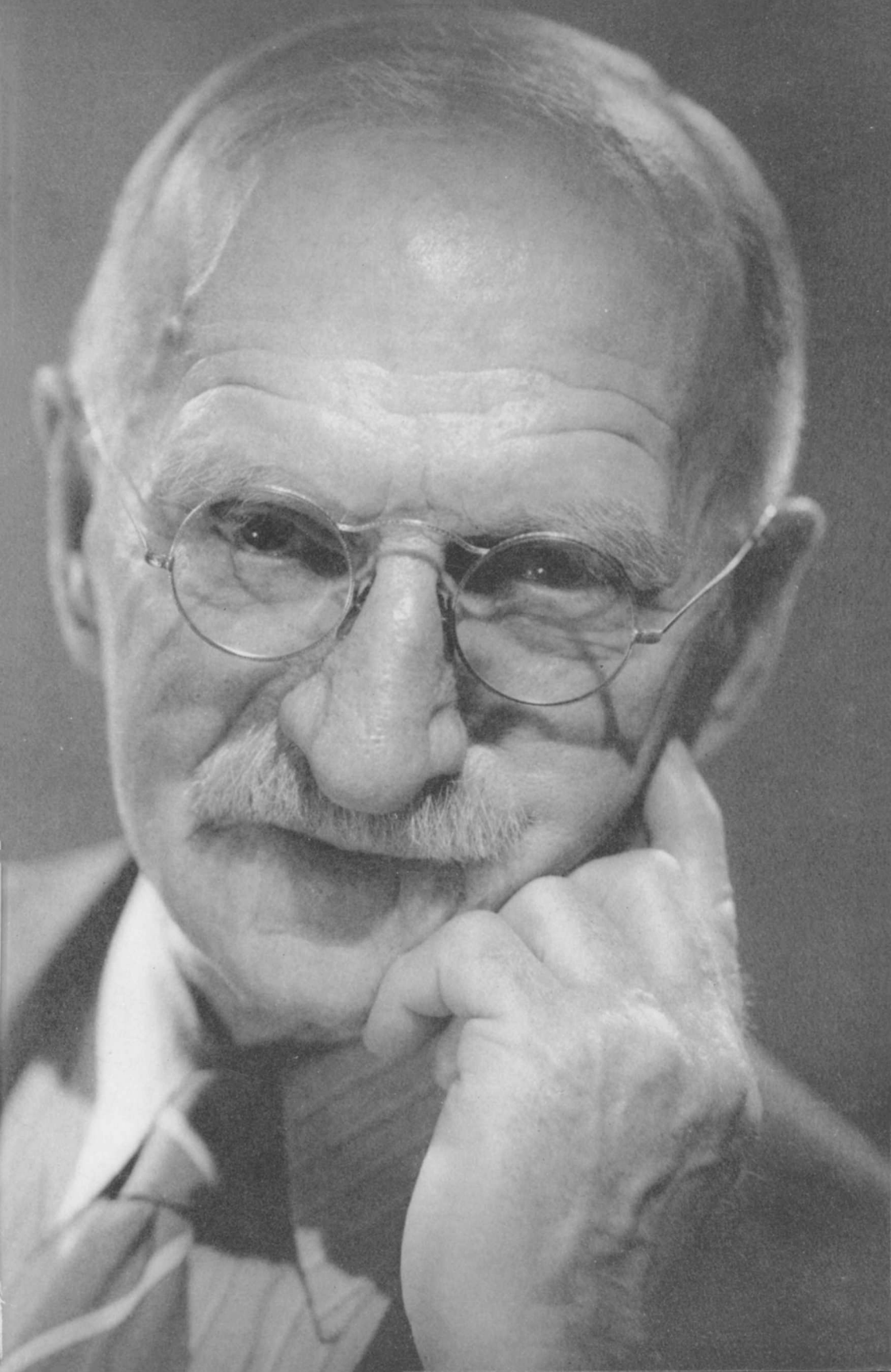


For
The Dean





FOR THE DEAN

ESSAYS IN ANTHROPOLOGY

IN HONOR OF

BYRON CUMMINGS

ON HIS EIGHTY-NINTH BIRTHDAY,

SEPTEMBER 20, 1950

Published by the Hohokam Museums Association, Tucson, Arizona,
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1950

