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10-23
(May 1929)

UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
ORGAN PIPE CACTUS NATIONAL MONUMENT
---------- NATIONAL PARK

FILE NO. 101

PART ONE

Bx 2319

ORGAN PIPE CACTUS NATIONAL MONUMENT

HISTORY

LAST DATE ON TOP

IMPORTANT

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ARNO B. CAMMERER,
*Director.*

U. S. GOVERNMENT PRINTING OFFICE 6—7410

PIMA COUNTY

STATE OF ARIZONA

TUCSON

COPY

February 7, 1934.

Mr. Lawrence C. Merriam
District Officer
E. C. W.
409 Underwood Bldg.
San Francisco, California

Dear Mr. Merriam:

Herewith a resolution adopted by the Board of Supervisors of Pima County, Arizona, in regular session Monday, February 5, 1934, which was submitted to them by the Tucson Natural History Society.

It is true that this species of cactus is rare and if not protected will rapidly diminish and, we therefore, urge that every possible effort be made to establish the area shown in this resolution as the Organ Pipe Cactus National Monument.

Yours very truly

/s/ Gladstone MacKenzie

Clerk, Board of Supervisors
Pima County, Arizona

b

Pencil notes:

(note: original resolution sent to washington - 2/12/34)

D.H.
Please look into this.
Possibly a State Park?

LCM

Box 2319

January 9, 1934

COPY

To Whom it May Concern:

In view of the fact that the acreage of public domain is rapidly diminishing in Arizona; that it is becoming more and more imperative that sample tracts of our native vegetation and animal life be protected and preserved for educational, recreational, and scientific purposes; and more especially, that the rapidly vanishing and nearly extinct forms of desert plant life such as the unusual and interesting species of cactus, Lemaireocereus thurberii (organ pipe cactus) must be given immediate protection if we are to save any of them for future generations;

Be it therefore resolved that we as a group in our official capacity and as individuals give our whole-hearted support to the establishment of a National Monument in south-western Arizona the primary purpose of which will be to preserve the best available stand of the Organ Pipe Cactus (Lemaireocereus thurberii) and do all in our power to encourage and aid the National Park Service in carrying out this project;

And, be it further resolved, that in as much as an area in Southwestern Pima County, Arizona, contained within the following boundaries: Mexican Boundary (S), Papago Indian Reservation (E), Sonoita Road (W), and Ajo Road (N), in our opinion best meets the requirements set forth above as most desirable for this Monument, we go on record as favoring the establishment of an Organ Pipe Cactus National Monument within the above mentioned boundaries.

(Signed)
BOARD OF SUPERVISORS
PIMA COUNTY, Arizona

(Signed) George A. Anklam
Chairman

(Signed) Jay C. Hicks
Member

AJO CHAMBER OF COMMERCE

(Signed) W. R. Denison
Member

(Signed) W. R. Denison
Secretary

(Original sent to Washington 2/12/34 )

Bx 2319

UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
REGION THREE
SANTA FE, NEW MEXICO



FEB 28 1942

Mr Kahler
Dr Kelly
File
Organ Pipe
101

February 25, 1942.

MEMORANDUM for the Director.

Reference is made to Mr. Kahler's memorandum of February 7 requesting a statement on historical and archeological values at Organ Pipe Cactus National Monument.

The following statement has just been received, in a memorandum of February 23, from Acting Superintendent Thomas of Southwestern National Monuments:

"Historical Associations

The historic Camino del Diablo cuts across the extreme southwest corner of the monument. The wagon road used during the gold rush crosses the monument from east to west and is still a usable road across the central portion of the area. This is the original Yuma-Tucson trail which joins the Camino del Diablo west of the monument. This whole section, of course, is closely associated with the travels of Father Kino who passed through the area on several occasions. The de Anza expedition of 1776-77 returned from California by the Camino and it was long used for trade between Sonora and California.

"Prehistory

No survey or intensive research has been made as to the archeological sites contained within the monument boundaries. Information from local people and observations made by the custodian on patrol duties have established more or less positively the following listed sites on the monument. These are a minimum only and should by no means be considered to represent a complete picture of the archeological values included within the boundaries.

1 trinchera
2 occupied caves
15 miscellaneous camp sites

4 known village sites, one with a possible ball court
12 possible burial grounds
3 sites with petroglyphs

"The caves mentioned above show evidences of occupational use. They may prove to be of considerable importance in view of the recent finds brought to light at Ventana Cave northeast of the monument a few miles. Custodian Supernaugh, after having visited Ventana Cave, believes that the two caves mentioned above might prove upon excavation to be just as interesting and important as the one which is now being excavated by the University of Arizona."

It is interesting to note the increase in archeological knowledge of the area over a period of two years, even without actual survey work. The telegram sent you by Superintendent Miller on February 19, 1940, in response to a similar request, listed only ten sites. These included 5 prehistoric occupation sites, 2 areas of bedrock mortars, 1 cave with paintings, and 2 Papago camp areas. Reference to that telegram, incidentally, will provide you with an idea of the wide distribution of sites over the area. The probability of many more sites is obvious, as no real archeological reconnaissance has been made. The startling and impressive finds made by Haury at Ventana Cave, referred to in the above statement, are partially indicated in American Antiquity VII-1, July 1941, Notes and News, page 79. Cave sites of comparably great importance might be found in various parts of Organ Pipe Cactus National Monument.

