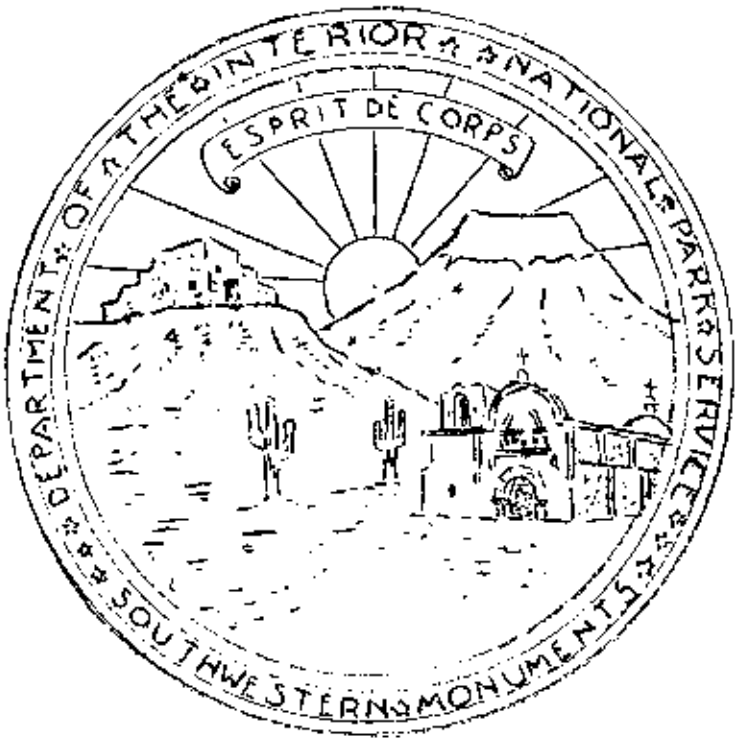
SOUTHWESTERN MONUMENTS

MONTHLY REPORT

OCT., 1936.



DEPARTMENT OF THE INTERIOR

NATIONAL PARK

SERVICE

SOUTHWESTERN MONUMENTS
OCTOBER 1936 REPORT
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HEADQUARTERS STUFF

THE SUPPLEMENT

SOUTHWESTERN MONUMENTS
PERSONNEL

HEADQUARTERS, Southwestern Monuments, Coolidge, Arizona; Frank Pinkley, Superintendent; Hugh M. Miller, Assistant Superintendent; James Luther, Chief Clerk; J. H. Tovrea, Assistant Engineer; Robert H. Rose, Assistant Park Naturalist; Charlie R. Steen, Junior Park Naturalist; Millard Singerman, Clerk-Stenographer, Luis Gastellum and W. H. Sharpe, ECW Clerks.

FIELD STATIONS

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

CONDENSED REPORT

Coolidge, Arizona
November 1, 1936

The Director,
National Park Service,
Washington, D. C.

Dear Mr. Director:

The Condensed Report on Southwestern Monuments activities for October:

TRAVEL	October, 1936	October, 1935	October, 1934
Aztec Ruins	615	1,155	645
Bandelier	728	659	803
Canyon de Chelly	119	64	129
Capulin Mountain	400	1,200	1,000
Casa Grande	2,190	2,281	1,825
Chaco Canyon	732	615	826
Chiricahua	690	---	---
El Morro	169	160	---
Gran Quivira	159	339	288
Montezuma Castle	499	666	1,080
Natural Bridges	65	---	---
Pipe Spring	89	220	420
Sunset Crater	287	---	107
Tonto	217	332	259
Tumacacori	808	711	1,155
Walnut Canyon	758	687	499
White Sands	5,979	3,507	---
Wupatki	155	100	141
Actual Reported Registration	14,859	12,696	9,177

Travel in the Southwestern Monuments for October shows a gain of a little more than 2,000 over the visitor count for last September. Exactly half of this gain, however, was made by three monuments for which there were no reports in 1935. The out-of-the-way stations are showing a definite decrease in traffic due to poor roads and wet weather. This is a seasonal occurrence, and to be expected. Most of the other monuments have also fallen behind last year's figures; the loss in the total count was taken up by a decided gain at White Sands.

The recent storms in the Rockies have made themselves felt in the Southwest. Snow has fallen on the plateau and cool days and nights with some rain in the desert. The Navajos at Canyon de Chelly are predicting the most severe winter in years while at the same time the U. S. Weather Bureau is telling the farmers to look forward to another warm winter with a sub-normal rainfall--we shall see. At any rate, while the custodians of the northern monuments are preparing to hole up and do a lot of odd jobs which have been hanging fire for months, the men in the south are

preparing for a very heavy tourist season. Hotels and tourist associations are looking forward to one of the heaviest travel years on record.

120 PARK INSPECTION BY

121 SUPERINTENDENT

Gran Quivira, Tumacacori, Saguaro, and Bandelier.

123 NATIONAL PARK OFFICERS

Gran Quivira - Charlie R. Steen
El Morro - Robert R. Budlong
Tumacacori - Charles A. Richey, Clinton Rose, J. H. Tovrea, Scofield deLong, Richard Sutton, A. L. Skidmore.
Walnut Canyon - H. B. Chase, A. C. Kuehl, Charlie Steen, T. C. Miller
Wupatki - Eric Reed
Chaco Canyon - Charlie Steen
Montezuma Castle - A. J. S. Eccleson
Casa Grande - Custodian T. R. Goodwin, Death Valley National Monument, T. C. Miller, Neal A. Butterfield, A. E. Underhill.
Chiricahua - Clinton Rose, Charles Richey, J. H. Tovrea, W. W. DeLeon Ward Yeager, Adrey Borrell, Lyle Bennett.
Aztec - Charles Richey, George Collins, Charlie Steen
Bandelier - Charlie Steen, Jack Diehl, J. B. Hamilton, Addison Pinkley, Carl Schmidt.

200 MAINTENANCE, IMPROVEMENTS, NEW CONSTRUCTION

220 IMPROVEMENTS

Wupatki - Trail to new parking area was completed and a screen of native shrubs and grasses planted.

230 NEW CONSTRUCTION

Chiricahua ECW
Massai Point road rock slide is nearly cleared. About 1500 yards of rock and dirt have been removed.
2000 feet on Echo Point-Rhyolite Canyon Trail constructed. This trail is nearly complete.
Headquarters Ranger Station 70% complete
Equipment shed walls 50% complete
Headquarters and Echo Park parking spaces staked out, construct will start soon.
Chaco Canyon - Engineer Clark's engineering crew made plans for the proposed approaches to the bridge over Chaco Wash. While at the Monument two new gauges were set in Threatening Rock.

200 MAINTENANCE, IMPROVEMENTS, NEW CONSTRUCTION
230 NEW CONSTRUCTION (CONT.)

White Sands - Engineer Clark and party have been staking out stakes for three miles of road into the sands.
Bandelier - An engineering crew is doing preliminary work for surfacing the entrance road.
Bandelier ECW -
Signs for Walnut Canyon and Aztec Ruins National Monuments were finished and shipped. Chiricahua signs are being prepared at present.
Two root cellars are complete and the third nearly so.
Equipment shed project was completed.
Some planting was done during the month.
Roofing material was secured from the clearing of a right-of-way by the Forest Service near the monument.
New enrollees were kept busy on the rock quarry project.

300 ACTIVITIES OF OTHER AGENCIES IN THE MONUMENTS

320 COOPERATING GOVERNMENT AGENCIES

Chaco Canyon - The Soil Conservation Service has continued its activities in flood control.
Canyon de Chelly - Geological Survey is determining the monument boundaries.

350 donations and accessions

Chaco Canyon - The School of American Research has given a collection of forty books and scientific reports of the Monument.

400 FLORA, FAUNA, ETC.

420 MUSEUM SERVICE

Bandelier - Work is progressing on the installation of new exhibits in the new museum. The "Trash Mound" case and relief model of Tyuonyi are occuping most of the attention of workers at present; the former case is nearly complete.

430 ARCHEOLOGY

Wupatki - Eric Reed, ECW archeologist, is cleaning out room 7 of Wupatki Pueblo. This room, from which much restorable pottery and some artifacts have been recovered, has been badly washed by rains.

CONDENSED REPORT (CONT.)

470 ANIMALS (CONT.)

Opening of the big game hunting seasons in the southwestern states has caused a concentration of deer in several of the monuments. This is a yearly occurrence.

600 PROTECTION

620 FIRE PROTECTION

Walnut Canyon - A small fire was started in the vicinity of the Monument by a group picking pinyon nuts. The blaze was under control by the time the custodian arrived.

630 ACCIDENTS

Capulin Mountain - Custodian Farr reports that more than two hundred fifty thousand autos have travelled the three-mile road up the mountain without an accident of any sort. This should establish a record of some sort.

MISCELLANEOUS

MAIL COUNT:

Incoming		
Personal	881	
Government	1,684	
Total Incoming		2,565
Outgoing		
Government only	1,959	1,959
Total Mail		4,524
Telegrams		
Incoming	43	
Outgoing	42	
Total Telegrams		85
Total pieces of mail handled		4,609

Cordially,

Frank Pinkley

Frank Pinkley,
Superintendent.

REPORTS FROM MEN IN THE FIELD

AZTEC RUINS

By Johnwill Faris, Custodian

Visitors for the month total 815 which is not quite up to par, but enough to keep us busy the way they string in. Our parties this time of the year often number only one or two to the party and in reality we are on the go about as much as we are in mid season when our parties number ten to 20. Such is life in the wild West, however, and after all it is a grand time we are having whether our count is one or 100.

Other than the visitors the month has been very normal. No work on the side has been going on and really it hardly seems that I should be writing a report and not fill it up with the progress of various projects.

Official visitors for the month include Mr. Collins, of the District Office, and Chuck Richey, also of the District Office. Charlie Steen was in for a few days and we had a great time with him. It was his first visit here and we hope that now he has broken the ice he will drop in quite often.

This hardly seems like a report, Boss, but it covers the subject and any more at the present time would be folly so I sign off one of my shortest reports in months.

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TONTO

By Francis Stevenson, In Charge

It was a good month at Tonto - good visitors, good weather, and a good time by all.

Statistics tell the story pretty much. There were a total of 217 visitors from almost every section of the country. These composed 65 group trips to the ruins and 75 to the museum. The visits averaged 45 minutes to the ruins and 15 minutes to the museum. There were 177 guided to visit the ruins and 209 the museum. The total time for trips to the museum was 2,943 minutes and to the museum 1,137 minutes.

The callers all showed keen interest in the ruins and the life of the old Indians. Many, however, found the going a little tough and suggested an escalator to replace the winding gravel path.

The trail seems in good condition.

The mice and I seem to be fighting a draw but life is very pleasant in the little stone castle amid the cactus.

CASA GRANDE

By W. J. Winter, Custodian

Traffic did not increase much this month until the last few days, which have been fairly heavy. If this continues next month's report will show a substantial increase. The total number shown through the ruins was 2,190. These came from 38 states, Hawaii and the District of Columbia, as well as Canada, France, England and Kenya Colony, British East Africa. One lady registered from a battleship, the U.S.S. Oklahoma, thereby giving rise to considerable speculation on the part of those of us who know our navy.

No special large groups are recorded. Several visitors worthy of special mention were received, among them being Robert Marshall, Director of Forestry and Grazing, Office of Indian Affairs, Washington, accompanied by W. H. Zeh, U.S.I.S. of Albuquerque, on October 3. October 4 we met Volney A. Jones, Ethnobotanist of the University of Michigan Museum, Ann Arbor. You will recall the correspondence (published in this report) between Charlie Steen and Mr. Jones regarding our "ceremonial cigarettes". October 4 we also met Elizabeth Toohey, State Historian of Arizona. October 4 seems to have been an interesting day, for it was also on that date that a Phoenix car drove up to the curb and there emerged a lday, her husband and three girls and when I inquired if they wanted to visit the ruins the lady replied, "Oh, no, we don't want to waste that much time!" That stopped me.

Several NPS visitors were recorded for the month. September 25 T. R. Goodwin, Custodian of Death Valley National Monument, came in for a few minutes. October 16 and 17 we had the plreasure of again seeing Custodian Cal Miller of Chaco and of meeting Mrs. Miller. Cal still thinks he has the best monument in the Southwest, even after several visits to this one. What can you do with a guy like that? October 24 we met Neal A. Butterfield of the Washington Office, Branch of Planning and State Cooperation.

Day temperatures this month ran from 71 on the 24th to 102 on the 11th. Night temperatures were from 43 on the 22nd to 68 on the 16th. Precipitation was .22 inch.

We are still contending with our balky sewer pump and hope that the plans for the new system are turned loose pretty soon. We wouldn't feel normal if we couldn't gripe about something. Our newest gripe is an old one revived -- shortage of personnel. The winter rush seems to have started just in the last few days and has made very apparent the need for an additional guide. Our authorized temporary man won't go on duty until January 1 and we hate to think of the two months between now and then, if the crowds keep up as they have been for the last three days.

Another improvement that is hanging fire is the resurfacing of our entrance road and parking area. A. E. Underhill is here to supervise the

job and we have enjoyed getting acquainted with him. We don't always tell the truth, either. (Now Everett will claim that we pondered half a day to think up that bum crack. Maybe we did.)

Now that we have practically run out of things to say, we get to nature notes. "Sort of a last resort," say we dirtily, looking at Jr. Naturalist Steen. The first Gambel Sparrows of the season were observed October 13. None have been caught as yet. Bats in the ruins are not as plentiful as last month. There has been a shake-up in the owl family in the Casa Grande. For about a week we missed one of the owls. October 17 we found his body in one of the low house ruins in Compound A, north of the Casa Grande. Cause of death unknown. For several nights thereafter the other owl hooted continuously all night - at least he was still at it when any of the bachelors came in from their dates, so we may say it was all night. Within a week another mate was attracted (by the owl, not the bachelors), and now there are again two owls to be seen up in the roof, just as before. We wonder now how many times this may have happened since a pair of owls was first noticed in the roof, which we understand was many years ago.

Charlie Steen reports that our gas delivery man is a big help to the bird banding industry. It seems that he met Steen and said "You know that there little cage out behind your house? There was a bird got caught in there and I was going to take him home to my kid. I put him in my pocket, and y'know, he got away!" Which livened the day for Custodian if not for the bird banding naturalists.

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CANYON DE CHELLY By Robert R. Budlong, Custodian

During the month of October, 1936, we had a noticeable increase in visitor travel over that of October, 1935. Total visitors this months, 119. (In October, 1935, 64 persons visited this National Monument.) This month's visitors took trips as follows:

TRIP	NO. TRIPS	NO PERSONS	TOTAL TIME	AVERAGE TIME PER TRIP
Rim	10	30	1,380 Min.	138 min.
Trail	1	3	180 Min.	180 min.
Car in Canyon	20	89	3,960 Min.	198 min.

Car trips within the canyons should be broken down as follows:

	TRIPS	PERSONS	TOTAL TIME	AVERAGE TIME
Concessioner's car	4	9	1,320 min.	330 min.
Other cars (22)	16	80	2,640 min.	165 min.

Visitors arrived in 37 cars, each car averaging 3-plus persons. Increase in number of visitors this month, over the same month last year, was 46 per cent.

Weather seems to be a little more winter-like than during October last year. Maximum temperature this month, 87 degrees, on September 25; minimum 26 degrees, on October 8 and 9. Greatest range in 24 hours, 60 degrees, on October 9; least range in 24 hours, 12 degrees, on October 20. Total precipitation during the month .26 inch. First killing frost was on October 7. The leaves on the cottonwoods promptly turned a bright yellow, furnishing a new color note in the general landscape. Nights are cold, and we had a trace of snow early in the morning of the 19th. Hail fell hard for a few minutes the afternoon of the 21st, the hailstones measuring about a quarter of an inch in diameter. Both snow and hail melted shortly after reaching the ground. At this writing the Lukachukai Mountains have a light capping of snow.

"Doc" and Mrs. Gipe left this Monument for Headquarters the afternoon of the 5th. I was in Gallup at the time, but Doug said he never saw people pack up and move in such a short time. The skies threatened rain or snow, the work was finished, and they took no chance of being caught. We hope their old truck, "Hohokam", made the trip to Headquarters without any troubles along the road, but are inclined to doubt it.

Mr. E. E. Harris, of the Geological Survey, arrived at this National Monument with a crew of four men on October 10, taking temporary quarters in "Doc's" deserted tent. They started establishing levels for the work of accurately determining the boundaries of this National Monument the following morning, and at this writing have only about one more day's work remaining. At least, they did have, up until last night. While they were in Canyon del Muerto, rain fell in the upper reaches of Canyon de Chelly, and as they drove their car down-canyon below the forks of the two canyons the water kept slowly rising. There was nothing to do but keep on, and they almost made it - but not quite. A patch of new quicksand caught their car just within the mouth of the canyon, and it bogged down to the frame at once. They spent all evening and much of the night trying to extricate it, but the water kept rising, and the sand grew softer, affording no footing for timbers or fulcrums for the pry-poles.

A dam was built upstream from the car to divert the water, and when finally the sand grew more firm they managed to get the car out, using three teams and many Navajos. The Custodian managed to shoot a dozen photographs with his Graflex, to be used in the future in convincing skeptical visitors that cars can get badly stuck or lost in the sands within the canyons.

Mr. F. Armstrong Roberts, of photographic fame, visited this Monument the 4th and 5th of October. He took several hundred photographs during his two days' stay, and we are hoping to see some in the near future.

And so winter draws near, and shortly visitor travel will cease almost entirely. The Navajos predict the hardest winter in many years, and this year we believe their predictions may be correct.

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MONTEZUMA CASTLE

By Martin L. Jackson, Custodian

Have had 499 visitors from the first to the 23rd, inclusive. The last five days of last month were estimated and went in on the annual travel figures. 228 made the climb up to the Castle.

Roads leading into the Monument are still in bad condition and more road work is yet to be done this winter.

The past month has been a rather hectic one with us. On the 11th of last month I managed to knock some teeth out cranking the gasoline electric motor. I went to the doctor immediately and he thought they might tighten up and grow back naturally but no such luck. They became badly infected and when the smoke cleared away the dentist had gotten eight teeth. Meaning that I have been without any front teeth for the better part of the month. It was impossible for me to pronounce some words very distinctly - made a kind of whistling noise. Was in constant fear that some visitor w ould possibly think I was whistling at them or maybe to date up some lady. So far have not been landed on.

Russell Farmer, the new ranger, arrived on the first, and took hold of the situation here like an old war horse. Mr. Farmer comes from Lassen Volcanic National Park.

During the month we had a nephew of Andy Mellon (The Andy Mellon) in to visit us with his family. He is the founder and head of the Gulf Oil Company and seemed to enjoy the Monument a lot - coming to the place three times from a neighboring guest ranch.

A. J. S. Eccleson, Special Agent of the Department of the Interior, was in looking over the books of the Concession for a day or so.

Dr. Byron Cummings, Dean of Archeology of the University of Arizona, was a visitor about ten days ago, coming in with Mr. and Mrs. Gable, also of the University.

Ranger Bingamon and wife were in on the 15th from Yosemite National Park.

We bring the month to a close with the weather looking very unsettled and stormy with reports of snow in the mountains to the north and around Flagstaff.

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WHITE SANDS

By Tom Charles, Custodian

The only excuse that I have to make a report this month is the precedent which the other boys have established.

Except for the fact that the Park Service crew of surveyors under A. E. Clark, is here and settling grade stakes there is no news except visitors. Mr. Clark's party is setting stakes for the first three miles of road into the Sand. Twenty-five thousand dollars was set up for this work. There are still lots of visitors. Sunday, the 18th, Mrs. Charles and I were at the Sands six hours and counted 47 cars at the turn-around. They seem to come in about as fast as when the weather was warmer, the only difference being that the hours are not so long; they visit about 10 hours a day now instead of 14 as they did in the summer.