ERIK K. REED, AND DALE S. KING,
editors

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EDITORIAL PREFACE

In 1946 a few associates and former students of Dean Cummings realized that despite his continued activity he was approaching his 90th (!) birthday. As a tribute to an eminent field archeologist and a great teacher, this volume of essays contributed by former students of the Dean has been assembled for presentation to him on his 89th anniversary. The roster of contributors includes many of the active workers whom the Dean inspired and guided into their chosen work in various fields of anthropology.

The papers were submitted to the editors in the latter part of 1946 and early 1947, but authors have been given no opportunity since to revise them.

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OUR FRIEND, BYRON CUMMINGS

ANDREW ELLICOTT DOUGLASS*

In paying tribute to the still youthful activity of Dr. Cummings, one thinks of contacts with him for the last thirty-five years. We recall his coming to our University of Arizona in 1915, his activity as a member of the faculty, his inspiration to his students, his accomplishments in beginning a society devoted to archeology, a society that still flourishes. His tremendous enthusiasm in studying the work of prehistoric peoples has led thousands to appreciate Arizona as a treasure house of American archeology.

During that time he was twice Acting President of the University and most of the time he was Professor of Archeology. He was Director of the Arizona State Museum during its early formative period when it had to find place after place in different and enlarging locations on the campus till it reached a permanent home in a building of its own. During that time he was one of the early leaders whose influence helped to develop the high standards of scholarship that have characterized the University of Arizona.

On August 14, 1909, Dr. Cummings was the first to see and appreciate Rainbow Bridge, one of the most beautiful and gigantic wonders of the Southwest. At that time the trip to it around the north side of Navaho Mountain was long, difficult, and even dangerous in places.

Dr. Cummings' activity as a professor has had a deeper expression than the mere imparting of knowledge. It included a distinctive human element. He was appointed Dean of the College of Liberal Arts in 1918, the year of the great influenza epidemic. I was present at the meeting of the Advisory Council when the President announced the closing of the University during the epidemic and requested the faculty

*Dr. Douglass has been connected with the University of Arizona since 1906.

members to live off the campus. Dean Cummings answered he would wish to live on the campus in order to care for the sick for whom he felt a responsibility. That was no idle remark. I have always felt that his help day and night in the campus hospital at that time when nurses were scarce and students were dying, saved the lives of many students.

On his many field trips such as he made each summer, his fine feeling of companionship with his students and his influence on them conveyed those intangible forces of right and wrong that ordinary teaching does not necessarily give to the student. I feel myself that this greatly needed line of instruction finds too few channels through which it is made effective in proportion to its worth to University graduates. The presence and activity of such a man is surely a blessing to any institution, especially in the recent days when materialistic theories of human motives have found so much popular applause. Cummings accomplished some of this influence by his ability on his field trips as a camp manager and even as cook and perhaps especially by his celebrated biscuits and his campfire evenings. May he have many more of them.

Thus in a generous way, Dr. Cummings recognizes the values of life about him in people both present and past and he appreciates the joys of contact with nature in the great Southwest. By this understanding he has great and good influence in a formative period of his country.

BIOGRAPHICAL DATA

Born:

Westville, New York, Sept. 20, 1861, son of Moses and Roxana (Hoadley) Cummings.

Married:

Isabel McLaury, Aug. 12, 1896; one son, Malcolm Byron Cummings. Mrs. Isabel Cummings passed away Nov. 11, 1929. On Oct. 17, 1947, Dr. Cummings married Miss Ann Chatham.