Archeology and history are, of course, of secondary importance in this outstanding biological reserve, and will enter into the interpretive program from primarily the ecological and ethnobiological angles. Future contributions to knowledge by archeological research in Organ Pipe Cactus National Monument, however, might prove immense. Certainly all archeological sites in the entire Papagueria, and particularly those under National Park Service jurisdiction in Organ Pipe Cactus National Monument, should be fully protected from vandalism, grazing, and other possible damage.

B. L. Douglas
Acting Regional Director.

cc: Acting Supt., SWNMS.

This Memo sent to Organ Pipe 101

UNITED STATES

DEPARTMENT OF THE INTERIOR

NATIONAL PARK SERVICE

WASHINGTON

ADDRESS ONLY
THE DIRECTOR, NATIONAL PARK SERVICE

November 24, 1941.

MEMORANDUM for the Acting Regional Director,
Region Three.

Attached is a map showing the location of the Camino del Diablo, a part of which passed through the Organ Pipe Cactus National Monument. The route assigned is based upon a study of the map of Pimeria Alta 1687-1711 - Principal expeditions of Father Kino and his Associates - found in Vol. 2., pp. 233-234 in "Kino's Historical Memoir of Pimeria Alta, 1683-1711" by Professor Herbert Eugene Bolton, and particularly upon the history of the Camino del Diablo attached, taken from pp. 413-423 of Water Supply Paper 499, "The Papago Country, Arizona" by Kirk Bryan, U. S. Geological Survey, 1925.

The principal route followed by Father Kino and his immediate associates in the vicinity of the national monument went from Agua Salada to Las Playas, Tule Well, and Tinajas Altas. However, variations of the road passed through the national monument, all of which joined at Las Playas. One of these was from Ajo to Bates Well to Las Playas. Bryan identifies the Ajo-Yuma road from Bates Well as following in a general way the Camino del Diablo. Concerning this part of the old Spanish road, Bryan in his report states:

P. 334 - "Ajo to Yuma by the Camino del Diable" . . . This road goes from Ajo to Bates Well, and then follows in a general way the route of the Camino del Diablo, the old route from Altar and Caborca in Sonora by way of Sonoita to California."

P. 335 - "Papago Well . . . A road also goes north on the west side of Mohawk Mountains, 52.5 miles to Mohawk (see pp. 271-272). No dependable water on this route. To follow the old Camino del Diablo go west."

P. 335 - "Las Playas . . . All variations of the Camino del Diablo route passed through Las Playas, and from this place the modern route is practically identical with the old one."

Associate Director.

Enclosure 2531151
cc: Supt. Miller, Southwestern National Monuments (2)

Box 2319

# ROUTES FROM AND NEAR AJO

## AJO TO YUMA BY THE CAMINO DEL DIABLO

The road from Ajo to Yuma by the Camino del Diablo ("devil's road") is probably the most difficult and dangerous route in the Papago country. The region west of the Growler Mountains, east of the bluffs of Colorado River, and south of the Southern Pacific Railroad, an area 60 miles wide on the east and 20 miles wide on the west and nearly 100 miles long, has only one permanent inhabitant, who is the caretaker at the Fortuna mine. The same absolute lack of settlement extends below the international boundary to the Gulf of California. The absence of population and the rarity of travelers make accidents, which in other places are mere incidents of travel, serious disasters. The difficulties and dangers of this route are, however, much less than in the early days, as explained in the log.

History of the route. - The camino del Diablo is the route from Altar and Caborca, in Mexico, through Sonoita to California. It gained an unenviable name during the rush to California in the fifties because of the large numbers who perished along it. The road went west from Sonoita (p. 425) along the valley of Sonoita River to Agua Salada and then turned northwest, passing by a represo near the south end of the O'Neill Hills to Las Playas, thence west by way of Tule Well and Tule Tank to Tinajas Altas. From Tinajas Altas one branch went north to Gila River, on the east side of the Gila Mountains, and the other went on the west side; both followed the river down to Yuma, which was the beginning of the route in California. This was the usual course of travel, to which there were exceptions. The route described herewith joins the old road at Las Playas and depends for its existence on Bates Well and Papago Well. But for these wells travel west from Ajo would go south to Sonoita and then over the old road.

The adventurous Padre Kino made the first recorded trip over this route in 1699. In the previous year a trip through the Papago country to Sonoita had given him much information, and he doubtless learned of this route to Colorado River. His predecessor, Melchior Diaz, of whose explorations Kino had no knowledge, went west from the Valley of Sonora in 1540 to the sea and thence northwest to and beyond Colorado River, but whether he used the Camino del Diablo or not is unknown because of insufficient records. On February 16, 1699, Kino, Padre Adamo Gilg, and Juan Mateo Mange arrived at Sonoita and began a new ranch with 36 head of cattle. Leaving Sonoita on the 17th, they went down the river past the Carrizal (Agua Salada), then 20 leagues (about 60 miles) to Aguaje de la Luna ("watering place of the moon"), 15 leagues to another good watering place (Aguaje), 15 leagues to Las Tinajas, and 6 leagues to Gila River in the vicinity of Wellton. This journey was made in five days.