It is a long drive from the days when I first saw these White Sands to their present state of development. Then there were over 100,000 acres of these alabaster dunes held by one group, under their mining claims. The smoke of the mesquite roots gave the desert air a tang, the creaking of heavy machinery left the impression of the busy, business life.

Across the chalky hills, to the new town of Alamogordo, the six ox team of longhorn cattle moved at a snail's pace. The heavy, wide tired, wagon creaked and groaned under the tons of snow-white Plaster of Paris. And Industry proclaimed that there would come a day when the use of gypsum would make these hills the commercial centre of the great Southwest.

These industrial prophets were at least 50% correct, the day of gypsum has arrived; the skyscrapers of the city are built of steel and gypsum, the fire-proof walls, the wall boards, even the tile of the floor and the roof is gypsum and a late issue of Fortune tells us that the modern oak finishings are made by pasting the photograph of an oak board on a slab of Plaster of Paris.

There are millions of tons of gypsum used annually in the United States alone. But every one has gypsum. They put it on board ship in Nova Scotia for $1.00 a ton and there is plenty of it to supply the Atlantic sea coast for years to come. Arizona, New Mexico, Texas, all have inexhaustable supplies of gypsum in one form or another and it is just as good as ours for commercial purposes.

But if you w ill let me classify this material into commercial gypsum and recreational gypsum, then we begin to shine for in recreational gypsum the White Sands has no competition. No place else is there alabaster sand dunes with the beauty and splendor of the Great White Sands; no place else do they have gypsum that the children cry for and the grown-ups love to play and dig and bury themselves in; no place else do they have gypsum where you can turn 3,600 school children

loose, without preparation, and without fear of injury from sticks or stones or stings or snakes or anything else, And we thank the lucky stars that White Sands has escaped commercialization.

About five years ago there was definite turn toward the inspirational. The chambers of commerce of a dozen towns demanded the reservation of the area for recreational purposes, Horace N. Albright answered the call for considering the area; Roger Toll made an official inspection and President Hoover declared the area a National Monument.

In the past year 25,000 children have enjoyed the pleasures of a romp in the national sand pile; 1,000 teachers have carried their inspiration back to the schools; 100 preachers have stood on the hills in awe of God's handiwork. Over 90,000 people have reveled on these velvet hills, this year, and with this inspirational feast they have combined the fact that 20,000 out-of-state cars have paid their commercial toll of gas and oil, of food and lodging, an estimated $400,000 as White Sands contribution to the tourist business of New Mexico.

It is a long way from Bill Fetz and his six-up teams of longhorn cattle, to 90,000 annual visitors. We have arrived at a safe distance from the commercial. The public has decreed that there is something more to the White Sands than just gypsum. There is more to the picture than just the paint that is on it. There is beauty and thrill and inspiration and recreation; if there wasn't there wouldn't have been 90,000 visitors this year.

We have had a number of good sized parties this month, which may bring the contacts up a little though the total count is down. On October 1o the custodian addressed 300 women at the annual meeting of the State Federation of Woman's Clubs; on the 18th ten carloads, about 60 people came from the Soil Conservation Camp at Ysleta, Texas, and on the 19th 80 students from the Austin High School, El Paso, came up with a group of teachers. But the registration book shows 837, which on the basis of 14% registration, gives us 5,978 visitors for the month.

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WUPATKI

By James W. Brewer, Ranger in Charge

500 USE OF MONUMENT FACILITIES BY THE PUBLIC

76 guests registered at Wupatki; 105 at the Citadel group; 27 names are duplicated, leaving a total of 155 visitors to this Monument in October 1936; 1935, 100; 1934, 141.

One party camped overnight in the first trailer to reach the Pueblo this year.

WUPATKI (CONT.)

530 NEWSWORTHY VISITORS

Ranger F. V. Leicht of Grand Canyon on the 30th.
Dr., Mrs. and Farrell Colton on the 4th.
Richard Van Valkenburgh of U.S.I.S. on the 14th.
Mr. a nd Mrs. Bert Lauzon, Ranger, Grand Canyon, on the 11th.

021 WEATHER

September and the first half of October were nice Indian summer days; on the 16th wintery skys began to appear and are still with us.

Days cloudy	7
Days part cloudy	2
Days sunny	21
Maximum temperature	86° on the 25th
Minimum temperature	38° on the 20th a nd 22nd
Precipitation	.034 inch
Anemometer	4769.8 miles, total for month
Maximum 24-hour reading	407.8 on October 16
Minimum 24-hour reading	42.3 on October 18.

200 MAINTENANCE, IMPROVEMENTS, NEW CONSTRUCTION

220 IMPROVEMENTS

The trail from the east wash to the new parking area is complete.

I borrowed Clyde, a team and scraper, and moved the pile of back-dirt over the ledge and graded it to make a ramp. Two drain pipes fitted with rock culverts are installed under the ramp. Leaving enough back-dirt on the ledge to encourage vegetation, I have leveled it off and transplanted what I hope will form a nucleus of typical flora. (Mormon tea, Rabbitt brush, Atriplex, Apache plume, thistle, Match bush, and grass.) I have been hauling water and watering those transplantations, each of which has been planted in a mixture of cinder, mold and the back-dirt. (The back-dirt alone does not seem to encourage plant life.)

The ramp itself has not yet thoroughly settled and will need occasional attention until usage a nd rain have packed it down.

On the 20th I hauled out a load of scaffolding lumber to be erected under the east wall of room 41 while the I beam is being installed. This work is being held up until some engineering advice arrives.

On the 13th Paul brought Mr. Eric Reed, Assistant Archeologist, to the Pueblo to trowel out room 7.

220 IMPROVEMENTS (CONT.)

The artifacts being recovered are so badly mixed with fallen walls that a great deal of care must be given.

Already about one dozen restorable vessels have been taken out; also bone implements, an animal figure carrying a small bowl, a large stone pendant, a stone bowl, pestles, two metates, a dozen manos, and some shell ornaments. (Half the fill to the ground floor level has been excavated.)

230 NEW CONSTRUCTION

A cement lined catchment basin was constructed around Wupatki Spring. A weather tight cover was installed, also a diversion dike to prevent damage by surface water.

WATER ANALYSIS

Mr. Robert A. Green, Director of the Arizona State Laboratory, University of Arizona, gives the following chemical analysis of Wupatki Spring water: (9/21/36)

Parts per million:

Total soluble salts	1189 ppm
Calcium	80 ppm
Magnesium	65 ppm
Sodium	196 ppm
Chlorides	96 ppm
Sulphates	428 ppm
Carbonates	60 ppm
Bicarbonates	284 ppm

"This water is fairly hard and the amount of salts slightly exceeds the limit w hich we usually recommend for domestic water. I see no reason, however, why this water might not be used for domestic purposes, provided that it has satisfactory bacteriological qualifications. This water contains a good deal of gypsum which is calcium and magnesium." (We just sit around and listen to our arteries harden.)

320 COOPERATING GOVERNMENT AGENCIES

AERIAL SURVEY

On the Monument one quarter mile east of the Pueblo the Coast and Geodatic Survey has erected on aerial target and placed 3 brass buttons.

AERIAL SURVEY (CONT.)

The "target" is a 5' square platform erected to a height of about 5 feet above the ground, with a flagpole centered above one of the brass markers.

Three triangulation parties have come to the target at night, and with automobile headlights mounted on the platform, have measured the distances between the targets. (One has also been placed on the east rim of Sunset Crater, another on the San Francisco Peaks and many others.

The measurements will be correlated to the aerial photographs. (Adding these three new brass buttons to those of the N.P.S., land office survey and bench marks, Wupatki should look like a hotel doorman.)

GENERAL

TRAFFIC RECORDER

On Highway 66 about 4 miles east of Flagstaff the highway department has installed a photo-electric cell "Traffic Recorder". This instrument projects a double beam of light across the highway at a 25° angle and when the beams are broken simultaneously by a passing car the instrument records the day, hour, and minute of the passing vehicle and also computes an hourly total.

At a 23° angle the beams are broken only once by a car and trailer. The two beams being 3 feet apart are not broken simultaneously by pedestrians.
Friday (16th) noon to Saturday noon 1,416 cars and trucks passed
Saturday noon to Sunday noon 1,350 cars and trucks passed.
The Sate highway engineer asks cooperation of National Park Service Rangers to see that the instruments are not molested.

(Clyde was with me when this recorder was explained by the engineer and after inspecting its innards and listening to it tick as a car passed, his only remark was: "White man, too much a loco").

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SUNSET CRATER

By James W. Brewer, In Charge

The geological rim sign was installed on the 24th. A clean-up was made on the 25th. 287 visitors registered at Sunset Crater during the month of October, 1936; 1935, 165; 107 (18 days), 1934.

CHACO CANYON

By. T. C. Miller, Custodian

General

October has been a good month in the Chaco. Weather has been excellent for travel. It is one month in the year that is not too wet or too dry for the average visitor to make the drive from highway U. S. 66 into Chaco, then continue on north to Aztec and Mesa Verde, or State road 55 to Albuquerque.

On official trip was made to Headquarters by the Custodian during the month.

Weather Statistics

Maximum temperature, 81 on the 12th; minimum temperature, 26 on the 22nd. .71 inch of precipitation was recorded during the month. The first trace of snow fell September 27. The first killing frost was recorded September 29.

Travel

732 people entered the Monument in 202 automobiles, coming from 20 states and the District of Columbia; Foreign countries: Budapest, Hungary, and Paris, France.

National Park Service Officers

Engineer Clark and his three assistants arrived September 20 and departed October 3. While Mr. Clark's assignment was roads and bridges in Chaco, Associate Engineer Hamilton had two additional steel bars set in the Cliff and the Threatening Rock. These bars serve as gauges to determine any movement that might take place from time to time in the Threatening Rock. The first gauge of this kind was set by Mr. Clark November 2, 1935. Five months later I noticed that something had happened, but I could not believe that the rock had moved $\frac{1}{2}$ inch until Andy came back and made the check in person. Now that we have begun to wake up to the fact that this rock might fall on Bonito, I think that we had better get our Engineering Department to take that Rock down. I will watch those steel bars this winter and if the rock should move again even a fraction of an inch something should be done about it. John Keur has given that rock considerable time and thought, he could probably give us some close figures on the subject.

Charlie Steen, Junior Park Naturalist, arrived on the afternoon of the 10th and departed on the 11th.

Special Visitors

Dr. and Mrs. Edgar L. Hewett, Director School of American Research, and Dr. and Mrs. C. L. Lowman, Los Angeles, California, arrived September

30 and departed October 1. Dr. and Mrs. W. W. Peter, Medical Director U. S. I. S. Navajo and Hopi areas were interested visitors on the 4th. Mr. G. M. Duckworth and Mr. Glen Myres from the Automobile Club of Southern California arrived on the 4th and departed on the 5th. Mr. E. G. Fine, lecturer and photographer, Boulder, Colorado, and Mr. Lloyd Case, Chamber of Commerce, Durango, Colorado, spent the day on the 12th photographing the ruins of Pueblo Bonito and Chetro Ketl. Mr. and Mrs. Poil Teleman, archaeologist from Budapest, Hungary arrived on the 14th and departed on the 15th.

Personnel

Homer F. Hastings, temporary Ranger-Historian, separated from the Service September 30. I surely have missed Homer during the month of October. He has finished a busy season and he certainly made the service many friends during his tenure as Ranger-Historian in this Monument. All we can say is "thanks Homer," and we surely hope we can get you back next season!

Activities of Other Agencies in the Monument

During the month of October the Soil Conservation Service have moved approximately 1000 yards of dirt that was placed on the Diversion Dikes near headquarters. Sixty yards of masonry wall was built near the ruins of Kin Kletsoi where they plan to bring the flood water into the Chaco Wash.

The School of American Research have been building what the Navajo's call "ya-be-chi Hogans", near their headquarters building. One hogan is complete and is being occupied by Mr. and Mrs. Paul Reiter. Two more hogans are about 40% complete; it is understood that Mr. Vivian and family will move into the next one completed.

The following Technical papers were donated for permanent use for the personnel of this Monument, by the School of American Research. This is a valuable collection and we greatly appreciate the contribution.

No. 17 Educational Addresses of Dr. Frank Springer.
21 Two Addresses on The Life of Frank Springer, Edgar L. Hewett
22 Official Acts and Administrative Reports of the School of American Research
24 Twenty-five Years of Achievement, Paul A. F. Walter
25 The Sciences of Man in The Program of Research, Edgar L. Hewett
Director's Statement for 1928-1929-1930
The Third Season's Work in Guatemala, Edgar L. Hewett
Archeology of Rio Grande Valley, Edgar L. Hewett
Annual Reports for the School of American Research in Santa Fe for 1931-1934-1935.

CHACO CANYON (CONT.)

32 Architecture of The Exposition, Edgar L. Hewett and Wm. T. Johnson
34 The Proposed "National Park of the Cliff Cities", Edgar L. Hewett
42 An Address Delivered by Hon. Frank Springer at Dedication of New Museum Building, Santa Fe

PAPERS OF THE SCHOOL OF AMERICAN RESEARCH -- New Series

2 The Southwest; Yesterday and Tomorrow, Edgar L. Hewett
3 Catalog of the Borrowdale Collection
5 "Tonita of the Holy Faith", Maude McFie Bloom
6 Organic Acts and Administrative Reports of the School of American Archeology
7 Early Bridges in New Mexico, Lansing B. Bloom
8 A Proposed Indian Theater in Santa Fe, Edgar L. Hewett
9 Letters on the Pueblo Indian Situation, Edgar L. Hewett
10 Present Condition of the Pueblo Indians, Edgar L. Hewett
11 Pecos Explorations in 1924, A. V. Kidder
12 A new Process for Photographing The Interior of Indian Pottery Bowls, Wesley Bradfield
13 The Fiesta Book
14 The Excavations in Pecos in 1925, A. V. Kidder
16 Early Pecos Ruins on the Forked Lightning Ranch

PAPERS OF THE SCHOOL OF AMERICAN ARCHEOLOGY

No.	Title	Author
1	The Groundwork of American Archeology	Edgar L. Hewett
2	The Excavation of the Cannonball Ruins in Southwestern Colorado	Sylvanus G. Morley
3	The Pajaritan Culture	Edgar L. Hewett
5	The Excavations at Tyuonyi, New Mexico, in 1908	Edgar L. Hewett
7	The South House at Puye, New Mexico	Sylvanus G. Morley
10	The Excavations at El Rito de Los Frijoles in 1909	Edgar L. Hewett
11	The Correlation of Maya and Christian Chronology	Sylvyanus G.Morley
12	On Phonetic and Lexic Resemblances Between Kiowan and Tanoan	John P. Harrington
13	Documentary History of the Rio Grande Pueblos of New Mexico	Adolph F. Bandelier
14	An Introductory Paper on the Tiwa Language of Taos New Mexico	John P. Harrington
15	Explorations in Southwestern Utah in 1908	Alfred V. Kidder
16	Antiquities of Central and Southwestern Missouri	Gerard Fowke
17	A Brief Description of the Tewa Language	John P. Harrington
20	A Key to the Navajo Orthography Employed by the Franciscan Fathers	
	The Numerals "Two" and "Three" in Certain Indian Languages of the Southwest	John P. Harrington
31	The Santa Fe of the Future	Wm. T. Johnson

WALNUT CANYON By Paul Beaubien, Ranger in Charge

This month 758 visitors registered at Walnut Canyon, of which 577 are listed as educational contacts. There were several hundred others in the vicinity to harvest the first pinyon crop in 11 years.

One fire was started by the nut pickers, but it was under control by the time I arrived.

Park Service visitors were H. B. Chase, A. C. Kuehl, Charles Steen, Milton Wetherill, and T. C. Miller with Mrs. Miller and Joe. Mr. Kuehl registered the 13th while I was taking Eric Reed to Wupatki, and Mr. Miller arrived the 18th while I was taking an airplane ride over Grand Canyon for six well spent dollars. "Hub" Chase came through one evening after I had gone to town for mail, so I missed him also. Altogether, my batting average with Park Service visitors was rather low this month.

Lyndon Hargrave of the Museum of Northern Arizona spent the nights of the 17th and 18th with me. He banded 54 birds on the 18th besides accompanying me on the Grand Canyon trip. About 50 pine siskins were released that day without bands as we did not have the right size.

In total, 109 birds were banded this month: 38 Pine Siskins, 24 Chestnut-backed Bluebirds, 17 Crossbills, 6 Western Chipping Sparrows, 12 Pygmy Nuthatches, 4 Red-naped Sapsuckers, 3 Western Robins, 2 Rocky Mountain Evening Grosbeaks, 1 Gambel Sparrow, 1 Red-shafted Flicker, and 1 Red-backed Junco. "Lyn" Hargrave believes the Evening Grosbeaks to be the first ones banded in Arizona. To date, nine "returns" have been reported to the Bureau of Biological Survey.

A few stormy days rendered the water trap useless much of the time as the birds do not flock to the trap when small puddles of water are near. Also, bad weather has a decided effect on the visitor count.

Have just received word that the new road signs from Bandelier are awaiting me in town. I suspect there will be many more visitors next summer because of them.

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CHIRICAHUA By Frank L. Fish, Custodian

Dry conditions have prevailed during the month without any storms. Nights have been cool with no killing frosts up to the present date on the monument. To the south of us at an elevation of 9,000 feet the aspens have changed color, indicating frost at that elevation.

Rain is falling at the present writing (Oct. 24) which will probably result in colder weather in the near future.

Roads

Approach roads have been badly corrugated due to lack of moisture and grading.

Visitors

Our October registration shows a gain of over 100% in visitors over that of last October, 690 arriving in 158 cars as against 325 in 80 cars last October. 63 were new enrollees who were taken on a sight-seeing trip. Approximately 50 others can be considered extra as the Copper Register gift referred to in last month's report was made on September 27 and counted as part of this month's registration. 213 or 30% of the visitors were from out of the state.

Park Service Officials

Clinton Rose, Charles Richey and J. H. Tovrea looked over our trails, camp grounds and buildings.

Hugh Miller and Mr. Strieby were here on ECW work, while they were busy it was my pleasure to educate the wives along with Mrs. Yeager in horseback riding a la Chiricahua.

Dr. De Leon and Ward Yeager did some bug hunting. Ward also classified some of the trees of this region.

Adrey and Mrs. Borell intended staying with us a while, but a telegram rushed them away before we could hardly renew old acquaintances. In fact Adrey left his hat here in his rush.

Lyle and Mrs. Bennett were in looking over buildings and these people who live around the Pueblos brought a rain with them.

Newsworthy Visitors

John Ball, photographer, Bisbee, Arizona; A. H. Gardner, Secretary of the Chamber of Commerce, Douglas, Arizona; Grace Sparks, Secretary of the Yavapai Chamber of Commerce, Prescott, Arizona.

Father Victor Stoner, District Chaplain, Tucson, Arizona. Father Stoner agrees with Mr. Pinkley on the Tumacacori Mission Museum. Incidently he is considered an authority on the Kino Chain of Missions.

Cooperation with Other Agencies

Two lantern slide talks were given to the enrolles at the CCC Camp, total attendance 220.

CHIRICAHUA (CONT.)

The Custodian is continuing a course in practical Forestry with 24 enrolled. Part of this shall be a course on future fires next summer.

Fauna and Flora

Deer season opened October 16. So far there has not been any violations known within the Monument. Many shots have been heard outside the area. Two parties have been warned about shooting near the boundaries. This is a difficult situation as the Monument has not been marked as yet.

Ed and Mrs. Knagge reported a small lion track in the trail at Echo Point on the 18th.

A black tail rattler was captured the 22nd and will be shipped to Dr. Blanchard.

General

A talk was made by the Cus todian to the new enrollees warning them about defacing or destroying the natural features of the Monument. The ideals and origin of the Park Service was explained also.

