors with?
1	146. Did this ever have a roof? (Tyuonyi's passage.)
1	147. What kind of bird is that (Vulture)
1	148. Why did the men weave?
1	149. Did they have saber toothed tigers then?
1	150. Where is the Pajarito Plateau?
1	151. Why do they call this the Pajarito Plateau?
1	152. Did the CCC boys build the road into the canyon?
1	153. Were these people related to the Aztecs?
1	154. Were Aztec Ruins built by Aztecs?
1	155. Did kiva openings come up into rooms?
1	156. Did the Taos Indians come from here?
1	157. How far do the ruins extend?
1	158. What is the name of this creek?
1	159. Is the upper part of the cliff lava?
1	160. When did the Indians live here?
1	161. Did they have any livestock?
1	162. Was Bandelier here with Dr. Hewett?
1	163. Have you read the Delight Makers?
1	164. What kinds of trees do you have?
1	165. What makes you believe only men could enter kivas?
1	166. What do you intend to do after you leave CCC's?
1	167. What is a clan?
1	168. Can you still get up the old trail?
1	169. Have they found any well-preserved pieces of pottery here?
1	170. Are all of those caves higher up the cliff well explored?
1	171. Was the Community House excavated when Bandelier was here.
1	172. Is Puye the same as these ruins?
1	173. Is the Custodian here any relation to the Jacksons of Montezuma?
1	174. Will there ever be a museum here?

Times asked	Questions numbered. Questions are given in descending order of frequency.
1	175. Are we allowed to tip guides?
1	176. Did they weave in kivas?
1	177. Have they ever found any mummies here?
1	178. Were these Indians related to those of the Davis Mountains in Arizona?
1	179. Did the CCC's build these steps?
1	180. Did these people have toilets then?
1	181. Was this place used for a bathhouse, where the Indians took sweat baths? (pointing to kiva.)
1	182. What kind of formation is this? (pointing to cliff.)

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At Tonto

By Woodrow Spires

In regard to Bob Rose's request for a list of questions by visitors which might prove beneficial in future museum developments, I am sorry to say I have not been able to keep any accurate list or account of times which the questions were asked. I have prepared a list of the most common occurring questions arranged in a graduated form of their occurrence.

1. Why did they build up here instead of in the valley near their fields?
2. Who were the people occupying these dwellings?
3. Did these people anti-date the Indians?
4. Where did they get their water?
5. Were they hunters?
6. Were they farmers if so where did they farm?
7. What is the difference between a park and a monument?
8. How do you know how old these ruins are?
9. How do these ruins compare with Casa Grande, Montezuma, Mesa Verde?
10. Did you say the 14th Century was prehistoric?
11. How did the Cliff Dwellers differ from the other people of the same time?
12. What material did they use for wall construction?
13. How great a population did this valley support?
14. Where did these people go?
15. Is there any connection between the Pueblo's and the Mexican culture?
16. Are there any other ruins in this vicinity?
17. Did these people use metal in any form?
18. Where did they obtain their knowledge of farming and food plants?
19. Were these people very short in stature?
20. Who first discovered this ruin?

21. Why were they better weavers than potters?
22. Has the physical features and climatic conditions of the country changed in the last 600 years?
23. Why don't you find any cremation burials?
24. Why are these timbers in such good state of preservation?
25. Why did they use trash heaps for burial grounds?
26. How can you identify an Indian skull?
27. Did they have any domesticated animals?
28. What materials did they use for paints?
29. Did they have large families?
30. Why aren't arrow points more numerous?
31. Why did they excavate this section?

The above questions are the most common ones in regard to the educational features of the Monument, but the following are the ones occurring most often.

1. Where is the Monument?
2. Do you stay here all the time?
3. Don't you get any relief?
4. How much do you get paid?
5. Haven't you a wife?
6. Doesn't the Government furnish your subsistence?
7. Isn't it lonesome?
8. What do you study for this job, forestry? (After an hour or so in the ruins and museum).
9. Do you do your own cooking?

This is only a few of the many questions I am bombarded with every day regarding a rangers private life.

Needless to say I get a world of stupid questions which are in no way beneficial to a survey of this type so I will not bother to cite any of them.

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PARKERS WILD PALMS

(Reprint from Arizona Republic, January 12, 1936. Sidelight interesting to puzzled Jimmy Brewer who recently discovered two unusual date seeds apparently in situ in a prehistoric Hupatki midden.)