On October 10, 1700, Kino with 10 servants and 60 pack animals, having arrived at Yuma by a trip down the river from Casa Grande, turned south from the river by way of La Tinaja to El Agua Escondido ("hidden water"),

12 leagues from La Tinaja, and this is the "good watering place" of the trip of the year before. From Agua Escondido on October 11 he went to the tank of La Luna and two hours' journey beyond, 12 leagues in all. On October 12 he went to Carrizal, 13 leagues, and thence to Sonoita, 8 leagues more. It is plain from this journey that the Carrizal is Agua Salada, 8 leagues or about 24 miles from Sonoita, and that the Aguaje de la Luna is not more than 15 leagues from Carrizal.

On his next journey, in 1701, Kino left Sonoita on November 13 and went to the tank of La Luna by way of Carrizal, 20 leagues; on the 15th he went to good pasturage near Agua Escondido, and then some distance beyond the tank; on the 16th to a good stopping place with water and pasturage, 5 leagues; and thence by way of La Tinaja to San Pedro on the Gila--that is, to the vicinity of Wellton. On his return he left San Pedro on November 25 and reached Agua Escondido; on the 26th he reached La Luna, where he opened a road through very sharp stones and rocks so that the animals could drink, and went 5 leagues farther to good pasturage; on November 27 he went to Carrizal, 13 leagues, and then to Sonoita, 8 leagues.

In February, 1702, Kino and Padre Manuel Gonzales left Sonoita on the 19th and went to Carrizal; on February 20 they went 15 leagues to a point near La Luna; on the 21st they went 20 leagues to plains and pastures near Agua Escondido, passing near La Luna; on February 22 directly to La Tinaja, which they renamed Aguaje de los Algives ("watering place of the cisterns"); thence on February 25 6 leagues to San Pedro (Wellton). On the return they left San Pedro on March 18 and reached Algives; on March 19 the plains of Agua Escondido; March 20, La Luna; March 21, Carrizal; March 22, Sonoita.

It is obvious from a consideration of these itineraries that Kino went down Sonoita River to Agua Dulce, or more probably Agua Salada, which corresponds to his Carrizal. From this point he went north 13 leagues to Aguaje de la Luna, a tank that was inaccessible to animals until he built a trail in 1701. This description would apply to Heart Tank, which is not accessible to animals at the present time, or to Cabeza Prieta Tanks, which lie in a mountain canyon. Cabeza Prieta Tanks are northwest, not north of Agua Salada. Also Las Playas lies 5 leagues (15 miles) south of Heart Tank, and this may be the "good pasturage" which he reached on his return journey in 1701. The Agua Escondido seems quite certainly to be the Tinajas Altas of present nomenclature. In the journey of 1689 Kino gives the distance from Agua Escondido to La Luna as 15 leagues. By the most direct route it is about 30 miles (10 leagues), but as the way leads through a complicated pass the distance might easily be exaggerated. From Agua Escondido the road leads north "15 leagues" to La Tinaja, also called Aguaje de los Algives. This distance is grossly exaggerated, for it is only 27 miles, not over 10 leagues, to the Gila from

Tinajas Altas. La Tinaja seems to be either one of the small tanks on the east side of the Gila Mountains near the north end of Baker Tanks. Thence Kino gives a distance of 6 leagues to San Pedro. There are thus a number of uncertainties in Kino's routes.

Padre Garces in October, 1771, being in the vicinity of Yuma, returned to Sonoita over this route, but we have no record of his stopping places. In January, 1774, however, with Juan Bautista de Anza, he left Sonoita on the 29th and went 9 leagues west to Carrizal; January 30, north-northwest 6 leagues; February 1, northwest 3 leagues to Purificacion; February 4, 5 leagues to Springs; February 5, 7 leagues to Agua Escondido; February 6, southwest (?) $6\frac{1}{4}$ leagues; February, $10\frac{1}{2}$ leagues to Palmas rancheria, called by the Jesuits San Dionisio, at the confluence of Gila and Colorado rivers.