The power saw was received and operated during the month resulting in a nice supply of sawed wood, mainly oak, for use this winter.

Accumulation of refuse in the borrow pit was burned; Humus was hauled and placed around the recently planted trees in the road obliteration area.

With the help of new enrollees a general clean-up was carried out along the roads and old camp sites, the usual maintenance clean-up was carried on during the month.

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CHIRICAHUA ECW

By Wm. Stevenson, Project Superintendent

The large rock slide which occurred early in September on the Massai Point Road has been mostly cleared away. There remains yet about 200 yards of overhanging rock and dirt to be removed to give a proper slope. A total of about 1,500 yards has been removed to date.

Considerable maintenance has been necessary on the Bonita highway this month. This consisted mainly in opening up ditches and culverts. Some resurfacing has been done also.

The Echo Point-Rhyolite Trail is nearly complete. 2,000 feet have been constructed this month. This trail has been open to horseback parties for several weeks.

Due to shortage of men during the past three weeks, no trail maintenance has been carried on this month. The work will be resumed as soon as the new men are available.

Headquarters Ranger Station is about 70% complete. The work on this building has been somewhat slowed up this month due to the loss of several key men. During the past week a few of the new men were available for this job so the work is now moving along very well again.

The equipment shed walls are about 50% complete. Window frames are in place; also most of the framing of large timbers has been done. There is still some rock to be selected for window sill finish and some for top finish around rafters.

The Headquarters and Echo parking spaces have been staked out and construction will start as soon as possible.

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TUMACACORI

By Louis R. Caywood, Custodian

So much has happened during the past month that the time has slipped by unnoticed. Although the visitor record is not high for the month, it may be that it is the lull before the storm or the breathing spell before the winter rush begins. Seven hundred and forty-three visitors were contacted by guided trips through the Mission while 65 others used the facilities making a total of 808.

Although other parts of Arizona have reported rain and even snow, neither has fallen here. With the exception of two days of severe wind the month has been delightful. The mornings are now a little nippy and there is a tang of autumn in the air.

The proposed museum and administration building has been the cause for quite a number of official visitors. On October 1st Charles Richey, Clinton Rose and J. H. Tovrea were here on their way from Chiricahua to Headquarters. Unfortunately, the custodian was in Tucson that day obtaining wage rates for various building crafts and missed the party.

On October 16, the Boss, Nancy Margaret, and Tovrea from Headquarters accompanied three of the Park Service architects here for a first hand discussion on mission architecture. Seefield DeLong, San Francisco, and Richard Sutton and A. L. Skidmore, both of Washington, D. C., spent considerable time studying the architecture of Tumacacori. We certainly enjoyed their visit and discussion, but really could have done without the sample of a good old Coolidge dust storm which they accompanied here. The Boss and Nancy returned to Headquarters while Tov and the architects made a flying trip into Mexico to see other missions. On their return on the

19th they stopped in long enough to report that they had visited Cocospera, San Ignacio and Oquitoa.

October also brought us Charlie Steen from Headquarters who was accompanying his sister and her family on a short tour of Southern Arizona and Luis Castellum who dropped in one Sunday morning to say hello.

Fred Winn, Supervisor, Coronado National Forest and party of Forest Service Officials were mission visitors on October 1.

The Custodian and H. C. W. P. visited Headquarters on October 12 and 13 where a discussion was held over the proposed Tumacacori Museum plans. This was our first visit to Coolidge since coming to Tumacacori and we certainly enjoyed seeing the gang again.

Work has gone ahead on the grounds this month until they begin to look presentable after the final removal of a blanket of weeds.

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EL MORRO

By Evon Z. Vogt, Jr., Acting Ranger

Weather and Roads

On September 27 a heavy snowstorm caught this ranger without firewood, having used a gasoline stove all summer, and with only enough bed covers for balmy weather. While snow fell fast and furiously all day, I chopped up old fence posts for wood, painted signs indoors, and recorded the first Sunday this season without a visitor.

Snow fell again on October 6, and heavy rains soaked the Monument on October 19 and 20. Between storms, however, we have had the usual beautiful autumn weather.

As November the 3rd draws nearer, road work in this part of the state progresses rapidly. Believe it or not, a tractor and grader have actually passed in front of historic El Morro. During the past seven centuries pre-historic Indians on foot, Spanish conquistadores on horseback, American emigrants in covered wagons, tourists in automobiles, and transcontinental passengers in airplanes have all passed El Morro, but this is the first time in history that a tractor and grader have chugged across the valley from the Zuni Mountains and noisily graded along the Monument boundary and on beyond. El Morro's time-honored tradition has been broken, for it is no longer as inaccessible as it was in Coronado's time!

The grade is thirty feet wide, follows a good straight route, and is twelve miles long, leading from El Morro east to Swatzell's Ranch.

From there to Paxton Springs the road has been graded by the lumber camp outfit. The Grants approach road is now in much better shape than the Gallup road.

Travel

From the standpoint of travel the month has been slow and uneventful. Visitors number 169. Only newsworthy visitors were Robert R. Budlong, that tall lanky cliff-dweller from Canyon de Chelly, and Mrs. Budlong.

I think the reason that Bud squawks so much about de Chelly being the finest National Monument in the Southwest is that he hasn't seen any of the other monuments. After his visit to El Morro, he will think three times before making any more rash statements!

Flora and Fauna

October is by far the most beautiful month of the year at El Morro. Jack Frost turns the oaks to a deep yellow and later to a rusty orange. The mountain sumac bushes are colored a flaming red. These gorgeous colors stand out against the buff-colored rock and dark green pines. Above all is the deep blue New Mexican sky with its white billowy clouds. All this presents a vivid scene which is not soon forgotten.

But already the winter winds have stripped the oaks of their lovely leaves, and pack rats are hurrying to fill their nest with piñons before the first big snowstorms cover El Morro.

The following birds were observed at El Morro during October

Golden Eagle	Pinyon Jay
Western Crow	Woodhouse Jay
White-throated Swift	Mountain Bluebird
Cooper Hawk	Chestnut-backed Bluebird
Red-shafted Flicker	Pigmy Nuthatch
Lewis Woodpecker	Canyon Wren
White-breasted Woodpecker	Arkansas Goldfinch
Western Meadowlark	Belted Kingfisher

The belted Kingfisher is a newcomer to the list. He was spotted flying around the water hole in the Rincon. I'll bet he had his eye on the big juicy salamanders in the pool.

General

Two signs warning visitors that "the engraving of names on the rock is strictly forbidden by law" were repainted.

The roof of the ranger's cabin was painted with tar.

Three loads of oak and cedar wood were ordered for fuel for the permanent custodian this winter.

Old Rafael (Navajo) and family were gathering the piñons on top of the mesa southwest of the south ruin where the crop is exceptionally heavy. They are being careful not to damage the monument fence or injure the trees in any way.

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GRAN QUIVIRA

By George L. Boundey, Custodian

Visitors for October, 159.

On September 27, it started to rain but during the night it turned to snow and the morning of the 28th showed about a foot on the level and many drifts.

Except for a few who had cut their corn and beans early, those crops are a total failure as there is no market for discolored beans and of course the corn was frozen.

There was unusually heavy traffic on our roads following the snow and the roads were so badly cut up that the few tourists who ventured over them found them very bad and this of course has cut down visitors for this month considerably.

As is the custom each year, several hundred transients from southern states arrived to help harvest the bean crop, just before the snow. The general verdict was that they did not know there was any place in the United States that ever got as cold as that, and every one left the following morning.

Two nights a week we are using the film projector down in the community building. The District health nurse has agreed to come down from Albuquerque every Tuesday; during the afternoon she will conduct classes in nursing and in the evening we will project the films which will be a part of the nursing course.

Another night each week will be given over to films of the National Parks, Monuments, National Forests and all those subjects the average person should be interested in.

A few of the Evening Grosbeaks stayed with us all summer but the majority went farther north, but now they are returning in great flocks, along with thousands of Robins and Bluebirds. It keeps one busy filling up the drinking water containers.

Have cut off the water and drained those sections of the pipe lines

not in use in the winter time and have made the more exposed portions safe from winter freezing.

The Boss, Nancy Margaret and Mr. Steen called on us September 25 and we were most pleased to see them again. Captain Berrywell in charge of the CCC camps, Miss E. M. Smith,head of the State Health Work, and Miss Lassoff, State Health Nurse, were also among the visitors this month.

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CAPULIN MT.

By Homer J. Farr, Custodian

We have had about four hundred visitors during the month and for some reason I have noticed an extremely large number on top of the volcano at night; almost every night I see cars coming and going during late hours at night. As one party explained it, they get a great thrill making this drive at night.

Our weatherman has dished us out an extremely cold and damp October so far, with three snows and snowing again today, with the top of the mere showing around 25.

A rather remarkable statement to make is the fact that over two hundred fifty thousand automobiles have traveled the Capulin Mountain Road without accident of any kind. If records were obtainable I sincerely doubt that any other three mile stretch of mountain road could boast of a better record. Now knocking on wood is in order, and I hope we will be able to continue as fortunate as in the past.

No guided trips were made this month.

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PIPE SPRING

By Leonard Heaton, Acting Custodian

Hello, to all you Southwestern bunch; I am back on the job after a month's leave and glad to get into the straps again. I have been kind of lost without the monument and the spirit of the Southwestern Monuments. I have had a great time while away from work; done most all the trades of a Westerner, riding, farming, carpentering, masonry, maildriver, and a lot of other jobs that I have not done for a long time.

Since I have not been at the monument to do any work, I will have to let Mr. L. J. Brown tell you how the Monument has progressed this past month. From the travel record he has been rather busy. On October 18 the Lions of Southern Utah came out and I came down for four hours to help with the beasts to see that they did not frighten all the other visitors away. But we had a great time as it was.

I find that I have several days' work ahead of me and letter-writing which I do not care very much for, besides the laying out work for the CCC boys that are working on the Monument. It seems that the boys want to do those things that we are not ready to do as yet, and the projects that have not been approved. But I guess in time we will get them to working on things they like, if any.

The first Gamble Sparrow that I saw this fall was at Moccasin, four miles north of the Monument, on October 5. On the 6th I saw quite a flock and they have been passing or feeding in this part ever since.

Will start my bird banding as soon as I can get caught up on my work and have a little time to spare. Mr. Brown reported that he heard some Gamble Quail here on the 22nd of this month. These are the first that I know of being reported here for over two years, and I guess they will not stay long if the CCC boys find it out for they are always out hunting with their 22's.

Weather has turned cold. We had two days' snow in the mountains and a lot of rain on October 19 and 20, the most we have had since last winter.

By L. J. Brown

The travel through Pipe Spring National Monument has been getting less and less during the months of September and October, being confined chiefly to Western people. However, most of those have displayed a genuine interest in the buildings and surroundings. I find that the visitors from Eastern parts appreciate the old relics and furniture most, while those from the West like the buildings. Some, of course, have been bigger and better, and, incidently, more modern sights recently but they are in the minority and most feel well repaid for their efforts.

The road between Fredonia and the Monument is very rough and "washboardy" with ruts developing rapidly. Possibly, though, the Division of Grazing will attend to it as soon as we have some rain. The Indian Service is without proper equipment at the present time.

About 66% of the boys from the CCC Camp here went home at the expiration of their enlistment period late in September and a new group of 102 arrived in camp, October 11. Twelve of these new boys have been up to look over the Monument and I expect most of the rest of them will pay a visit on Saturday and Sunday.

The wild life on the Monument is increasing and is comparatively tame. The gamble sparrow is still with us and there are several little Rock Wrens around. Also some small birds that I could not identify stopped at the water hole for a drink as they went south. The rabbits, both cottontail and jack, are quite numerous but the big hawks have started to come down out of the hills and mountains, so I suspect some of the bunnies will disappear.

BANDELIER

By J. W. Hendron, Acting Custodian

Visitors

Our total travel for this month numbered 728 people, however, small compared with last month's figures we ran ahead of the total for October, 1935, which was 659. Visitors arrived in 231 cars from 25 states and District of Columbia.

The six highest states in order by visitor count were: New Mexico, 243; California, 74; Colorado, 36; Texas, 36; Illinois, 29; and New York, 24.

Twenty-two people visited us from foreign countries including England, France, Canada, Argentina, Hungary, also Hawaii and Africa.

Return visitors numbered 140

Weather and Roads

Days partly cloudy------	12	
Days cloudy----------	6	
Maximum temperature-----	70	September 25
Minimum Temperature-----	32	October 7
Mean maximum----------	58.5	
Mean minimum----------	41	
Precipitation----------	1.69 against 1.65 for October, 1935.	
Rain and Sleet----------	Sept. 27, 28, October 19, 20, 22.	
Dust storms-------- ----	None	

I might say that on the whole the roads leading into Bandelier have been exceptionally good this month. On several occasions they have been a little muddy and rough, due to sporadic showers and a little snow. New Mexico is now producing its regular trend in fluctuating weather conditions that always precede mid-winter; first the sun shines for a week and then it turns cold and is cloudy for several days and then it turns warm again for a spell which ordinarily means that old man Winter is just teasing us before the grand slam.

Visitor Trip Chart

Eighty-seven parties took guided trips through the ruins, making a total of 349 people. The average time per party was 65 minutes. Five parties were given short talks or partial ruins trips, the average time being 30 minutes per party.

Most of our visitors this month have visited Bandelier because they were interested in the ruins. Very few have come only as picnickers and as a result we have had very little use of our camp ground, with the

exception of a few occasions. Several parties have expressed a desire to visit the lower canyon to see the falls and the geologic outcrops. We contacted four people who made that trip this month, which proves that some day we may be able to conduct an occasional trip to that part of Bandelier.

Our largest parties number 16, on October 11 and 18th.

Special Visitors

September 23 - The Boss dropped in for a short stay with Nancy Margaret and Charlie Steen.

October 8 - Mr. and Mrs. Pal Keleman of Bucharest, Austria, were in for a trip around the ruins. Mr. Keleman is well known as a writer. He has recently been to Mexico gathering material for a new book and at the present time is visiting the interesting places of the Southwest. Being so impressed with the architecture at Bandelier, Mr. Keleman plans to return and spend considerable time here studying our different sites including those in the Detached Section.

October 14 - Jack Diehl and J. B. Hamilton were out on business.

October 23 - Addison Pinkley and Carl Schmidt, engineers, came in this afternoon to work on the new entrance road. They will be here for a week or so.

General -

As the hunting season draws near hunters are making camp on many of the roads outside the Monument and particularly over near Water Canyon. Game seems to be plentiful this year around here; a few days ago I saw 10 turkeys just this side of the Ceremonial Cave and George Sholly saw 30 deer on the South Mesa, which we recently posted so woe unto those who hunt on the Monument and get caught. Turkey tracks have been seen everywhere in the Detached Section, but no turkeys.

Museum Notes

And now, Boss, I wish to make an account of the Museum work that we are doing and the work that we have completed to date.

Perhaps we took our sweet time in completing the trash mound but I think that we have done a good job on it. All of the pottery is arranged in chronological order and we have a good display of it too. We have every type of pottery, or I might say, the most general types of pottery found in this part of the country. We are showing only two periods, Pueblo 3 and 4 which takes in the occupation of Bandelier, and these periods are divided in such a manner that they will be easily distinguishable by the visitor.

The background for this case is not complete and we are waiting for the maps and necessary labels from the Berkeley office.

Due to misfortune we were forced to rework the Pottery family tree which has held us up to some extent but now that is completed with the exception of gathering a few additional pottery types and photographs.

We are undertaking something now which may slow us up a bit but I think it will prove best in the long run. We are preparing a drawing of the ground plan of the big community house which will show the levels of the different storied rooms, the 1st, 2nd, and 3rd stories to be represented by different types of shading. When we finish the ground plan we will start on a reconstruction drawing, showing how Tyuonyi looked at the time when the Indians occupied it. A better model can be made if we know how it is to look when it is completed. This will be a view looking from about 30 feet high and to the side of the structure showing how both the outside and inside rooms looked. A considerable amount of time and study has been spent in figuring this out and I don't think it will be in vain, for this will be one of the most interesting exhibits in the entire museum.

Borings and V-cuts have been made from around the surrounding country for the tree-ring case. We may need additional specimens but these will be a starter. We also have a number of cross-sections which have been polished down. This case can be put into shape after all the labels and photographs are completed.

From the looks of things, Boss, the Bandelier Museum is making progress, and I am confident that we will have something very interesting to show the visitors during the next travel season.

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BANDELIER ECW

By H. B. Chase, Project Superintendent

Signs for other Southwestern Monuments were completed for Walnut Canyon and Aztec Ruins National Monument, and shipment made about the 15th of October. Signs for the Chiricahua National Monument are now in the process of making.

Receipt of approved plans for Quarters No. 3 enabled us to proceed with construction with a double shift and now the building is to lintel height.

The three root cellars for the three Quarters in the Residential Area have been completed and the built-in shelves installed in the two for Quarters one and two. The finishing of the third root cellar interior is in progress at this time.

The equipment shed project was completed and the two living quarters are now being occupied by two of the Supervisory personnel at this camp.

Two large crews are now doing preparatory work of transplanting trees and shrubs. Some small planting has been carried out this month. It is anticipated using two crane truck pieces of equipment this planting season instead of only one as in the past two seasons.

The clearing of a new road right-of-way by the Forest Service on lands adjacent to the Monument has enabled us to secure considerable aspen material for ceilings and pine timber for vigas and lintels, This operation has been carried on at intervals throughout this month, storing the materials for future building projects planned for the 3th period, while it is available on an economic haul.

A large number of new enrollees received this month were assigned to the Rock Quarry Project, quarrying and shaping rocks and stones for our building program.

The recent contracting and delivering of a large order of finished lumber will allow the carpenter crew to proceed with the installation of museum cases under our furniture project. It is anticipated this installation will be completed during the winter months.

A small crew of enrollees have been working under the direction of Acting Custodian Hendron constructing and preparing exhibits for the museum.

BANDELIER FORESTRY

By James T. Fulton, Forestry Foreman

After having completed the painting of the equipment shed by October 9, I began using the crew to hew 210' of lintels and to cut 17 vigas for Quarters No. 3, or Project No. 31. This material was obtained from our stock of timber cut several months ago.

For the week of October 19 - 23, I had a crew of about 30 men engaged in cutting aspen poles on Sawyers Mesa. In time these poles will be worked up into ceiling material. The work required to do this is peeling and splitting. All of these aspen poles were salvaged from snow-damaged aspen stands on top of Sawyers Mesa, along the new road being constructed in that vicinity.

This month there has been no particular reason for having forest fires. however, hunting season will begin on October 25 and continue until November 15; at this time we will be on the alert for man-caused fires; such fires during hunting season have occurred in the past years, but we hope that nothing like that will happen here this year.

NATURAL BRIDGES

By Zeke Johnson, Custodian

I came in from the Monument on the 18th and expected to go back the next day, but it has rained every day since. However, it looks clear this morning and I will go back this afternoon. I expected to make another trip before I sent in my monthly report. As a result of this anticipation, I left my report slips at the camp and won't be back again until time to vote, so can't make report in full. However, there have been a lot of visitors out there this month and I have been able to contact all of them. For the most part, weather has been ideal.

There are about 100 deer hunters on Elk Mountain now. After the shooting has been going on for three or four days, hundreds of the does and fawns come down in herds of sometimes 40 or 50 and hide on the cedar points close to the monument. Sometimes some of the hunters that have failed in getting his buck will come down and try to find one and if they fail they will kill anything; accordingly, I am determined they won't do any killing this year near the monument. I will stay right on the job until season is over. I have a horse and plenty of hay out there so I can ride out and scout around all that is necessary. Four mountain sheep were in Armstrong Canyon when I left, and wouldn't one of those lazy buck hunters be thrilled to get a shot at them? I only saw them once but they were very tame. In view of this fact, I am determined that no one will get near the monument with a gun.