Education and degrees:

Graduated from Oswego Normal School, 1885; A.B., Rutgers, 1889; A.M., Rutgers, 1892; studied at the Univ. of Chicago in 1896, and at the Univ. of Berlin in 1910-11; LL.D., Univ. of Ariz., 1921; Sc.D., Rutgers, 1924.

Career:

Teacher in Syracuse, N. Y., High School, 1887-88; teacher of Greek and mathematics, Rutgers Prep. School, 1889-93; instructor of Latin and Greek, Univ. of Utah, 1893-94; assistant professor, 1894-95; professor, 1895-15; Dean of School of Arts and Sciences, Univ. of Utah, 1905-15; Professor of Archeology, Univ. of Arizona, and Director of the Ariz. State Museum, 1915-37; Dean of the College of Letters, Arts, and Sciences, Univ. of Arizona, 1918-21; Acting President, 1921 and 1927-28; Director, National Geographic Expedition to Cuicuilco, southern Mexico, 1924-25; since 1938 Director Emeritus, Ariz. State Museum.

Member of:

Amer. Assoc. for the Advancement of Science; American Anthropol. Assoc. (councilor); Amer. Assoc. of Museums; Archaeol. Inst. of Amer.; Inst. of Social Science; Utah Academy of Sciences; Ariz. Archaeol. and Hist. Soc.; Sigma Xi; Phi Beta Kappa.

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Compiled by GERTRUDE HILL*

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A short survey of the Pueblo culture of the San Juan area.

"The Great Natural Bridges of Utah." *National Geographic Magazine*, v. 21, no. 2, February, pp. 157-167.

Descriptions of several of the important natural bridges of Utah, including the famous Nonnezoshi or Rainbow Bridge.

1915

"Kivas of the San Juan Drainage." *American Anthropologist*, n.s., v. 17, no. 2, April-June, pp. 272-282.

A paper read before the American Anthropological Association at Philadelphia. Reprinted in *The Kiva*, v. 3, no. 7 & 8, April-May, 1938, pp. 25-30.

The Textile Fabrics of the Cliff Dwellers. The National Association of Cotton Manufacturers, 1915.

A paper read before the National Association of Cotton Manufacturers at their 98th meeting in Boston, Mass., April 29.

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1922

(With Mrs. Louisa Wade Wetherill). "A Navaho Folk Tale of Pueblo Bonito." *Art and Archaeology*, v. 14, no. 3, September, pp. 132-136.
The legend of the downfall of Pueblo Bonito, New Mexico, as related by members of the Navajo Salt Clan.

*University of Arizona, B.A., 1937.

1923

"Cuicuilco, the Oldest Temple Discovered in North America." *Art and Archaeology*, v. 16, nos. 1-2, July-August, pp. 51-58.

A description of the discovery of Cuicuilco, prehistoric site in the Valley of Mexico.

"Ruins of Cuicuilco May Revolutionize Our History of Ancient America." *National Geographic Magazine*, v. 44, no. 2, August, pp. 202-220.

Excavation of an important archeological site in the Distrito Federal, Mexico.

1924

"Arizona State Museum Forms Basis for Preserving Early Cultures." *The Arizona Alumnus*, v. 1, no. 3, March 15, pp. 3-4, 11.

The work of the Arizona State Museum on the University of Arizona campus.

1926

Casa Grande Pageant. Sims Printing Co. Tucson, Ariz.

Life in the Casa Grande valley during prehistoric times, as presented in the form of a pageant.

"Ancient Canals of the Casa Grande." *Progressive Arizona*, v. 3, no. 5, November, pp. 9-10, 43.

Account of the prehistoric canal systems of the Gila valley in the region of the Casa Grande ruin.

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Short outline of the history of Arizona under Spanish rule.

"Cuicuilco and the Archaic Culture of Mexico." *Scientific Monthly*, v. 23, October, pp. 289-304.

Description of the excavations made at the temple site of Cuicuilco, Distrito Federal, Mexico.