In 1775 Garces with Anza, Font, and Eixarch made the trip to Yuma down the Gila from the Pima villages, and on the return from California the expedition, except Garces, returned by way of Sonoita. According to the itineraries of Anza and Font, who disagree as to distances, they were on May 14 at the ford of the Colorado below the Gila; May 15, they went up the Gila to the Cerros del Cajon (Dome), 5 leagues (or 7); May 16, 7 leagues (or 4) to Laguna Salada (near Wellton); May 17 they turned from the river southwest 8 leagues (or 11) to Pozos de en Medio, or Zacate Duro; May 18, 9 leagues (or 18) east-southeast past Tinajas de Candelaria to Puerto Blanco or Llana del Fuzal; May 19, 8 leagues (or 10) to Arroyo del Sonoitac or Carrizal; May 20, 12 leagues past the ruined mission of San Marcelo de Sonoitac. On Garces's trip of 1771 he seems to have gone from Agua Salada to Heart Tank, which he calls Purificacion, and thence west to springs in the Cabeza Prieta Mountains. No such springs are now known, and Cabeza Prieta Tanks may be meant. From the springs he went to Agua Escondido or Tinajas Altas, and thence southwest (possibly an error) and then north to the Gila. The account is confusing but is not explained by the itinerary of Anza and Font in 1775. These explorers left the Laguna Salada west of Wellton on Gila River and went southeast 8 leagues to Pozos de en Medio ("the wells of the middle (of the hills)"), or Zactal Duro ("the place where there is hard or tough hay" or "the hard place where there is hay"). Either of these descriptions would fit Baker Tanks, which are shown on many recent maps as Los Pozos. Thence they went east-southeast past Tinajas de Candelaria to the Puerto Blanco ("white pass") or Llano de Fuzal ("plain of Fuzal"). It seems that the Tinajas de Candelaria was a new watering place which they did not see in 1774, and it may be the Cabeza Prieta Tanks, which may be reached by going on the east side of Copper Mountain from Baker Tanks. However, the direction in south-southeast, not east-southeast. The tanks lie in a canyon off the road, and it is therefore natural that the travelers should have passed them and proceeded toward the south. There is, however, no "white pass" within the proper distance, 8 leagues from Agua Salada, or rather there are so many

possible small gaps that might deserve this name that a satisfactory solution of these itineraries seems impossible.

The rush to California brought about a large amount of traffic on this route. It was the shortest route for Mexicans from Sonora and also much safer from Indian attacks than the journey down Gila River. In 1861 Pumpelly[22] and Charles D. Poston left Arivaca and traveling through Altar and Caborca reached Santo Domingo, on Sonoita River, and from this point followed the trail through Las Playas, where they encountered a storm that covered the playa with water. They crossed the Pinacate Plain where it is only a mile wide--that is, south of the present road--and made the next camp at Tinajas Altas. In 1915 Pumpelly with his family and four Ford cars left Tucson and followed the Tucson-Yuma road to Ajo and thence by way of Bates Well and Papago Well repeated his former trip to Tinajas Altas. From Tinajas Altas he went through the pass and reached Gila River by way of the Fortuna mine, although one car broke down on this route. He gives a lively account of this second journey.[23] All portions of the trail were traveled by the boundary survey party of 1857,[24] but it met great difficulties on account of water, as Tule Well was not in existence at that time. The trail was in active use by emigrants to California, and the account speaks of recent deaths.

On the resurvey of the international boundary in 1893 Tule Well,[25] which had been dug in the meantime, was cleaned out and furnished 500 gallons water daily. McGee,[26] who spent some time camping at Tinajas Altas, quotes Captain Gaillard, of that survey, in estimating that more than 400 people had died on the trail. Gaillard considered this a fair estimate after counting 68 graves in a single day's ride of a little more than 30 miles. More than 65 graves can be counted at Tinajas Altas at the present time, and many graves must now be undiscoverable, as is that of Johnson, which his murderer, Williams, showed Pumpelly in 1861.[27]

Reasons for travel on this route. - At the present time there is little travel over this route. The Geological Survey automobile, in October, 1917, broke the trail from Papago Well to Tinajas Altas. No machines had been over the route since the last rain, which occurred some six months before. In September, 1920, the Survey automobile also broke the trail from Bates Well to Tule Well and from Tinajas Altas to Wellton. Heavy rains in the early part of September had washed the road badly, but there was abundant water at Las Playas, Tule Tank, and Tinajas Altas.

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22. Pumpelly, Raphael, Across America and Asia, 3d ed., pp. 53-61, New York, 1870.
23. Pumpelly, Raphael, My reminiscences, vol. 2, pp. 761-776, New York, 1918.
24. Emory, W. H., Report on the U.S. and Mexican Boundary Survey, 1857, vol. 1, pp. 114-116, 122.
25. Report of International Boundary Commission upon the survey and remarking of the boundary between the U.S. and Mexico west of the Rio Grande, 1891-1896. 55th Cong., 2d sess., S. Doc. 247, p.24, 1898. See also Mearns, E.A.,op.cit.,p.19.
26. McGee, W.J., The old Yuma trail: Nat.Geog.Mag.,vol. 7, pp. 103-105, 1901.
27. Pumpelly, Raphael, Across America and Asia, p. 55, 1918;

Several exploring expeditions have used the road, in part at least, in recent years. The Carnegie Expedition in 1907, Lumholtz in 1912, Pumpelly in 1915, and McGee some years before have been referred to in other parts of this report. Between 1912 and 1916 the engineers of the New Cornelia Copper Co. made numerous trips through the region, two of which were well-organized expeditions to the coast in the vicinity of Adair Bay. The loss of an Army airplane in 1916 on the coast near Adair Bay led to a number of rescue expeditions. The aviators walked north, and one of them reached the camp of a rescue party from Wellton under the leadership of Winn Prebstel, south of Tinajas Altas; the other aviator was found that night. W. D. Tremaine, after two unsuccessful expeditions, found the airplane, and on a fourth trip towed the machine out of Mexico behind his automobile. In 1918 a detachment of engineers and aviators made an airplane survey of the area. In 1920 the road as far as Las Playas was being used by engineers in the survey of a railroad route from Ajo to the Gulf of California.