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HEADQUARTERS STUFF
DIV. OF EDUCATION

Park Naturalist Rose was stationed at Berkeley during the entire month of October; he continued his investigations of mission records in the Bancroft Library and assisted Ansel Hall in the preparation of museum exhibits for Aztec and Bandelier National Monuments. Junior Naturalist Steen was in the field during the first part of the month making a tentative museum plan for Aztec Ruins; he returned to headquarters on the 13th where he spent the remainder of the month. The vacancy made by the absence of Junior Naturalist King has not yet been filled.

Gifts and Accessions

A number of books and reports were received for the library during the past month. These are listed in the Supplement for this report and additional copies of the list will be made for inclusion in the loose-leaf information binders.

Bird Banding

Walnut Canyon and Casa Grande were the only two monuments to report new banded birds for October. All birds banded during the period July 1

to November 1 are included in the list.

Paul Beaubien has trapped eleven returns to date, but the Casa Grande banding station just barely got under the wire with a single return, a Bendire Thrasher, banded on October 12, 1935, was caught again on October 28. Many Gambel Sparrows are on the Monument but they have refused all profered baits. It is very annoying, to put it mildly, to see a number of freshly arrived birds hopping all around a trap but refusing to enter, particularly when several of them are sporting some nice aluminium bands.

Analysis of Casa Grande Visitor Figures

A resume of a year's visitors at Casa Grande proves to be quite interesting. We had 27,704 visitors covered by this study and with them we obtained 43,218 personnel visitor contacts, which is 155% out of a possible 200%; not bad, but it could have been better.

Notice that the attendance fluctuates. The low point falls in July, as one might expect because of the heat which drives the transcontinental traffic farther north to the higher and cooler roads. The attendance goes up in August, up again in September, and rises again in October. There is a fall so slight as not to matter in November and December and then a sharp rise in January. This is caused by the winter visitors to Arizona who have waited until after the Christmas holidays to come West. February drops a little, probably due to the shorter month. March shows a decided drop with a heavy comeback to the peak month of the year in April. May and June hold up well with a sharp drop to July.

There were 3,707 guided trips through the ruins averaging 33 minutes per trip. 25,936 visitors took these trips averaging just under seven persons to the party. The minimum load was in July with 232 parties and the maximum load fell in February with 384 parties, although April ran a close second with 378 parties.

Peak load months use the longest trip time on field trips at Casa Grande. February and April are the heaviest months and the trip time is 38 minutes; July, the lightest month shows a trip time of 29.7. In September, when trips, attendance, and total time used are all on the increase, we fall down to 27.6 minutes for the trip time. For October, 1936, the month just closed as I write this, our number of trips remains stationary, visitors and total time increase, number in party increases and the trip time goes up nearly two minutes but is only 29.4 as against 37 last year. Does this mean that the visitor is not staying so long as last year, or is our service falling off, or is there some unknown factor at work?

We gave 2,430 museum trips to a total of 17,182 visitors, the average trip being a trifle over 21 minutes. The variation in the museum trip time was from 19.7 to 25 minutes. It is to be noted that we do not get the

CASA GRANDE VISITORS FIGURES

	No. Employ		Guided Trips					Museum Lectures					Museum Unatt.	Outside Lecture	Total Contact	Total Travel	Percent Contacts
	Perm	Tem	No.	Att.	Time	Av. Att.	Av. Tm	No.	Att.	Time	Av. Att	Av. Time			Educational		
October '35	2	--	285	2281	10545	8	37	94	800	1880	8.5	20	1481		3081	2,281	135
November	2	--	309	2165	10815	7	35	100	800	2100	8.0	21	1365		2965	2,165	136
December	2	--	243	1390	7681	5.7	32	60	342	1200	5.7	20	1793		1732	2,135	81.1
January '36	2	1	337	2938	12336	8.7	36	223	1869	4394	8.4	19.7	1069		4807	3,370	142
February	2	1	384	3043	14497	7.9	38	256	2332	5330	9.0	21.	711	100	5475	3,043	179
March	2	1	351	2705	12109	7.7	35	248	2016	4783	8.2	19.2	689		4721	2,705	174
April	2	-	378	3251	13294	8.6	38	242	2163	5290	8.9	22	1088		5414	3,436	157
May	2	-	301	1867	8971	6.2	30	194	1099	3829	5.7	20	768		2966	2,234	133
June	2	-	291	1650	8324	5.7	28	266	1405	5421	5.3	20	245		3055	1,661	183
July	1	1	232	1133	6911	4.8	29.7	203	1058	5103	5.2	25	20		2191	1,142	191
August	1	1	270	1468	8558	5.4	31.7	239	1483	5959	6.2	24.9	--		2951	1,487	198
September	2	-	326	2045	9117	6.2	27.8	305	1815	6164	5.9	20.0			3860	2,045	188
TOTAL			3702	25936	123158	6.9	33.3	2345	17182	51453	7.0	21.1			43218	27,704	155
Average			308	2161	1026	7.0	33.3	202	1432	4287	7.0	21.2					
OCTOBER, 1936			323	2190	9513	6.7	29.4	288	1865	6436	6.4	22.3			4055	2,190	185

maximum trip time falling on the maximum visitor load in the museum as we do in the trip through the ruins. The talks in the museum are longest in the dull months. The possible solution is that the dull months are the hottest months and the visitor does not want to walk around the ruins in the 110 degree weather, but is willing to loaf in the comparative coolness of the museum where the fans are running.

It will be noticed that while the museum talks hold up in length to a reasonable maximum and minimum, the museum attendance fluctuated widely, from a minimum of 342 in December to a maximum of 2,332 in February. The real explanation of this lies over to the right in the "Museum Unattended" column. For several months large numbers of visitors were turned into the museum by the guide upon his return from the ruins and allowed to wander at will without guidance. We checked the time on a lot of these parties and the average stay in the museum was about 13 minutes. The average stay of 3,200 guided museum parties was 21.2 minutes. There is no question in my mind but that the visitor receives a much deeper impression from a 21 minute guided talk where things are explained to him in their proper sequence than he can possibly get from wandering at will for thirteen minutes and we have now established the definite policy of guiding all parties, so far as it is possible, through our museums.

The total trip time, which is the time taken for the ruins trip plus the museum trip varies during the year from 48 to 60 minutes with a yearly average of 54.5 minutes. The longest trips were given in April, the month of maximum number of visitors and the next longest were in February, which had the next largest number of visitors. I am not certain of the explanation for this but suspect that in the peak months we have a considerable number of heavy parties which ask so many extra questions and move so slowly from room to room during the trip as to bring the trip time up. An examination of the tickets for the thirty longest trips in the heavy months and comparison with the same number of the longest trips in the slack months might disclose whether or not this is a correct guess.

We asked Custodian Winter what he thought about this tabular matter, and he responded as follows:

> "This chart hands out some interesting and valuable information. I notice it shows that there was an average of ten trips a day made through the ruins for the past year. This means ten trips <u>every</u> day, and each trip averaged 33 minutes.
>
> "I wonder where, outside the Southwestern Monuments, would we find as many as ten half hour lectures being delivered <u>daily</u> with neither admission charge nor tips being collected? Then in addition we find that there was an average of seven museum trips conducted daily, lasting 21 minutes each. Seven out of our ten ruins lectures, therefore, were followed by a museum talk.

"These figures, of course, are averages, so there were many days on which there were more than ten lectures delivered. I am not writing this to pat ourselves on the back, but to emphasize our ever present need of more personnel. It may be noted from the chart that for three-fourths of the year there were only two men on the job to do all this lecturing, in addition to their other duties. Does it occur to the people who read this just how many things a Custodian and a Ranger can find to do beside guiding? True, we guide more than we do anything else, but it is not from choice alone. While we are spending so much time in public contact work there are many things about the Monument that are left undone or which have to be done hastily and in a half-way manner. For example, clean-up work is needed -- picking up scrap paper along our half mile entrance road, perhaps. Another, shooting is heard not far from my office. Is someone hunting our quail? I don't know, we haven't time to go find out for I am busy taking visitors through the ruins and the Ranger is down pumping out our defective sewer system. But the ten trips a day must be made, for there a re visitors here to take them.

"I suppose that something more than just a gripe should be written in connection with the attached chart. Lately, however, I have had brought to my attention most forcibly the need for another guide here, so when I see figures bringing out the amount of guide service rendered I naturally think most of how to maintain that high standard of service and at the same time adequately attend to the manifold other necessary duties.

"As it is now, I have been two days writing these few comments and the only way in which I can write more will be to lock the visitors out at the front gate. This can't be done so I guess I will sign off and go on another trip to the ruins."

Analysis of Aztec National Monument Visitor Statistics

We are filing herewith a tabular report on visitor statistics for Aztec Ruins National Monument covering one full year of operations.

Aztec has a pretty attendance curve; January is the low month with 225 visitors, the curve rising regularly through the months to a peak in August with 2,658 visitors and then falling rather sharply to the beginning. We had 12,984 visitors reported and obtained 23,853 personnel visitor contacts. Note that the personnel visitor contacts followed pretty much the same curve as the total travel curve, indicating that the boys did not fall down in the delivery of service. The percentage of personnel visitor contacts was 183% on a basis of 200% as perfection.

AZTEC RUINS VISITORS FIGURES

	GUIDED TRIPS					MUSEUM LECTURES					Total Educational Contacts	Total Travel	Percent Contacts
	No.	Att'd.	Time	Av. Att'd	Av. Time	No.	Att'd	Time	Av. Att'd	Av. Time			
October	125	1155	3750	9.2	30	125	1155	2500	9.2	20	* 2,310	1,155	---
November	74	409	2442	5.2	33	74	409	1480	5.7	20	818	409	---
December	55	391	1760	6.6	32	55	391	1100	6.6	20	782	391	---
January	45	172	1428	3.8	32	48	176	847	3.7	18	350	225	155%
February	57	243	1780	4.3	31	51	244	1055	4.8	21	487	287	169
March	89	462	2840	5.2	32	80	435	1460	5.5	18	897	602	149
April	118	571	4371	4.9	37	110	579	1723	5.3	16	1,150	701	164
May	147	853	5200	5.8	37	138	854	2682	6.2	19.5	1,707	1,172	145
June	255	1180	8497	4.6	33	227	1170	4113	5.2	18.2	2,350	1,323	177
July	331	2023	12015	6.1	36.2	260	1956	4730	6.9	16.8	3,979	2,089	190
August	323	2658	12690	8.2	39.2	294	2585	4785	8.7	16.2	5,243	2,658	197
September	314	1893	9780	6.0	31.1	280	1887	4325	6.7	15.4	3,780	1,972	191
TOTAL	1933	12010	66553	6.2	34.4	1762	11843	30800	6.7	17.4	23,853	12,984	183%
Average	161	1001	5546	6.2	34.4	147	987	2566	6.7	17.4			
October '36	186	781	5490	4.2	29.5	157	700	2435	4.4	15.5	1,491	815	182%

* First 3 months estimates.

This seems to us a pretty good average. We do not see quite why it slipped off in January, February, March and May into the 150% class, when the travel was light as compared with July, August and September when the travel was at the peak and the contacts ran above 190%.

There were 1933 guided trips through the ruins as against 1762 trips through the museum. The fewer museum trips is probably explained by joining parties in the museum; the guide coming in from the ruins finds a new party waiting and joins them to his incoming party making the one museum talk serve both parties, then he takes the second party out through the ruins and thus counts two ruins trips with one museum trip.

12,010 persons were guided through the ruins as against 11,843 through the museum. I would have expected more visitors through the museum, due to the fact that aged and crippled persons could go through the museum but might not be able to go through the ruins. The average party in the museum was 6.7 as against 6.2 in the ruins, which would also look like some people were taking the museum trip who were not taking the ruins trip.

Note that the average number in the party fluctuates from just under four persons to about nine persons in the course of the year. The average trip time in the ruins varies from 30 minutes to 39 minutes and the surprising thing is the greatest trip time is taken in the month of the peak load. I should have expected the men to speed up the trips and cut down the trip time when the heavy load struck, but I suppose that tendency is offset by the slower movement and more questions caused by the larger average party and the net result is a lengthening of the average trip time. Upon examining the average museum trip time, however, we find there is a slight tendency to talk longer in the slack season than in the busy season; this doesn't check precisely but it looks like it might be true.

By adding the ruins trip and museum trip times together we find we have a total trip time running from a minimum of 50 minutes to a maximum of 56.5 minutes, except in September when we get a sharp drop to 46.5 minutes. This last drop runs into October, 1936, when it is 45.0 minutes for the average total trip. We changed men about this time and the change is probably reflected in the amount of service given, the new man taking some time for the 'breaking in' process before he is able to deliver the standard amount of service to the visitor.

It can be seen that we had more ruins trips and more museum trips in October, 1936, than in October, 1935, and that the average number in the parties and the average trip time was lower this year than last. There were less visitors but the parties strung out more, using considerably more total time in the ruins trips than a much larger number of visitors used last year. The average trip time, however, for the ruins, reached

the all-time low of 29.5 minutes, and the average trip time for the museum was only one-tenth of a minute above the all-time low. The total trip time was 45 minutes, which is the all-time low for the thirteen months, the average total trip time for Aztec being 51.8 minutes.

Analysis of Visitor Service, Southwestern Monuments, October, 1936

With eighteen monuments reporting, we had 14,869 visitors as against 12,608 last year. This is a long drop from the 33,507 visitors we reported last month and is in large part due to the natural seasonal drop we can expect when the schools open in the fall.

Our personnel educational contacts amounted to 10,897, or 73.2% as against 9,565 for the same month last year, or 75.8%. The reason for our percentage of contacts falling this year lies in a sharp bulge in the visitor curve for White Sands this year where we have no resident contact man.

We gave more guided field trips to a less number of visitors this year than last and the visitors came in smaller parties and stayed less time. The fact that the parties are smaller this October than last turns up in the figures from several of the monuments and I have no explanation to offer.

We gave 997 museum trips this October as against 389 last year. White Sands and Walnut, which were not reported last year account for part of this increase. At White Sands we have some exhibits in Mr. Charles' office in Alamogordo and he talks to hundreds of visitors there; it is not a museum in the strict sense of the term, but it is talking with visitors over exhibits and, we think, qualifies under that heading. Again the average party shrinks from 7.2 persons last year to 4.7 persons this year, and the average museum time is cut from 20 minutes to 16.8 minutes. No reason appears for this.

Casa Grande furnishes about half the total educational contacts for the month and will probably continue to do so for the remainder of the fall and winter. We have a temporary position established at Casa Grande beginning January 1 but Mr. Winter and Mr. Erskine are going to need help before that if the curve goes up as fast as it is starting.

There is one interesting little point in this table which needs bringing out. Casa Grande, with its comparatively large museum exhibits, held the average party 22.3 minutes. Walnut Canyon, where Paul has a very meager collection of artifacts which can be spread out on top of a desk, held the visitor 21.4 minutes. What is the answer?

STATISTICAL SUMMARY ON EDUCATIONAL CONTACTS FOR OCTOBER, 1936

SOUTHWESTERN NATIONAL MONUMENTS

MONUMENT	No. Employes		GUIDED TRIPS					MUSEUM TRIPS					Unatt'd.	Outside lectures		Total Educat'l Contact	Total Travel	Percent Contacted
	Per.	Tem.	No.	Att'd.	Time	Av. Att.	Av. Time	No.	Att'd	Time	Av. Att.	Av. Time	No.	No.	Att'd			
Arches																		
Aztec	1	1	186	791	5490	4.3	29.5	157	700	2435	4.4	15.5	19			1,491	815	
Pandelier	1	2	87	349	6905	4.0	80									349	728	
Canyon dechelly	1	1	8	20	1320	2.5	165									20	119	
Capulin Mt.																	400	
Casa Grande	2		323	2190	9513	6.7	29.4	288	1865	6436	6.4	22.3				4,055	2,190	
Chaco Canyon	1		53	218	4330	4.1	81.6	51	209	940	4.0	18.5				427	732	
Chiricahua	1	1	16	128	1725	8.0	107.8									128	690	
El Morro		1	30	153	1695	5.1	56.5						16			153	169	
Gran Quivira	1		50	159	2835	3.2	56.7									159	159	
Gila Cliff-Dwl.																		
Lovenweep																		
Montezuma	2		148	510	5473	3.4	36.9	115	459	2045	4.0	17.7				969	510	
Nat. Bridges		1											65				65	
Navajo																		
Pipe Spring	1		18	89	615	4.4	34.1									89	89	
Rainbow																		
Saguaro																		
Sunset																	287	
Tonto		1	65	177	2943	2.7	45.	75	209	1137	2.7	15.				386	217	
Tumacacori	1	1	196	743	6502	3.7	33.1						65			743	808	
Walnut Canyon		1	77	253	1325	3.2	17.2	149	450	3195	3.0	21.4	168			703	758	
White Sands	P	P	66	330	390	5.0	6.0	162	821	569	5.0	3.5				1,151	5,978	
Wupatki		1	25	74	1600	3.0	40.0									74	155	
Yucca House																		
Headquarters														4	524			
Total This Mo.			1348	6184	52661	4.5	39.0	997	4713	16757	4.7	16.8	333	4	524	10,897	14,869	73.2%
Total Last Mo.			2089	10427	77557	4.9	37.1	1121	5903	21483	5.2	19.1	83	1	35	16,365	33,507	48%
Oct. Last Year			1045	6760	52074	6.4	49.8	389	2805	7780	7.2	20.				9,565	12,608	75.8%

SUMMARY OF EDUCATIONAL ACTIVITIES OF THE NATIONAL PARK SERVICE
(July 1, 1935, to June 30, 1936)

For comparative purposes we have lifted the tabular matter off page 50 of the Park Service Bulletin for September-October, 1936, and filed it in three tables in this report where it can be used in future references.

The first table deals with guided trips and contains some information of great interest to us of the Southwestern Monuments. It comes as a pleasant surprise to us to find that we are delivering over half the guided trips of the whole number reported, 10,558 out of a total of 17,115.

The size of the average party is an interesting thing because it is one of the factors showing the total amount of work done by the personnel. Yellowstone handled its 107,000 visitors in 1900 guided trips, or approximately 87 persons to the party. Yosemite ran 57 to the party, Grand Canyon,77; Zion, 48; Sequoia, 35; Glacier, 23; Mesa Verde, 21; and the Southwestern Monuments averaged 10 to the party. When you handle 107,000 people in lots of ten to the party, you put a lot of personnel time into the job.

There is evidently an error in the Carlsbad Caverns handling 4,036 in one party. We wonder if the total is correct as the number of visitors handled on the nature trail, and if that is correct we wonder what number were in the average party.

We would like to suggest to the Educational Division the value of gathering figures showing the average time of the average party as this would give us some idea of the amount of personnel time used and allow us to compare the work in one park with that in another.

We wonder if the 100 trips in the horse column for Mesa Verde were guided trips given by park service personnel. We rather think not and we would not count them if they are operator trips given for pay under regular wranglers and with no park service educational personnel along on the trip.

The Southwestern Monuments figures could have been repeated in the "Hiking" column if the Branch of Education preferred to do so as they were really hiking trips through ruins, etc.

DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
SUMMARY OF EDUCATIONAL ACTIVITIES - JULY 1, 1935 to JUNE 30, 1936

	GUIDED TRIPS											
	AUTO CARAVANS			HIKING		HORSE		BOAT		TOTAL	
	No.	No. Cars	Att'd.	No.	Att'd.	No.	Att'd	No.	Att'd.	No.	Att'd.
Acadia				36	986			15	422	51	1,408
Bryce Canyon	85		4,807	97	4,545					182	18.137
Carlsbad Caverns				1	4,036					1	4,036
Crater Lake	55	377	1,074	50	370			92	1,329	197	2,773
General Grant	10	42	150							10	150
Glacier	11	99	1,303	405	8,022	2	11	220	5,826	638	15,162
Grand Canyon	296	6,315	24,214	96	5,603					387	29,817
Grand Teton	1	4	11	16	198					17	209
Great Smoky Mts.											
Hawaii	184	903	5,857	126	2,455	3	20			313	8,332
Hot Springs				4	180					4	180
Lassen Volcanic	149	964	3,088	185	4,870					333	6,902
Mammoth Cave											
Mesa Verde	905		20,851	1	3	100	373			1,006	21,227
Mount McKinley											
Mt. Rainier & Olympus	3	20	76	278	5,601					281	5,677
Nat'l Cap. Parks (1 mo.)				12	437					12	437
Platt											
Rocky Mountain				84	2,063					84	2,063
Sequoia	92	1,173	5,032	115	4,483					207	9,515
Shenandoah (4 mo.)											
Southwestern Monuments										10,558	107,911
Wind Cave											
Yellowstone	407	7,934	29,442	1,554	141,477					1,961	170,919
Yosemite	206	4,712	19,630	384	14,243					590	33,873
Zion	4		127	279	13,804					283	13,804
TOTALS	2,408	22,543	115,662	3,723	213,376	105	404	327	7,577	17,115	452,659

DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

(Sheet 2) SUMMARY OF EDUCATIONAL ACTIVITIES - JULY 1, 1935 to June 30, 1936

	LECTURES									
	CAMPFIRE		LODGE		MUSEUM		BEAR AND OTHER SPECIAL LECTURES		TOTAL	
	No.	Att'd.	No.	Att'd.	No.	Att'd.	No.	Att'd.	No.	Att'd.
Acadia	21	3,790	1	150			7	448	28	4,388
Bryce Canyon	21	1,871	89	13,312	138	16,365	84	1,098	332	19,517
Carlsbad Caverns								21,660		21,660
Crater Lake	88	7,744	78	1,801	137	29,608			281	41,731
General Grant										
Glacier	188	13,339	205	16,353		858			420	31,987
Grand Canyon	179	20,360	461	40,556	796	63,389	24	4,700	1,460	129,405
Grand Teton	78	9,144							78	9,144
Great Smoky Mts.										
Hawaii	2	428	14	1,797	148	7,314			164	9,539
Hot Springs					17	2,337			17	2,337
Lassen Volcanic	83	8,432			2	190			85	8,622
Mammoth Cave										
Mesa Verde	112	7,714			418	13,431			530	21,145
Mount McKinley			8	149					8	149
Mt. Rainier & Olympus			217	24,212					217	24,212
Nat'l Cap. Parks (1 mo.)	3	661	1	19					4	680
Platt										
Rocky Mountain	14	1,418	71	4,027					85	5,445
Sequoia	250	63,081	124	11,022	100	8,438	180	33,475	934	127,516
Shenandoah (4 Mo.)										
Southwestern Monuments					4,478	27,592			4,478	27,592
Wind Cave										
Yellowstone	713	126,366	28	1,679	317	26,993	145	160,096	1,279	328,597
Yosemite	332	119,544	186	74,817	1,838	97,373	172	94,835	2,528	386,569
Zion	109	5,477	120	12,637	375	17,056	343	8,622	917	43,792
TOTAL	2,193	389,369	1,603	212,531	8,764	311,344	955	324,934	13,845	1,244,027

DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

(Sheet 3) SUMMARY OF EDUCATIONAL ACTIVITIES - JULY 1, 1935 to JUNE 30, 1936

	MUSEUM VISITORS	LIBRARY AND OTHERS		LECTURES OUTSIDE PARK		TOTAL CONTACTS	TOTAL NUMBER VISITORS	PERCENT CONTACTED
	Number	No. Loans	No. Contacts	No.	Att'd.			
Acadia	7,683	2	1,118	2	79	14,676	317,910	4.6
Bryce Canyon	7,964					50,375	73,244	68.
Carlsbad Caverns						157,714	132,045	119.
Crater Lake	20,567		6,223	42	4,922	77,411	130,502	59.
General Grant						33,604*	134,416	25.
Glacier			26,261	46	7,786	136,536	151,711	89.5
Grand Canyon	135,729	296	491	1	50	296,497	241,111	123.
Grand Teton	17,719			1	100	27,165	71,168	38.
Great Smoky Mts.				4	310	51,634*	516,347	10.
Hawaii	12,435			2	1,725	32,021	188,556	17.
Hot Springs	93,910			9	2,391	96,124	277,023	35.
Lassen Volcanic	23,560			14	1,319	33,566	57,696	58.
Mammoth Cave								
Mesa Verde	26,053	85	144	12	4,265	72,834*	22,960	317.
Mount McKinley				1	55	1,206*	1,002	120.
Mt. Rainier & Olympus	127,185			25	4,692	161,766	260,125	62.
Nat'l Cap. Parks (1 mo.)				3	703	1,820	1,820	100.
Platt						49,650*	248,252	20.
Rocky Mountain	31,303			61	4,708	45,519	322,005	13.5
Sequoia	30,971	1,149	1,149	3	300	169,451*	208,117	81.
Shenandoah (4 mo.)						8,634*	172,687	5.
Southwestern Monuments	31,035	1,356	5,827	53	4,694	177,259	212,133	84.
Wind Cave						21,322	21,322	100.
Yellowstone	492,841	396		55	10,544	1,003,034	349,795	283.
Yosemite	296,115			28	7,213	723,570	395,213	183.
Zion	35,588			17	4,212	102,217	107,871	95.
TOTAL	1,390,666	3,284	41,213	379	60,268	3,544,600	4,612,694	77.

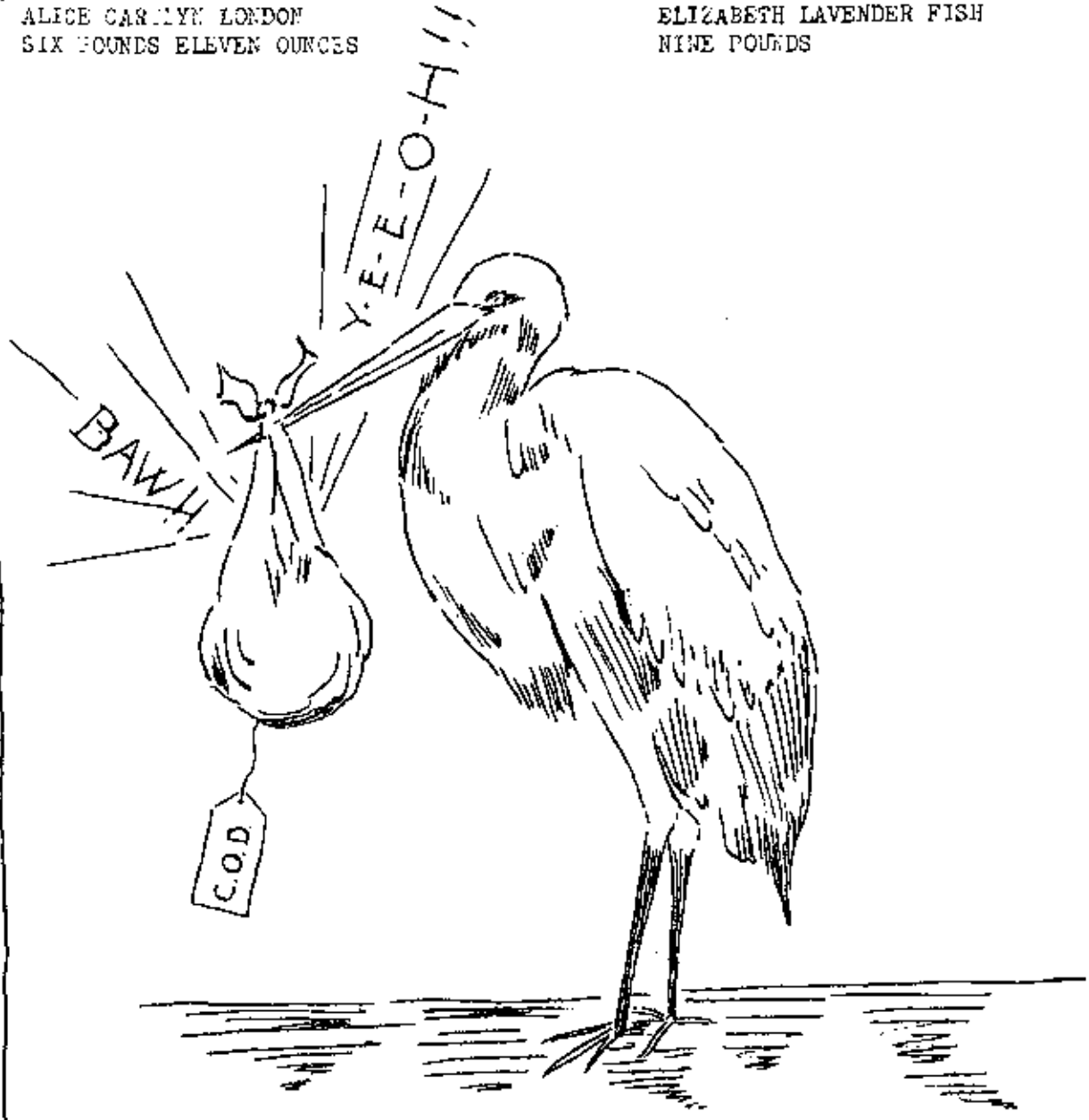
* Estimated.

BIRDS BANDED BETWEEN JULY 1 AND NOV. 1

Bird	Walnut Canyon	Pipe Spring	Tumacacori	Casa Grande
Bluebird, Chestnut-backed	29			
Bunting, lazuli			1	
Arizona Cardinal			4	
Cowbird			1	
Crossbill	28			
Dove, Inca			1	2
Finch, House		1	1	
Flicker, red-shafted	2			
Fly-catcher, Arizona crested		5		
Goldfinch, greenbacked	1			
Grosbeak, Rocky Mt. evening	2			
Junco, red-backed	1			
Mockingbird			2	
Nuthatch, pigmy	12			
Nuthatch, Rocky Mt.	1			
Pyrrhuloxia			5	
Quail, Gambel				3
Robin, Western	3			
Sapsucker, red-naped	4			
Siskin, Pine	38			
Sparrow, Gambel	1			
Sparrow, Western chipping	7			
Tanager, Western	2			
Thrasher, Palmer			1	
Towhee, Canyon			4	
Wren, Cactus				1
TOTALS	131	6	20	6

Oct. 17, 1936.
ALICE CARILYN LONDON
SIX POUNDS ELEVEN OUNCES

Oct. 26, 1936.
ELIZABETH LAVENDER FISH
NINE POUNDS



WESTERN UNION

FEELING UNABLE TO HANDLE ASTLC ALONE AT ANNOUNCING A NEW HELPER JAMES CHESTER SEVEN POUNDS FIVE OUNCES STOP PLEASE SECURE CIVIL SERVICE RATING

JOHNWILL PARIS

CLOSING

I trust you will gain the impression, Chief, that we have been pretty busy down in the Southwestern Monuments this past month, though as a matter of fact the boys have side-stepped a little on the reports and let us down some in this consolidated report. We will have to bring this to their attention and see if they can't do a little better next month. It seems like enough ought to happen even on a dull monument in the slack season to allow the man in charge to write two or three single-spaced pages about a month of it, and I have yet to get one of these boys to admit that he has a dull monument or that he ever has a slack season, so they ought to have no trouble getting together enough interesting information about the month's work to cover three or four single-spaced pages.

We hope the tabular matter filed away in this monthly report won't look too dry at first glance and thus prevent your finding out how interesting it is. It deals with the second most important thing in the National Park Service -- the visitor and it deals with quite a number of him. We are beginning to get some ideas as to what we can and cannot do with him; not that we think we know all about visitors or even that we know very much, but we are getting together a few ideas that have stood the test of several thousand parties, and, probably better yet, we have punctured some lovely theories we used to have which have not stood the test.

In the Supplement to this issue we are running a short article on what studies have shown visitors will do in certain types of museum rooms and we wish you would take time to look over it because it seems to us that the layout of a museum through which a million or so visitors will pass is a pretty serious thing.

Jeff Milton dropped in here the other day and among other things we talked some of the possibilities of making a national monument out of the old town of Tombstone. He has had a great hand in making some of the history down in that part of the country, is now living in Tombstone and is very interested in making a monument of the town if it is found to be feasible. Mr. Milton is seventy-five years young, hale, hearty and sound as a nut, and he has been living Arizona history for the last fifty-five years. It seems to me we ought to have some of our Regional Historians get down into Tombstone for a couple of weeks and make a preliminary study with such men as Mr. Milton and find out just what the possibilities are for that proposed national monument.

It looks like a good season is ahead of us this winter in the Southwest. Reservations at the resort hotels are reported heavier than for several years and winter visitors are already beginning to arrive in numbers in Phoenix, Tucson and El Paso.

Cordially,

Frank Pinkley

THE Supplement

REPAIR AND RESTORATION OF TUMACACORI—1921

By Frank Pinkley,

(Ed. Note: While going through the old files the other day on some other matter we ran into the old report of the work done on the Tumacacori Mission in 1921. The original of this report was filed with the Washington Office, but in reading it over we thought it was of sufficient general importance and has enough historical value to incorporate it here.)

Early in the year it was decided to restore the roof over the nave of the church and arrangements went forward so that the work started the latter part of April.

Our fund for the protection of national monuments being so small as to preclude the allotment of an amount sufficient to complete this work, and there being no way of putting half a roof on this year and another half later on, recourse was had to local aid.

Too much credit cannot be given to the local organizations who contributed funds for this work. The National Park Service allotted $800; the Knights of Columbus of Tucson gave $100; The Arizona Archeological and Historical Society gave $160; the Chamber of Commerce of Nogales gave $600; and the Knights of Columbus of Phoenix gave $100; making a total of $1,760 on hand when the work started. In July and August further allotments of $395 were made from Service funds, so the total amount expended came to $2,155.

The roof was partly a restoration and in part a modern weatherproof construction. Special sizes of bricks were manufactured and burned and with them the badly eroded walls were carried up to their original height. This included raising the front wall ten or twelve feet in the restoration of a semi-circular pediment which originally formed the upper part of the facade.

Logs were brought out of the mountains, hand hewn, stained to give the appearance of age, and put in the places of the old beams. Ocotillos were brought in from the desert, cut to fit, and placed on top of these beams, forming the ceiling.

Viewed from the interior of the church, the roof is a perfect restoration. A complete restoration would not, however, have been so satisfactory from the weatherproofing standpoint, so above this restored portion we built a modern roof, from which the drainage is cared for through the restored downspouts of the old construction. This modern roof does not show from below, being hidden by the parapet walls of the nave, which extend above the roof line.

Aside from work on the roof, the tower stairs, running from the ground level to the bell arches in the third story, were entirely restored, they having been dug out long ago by treasure hunting vandals.

Many other smaller places too numerous to mention were patched and filled wherever it was considered necessary to strengthen walls or remove traces of vandalism.

General Conditions

It must be remembered that the Tumacacori Mission is 18 miles from the nearest town and that, although we had a good motor road to Nogales, railroad shipments were out of the question.

The amount of work to be done precluded the use of labor-saving machinery as the expense of buying or renting it and bringing it out would have more than offset the saving gained by using it.

We were thus forced by circumstances to do the thing which our logic suggested; follow as nearly as possible the methods of the builders in making our repairs. This line of reasoning applied to the men to be used in the work as well as to the methods.

We had the choice of bringing high priced workmen out from town and boarding them in a camp, or of using the workmen of the locality who could live at home while the work was going on. We chose the latter course for several reasons, and while there were times when we were discouraged and thought maybe we had not made the wisest choice, we were at least wise enough not to change horses in the middle of the stream, but carried through the original plan to the end of the work.

The high-priced expert workman would have meant a heavy pay roll over a short period of time and our funds were not arranged so that we could secure them so freely as that would demand. That part of the money contributed by bodies outside our Service could not be obtained on short notice in every case, so it was considered wise to proceed with the work by easy stages rather than to crowd it to a quick conclusion.

Another objection to rushing work of this kind lies in the need of time to note and digest the many points which come up as the work proceeds. Haste would cause many problems to be slurred over, wrong solutions applied to others, and a general tangling of affairs, due to the fact that we were under a heavy daily expense and could not hold up the men to obtain the right solution.

Another factor with us was that the expert workman, be he brick man, cement man, plasterer or carpenter, is not inclined to brook much interference with his methods and more or less friction will be started when one tries to experiment and adapt present day methods to hundred-year-old results.

By using local workmen we reduced our amount of work done per day about

20% as compared with the same number of expert workmen; but since our cost per day was reduced about 50%, the net result was a gain, the amount of extra time used in making the repairs not being a serious factor.

I was unable to be on the ground all the time when the work was going on and this was a decided disadvantage. My other duties kept me going back and forth and it was only the last five or six weeks of the work that I was able to be with the boys practically all the time. Questions arise from day to day which need the decision of some person who knows the causes, history, and environment which led to the construction of these walls. In some of these cases, unless the leader is present, the men must choose between delaying the work for a decision or making a guess which may be the wrong one.

We experienced the usual troubles which a Government man on a small job in a semi-isolated position like this will generally find. Since it was a Government job we were expected to pay high wages and be generally generous and easy. The hardest single phase of running a small Government job is in meeting the payroll. So far as possible local funds were used for this purpose so we could draw checks on local banks and pay off Saturday night or Sunday morning for the week just closed; but toward the end, we had to put the men on the Government payroll, which meant a two or three weeks' delay in getting the pay checks. This caused a good bit of dissatisfaction as these men live from hand to mouth and had no means of bridging this gap and feeding their families unless, as in one or two cases, temporary loans were arranged.

The summer rains caused some trouble although they did no serious damage other than flood our storage room in one case and slack two or three sacks of lime for us, and wet and spoil some cement on its way out from town in another.

There is no intention here to point out only those general conditions which were not favorable to us. Many things worked together for our good, but it is human nature to note and remember those things which cause delay and trouble.

We had, as has been stated, a splendid wagon road from Nogales to the mission over which we could bring in material and supplies regardless of the weather. The matter of drayage over this road developed a peculiar twist which puzzled me for some time before I settled on its cause. It was only 18 miles to town, and a man with a two-horse team could have made the round trip in a day, bringing out a 2000-pound load, but I could never get it done that way. The freighter, a Mexican, would hook up a four-horse outfit, drive down to town the latter part of one day, stay overnight and come home the next day with the load. He thus put in two long half days rather than one long day. It took me some time to figure out that a generation or so ago, when this freighter was

a young man, the roads in that part of the country were none too good and this trip from the mission to town and back was too much to be made in a single day or with less than a four-horse outfit. This man's mind has not changed with the changed conditions and he still thinks that it is the proper way to get a load from town and far be it from him to depart from the ways of his fathers! Since I was paying for the drayage by the hundred pounds, I didn't consider it worth while to try to uproot this local belief in the old customs in this particular case, so the freighter had his way and used all the time and horses he wanted.

The Bricks

In the restoration of the walls we were to use two classes of bricks; the adobe and the burned brick.

The adobes presented no particular problem excepting that the Mission adobe is much longer and thinner than the common size in use today, being 11½ inches wide, 25½ inches long and 2½ inches thick.