As an ardent student of Arizona flora and occasional co-worker in behalf of the herbarium of the United States station at Sacaton, I was very much surprised in reading the enclosed clipping from your great Resource Edition entitled "Wild Palms Grow in Parker Area." Surprised and chagrined, first because that, if a fact, they had never before been reported, second, because the item did not state whether these palms were of the fan type like the world-known fan palm from Palm valley, California, or the Pluriosus ty pe like the date or cocoa palm.

We have been all these long years laboring under the belief that the California fan palm, species Washingtonia, was the only true palm indigenous to the North American continent, the coconut palms in Florida are not because they were accidently grown from nuts that floated ashore from a ship loaded with nuts from Cuba to New York market broken up in a storm. There are two known species of the genus of this California fan palm. Washingtonia filifera and Washingtonia robusta, both well known in his valley. Now the question arises: Are these palm of Parker the same or are they another unknown? It surely would be worth the while for a person or persons qualified and competent to do so to make an investigation of this point. I say competent and qualified advisedly because it was only after long years that it was established that the California fan palm was a family all its own and renamed Washingtonia after it had been classed with the genus Brahea, named after the celebrated Danish astronomer Braha. Later it was classed again as Pritchardia filifera, both were found to be wrong and therefore, being the only true American palm, the name Washingtonia was proposed and given.

Such errors in botany have been more frequent in the past than they are now. We have an example right here in our area. The saguaro, giant cactus. For a great number of years, this landmark of our desert was known as cereus gigantea until it was found that it was not, but a genus of its own and the only species of this at that. So a new name had to be found and it was suggested by Drs. Bitten and Rose, if I remember correctly, to name this outstanding desert plant in honor of Andrew Carnegie, who endowed the world-famous Desert Laboratory near Tucson and so it is now officially, Carnegia gigantea.

Another confusing fact is that the article mentions that the Palm is like the Royal Palm, leaning down at an angle. Now as a matter of fact, the Royal Palm, a native of Hawaii, grows as straight as our Fan Palms, always assuming that the correspondent is speaking of the Oreodoxa regia.

In closing, your correspondent mentions that there are no other palms within hundreds of miles. I do not know how far Palm Valley in California, on the edge of the Colorado desert, is from this point on the Colorado River, but it is certainly not too far as the robins fly, who on their migration south rest, water and feed on the berries of the fan palms in Palm valley, like they do on their return trip, rest and feed on the seed of the palm in Salt River valley and when the seeds have gone through the gizzards and the intestines of these birds, they will sprout and grow as readily as corn. So it is just as likely as not that a bird flying from Palm valley to the Colorado river for another drink and rest at the C Bar S Ranch left the seed behind.

SOUTHWESTERN BIRD BANDING TOTALS

Species	Bandelier		CasaGrande		Chaco		Navajo		Pipe Spr.		Tumacacori		Walnut		Wupatki		Total
	Prior	May	Prior	May	Prior	May	Prior	May	Prior	May	Prior	May	Prior	May	Prior	May	
Bluebird,Ch-b.													215				215
Cardinal,Ariz.			1								9						10
*Chat,Long-tail										2							2
Crossbill,Bend.													17				17
Chickadee,Mtn.							6						3				9
Creeper,R.Mtn.	2																2
Dove, Inca			2	2													4
Dove, W. Mourn.			13	3							1						17
Finch, House			132	5								2					139
Flicker,Red-sh.	1																1
Flcthr, Ariz.			2														2
Flyctr,Vermin												2					2
Cldfnch,Gr-bkd													2				2
Jay,Long-crstd	2																2
Jay, Woodhouse	3						6										9
Junco,Gra-hded	56						12	25									93
Junco,Montana							9										9
Junco,Pnk-side	7																7
Junco, Red-bkd	9						2						42				53
Junco,Shufeldt	7						14	2					11				32
Mockingbird,W.			2									5					7
Nuthatch, Pyg.	21												26				47
Nuthatch, R.M.	2												6				8
Owl, W. Horned			1									2					3
Phoebe, Say			19								4						23
Quail, Gambel			58								1						59
Roadrunner			4														4
Robin, Western													7				7