The greater part of the travel is, however, that of prospectors who comb the mountains of this waterless region in the search for mineral deposits. The Fortuna mine (p. 348) and the Papago mine have been the principal fruits of this search. In addition to legitimate prospecting, which may yield eventually greater results than now seems possible, there is the lure of the legends that spring up continually about any uninhabited region.

One of the legends has to do with the lost mission. The following quotation[28] gives it in substantially the current form:

> Among Mexicans there is a persistent rumor of an abandoned mission somewhere in the sand-dune country east of the Colorado River, showing foundations of walls, near a spring with running water among the sand dunes, and an old smelter connected with it. Its location usually is placed near the coast south of Tinajas Altas. A man from that camp, who was looking for his horses, is said to have come across these ruins near Cabeza Prieta Range, but the lower part of the Sonoita River is assumed to be the locality by others.

According to a variation of the tale the mission was started to convert the Arenenos, or Sand Papagos. Another phase of the story, that coarse placer gold exists near the mission, is tempting to cupidity, and each year treasure seekers, having some new and supposed valuable clue, hunt for the mission. They frequently combine this with the hunt for the $60,000 worth of gold ore which, according to tradition, a prospector dug from the fabulously rich veins of the Sierra Pinta southwest of Quitovac, in Sonora. He packed the ore on burros and started for Yuma. Losing his burros one night, he buried the treasure under a large palo verde and with incredible

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28. Lumholtz, Carl, op. cit., pp. 197-198

suffering made his way to Yuma, where, after relating his experiences, he died. Doubtless much more than $60,000 and much labor has been expended in searching for this treasure, and the traveler will have difficulty in finding along the Camino del Diablo a large palo verde under which some treasure seeker has not dug.

Another tale adds interest to the Pinacate region of Sonora. The Arenenos or Sand Papagos (see p. 26) are said to have made a practice of attacking emigrant trains and travelers on the Camino del Diablo during the gold rush. Of the loot from these massacres they used the food and tobacco but stored the goods and gold, for which they had no use, in a cave in the Pinacate Mountains. This cave, therefore, is supposed to contain a treasure rivaling that of Captain Kidd. There is no record that the Papagos ever robbed caravans, though the Mexicans make that assertion, and if they took any gold they undoubtedly used it, for all the Papagos have known the value of gold since early Spanish times, and many of them are miners.

One of the peculiar industries of the region has been the search for guano. This manure is found in considerable quantities in caves inhabited by bats, the dry climate being favorable for its accumulation. The loneliest and most forsaken parts of the region have been prospected by the guano hunter. Most of the large caves have now been explored and the guano removed.

The usual illegal activities of a border region are favored by the lack of population, but the lack of water and the perils of travel have been a deterrent factor. A certain amount of smuggling and numerous attempts to evade the immigration laws have been noted in recent years. During one of the Mexican revolutions gun running was for a time a lucrative business.

Ajo to Bates Well. - The road goes southwest through the model town of Ajo, newly built by the New Cornelia Copper Co. (p. 356), and turns south into the open valley between Arkansas Mountain and the neighboring peaks of the main mass of the Little Ajo Mountains and Reservoir Hill. This is the mineralized area, and the large open cuts of the New Cornelia mine lie on the right of the road. Old Ajo (1.2, 151.5) is now mostly in ruins but has a certain sentimental interest owing to the fact that this outpost in the desert has never been wholly abandoned since it was first settled by white men in the fifties.

Beyond Old Ajo the road comes into an extensive dissected pediment south of the main mass of the Little Ajo Mountains. The Ajo Peaks rise from the plain about 3 miles west (Pl. X, A), and a road goes north of them to Cardigan and Tule Well (p. 346). On the southeast of the purplish-brown slopes of Black Mountain rise above the plain. Darby Well lies in the valley just north of this mountain.

The rolling country of the dissected pediment is covered by the typical foot-hill vegetation--sahuaro, palo verde, and ocotillo--and above the plains rise scattered knobs. One of these is the Locomotive Peaks, a hill with fantastic pinnacles and boulders said to look like a locomotive. The road, passing numerous forks, goes between these "peaks" and Black Mountain.

At the fork marked by a Geological Survey sign (7.1, 165.6) the road is on an alluvial plain, and at this fork the traveler turns slightly southwest, parallel to the low ridges about 2 miles off the road on the right. Back of these ridges are some charcos, and a trail runs from a point near the Cardigan mine past these charcos to Bates Well. The Sonoita road goes due south from the sign mentioned.