The adobe is a sun-dried brick in common use all through the Southwest for building purposes and perhaps a little description of the method of its making might be interesting. Fortunately we had water near at hand in a little ditch about a hundred yards east of the Mission, which, by the way, must be running on almost the exact line as the one the padres used during the ancient days to irrigate their garden and field. The boys dug a pit a few feet to one side of this ditch, removing and discarding the surface dirt as not fit for adobes. The surface soil at this point had been built up a couple of feet in the last century and it was only after going through this accumulation of past generations that the men pronounced the material good 'dobe dirt. About a wagon load of this dirt was then loosened up in the pit and worked over with the shovels until it was fairly well pulverized. Stones and sticks of any size were picked out during this working. Water was then led from the irrigation ditch by a small trench and allowed to run into the pit while the dirt was turned with the shovels until the boys had constructed a magnificent mud pie. The water was then shut off and some refuse straw was worked into the mud. This straw was to bind the mud together when it was dry and to help absorb the rain when it falls on the face of the brick after it is placed in the wall. The men at this stage prefer to work barefooted with their trousers rolled up above the knees and it is a real athletic exercise to mix a wagon load or so of mud while standing on such insecure footing.

When the mixing is finished, one man in the pit shovels the mud up into a wheelbarrow and a second man wheels it away to the moulding ground. This is a level piece of ground which has been raked and dragged flat with a board. The moulder has his mould ready on the ground and the barrow man wheels his barrow up and empties it directly into the mould which is simply a frame without top or bottom having three

or four compartments the size of the prospective adobes. The moulder then gets down on his knees and rams the mud into the frames with his hands until all the frames are full, when he 'strikes' them by raking the surplus mud off at the level of the top of the frames. The two men then pull the frame up, leaving the newly moulded bricks, like so many cakes of black jelly, lying on the ground. While the barrow man goes back after another load of mud the moulder washes his frame off in a bucket of water and lays it out on the ground ready for the next load.

A couple of days after moulding the bricks are dry enough on top to turn up on their edge. Another two or three days and they are dry enough to stack, or, if they are wanted for immediate use, to be hauled to the job and placed in the wall.

This method of manufacture leaves finger and hand prints on the bricks which dry and become lasting impressions, so that the sign manual of our boys went into the walls in the bricks they made. In tearing some of the top material off the walls to start the reconstruction we often saw these handprints left there by the people who laid the bricks more than a century ago. In one case we found a perfectly preserved cockleburr in a brick when we broke it in two, and in another a little blue bead which had probably once been part of a necklace around some dusky throat.

The burned bricks caused us quite a bit of worry before we finally arranged for a supply of them. Seven sizes of burned bricks have so far been identified in the walls of the mission and I would hesitate to say that these were all that were used.

The most interesting size to us, because it was the hardest to manufacture and to lay, was the one we called indifferently the cornice or moulding brick. It is represented by Figure 1, Plate I, is 22 inches long over its greatest length, 13½ inches wide at its greatest width, and is 3 inches thick. In other words it is the size of seven or eight of our common bricks of present day manufacture. One end of this brick is moulded in a scroll shape and a line of the bricks, standing side by side with this scroll end projecting over the wall, forms the cornice.

When we went to a brick man in Nogales and asked him to quote us a price on 1500 of these bricks, he said they couldn't be made; that they were so big that they would not hold together through the drying and burning processes but would crack and go to pieces. When we pointed out that they had been made by the padres out at the mission, he said maybe they could make them but he would hesitate to do so with the soil he had at Nogales. We finally persuaded him to say he would try 1500 of them at 10 cents each. We were not satisfied with this deal but kept looking for some one who would come out to the mission and burn the bricks right on the ground, for the wagon haul of 18 miles out from Nogales, no matter how good the road, meant a heavy loss in breakage.

At last we were able to find a Mexican by the name of Lopez who had had experience in building kilns and burning bricks, who agreed to come out and build us a kiln if we would make up a total of 6,000 bricks. We decided we needed two other sizes besides the cornice bricks to make the proper restorations and, while we would not need as many as 6,000 bricks for this present work, it would be no loss to have some bricks left on hand for future repair and restoration work. The other two sizes decided upon were the wedge shape and the 8 by 16.

The wedge shape brick shown at Figure 2, Plate I, gave us considerable cause for study and it was the better part of two months before we finally decided upon the reason for its shape. Architects, engineers, and contractors, all declared it was built for an arch brick, but all the arches in Tumacacori are built of the plain mission adobes. The wedge shape brick was found too in places where its shape could not be accounted for. It was used on the shoulder or offset of the outside walls, in the pediment on top of the front wall, and one or two other places where the 8 by 16 brick would have given more satisfaction.

The explanation finally arrived at was that it was a dome brick put to a secondary use in all the places we had been finding it. Upon this theory we experimented and found that the bricks laid flat, side by side, with the small end of the wedge pointing inward, formed a circle about seven feet in diameter. Smaller or larger circles could be made by making the cracks between the bricks wedge shaped, at the outer side for smaller circles and at the inner side for larger circles, so that a dome of any size could be started and gradually drawn in at the top without using false work underneath to support it during construction.

This explanation of these bricks checks out with a historical note in Bancroft's Arizona and New Mexico, (Page 535, footnote) where he says: "In 1822 a new church was in process of construction or extension, but work was for a time suspended on account of trouble about the pay for 4,000 head of cattle that Padre Estelric had sold to obtain funds."

Padre Liberes, who was in charge of the Tumacacori Mission from 1822 to 1824 was delayed in his work by lack of funds. He had used up all his standard sizes of bricks in the walls and could not get the necessary funds to burn another kiln. In this extremity he realized that the first thing to consider was protection, and to get protection from the weather for his exposed walls and offsets, he decided to use up the wedge shaped bricks which had been made for the domes over the bell tower and mortuary chamber. He expected, as soon as his funds were available, to go on and burn another kiln of bricks in which he would include another supply of dome bricks, and finish his church, but the church was abandoned before the work was completed.

We arrived at this solution of the problem of the wedge shaped brack too late to keep us from burning a supply of them, so while it was not really necessary, we restored the wedge shaped brick where we found it had been used with the exception of the pediment at the top of the front wall where we considered the 8 by 16 size stronger for the purpose.

A few words of explanation may be in order about the other sizes of the burned bricks.

Figure 4, is a special moulding brick used in the bell tower, the half round projection forming the moulding which can be seen near the corners of the tower, and the frame which can be seen around the bell arches, are made of this brick. Figure 5, is a thin square brick. A line of these bricks was left projecting a t the spring of the arches, just under the bell beams, in the bell tower. They project a little over an inch and were to be covered with plaster, forming a neck mould at the spring line of the arch.

Figure 6 shows what seems to have been intended primarily for a floor brick, although it has been found in one case, at least, in a wall, and in another as a capping for a bench. Figure 7 is the dome step brick. Photographs show a series of 12 steps leading up to the cupola on top of the sanctuary dome. These were for the practical purpose of getting up to the cupola to make repairs should the occasion arise, and for the artistic purpose of breaking the monotonous line of the dome. For a long time I thought these bricks were simply cut to shape out of the 8 by 16 size, but upon close examination they prove to be special diamond shaped bricks made for this particular purpose; only twelve of them were ever used;

The methods used in mixing and moulding the burned bricks did not differ essentially from those described above used in making the adobe bricks. We had to experiment with various amounts of sand and finally mix in a little straw to keep the large cornice bricks from cracking while drying.

After the bricks were well dried they were built into a kiln and burned, nine or ten cords of wood being used in the burning. Their quality, we found when we came to using them, was not so good as the old bricks of the padres. I think this was partly due to the burning; that they would have been better if we had burned them longer, and partly due to the fact that the material we had to use was more or less mixed with the loam of a century's use of the surrounding soil, probably reducing the clay content of our brick as against those of the padres. However they served the purpose for which they were designed and cost us less than they would if we had bought them in Nogales, aside from the saving of the drayage in transporting them and the loss in breakage.

PLATE I – Brick Sizes Used at Tumacacori

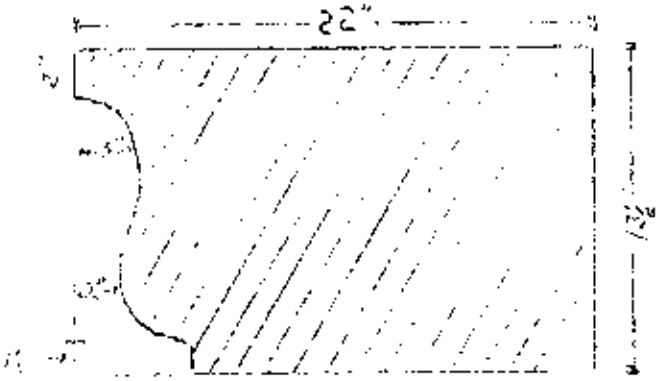


Fig. 1 – Cornice Brick
3" Thick

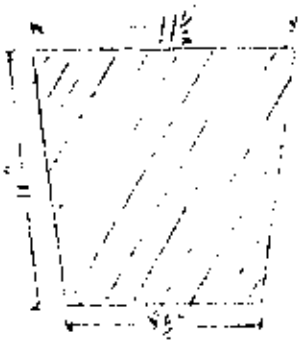


Fig. 2 – Wedge Shape
Scant 3" Thick

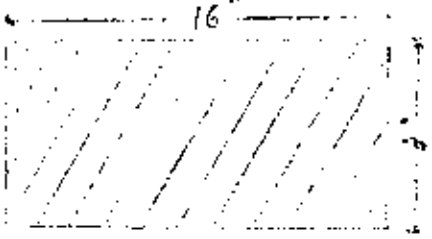


Fig 3 – The 8 × 16
3" Thick

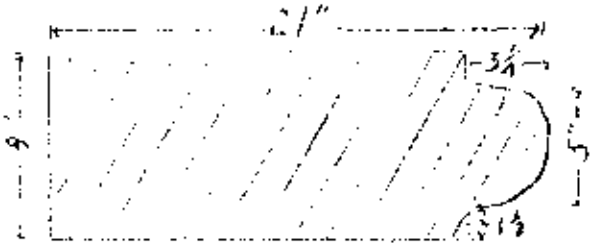


Fig 4 – Tower Moulding Brick
3" Thick

Present Commercial Brick

Fig 5 – Moulding Brick
1½" Thick

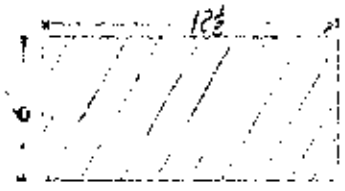


Fig 6 – Floor Brick
2½" Thick

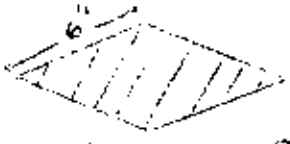


Fig 7 – Dome Step Brick
2¼" Thick

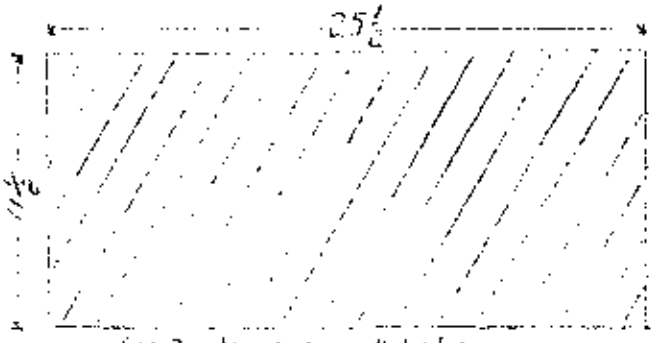
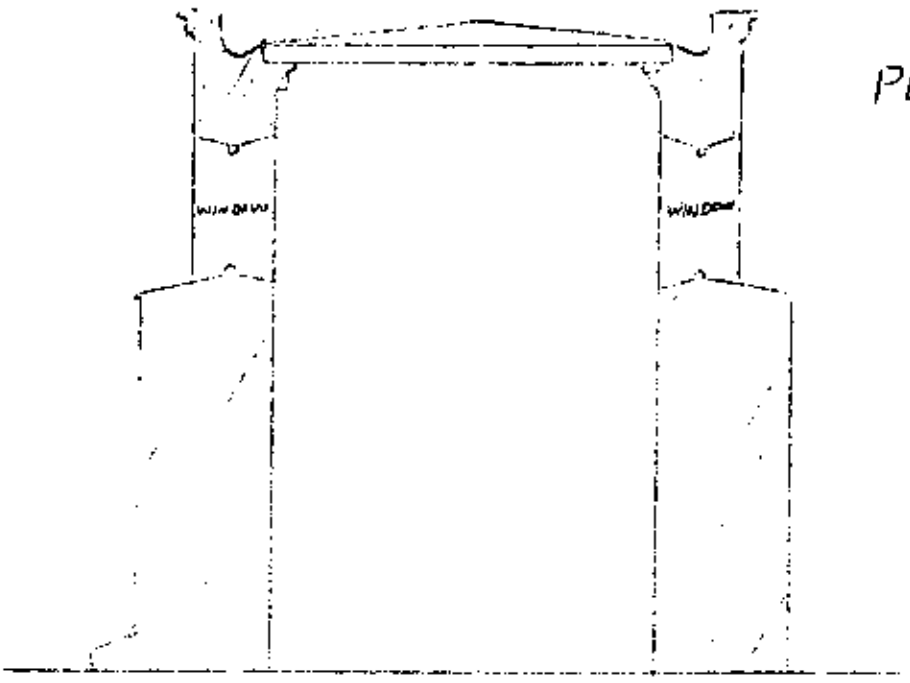
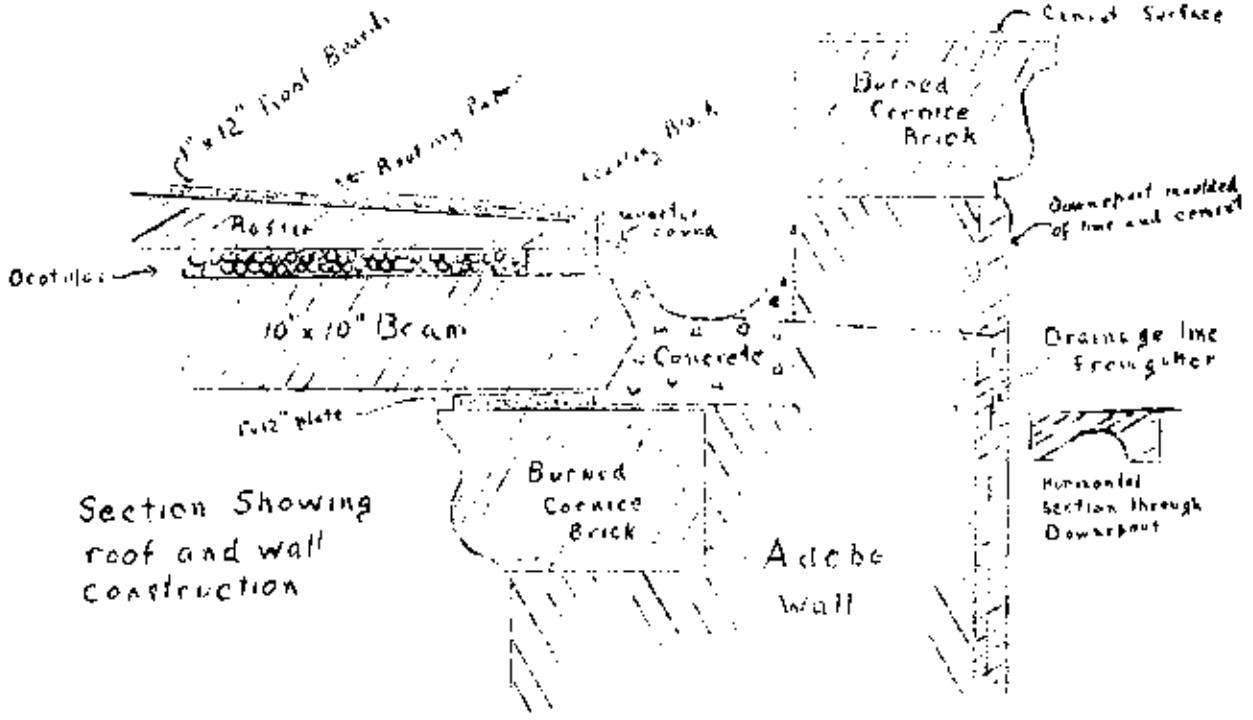


Fig 8 – Mission Adobe
2½" Thick

PLATE II



Cross Section, Tumacacori Mission



Section Showing roof and wall construction

Section Through Beams and Rafters

The Timbers

Feeling pretty well satisfied that we had conquered the question of bricks herewith to bring our walls up to the proper height, we next began to consider where we were going to get the timbers for the roof which was to cover the nave. The original roof was of pine timbers brought from the Santa Rita Mountains, at the nearest point about 20 miles away to the east across the Santa Cruz River.

I went over and looked out the country on the side of the mountains nearest to us, going up the White House Canyon as far as it was navigable for a Ford, and going into consultation with a Mexican up there who had lived in those parts about thirty years. He assured me that the timbers could not be brought out that way. There were some large enough for our purpose up near Old Baldy, but it would be a question of snaking them two or three miles over canyons and washes to a point where our wagons could get to them. Before this I had sent a Mexican over who had spent a day and a half looking out the country and he had come to the same conclusion. I believe we looked over the ground where the padres got their pine timber, but all the large trees have been cut out of that part of the mountains in the last two or three generations.

Balked on this line, we had recourse to some Mexicans who had mined around on the south and southeast slopes of the Santa Ritas and assured me we could get trees of the size we wanted around there. This meant a matter of snaking the trees from the point of cutting some distance to the wagons; a wagon haul of about 12 miles down to the railroad; a rail haul of about 30 miles around to Tubac station; and then bringing them across the sandy Santa Cruz River to the mission on wagons. All this was finally done and we landed 26 sticks of timber eighteen feet six inches long, with an average diameter of about fourteen inches, on the ground.

We could, of course, have purchased timbers of the size we wanted at the lumber yard in Nogales; but there is a certain amount of sentiment to be taken into consideration in work of this kind, and I wanted, as far as we reasonably could, to use the materials and methods of the original builders.

I am sure the original timbers were pine because I have talked with two different men who claim to have seen the mission when a few of the rafters were yet in place and both men agreed they were pine. Not satisfied with this, we traced down a story to the effect that some of the timbers were taken out of the roof by Mr. King in the 60's or 70's and built into a house across the river. We found that the railroad, in building from Tucson to Nogales several years ago had condemned the land this house stood on for a right-of-way, destroyed the house, but had left one timber lying along the right-of-way. This timber laid there until a couple of weeks before we got interested in it when a clean-up gang of

section men set fire to the weeds and grass on the right-of-way at that point and burned the timber. We were still able to get our evidence however for, although we lost the pleasure of being able to restore an original timber to the roof, we were able to tell by an unburned portion of one end that it was pine, to get the approximate size of the rafters, and, by measuring the ashes on the ground, to get its length, which checked with the width of the nave of the church.

After getting our timbers on the ground we had our work cut out, so to speak, to get them hewn square and get them up on top of the 24-foot walls of the nave. We were all new to this work but by this time we were getting the habit of developing our own methods as the various needs arose so we got an axe and an adze and experimented until we were able to square up timbers which are passing inspection today by hundreds of visitors as a first-class job.

One day as I was squaring one of the pine timbers with an adze and thinking how, just about a hundred years ago, on this same plot of ground, a priest with his robe tucked out of the way was swinging a similar adze on another pine log from these same mountains, I was called back into the present by the drone of an airplane and, leaning a few minutes on the handle of my adze, I watched the silver glint of the sun on the wings of the plane as the man on fire patrol over the Santa Rita Forest Reserve went off duty and flew home to Nogales, making the 18 miles from our place to town, which would have cost Padre Liberos a weary half day, in about 10 minutes.

We spoke often while we were at work of what the padres would think could they revisit today these scenes of their labors.

When the timbers were squared out we devised our own tackle methods for getting them on top of the walls and succeeded in a couple of days' hard work in lifting them up safely without damaging the walls or breaking any heads. Here they looked entirely too new and white, so we decided to darken them a little to give them the appearance of age. We experimented with some crude oil diluted with kerosene and after painting and repainting some sample beams two or three times, attained what we considered the proper shade and went over all of them. The proper shade was largely a matter of guess-work for we were using the stain in the open air and bright sunlight and it would be seen against the semi-dark ceiling of the roof from the interior of the church, so we had to make it several shades lighter than we expected it to look later on. We were very fortunate in hitting upon the correct shade, and many visitors, looking at the roof now upon entering the church, think the beams are the original ones and are a hundred or so years old.