Species	Bandelier		CasaGrande		Chaco		Navajo		Pipe Spr.		Tumacacori		Walnut		Wupatki		Total
Spscker,R-nape													4				4
Spscker,R. Mun.													2				2
Shrike,White-r			3														3
Siskin, Pine													1				1
Solitaire,Townd													7		15		22
Sparrow,Lark			315						43	55	1						514
Sparrow,Lincoln			1														1
Sparrow,W.Lark											4						4
Sparrow,Nev.Sav									1								1
Sparrow,Western			1														1
Sparrow,White-cn			1	6			6				-						13
Swallow,Ro-wng			5	1													6
Thrasher,Bend.			5								3						8
Thrasher,Criss			7	2													9
Thrasher,Sage															2		2
*Thrush,Rus-bkd					2												2
Titmouse,Gray													1				1
Towhee,Canyon											5						5
Towhee,Gr-tail			2							2	5				1		10
Towhee,Spurred	1						1										2
*Verdin												1					1
Waxwing,Cedar															1		1
Woodpkr,Cactus				1							1						2
Woodpkr,Gila			8														8
Woodpkr,Mearns													9				9
Wdpkr,RM Hairy	1																1
Wren, Cactus			36	4							1	2					43
*Wren,Baird Be.												3					3
* New Species to this listing																	
SUB-TOTAL	112	0	718	24	0	2	56	27	44	39	35	17	353	0	19	0	
TOTAL		112		742		2		83		103		52		353		19	1466

RUMINATIONS

We have heard quite a bit about uniforms lately. We had an Office Order issued covering new uniform regulations, and we hardly got it bound into the file before Order No. 324 came along making a couple of more or less important changes in it. You can always get a rise out of any Park Service man or group of Park Service men by swinging the talk around to uniforms. They are all interested.

Office Order No. 324, dealing with uniform regulations, starts out by saying: "The fundamental purposes of the uniform are to symbolize the National Park Service and to identify the wearer to park visitors." There is a question in my mind as to whether this is a complete statement of the case.

There are still several men in the Service who were with us when we went through the conference which decided that a uniform should be worn by Park Service employees and what kind of a uniform it should be. Correct me if I am wrong in seeming to remember that there was considerable talk at that conference about the morale building value of a uniform. I also seem to remember being invited to "Look at the Mounted Police of Canada" a good many times at that conference; in fact, we thought so much of them that we adopted the hard hat brim which they wore, and which we kid ourselves into believing is a "Western hat."

In a February meeting in Washington there was a definite effort made to put ECW men in ECW uniforms and National Park Service men in National Park Service uniforms. The regulation in regard to this at that time read: "ECW officials, inspectors, technicians, and supervisory personnel shall wear the authorized ECW uniform." The first Office Order carried those words, but soon afterward, when Office Order 324 came out, the underscored words were missing. It now says: "ECW supervisory personnel shall wear the authorized unform." What about "Officials, inspectors, and technicians?"

Two paragraphs above, the original regulations said: "Emergency Conservation Work and other Emergency employees, when assigned to regular public contact service, in any of the areas open to visitors, shall wear the uniform when specifically authorized by the Director." In the revised Office Order 324 the words underscored are omitted.

Under the regulations as first issued ECW officials, inspectors and technicians would have had to wear ECW uniforms except in the few cases where they were working in any of the areas open to visitors and, for some reason, the Director should want specifically to authorize them to wear the Park Service uniform.

Under the regulations as revised in Office Order No. 324 the way is open to put all ECW officials, inspectors, and technicians into the Park Service uniform.

Somebody evidently thinks the National Park Service uniform is a pretty nice uniform to wear.

Personally, I agree with those who think that.

Do you remember what pleasure Mr. Mather used to get out of wearing the uniform in the field? Do you remember how he talked about its morale building quality? That it would help to weld the men into a compact unit of picked men who were proud of their work? That it would build up an esprit de corps which would hold us together through trying times?

These ideas are as sound now as when he stated them. The badge can symbolize the Service and identify the wearer to the park visitor, but the uniform can do more than that: it can build morale and prestige, morale in the man who wears it and prestige in the eyes of the public - when it is worn by the right men.

Have we changed? Do we believe now that we were mistaken when we thought the uniform might be a morale builder? Is that why we have decided to keep everybody out of the uniform except those who actually deal with the public? Is the Esprit de Corps so fine amongst all of us except those who deal with the public that the wearing of the uniform would not prove a morale builder? Do we hesitate to be known as National Park Service men?

It seems strange that we veterans should feel this way about the uniform, if we do. Maybe we are mistaken in feeling that there is no prestige in the uniform and in trying to keep from wearing it as much as we can, in acting as though we are slightly ashamed of it. Other people seem rather anxious to get into it.

Cordially,

Tom Boss