The Growler Pass lies just north of a high round plateau of lava mantled by black talus slopes. The road skirts a low mesa north of the plateau, which encircles a high jagged peak. It crosses a low divide and goes into an open valley. To the north is a sharp conical mountain, and between this mountain and the main range of the Growler Mountains lies the horse trail to Ajo. In the pass are two wells, of which the more easterly is the original Bates Well (16.6, 136.1), named from the man who dug it some 40 years ago. To the Mexicans it is El Veit because they can not twist their tongues to say "Bates," and the Papagos call it Tjuni Kaatk ("where there is sahuaro fruit"). It was occupied for a number of years by some of the remnants of the Sand Papagos and was then acquired by Reub Daniels (p. 358), who, with Charlie Puffer, dug the west well and installed corrals and a windmill. (See analysis, p. 184). As many as 2,000 head of cattle have been kept at Bates Well, but that number is more than the range can support. In 1920 the McDaniels Brothers, who occupied the ranch, had removed most of their cattle because of drought. There is usually some one either at the well or at the Growler mine, but here the traveler takes leave of civilization and plunges into the most desolate part of the Papago country.

Bates Well to Tule Well. - The Growler mine (17.9, 135.1) lies northwest of Bates Well over a little rocky divide. It was discovered by Frederick Wall and has been an active prospect for many years. West of the mine lie the broad plains of the Growler Valley. To the northwest, in the center of the valley, are the Granite Mountains, a small and, so far as known, waterless range, visited by only one or two men in the last 10 years. The picturesque western facade of the northern part of the Growler Mountains stretches like a red wall toward the northwest; the southern part of the same mountains is a confused jumble of dark plateaus that extend south toward the border. A long and apparently continuous sierra, the Agua Dulce Mountains, occupies the southern horizon. The road goes southwest toward the west end of this mountain range. On closer approach what seemed to be a continuous range is found to consist, in its western part, of detached hills and small mountains. At the foot of the first of these hills (30.6, 122.4), there is a fork, marked by a Geological

Survey sign. The right-hand road, which winds through the little plain between the hills, is usually followed to Papago Well (39.7, 113.7). This road avoids the hill and the crossing of a large wash. The left-hand road goes southwest 3½ miles to a fork, from which the road on the left continues to Steel Tanks, 5.7 miles from the Geological Survey sign. This watering place consists of two metal tanks set in small streamways in a rocky area on the south side of the road. They were installed by W. D. Tremaine to supply water on his prospecting trips, and, unless the water is used, they hold water for a month or more after rains. The right-hand road goes north about three-quarters of a mile to a prospector's camp, turns over a low rocky divide, and then goes down into a valley, passing the Papago mine, which is visible against a hill on the right. The road crosses the broad wash that passes Papago Well by a long and difficult crossing and comes into the road described above three-tenths of a mile east of Papago Well.

Papago Well (39.7, 113.7) was drilled as a water supply for the Papago gold mine, 1.5 miles to the east. (See pl. XXV, B.) The water is 235 feet below the surface and is not easily obtained. (For analysis see p. 172.)

From Papago Well a road goes north on the west side of the Mohawk Mountains to Mohawk station on the Southern Pacific Railroad. The distance is 52.5 miles, and there is no water except at Glynns Falls, 15 miles south of Mohawk. The rock tanks at this locality are said to hold water for a short time after rains.

From Papago Well the road to Yuma crosses the wash and goes west down an alluvial slope and south of an arroyo to a pass in sharp granite hills. In this pass, which now bears his name, Dave O'Neill, an old prospector, died of exposure and overexertion. His burros wandered away from camp in a storm, and after searching for them at least a day he died with his head in a mud hole and lies buried along the road (43.3, 109.7).

A few miles beyond the pass (45.4, 107.6) a road turns off to the left which in 1920 was very well marked. It was used in that year by the engineers of the Tucson, Cornelia & Gila Bend Railroad during the survey of their proposed line from Ajo to the Gulf, to reach Las Positas and Batamote, watering places on Sonoita River in Mexico.

West of O'Neill Pass the road runs down an alluvial slope to Las Playas, which is a typical playa--that is, a broad pan of clay without vegetation which holds a shallow sheet of water after a rain. Flood water from the south end of the Tule Desert and a considerable adjacent area collects here. This is the only inclosed basin in the Papago country, and it is not certain that the lake does not overflow into Mexico. A few small mesquites are found around the border of the clay flat, but the center is without vegetation and is broken by deep cracks, so that it makes a rough roadbed.

The western and southwestern borders of the playa have numerous charcos excavated by the tributary streams, and water remains in them for considerable periods after a rain. There is also said to be a small rock tank near a red volcanic crater about a mile southwest of Las Playas, but its exact location is not known. There is a represo which does not hold water about 5 miles to the southeast, just south of the international boundary, and near this represo is an adobe flat in which there are charcos that have water for some days after a rain. All the ancient routes from Sonoita to Yuma came through Las Playas, because there was a good possibility of finding water there and because of the presence of horse feed.

From the west end of the playa a road goes north to the Pinta Mountains, a narrow and very precipitous range with a northwesterly trend. Drifted sand covers the plain, and sand dunes are invading the western canyons along the south end of the range. It is 14 miles by this road to Heart Tank, but for automobiles and wagons there is an easier route west of the Pinacate Plains (p. 336).