The Ocotillos

The construction used in the original roof was to set the main

beams about three feet on centers and then crosswise over them put on a layer of ocotillo stems, ribs of the sahuaro cactus, or small brush. On top of this second layer was a layer of grass and above this, either dirt, with a lime surfacing in which bits of bricks were bedded to give strength, or the lime may have been put on the grass without the intervening dirt. By a process of elimination we decided the padres must have used the ocotillo stems. The sahuaro cactus does not grow in the vicinity of the mission and the ocotillo stems would have been much better for the purpose than the more crooked mesquite or the small reeds or brush which might be found along the river.

The ocotillo is confused by the average desert visitor with the cactus family, but it belongs to a very small family of its own, Fouquieriaceae, having only one genus and a very few species. Armstrong in "Western Wild Flowers", gives the following description:

> "A magnificent desert shrub, when in full bloom, but strangely forbidding in aspect in spite of its beauty. Its many stiff stems, from six to twenty feet tall, entirely without branches, stand up stiffly from the root, like a bunch of wands, and are armed their whole length with terrible thorns, which in the spring are masked with beautiful foliage, like little apple leaves. From the tip of each wand, springs a glorious cluster, from six to ten inches long, and crowded closely together, suggesting a flame and waving to and fro in the wind with a startling effect against the pale desert sand. When the flowers and leaves are gone, the clumps of dry, thorny sticks look quite dead and it is hard to believe that they were so splendid early in the season."

Having decided to use the ocotillos to cover our beams, we began looking for an available supply and seeing what they would cost us. They grew rather sparsely on our side of the river and were back up on a mesa where we could not get to them easily with the wagons, so we decided to bring them over from the other side. This we found to be quite a little job, and before we had brought over as many as we needed, the river got up and cut us off from that supply and we were forced to get the remainder on our side. It was fortunate that we only needed part of a wagon load to complete the work, for it took two or three days persuasion to get the Mexican to go out and gather them on the rough mesa.

Other Materials

Sand was obtainable in two or three washes a short haul from our work, and toward the end of the job an obliging young cloudburst washed down a plentiful supply about thirty yards from our mixing box.

Lime and cement were purchased in Nogales as was lumber, roofing paper, and like materials. We found we could not make a straight lime mortar which was strong enough to suit us, so we put cement enough in to make it the strength we wanted.

The Need of Protection

Having explained the sources of our materials, we are now prepared to take up the need of protection and the work itself.

The need of protection, and the primary cause of the restoration done in this work was protection, was very great. Destruction at the Tumacacori Mission has occurred from two main sources; the elements; and treasure seeking vandals.

A century of storm and sun had disintegrated surface in many places and eaten into the adobe walls. Settling cracks occurred in some places, due I think rather to the weight of the walls than to any earthquake, such as destroyed the towers of Cocospera in 1886 or 1887. The tops of the walls of the nave had worn down two to four feet and in some places we had to cut another foot or two off to get down to a solid footing so we could begin to build up the new wall.

The Treasure

Almost all the vandalism can be traced to the treasure hunters. For generations tales of buried treasure have hung around the Tumacacori Mission. If one is to believe all these tales, the padres spent all their time in mining and reducing immense amounts of gold and silver and the church was rich beyond computation.

Most of the vandalism has been done, not on any system but on 'hunches.' A scoundrel with a pick and shovel seems to have felt free to walk into the church any day and dig here, there and yonder without rhyme or reason. It never seemed to dawn on his dull brain that if the padres were hard-pressed and decided to abandon the mission in haste, they would hardly try to secrete any valuables by tearing up a perfectly good cement church floor where the soft earth and broken material would be sure to tell the tale to the first visitor, when they could go out into the garden and dig a hole in the freshly turned earth where a newly covered hole would merge into the rest of the soil and would not be noticed twelve hours after the work was completed.

One school of treasure seekers are trying to use some system in their work, but, so far at least, have not attained any success. In my work as custodian of the Tumacacori I have happened upon four copies of a document in the hands of different treasure hunters, from which they were constructing charts with which they were expecting to find the mines and treasure of the padres.

While it is not exactly germane to our subject of the repair and restoration of the Tumacacori Mission, a copy of this manuscript might be of interest, and I will insert a fairly accurate translation here, leaving the distances blank at the request of the person who allowed me to transcribe this copy.

The Manuscript

"One document which dates of the years 1558 to 1668. It expresses as follows:

"The mine which is called 'Virgin of Guadalupe' close to Tumacacori, it will be found at -- leagues, measured from the great door of the church to the south, and from the waters of San Ramon measured to the left---varas to the north. About --- varas before arriving at the mine is a black rock engraved with a chisel. On the rock you will red the inscription $\frac{CC\ D}{T\ D}$ and --- varas from the cross you will find the treasure and that is what the letters signify.

"At --- varas after you pass the black rock you will find a small monument in the direction of southwest. It is two peaks which were demolished by powder and fell over the mine in great masses. Without more testimony than the powder put in the cliff the place was abolished forever so people could pass over it and it would never be seen.

"In a certain place exists one square of --- varas in a square inside and outside the mine and the treasure is in the middle of the square. In the mouth of the mine there is silver and gold and white silver. The gold was brought from the mountain of Guachapa close to Tubac. The silver consists of 2050 bars smelted together with 965 of virgin silver. The whole amounts to the value of about 50,000,000 (pesos?).

"Ahead in the same direction to the south at -- leagues from the mine of Guadalupe there is a passway which is called 'Deep Water,' It has at the south, by the road of the passway, a canyon which opens out at the town of Santa Cruz. The mine will be found when you get in the pass. Below the said pass way are 12 arrastas and 12 patios. There is one tunnel of 30 varas which has the name 'Purissima Conception' engraved with a chisel. A tunnel runs to the north and about 20 varas ahead there is another tunnel, small about 100 varas, and it runs to the west. The ore is yellow. It runs 1/2 silver and 1/5 part gold.

"At --- varas there is a mine in the direction of north. You will find in this native silver from one pound to at least 5 arrobas, the greatest. This mine will be found covered or hidden by a copper door; it has enormous iron bars, everlasting. The copper was brought from the neighborhood of the mountain of Guachapa in the neighborhood of Tubac, smelted in Tumacacori and was taken with oxen to the mine in the years 1558 to 1658.

"From the mine 'Purissima Conception' to the mountain of Our Lady of Guadalupe there are --- leagues and half way on the road in the same direction there is another mine. It will be found by the name of 'Opata'. It has a tunnel 400 varas long and it runs to the south. The metal of this mine has a lime contact, and about 300 varas from the mouth of the mine there are some inscriptions and furthermore there is a long black mesa from the side where the sun rises and sets. Follow a deep canyon to a rock slide. You will see one inscription made by a bar. Here is a hole 1/2 vara deep and it will last forever. Opposite, to the south of the canyon, you can see the mark of the gold. At the side of the canyon to the north of the mark we have --- leagues from mine Opata to Tumacacori. The mark is to the west.

"On the other side of the mountain you will find the mine of Our Lady of Guadalupe. You will find the letters engraved "P. L. R. 12 Dec. 1508". This mine was found by chance and all her interests remain in charge of Tumacacori. In this mine will be found a copper box. It has a key hanging on one corner. There is a set screw which you open and then there is a rod which you pull out and open the box. There will be all the maps and the great treasure.

"If any one by chance will have the great fortune to find one of the mines he shall be obliged for the good of his soul to give 10% to the mother church.

"In the year 1558 belonging to Tumacacori was a mine by the name of San Pedro which you will find --- leagues from the mine Isabelle. The river is to the north --- leagues and the mine is close to some black rock at the point of the mountains. From this point a trail goes to the mine San Pedro, in a line with a line of the mountains at a point of the bar. The mine is --- leagues from the side door of the church to the west and when the sun rises it is directly in the mouth of the mine, and from this mine you can see the town of Arivaca.

"From the Virgin Guadalupe it is --- leagues to the mine San Pedro. There is a landslide of about 1/2 vara from the top to the bottom of the canyon. There is a trail that descends from the mine San Pedro. It comes down to the Virgin Guadalupe in the direction of the south to the mine of San Ramon. The eyes will be engraved in one rock. In the mine of San Pedro will be found enormous slabs of virgin silver, two deposits of virgin silver. There is a wooden door. To the west there is a landslide and in it there is a deposit, and to the east there are others, and at a certain place there are three deposits containing all pure virgin silver.

"And notice is given that any person who finds this mine will be obliged to give to the mother church 10% and repair this church, and the Lord will bless his soul."

(The following notice is appended to the copy of one document which I saw.)

"Notice: The original of this document was in the archives of the parish of Magdalena, Sonora, and from there it was taken by a priest to the museum of Paris."

It will be noticed at once that the dates of 1550 to 1658 given in this document are entirely too early. Tubac, Tumacacori, Arivaca, and several of the names given here, do not appear in history until after Kino's first visit in 1691.

Yet the internal evidence points to the fact that all the copies of this manuscript which I have seen came from some master document. On the face of it it looks like a hoax, yet I know two or three people who believe earnestly that it is an honest document and points the way to real mines and treasure.

The local population felt quite sure we were treasure hunting when we ran some experimental trenches in the odd hours after quitting time in the evenings. The main object of this trenching was to establish, if we could, the location of the older church. We failed in this, but we did pick up a few interesting points in the plan of the quadrangle so the work was not wasted. The trenches were filled up when we were through with our examination, as to leave them open to the elements was simply to invite further destruction. We have two pits still open on an unfinished trail which we hope will uncover one of the bells.

The Lost Bells

That the Tumacacori Mission had a bell in each of the four arches

of its bell tower can be seen by an examination of the tower today. It must be remembered that in these missions the bells were not mounted to swing as are our church bells of the present time, but the bell was hung in a stationary position and the rope was attached to the clapper, so the bell was really tolled instead of being rung. A great beam of oak brought out of the Tumacacori Mountains west of the Mission, is still bedded in the walls of the tower at the top of each of the bell arches. The beam in the south arch shows the marks made in it by the rawhide rope by which the bell was hung. Since this was the front arch, and the bell hanging here would be the one most often seen from below, it is reasonable to believe that the largest bell hung in this arch. The person ringing the bells would have stood almost under this south bell, making the pull of the rope here slightly different from the others, probably imparting a slight swaying motion to the bell, which has caused the rope to chafe the beam. A bell hung in the east arch as is proven by the marks left by its ringing rope. The piers of the tower are so large that the rope running from the clapper of the east bell to the place where the ringer would stand in the south arch, cut into the corners of the piers between these two arches, so that today you can see six or eight deep marks, some of them almost a hand's breadth deep, which the rawhide rope cut into the bricks in sawing back and forth whenever this bell was rung. The same marks can be seen where the rope from the bell in the west arch cut into the corners of the southwest pier of the tower. If the bell in the north arch had always been rung by pulling its rope from the south arch, we might now have no evidence of its existence; but for some reason the ringers sometimes pulled its rope over through the west arch, probably while standing on the roof near that arch, and so the rope left its story on the northwest pier of the tower. It may be taken then as a fact that at one time four bells hung in the four arches of the tower.

Legend has it that, shortly after the abandonment of the mission, the bells were buried by the Indian neophytes to prevent their destruction or removal. I am inclined to believe this legend is based on facts. The bells were so heavy that their transfer further south would have been more or less of a problem; they were not needed further south either, for, owing to political disturbances in the period of 1820-1830, the church was having a hard time holding its own without expanding and building new churches which would need new bells; and I think the padres expected, when conditions grew more favorable, to return and re-establish the mission at Tumacacori. The legend was strengthened some years ago when a Mexican or Indian man turned up in Tucson with two bell clappers which he claimed belonged to the bells of Tumacacori. The people connected with the university made up a small purse and purchased them from the man and they are at present in the university museum. They have every appearance of being hand hammered and are crudely shaped. The man claimed that he had dug these up, knowing from the story which had been handed down through his family where they were buried. For some

reason, according to this man, the bells and clappers were not buried together, but if the family story was true, then he knew where the bells were.

He was offered a further sum if he would bring in the bells, but he reported afterward that either the story was wrong or he used the wrong landmarks, or some one else had removed the bells, for they were not where he had dug for them and he was unable to locate them.

One day, while we were at work on the repair of the mission, an old Mexican who had been born and raised at Tubac, which is about 3 miles away, came over to smoke and talk awhile and incidentally asked why, since we were fixing the mission up, we didn't hang one of the bells in the arches. Upon our explaining that, like the immortal Barkis, we were "willing" but did not know where the bells were, he said he knew where one of them was. He then went on to say that he had known from boyhood by the local tales, where the bell was buried, but had not dug for it until about 35 years ago when a rumor became current that it had been removed. Upon this, he and another man came down to the mission and sunk a pit about eight feet deep where the bell was supposed to be located, and found it. Having proved that it was still there, and having no reason to remove it, they filled the pit up "And," he very logically concluded, "if no one else has taken it away I suppose it is there yet." He said it was at the foot of the bell tower about three feet out from the wall and he would show us the exact spot some time when no one was around. Upon this offer I told him that if what he said proved to be true I would raise a fund of $25 to repay him for his care in keeping the secret and delivering it to us.

On the strength of this story we sunk a pit about four feet square and eight feet deep on a spot he pointed out, but the dirt we took out had not the appearance of having been turned before and there was no bell at the bottom of the pit. We then set over about eight feet to the west and started another hole, thinking we would go down on this, run a drift between the bottom of the two pits and explore a little from the sides of both of them before we gave up. So far we have not had time to do this and I am unable at this time to either prove or disprove the old man's tale. This trenching was all done at odd hours and toward the end of the repair work I was working ten or more hours a day on the mission and had no extra time for this bell hunt. We did develop a lead which had us excited for a while. In the second pit, when I had gone down a foot or so, I uncovered a rotted stick standing vertically and axe marks on it proved it was not an old root of some bush which had grown there. The ground, too, had undoubtedly been turned once before. "Ah!" we cried, "the old man, when he found the bell, left a marker which he has forgotten to speak of." Needless to say, we worked quite earnestly after this and were soon down to a depth of about four feet when the shovel grated on a metal object!

It proved to be an old bucket.

I know now that a couple of the Alegria boys had prospected for this bell in that pit about 16 years ago, but, becoming discouraged, had laid this joke which took so long to come to light. It was a good joke on us. However, they had stopped at a depth of four or five feet and the old man was q uite sure his pit was over his head when his shovel touched the bell. So this old prospect hole didn't go deep enough to prove that the bell is not there.

The Pilar

A very heavy rain during the rainy season sent a large amount of water down past the mission and the erosion caused by this exposed a brick wall about 21 feet south of the southeast corner of the bell tower.

We examined this wall with some trenches and found it was built of the 6 x 12 burned bricks (see Fig. 6, Plate I), was about 12 feet long and turned south at both ends but, owing to its badly broken condition after it turned the corners, we gave it up. The wall which we developed was beautifully finished on the south side with a hard plaster resembling cement, and the floor, which we found about two and a half feet lower than the entrance threshold of the door of the church, was finished with the same material.

We decided this could not be the wall of a house because it was of burned brick and no other house on the grounds has brick walls; the floor of this structure was too low to have been on the ground level and not low enough to have been part of an underground room; and a house here w ould have destroyed the view of the facade of the church as one approached from the south. We pitched upon the explanation that this was a reservoir in which water could be stored. A day or two later a Mexican who had been born and had lived all his life near the mission happened along and confirmed our supposition. He said he remembered when he was a small boy he had visited the mission many times and at that time two of these reservoirs, which the Mexicans call a pilar, were in evidence. They occupied the plaza just in front of the church, were not very far apart, and between them was the evidence of a round well which had been lined with burned brick. We never got time to check this story up with trenches, but I believe it is substantially correct. It is to be hoped that we will at some time later be able to uncover and reconstruct this portion of the plaza, as it will make a pleasing foreground to the pictures of the facade of the church.

The Bench

At another time we opened a trench at a point about 14 feet north and 25 feet east of the southeast corner of the tower. It must be remembered that a row of rooms ran east from the tower, and this point

we opened was the junction of a wall running north from the back, or north side of this row of rooms. We afterward found that the wall running north was the east wall of a row of rooms, so this corner which we went down on was a corner of the quadrangle.

Along the walls forming this corner we found a bench or seat formed of adobe bricks built up some 16 inches and then capped with the 6 x 12 burned bricks and then finished off with a beautiful hard, red plaster. On the floor level we found a floor of the 6x 12 burned brick, several square feet of which was still in good condition.

Here again we were unable to continue our work and make a thorough examination, but I am sure this was part of a seat which ran along the house walls on the inner side of the quadrangle, and on this very part which we were examining Padre Liberos may have sat down to rest after a weary day spent with his neophytes in the village and field and garden, and watched the unpacking of a newly arrived pack train from far to the south bringing in material and supplies which he needed so badly to continue his work. The brick floor at the foot of the bench is a part of the corridor floor and one looked across it, through the sweeping arches into the sunshine of the quadrangle and felt that here was a mass of buildings, built at an immense expense of time and labor, but fit to endure for centuries. Little did he think as he listened to the clatter and jingle of the harness and the chatter of the Mexican and Indian attendants, that a scant hundred years later we would be opening trenches here in the debris of his walls in an attempt to discover the use of the various buildings!

Assembling the Materials

The actual work of rebuilding the walls and restoring the roof went along very slowly. The walls were so thick that it took a surprising amount of time and material to make such of a showing. At first we tried out the method of carrying all material up by hand, but this consumed so much time that we afterward put in a rope and pulley. We had to work out a special method of handling the cornice brick when we came to that point in the construction. It will be seen by a study of the cross-section sketch of the nave given in Plate II, that a row of these bricks come just under the roof beams on the inside of the church.

These cornice bricks, you will remember, were about 13 x 22 inches in size. We found that the simple method of laying the brick flat, covering it with mortar and then turning it up into place, would not work at all. The common run of mortar was too stiff to work down between the bricks if we stood them in position and then tried to fill the cracks. We next mixed the mortar to the consistency of a thin slop and tried pouring it between the bricks after they were set in position. Being so thin, the mortar promptly ran out of the crack at both ends of

the brick. We finally found that two men could work best on this job. The mason would set up the fresh brick at the proper distance. The helper then held a board over the crack at the back end and a special mould cut to fit the front curve, over the front end of the crack, while the mason upset half a bucket of mortar into the crack. In less than half a minute the mortar was set enough to allow the boards to be removed and the process could be repeated on the next brick. Since each of the bricks had to be lifted, carried, set and lined up, separately, it will be readily understood that a good bit of time was consumed in laying these cornices.

After laying the inner cornice, we stopped the brick work two or three days until we could get the beams up on the walls. These beams do not rest directly upon the brick cornice but upon some one inch board plates which we put upon top of the bricks. Our idea in this was that if a beam warped or twisted after being laid, these plates would distribute any strain from falling directly on the noses of the cornice bricks and breaking them off.

The beams were unequal in size, running from about nine to about twelve inches square. The problem raised by this was whether we were to let the bottoms of the beams remain even and let the unevenness all fall along the top line of the beams, or whether to cut some sockets for the large beams and distribute the unevenness between the top and bottom lines. We decided on the first method and it proved very satisfactory. The bottoms of the beams fall evenly along the line of the noses of the brick cornice or moulding and the irregularities of the tops are not noticeable because there is no regular or even line there to force a comparison.

We did another good stroke in the distribution of these beams when we began at the entrance end of the nave with the smallest and ended at the sanctuary end with the largest, grading them larger and larger as we went forward.