West of Las Playas is a long sandy slope that leads up to a low mesa. Just in the edge of the sand there is a large palo verde tree south of the road. Some one camped here for a long time and made a number of shelves in the branches, the trunk is covered with advertising signs, and the roots have been exposed by treasure hunters. This tree is a well-known landmark. From the tree to the top of the mesa the sand is deep and shifts with each wind, filling the ruts made by the previous traveler. Low-powered automobiles are likely to be stalled, and the traveler may be compelled to build a roadway of brush several times before reaching the top of the slope (p. 264).

The Pinacate Plain, an extension of the much larger volcanic region of the Pinacate Mountains of Sonora (p. 70), is crossed by a level road with a hard roadbed. "Pinacate" is the Mexican name of a black beetle, Eleodes, which lives in sandy places and has a curious habit of standing on its head when disturbed. Small cones and craters, which were the centers of eruption of the basalt that formed the mesa, are scattered about. The signs of recent volcanic activity are so plain that a short detour to one of these cones is well repaid. To the north the southwestern front of the Pinta Mountains can be seen. Here the remarkable change from the dark schist and gneiss of the southern part of the range to the light ivory-pink granite of the northern part is a conspicuous feature of the landscape.

The western edge of the basalt plain (50.6, 96.8) is an escarpment about 50 feet high, from which the traveler may overlook a wide expanse of alluvial plain and see the Tule and Cabeza Prieta mountains, which occupy all the western horizon. The road goes west across this plain, and the first half mile is covered with drifted sand, though not as deeply as on the east side

The plain, however, has numerous washes and very soft ground, so that the road is heavy for the next 8 miles.

The Camino del Diablo enters the pass between the Tule and Cabeza Prieta mountains between granite sierras and goes west in a narrow, flat-floored valley for 2 miles. It then turns to the right over a hill, where the roadbed is rough and covered by loose boulders weathered out of conglomerate (p. 72). An open valley, dotted with sharp hills, lies to the north. The road, after passing a wooden signboard bearing an inscription "2 miles to Tule Well," goes north between small hills and crosses an arroyo to Tule Well (69.9, 83.1).

The present Tule Well is dug 31 feet deep and has a plank curb 4 feet high. It was constructed by prospectors under the authority of Yuma County about 1907. Water stands about 30 feet from the top of the curb. The old well near by was a considerable excavation, with steps leading down to the water. This well was not in existence in 1861, when Pumpelly made his first journey, but was dug before the boundary survey of 1893, which cleaned out the well and obtained 500 gallons of water daily. Lumholtz, in 1912, did not visit the well but was told that it was dry. The water of the new well is brackish and not pleasant to the taste, though there is no reason to think it is harmful to the health. (See analysis, p.172).

The Cabeza Prieta Tanks, 21 miles from Tule Well by a roundabout road that leads off to the northeast, consist of eight pools one below another in a stream channel in a deep gorge that extends from the highest part of the mountains toward the northeast. There are six heaps of stone in a row at the entrance to this gorge. The tanks are not considered to be as reliable a water supply as Tinajas Altas. There is said to be a road passable for wagons which goes southwest from these tanks and joins the Camino del Diablo west of Tule Tank. A road also goes along the east side of the Cabeza Prieta and Copper mountains to Baker Tanks (p. 348). These roads are represented on the map but were not traveled.

Tule Well to Tinajas Altas. - From Tule Well the road goes west over some low hills into an open plain encircled with mountains. Through a gap in the mountains on the north can be seen a great white mountain with a cap of black lava. This is the Cabeza Prieta ("black head") which gives the name to the mountains and the tanks. About a mile beyond Tule Well tracks go 2 miles south to a prospect that lies on the north slope of the sierras to the south. Just west of this point is a clump of small but very steep-sided mountains of a notably white color. Tule Tank (72.9, 80.1) is marked by a Geological Survey sign at the entrance to a small canyon in the southern edge of these mountains. The tank was one of the camping places of the Sand Papagos, who called it Otoxakam ("where there is bulrush or tule"). The water is found in a plunge pool at the foot of a fall 1,600 feet west of the sign and is ordinarily obtained by digging in the sand that fills the pool. In November, 1917, the tank was completely dry, but in September, 1920, it was full of clear water and there

was a trickle of running water both above and below the tank. (See Pl. XVII, B.) Mortars excavated in the rock by the Papagos, called by the Mexican name bechete or pechita holes, are common around the tank. (See Pl. V, B.) They were used to pound up mesquite beans, one of the principal foods of the Indians.

Half a mile west of Tule Tank the road turns north in a narrow pass, and tracks go south across the plain to a gap between the brown lava-capped hills in the west and a high, light-colored peak. It is said that this road can be followed by automobile for 20 miles. A trail continues south through another pass called Paso de Juana, 25 miles in all, to Papago Tanks.

The road turns west through a narrow gap (74.3, 78.7), but a dim road keeps on northward, and this road is said to reach Cabeza Prieta Tanks (p. 337). On going through the gap, a view of which from the west is shown in Plate XIV, A, the road turns northwest in a flat-floored valley bounded on the west by a dark reddish-brown lava plateau. The road goes through a gap north of this plateau and between it and a high pinkish-white conical peak. Turning west in this gap (77.9, 75.1), the road goes down a little valley between gravel benches and then turns north onto the bench. This is one of the few roads in the region on dissected alluvium. The grade up the bench is soft and difficult, but the top is hard, though there are many large boulders. The otherwise commonplace slopes of the Cabeza Prieta Mountains are interrupted by a lava-capped mountain (Pl. XII, B). In the light of a setting sun this mountain is one of the most beautiful sights in the Papago country. To the southwest the Sierra de Lechuguilla ("lettuce mountains") project northward in a great wedge, and beyond them are the Tinajas Altas Mountains. The intervening valley is the Lechuguilla Desert, which drains northward to Gila River.

From the edge of the gravel bench (79.4, 73.6) the road goes west across soft ground covered with a sparse vegetation of creosote bush, and the traveler is likely to wonder where the "pasturage near the Agua Escondido" may be at which Kino camped. It is well known that there is little forage near Tinajas Altas and very little firewood, so that experienced travelers pick up wood at a distance and bring it with them.

At two wooden signboards (83.2, 69.8) a road turns north to Coyote Water, 4.5 miles. This watering place lies in the axial stream of the valley, which is a channel filled with coarse sand about 100 feet wide and with soft banks about 3 feet high. The sand lies in great waves, which indicates the way in which the sand moves downstream during floods. The water remains in a cavity or scour depression (p. 125) in the hardpan that underlies the sand of the channel and is obtained by digging about 4 feet. A wooden signboard and the marks of coyote or human digging will guide the traveler in finding the exact spot. The water is small in amount and not very permanent and has a bad taste. The taste seems to be due to decaying plant rootes. The other roads to this locality are noted in their proper places.

Just before reaching Tinajas Altas a road goes south into the pass between the Sierra de Lechuguilla and the Tinajas Altas Mountains, to Surveyors Tanks, in the Tinajas Altas Mountains just north of the international boundary. The exact location of these small tanks is not known. A branch trails goes around the Sierra de Lechuguilla 32 miles to the Papago Tanks, the most reliable watering place in the Sierra Pinacate.

Tinajas Altas lies in a cove in the border of the mountains, and the road comes in around the southern rocky ridge and down a bank into the bed of the arroyo that heads in the canyon above the cove. The local geography is shown by a sketch map (fig. 28, p. 132), and the characteristics and origin of the tanks are described on pages 131-132. Views in the vicinity are shown in Plate XVIII. The best camping ground lies west of the Geological Survey sign, but there is practically no horse feed and no firewood in the vicinity. A few palo fierro or ironwood trees are still standing and may furnish horse feed, but the traveler should bring his own firewood.

An analysis of water taken from the lower tank is given on page 135. The possibility of human contamination of the water should be borne in mind, and the traveler is advised to boil the water before drinking. The number of people who are supposed to have perished at this watering place is doubtless exaggerated, but at least 65 graves can now be counted. There are a number of inscriptions by travelers, one of which is noted on page 91. A band of mountain sheep make these tanks their headquarters and may be seen coming to water any day. Their breeding grounds, trails, and even the odor of their bodies will be found all over the cliffs surrounding the tanks. That these animals are able to survive on the scanty vegetation and uncertain water supply seems remarkable, and it is to be hoped that existing heavy legal penalties and public sentiment will protect them from destruction.

Tinajas Altas to Wellton. - From Tinajas Altas a road goes east 3.5 miles to Coyote Water. There are two routes to Gila River. One turns through a pass in the mountains half a mile north of Tinajas Altas (90.2, 62.8) and then goes northwest to the Fortuna mine and Blaisdell. It is about 25 miles to the Fortuna mine and 27 miles farther to Yuma. The part of the journey beyond the mine is easy enough, and a description of the road is given on pages 348-349. From Tinajas Altas to the Fortuna mine the road is difficult. Pumpelly in 1903 had a breakdown on this stretch of road, and it is doubtful if more than one or two machines have made the trip since that time. From this pass a trail goes due west toward a group of hills in Mexico called El Capitan, crossing the international boundary at monument 194. From El Capitan the trail goes across the "medanos," or sand dunes to Laguna Prieta, a pond of slightly salty water 28 miles from Tinajas Altas. Thence it is 30 miles to Colonia Lerdo, a Mexican town on the east bank of Colorado River. This is part of the so-called all-Mexican route to Lower California from Sonoita.

The second road from Tinajas Altas goes north in the Lechuguilla Desert to Wellton. This is a fair plains road 26 miles long, which will be traveled without incident. At 6½ miles from Tinajas Altas a wooden signboard marks another road to Coyote Water, and half a mile farther on there is a crossroads (96.7, 56.3), from which a dim track leads 3 miles to Raven Butte Tank, a small tank in the southeast side of the Black Raven Butte. (See also Pls. XII, A, and XIII, A.)

The Wellton Hills, a disconnected group of small mountains, occupy the center of the Lechuguilla Desert at its north end. The road goes through these hills to Wellton (115.8, 37.2), a watering place and railroad station on the Tucson-Yuma road. The town is described on page 362, and the road into Yuma on pages 362-363.

(Taken from pp. 413-423 of Water-Supply Paper 499, "The Papago Country, Arizona," by Kirk Bryan, U. S. Geological Survey, 1925).

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