The idea in doing this was that the visitor will almost invariably examine the roof construction as soon as he enters the church and will not pay attention to its details afterward. Now the nave is 73 feet long and this method of putting the larger beams at the far end makes all of them appear about the same size, while if we had put in any small beams toward the front of the nave, at that distance they would have had a sort of pipe-stem effect.

We had decided as soon as we hewed the beams out that they looked entirely too fresh and new for our purpose, so we looked around for some method of aging them in the wood, so to speak. For this purpose we used common crude oil, cutting it to the shade we desired with kerosene. We did not dare apply this stain until the beams were up on the wall because it did not dry very fast and we were afraid the handling

and the hoisting tackle might leave marks on them. After the beams were on the wall and before we had built the bricks in between them to hold them solidly in place, we applied the stain. The work of this was not hard, being simply a matter of brushing the stain on with long handled brushes, rolling the beam a quarter turn at a time until we had covered all four sides; but the mental strain of deciding out in the bright white sunlight under an Arizona sky what shade to apply to give the best result in the semi-dark interior of the church under the completed roof, nearly wrecked our force. We worked one beam over three times before we thought we had the shade and then after painting four or five beams that shade, decided to darken it a little. The boys considered this 'piddling' all foolishness, but the result when the roof was completed is fine.

We set these beams three feet apart on centers. We did not need such heavy beams nor need them so close together to support the weight we had to carry, but at this point the roof is a restoration of the original which did carry heavy construction above it.

Having the beams stained and finally bedded down, we next set the roof rafters above them. The roof must have a pitch as low as we could give it and get drainage, for it must not show over the low parapets of the side walls of the nave. To get this result, we used 2 x 12 timber laid on edge sawing them to a ten inch fall in a nine foot run. One of these rafters was set on top of each beam, and, since the tops of the beams were uneven, each in itself as well as with its next neighbor, it cost us two or three days' work to get the rafters lined up.

Having our beams and rafters in position, we were then ready to lay our ocotillos. These had been cut into fairly straight sticks 38 inches long, and were laid from one beam to the next on top of the beams between the 2 x 12 rafters. We did not lay these ocotillos straight with the longer axis of the nave, but laid those in the first row, that is between the first beams, slanting to the right, the next row slanting to the left, and so on. Viewed from the floor of the church, this gives a pleasing effect, and we have good precedent in that several of the old churches are so roofed.

The intention was to use the ocotillos alone for this ceiling effect, but when we came to put them in, we found that if we laid them two layers deep, as we had decided to do, one might, in places, still be able to see up between them and discover the modern board roof we were going to put on the rafters above. This caused us some worry but we solved the difficulty by going out to one of the neighbors and buying a ton of hay which we put on top of the ocotillos. Some showers came along at an opportune time and settled this hay down close before we put the roof on, so the reconstruction from the under side of the roof is perfect.

Finishing the roof was simply a matter of nailing 1 x 12 boards on on the rafters and covering them with a good grade of roofing paper.

While we were working with the beams and ocotillos, the walls of the nave had been brought up to the original height and the parapets had been finished off with a course of cornice brick. The top of this parapet was flushed over with a mixture of lime and cement to prevent erosion and this was carried down the back of the parapet to the gutter.

The cornice brick around the sanctuary walls, which are still in place, were tilted outward so that the rain drains off over the nose of the bricks and follows the face of the cornice down, causing erosion of the wall just under the cornice. We were careful to drain our parapet walls to the inside so that the rain will not run outward over the nose of the bricks but back and down the parapet into the gutter.

The gutters were made of a rubble of lime, cement and rocks. This was poured into place and shaped with trowels and a half round wooden float which we made for the purpose. We took great care to make the joint between the wooden roof construction and the cement gutters absolutely water tight. For this purpose we used a special plastic roof cement which is laid with a trowel. We used this plastic cement under the roofing paper, on top of the paper, and on top of a piece of quarter round moulding which we nailed into the angle where the paper and cement meet. I think the roof will leak any other place before it leaks at that joint.

As is stated on page 10 the roof drainage was handled by means of 18 downspouts. Nine of these took care of the water from the roof of the nave, five on the west side and four on the east side. These drains were all in bad condition and we had to repair what was left of them as well as extend them up over the new wall which we had built. They were originally made of lime but we used cement for restoring them. The water comes into these drains from the bottom of the gutter by means of openings just under the cornice of the parapet as is shown in the detailed drawing of the roof and parapet construction in Plate II.

In repairing these drains we opened the debris lying against the base of the west wall of the church to get at the foot of them and found a rock abutment wall running along the base of the church wall. The drains ran down to this and the water must have run on over this abutment wall and made its own path away from the church as we could find no signs of open drains on the original ground level. The rock abutment is not an integral part of the church wall but has been built after the church wall was completed and plastered. It is carried back along the west side of the church and the north and west sides of the cemetery. Evidently, since the west is the high side of the building, the water coming down off the mesa has given the padres some concern for fear it would wash the walls on that side and they have taken this means to

protect their construction.

Rebuilding the pediment was the most interesting single piece of work we did. The pediment was broken off at the line of the lintel which crosses the facade over the choir loft window. We had two pictures to work from which were taken before the fall of the original pediment. One of these was a direct front view and the other was taken from a point about 200 feet southwest of the building. These views are published in a recent book on Mission Architecture by Mr. Duell, as having been taken in 1880, but this is a mistake. The pictures were taken by Mr. George Roskruge, of Tucson, on July 3, 1886. I was glad to get this point cleared up very recently, for two interior pictures taken at the same time, show no beams over the nave. Now two men have assured me they saw some of the roof beams in position, one in 1882 and the other in 1886 or 1887. If the Roskruge pictures had been taken in 1880 they would have proved the men to be in error, but since they were taken in 1889, not only does the evidence of the two visitors stand, but we can date the fall or removal of the last beams of the roof of the nave between 1886 and 1889.

We were able to locate the footings of the gables which are attached to the face of the pediment quite accurately by the brick sockets which still remained in the lime plaster on top of the lintel. The diamond-shaped figure above the ends of these gables is in its proper place but we will not know until next July, when we can compare the shadows of the real diamond with the one in the picture, whether or not it projects far enough from the wall. If we find it is not far enough out, we can build it up with plaster.

To get the curve line of the pediment I sat at the point where the Roskruge picture was taken and had the boys experiment with different lengths of sticks, swinging them in the plane of the proposed pediment and using the center of the line across the shoulders of the facade as the center of the pediment, until the end of the stick covered the proper bricks on the tower in the background. We then used this stick as a radius in building the pediment.

The ball on top of the pediment, which carries a cross, is partly original. In the excavations a couple of years ago, when we cleaned the debris out of the nave of the church, we found about a quarter of this ball. It had a socket running from top to bottom, and when I saw it I remembered a plate in Rinton's Handbook to Arizona, 1878, made from an artist's drawing, which showed a cross mounted in a ball on top of the facade. So this portion of the ball is again resting in its original place.

Minor Repairs

The stairs in the tower, described on page 9, are completely a

restoration of ours. Vandals had not only torn out the old steps, but had dug several wagon loads of material out and thrown it back into the baptistery. Evidently they thought the treasure was buried under the steps.

We made no attempt to put these steps in with accurate workmanship. The effect we were striving for was the old stairs after some use and a hundred years of abandonment but without the touch of a vandal pick. That we succeeded pretty well is shown by the fact that more than half the visitors who had not seen the mission before we started our work, thought the steps were the original ones, two weeks after we had completed them.

A large hole in the back wall of the sanctuary was closed up. Many visitors thought this hole was originally a window. I knew it was not for it showed no marks of lintels to support the wall over the opening, and, although the padres were sometimes faulty in their construction, they would not put an opening in the back wall of the church directly over the high altar where it would make a glare of light to blind the eyes of the neophytes in the nave as they tried to see the ceremonies in the sanctuary. The Mexican who had visited the mission in the 80's told me there was a niche for a statue there over the high altar, and I am inclined to think his memory is correct. Vandals probably dug through the wall back of the niche looking for treasure.

The lighting of the sanctuary was wonderfully improved by closing this hole. I had many times tried to imagine what the interior would look like with a roof over the nave and this hole in the sanctuary wall stopped, but the effect was better than I had imagined.

There are five windows in the nave of the church, two on each side and one in the choir loft over the entrance. These windows light a space 17 feet wide by 73 feet long. There are two windows in the sanctuary which light a space 17 feet square. It will be seen at once, then, that the sanctuary is better lighted than the nave, and this is as it should be. Furthermore, the sanctuary windows, being higher up in the walls, give a sort of overhead lighting which must have brought out the decorations on and around the high altar. The quiet, the restfulness, the coolness, and the softened light of the nave, tended to center the attention down through the great arch, to the high altar in the sanctuary.

Tumacacori is not the most spectacular mission in this chain which Padre Kino founded, but its interior was well designed and very effective.

CONCLUSION

I wish to say in conclusion that the repair and restoration work at the Tumacacori Mission is by no means finished. The work will be

carried on as funds permit until we have this monument in condition to stand the erosion of the elements without serious deterioration. It is to be hoped that before many years we will be able to keep a custodian in charge under full pay, who can live at the monument and prevent vandalism and give the information to visitors which they desire so much.

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MUSEUM CIRCULATION By Frank Pinkley, Supt.

Because our proposed museum at Tumacacori National Monument is a comparatively small one, and because we have some individual problems in that installation, we have had some very interesting discussions regarding the plan. The building is planned around a patio and we want to open the rooms out into the loggia so that visitors will go into a room, turn to the right, go anti-clockwise around the room and come out by the door by which they entered, go along the loggia to the next room and repeat the process there. The other method is to open the rooms one into the other in series by connecting doorways. We do not like this method so well because few visitors will circle a room which has an outlet at the far end. We have argued that the visitors will enter room 1, turn to the right, go down the right hand wall to the far end, and will then go through the doorway into room 2. Since, in an archaeological or historical museum the material on display must be presented in some sequence from case to case, wall to wall, and room to room, it is pretty clear that this trick of passing down the right hand side of your rooms and leaving the left side unnoticed is going to wreck your chances of getting your material examined in the sequence in which you had planned.

I wish here to quote from pages 105-06-07 and 108 of Problems of Installation in Museums of Art, by Arthur W. Melton, Instructor in Psychology in Yale University. This is one of the Publications of The American Association of Museums, New Series No. 14, Washington, D. C., 1935.

> "As previously mentioned, we have records of the exact routes taken by the visitors in going through the Flemish-Dutch gallery. In Figure 21 we have shown the types of routes taken by those visitors who turned to the right on entering the gallery, and the frequency of occurrence of each type. In Figure 22 we have given a similar schematic presentation of the routes of the visitors who turned to the left on entering the gallery. In both instances the representation is of the records of Sunday and week day visitors observed during the first installation of the paintings, and all proportions are based on the total number of visitors observed, regardless of the direction of the first turn.

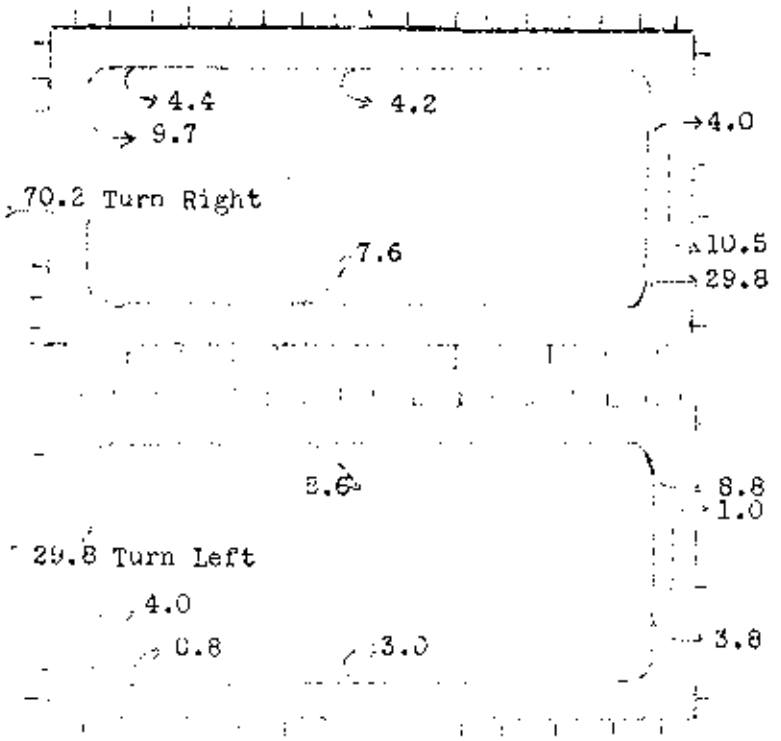

Figure 22 from "Publications of the American Association of Museums" 1935 Edition

"As shown in Figure 21, 70.2 of every one hundred visitors turned to the right on entering the gallery. Of this number 7.6 turned away from the right walls and passed one or more of the sections of the left walls before reaching the far end of the gallery, whereas the remainder (62.6) continued to follow the right walls until they reached the end of the gallery. Some 29.8 of the 62.6 visitors then left the gallery through the right exit without having looked at the paintings on the end wall. Another large group, composed of 14.5 visitors, passed the end wall before leaving the gallery either by the right exit (10.5) or the left exit (4.0). The remainder of the original group (18.3) managed to escape the siphoning effect of the exits and passed before one or more sections of the left walls. However 4.2 of the 18.3 visitors passed only one section before returning to the exit, another group of 4.4 visitors passed only two sections before returning to the exit, and only 9.7 of the original group of 70.3 visitors made a complete circuit of the gallery. The facts in Figure 22 are essentially similar to those presented in Figure 21, except for the reversal of the direction in which the visitors were moving.

"If we forget the differences in the particular walls passed by the visitors and pool the routes according to whether the visitors passed only the side of the gallery toward which they turned on entering, whether they passed that side and the end wall, or whether they passed that side, the end wall, and some part of the walls on the opposite side of the gallery, we find, as shown in Table XVII that 36.6 per cent of the visitors during the first installation passed only the side of the gallery toward which they turned when entering, 19.3 per cent passed only that side and the end wall, 12.4 per cent passed that side, the end wall, and at least half of the opposite side of the gallery, and 15.7 made a complete circuit of the gallery. Only 16.2 per cent of the visitors passed from one side of the gallery to the other before having passed the objects along the entire first side. The data on the visitors observed during the second and third installations confirm the gross relationships presented.

"The most outstanding characteristic was the tendency for visitors to leave the gallery through one of the exits before they had passed any of the objects located on the opposite side of the gallery from that toward which they turned on entering. During the three installations 57.9 per cent of the visitors, 60.5 per cent of the visitors, and 69.0 per cent of the visitors did just that. Moreover, the visitors often failed to traverse the entire length of the walls on the opposite side of the gallery before returning to the exit even though they succeeded in passing the exits when first offered the choice between the remainder of the Flemish-Dutch gallery and the objects in the next gallery."

It seems to us these figures cry out against more than one entrance and exit in small museum rooms. Why let 69 per cent of your visitors walk out at the far end of your room without passing before all your exhibits? Why not bring them back up that other side to the door by which they entered and let them see all the exhibits?

Do you think I am unnecessarily importunate on this matter of circulation of unguided visitors when it is our well known basic policy to guide all our visitors at Tumacacori? My reason is that I feel very sure that all the factors which operate to split individuals off the unguided parties will also be operating, to a much less degree it is true, but still operating, on the guided party. If 60 per cent of the unguided visitors will go through into the next room without seeing all we have in this room, that open doorway at the other end of this room will pull a certain per cent of my guided party away into the next room before I am ready for them to go there. By shutting the door I eliminate all these factors and bring my guided party around the room to the door by which we entered the room without losing a member. For similar

reasons we want the Tumacacori rooms laid out for a right hand circulation notwithstanding the fact that we expect to guide our parties. It will be a little easier to guide to the right than to the left and, on those occasions when our guide service breaks down, the museum will be laid out properly for unguided parties.

On page 137-138 of the above quoted report we find the following:

> "Aside from the question of whether or not a particular object will be seen more often in this position or in that position, there are in most museums of today expressions of the belief that the most perfect understanding comes from viewing objects or reading labels in some orderly sequence. Although this belief will probably undergo extensive experimental criticism, it stands as a reasonable educational postulate. We know from our studies that visitors are prone to follow the walls of a gallery very closely, that they do not shift from one wall to another and then back to the first in more than 10 per cent to 15 per cent of the cases. This normal regularity is a boon to those who would have visitors see exhibits in a specified sequence. But, assuming regularity, the order in which the objects are seen is "correct" for one group of visitors and the reverse of "correct" for another group of visitors. The direction of the normal movement of the majority of visitors through a sequence has usually been assumed to be from left to right. Thus, the most primitive paintings in the Flemish-Dutch gallery were placed to the left of the entrance, and the most recent paintings were placed to the right of the entrance. In this gallery only one visitor in every four followed the required route, because visitors have the habit of turning to the right on entering a gallery and will do it in 75 percent of the cases unless the habit is over ridden by some more potent determinant of behaviour."

Knowing this to be true, why lay out a left hand circulation in a museum?

We want a right hand circulation in individual rooms as against a left hand circulation in rooms joined in series.

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RUMINATIONS

I was startled the other day to get the news that Park Supervisor Gabriel Sovulewski had reached the age of retirement and was no longer on the active list. It doesn't seem like quite the same Park Service if Mr. Sovulewski is not over there in the Yosemite. I first met him when we had that conference of Superintendents over in Yosemite in 1921, I think it was. He has been an inspiration to me through all the years since; just knowing he was there on the job, doing the work he loved to do and doing it as no other man could.

One time when he and I were out together I well remember his saying that he cared not whether they put a monument over his grave after he was gone; that his real monument was up there on the side walls of the Yosemite Valley in the miles and miles of beautiful trails which visitors would be using for generations to come. I thought of this statement of his when I was reading this section from his letter:

> "We forget that trail construction is more common sense than engineering. Thorough knowledge of the country, love for that kind of work, a good, cool head with common sense, instinct of a dog to know which way to get home and last but not least, disregard for the time of day, are the principal requisites.
>
> "A man with tripod, transit and level has no business on trails. Personally I would consider him a nuisance. We put too much stress on technical knowledge in simple matters where only good common sense should prevail. In my experience in exploring, wild animals in many cases solved numerous difficult problems for me. Good, experienced engineers will see the point and agree with me. We are handicapped so much by inexperienced technical knowledge that it takes sometimes ten men to decide whether a certain shrub or tree should be taken out where a dozen could be taken out without injury to the landscape or nature. But the trouble goes further, we have a splendid lot of men in the Park Service, but their initiative is destroyed by details of a technical nature. Young technicians are sent to parks and tie the hands of Superintendents on projects on which they probably spent many sleepless nights. Our single-track scientific men bring up so many subjects, I have no doubt they give headaches not only to Superintendents but reach as high as the Director. I admire very much the patience of the Superintendents and the Director's diplomacy. To know their positions you cannot help but sympathize with every Superintendent and every man that holds an executive position. They have to be technicians of diplomacy."

Mr. Sovulewski has put his experienced finger on a thing that worries every Superintendent; we need more men of the type he is thinking

of to properly balance our organization.

Another thing I admired him for was that his park never became common-place to him. At that time I was a youngster with only eighteen or nineteen years of service behind me and he had served some twenty-six or twenty-seven years, yet he never grew tired of his work and he loved his park. It was he of whom I was speaking in another place some time ago who took me on a geological trip on the floor of the Valley which wound up at the foot of Capitan. We sat there three or four minutes; wordless; drinking it all in; and then he said something I've never forgotten: "You can talk all you want to about how this Valley was formed but <u>there</u> is where your science ends and Almighty God begins!" And after fifteen years of ruminating on it, I still can't see how you can improve on that statement.

May he be spared these many years yet to give us of his wisdom and experience.

Cordially,

Tom Boss