"Problems of a Scientific Investigator." *Science*, n.s., v. 63, March 26, pp. 321-324.

The difficulties confronting research workers in the scientific field, with particular reference to anthropology, and timely suggestions for remedying this situation.

"White Man's Discovery of the Rainbow Bridge." *Progressive Arizona and the Great Southwest*, v. 3, no. 1, July, pp. 23-24.

Short account of the discovery of Rainbow Bridge and Inscription House, with a description of the geologic processes which formed the Bridge.

1927

"Greetings." *The Arizona Alumnus*, v. 4, no. 3, March 15, p. 3.

An open letter to the alumni of the University of Arizona at the time of his appointment as Acting President.

1928

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A brief summary of the pageant to be held at the Casa Grande ruins on March 8, 9, and 10, 1929.

1929

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1930

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1933

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1935

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A plea for opportunities for the youth of the state.

1936

- "The Bride of the Sun." *The Kiva*, v. 1, no. 5, January, pp. 1-4.
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1938

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1939

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Description of the girls' puberty ceremony as observed on the White Mountain Apache reservation.

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A tribute to Dr. Edgar Lee Hewett and his share in the movement to make better known to the world the prehistory and history of the Southwest.

1940

Kinishba, a Prehistoric Pueblo of the Great Pueblo Period. Published under the auspices of the Hohokam Museums Association and the University of Arizona. Tucson, Arizona

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1941

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1945

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Handbook of Southwestern Archaeology.

A volume for the layman, based on the author's own archeological work during the past 40 years.

PIONEERING IN SOUTHWESTERN ARCHEOLOGY

NEIL M. JUDD*

During the summers of 1907, 8, and 9, I was one of Dr. Byron Cummings' student assistants on archeological exploring expeditions to southeastern Utah and northeastern Arizona. Three glorious summers, crowded with adventure! The country was wild and untamed; the trails we traveled were mostly Indian trails. There were no maps. In 1909, returning from the discovery of Rainbow Bridge, I saw Navaho in their middle twenties who had never before seen a white man. During those three summers Doctor Cummings blazed a trail for others to follow. Indeed, his first half dozen expeditions were all pioneer undertakings. He was a pioneer archeologist.

Doctor Cummings had been teaching Greek and Latin at the University of Utah for thirteen years before he added archeology to an already full schedule. Hardest working member of the faculty, he was friend to all the students and their Gibraltar in time of storm. He was never too occupied to hear a student's troubles. If studies lagged, he was there to help; if funds were running low, he found a part-time job or made a personal loan. As an instructor back in 1893 he introduced athletics in a modest way and personally bought the necessary equipment. Off the campus, church and civic interests commanded much of his time. In 1906, in addition to his teaching, he was appointed Dean of the College of Arts and Sciences. Nine years later he was one of seventeen faculty members to resign in protest against administrative myopia. But today, separated from them by time and distance, former students still think of him affectionately as "the Dean" or "the Professor."

*Curator of Archeology, U.S. National Museum, retired 1949. University of Utah—B.A., 1911 (M.A., Geo. Wash. Univ., 1918).

Utah's fertile valleys had sheltered a widespread and diversified population in prehistoric times. Tangible evidence was constantly turning up yet no one did anything about it. From under the streets of Salt Lake City trench diggers time and again exposed potsherds and fragments of bone and stone implements. Low mounds covered house floors on the northeastern shore of Great Salt Lake; adobe walls identified aboriginal farming communities near Payson, Nephi, and Paragonah; irrigation ditches in Santa Clara Canyon, west of St. George, had washed out burials accompanied by black-on-white pottery; the Deseret Museum, across the street from Temple Square, displayed a number of exceptionally well-preserved baskets from caves in San Juan County. One either accepted the Book of Mormon explanation of these occurrences or, if independently minded, sought to account for them through one's own reasoning ability.

The Professor's initial venture in Utah archeology was a brief horse-and-buggy trip in the summer of 1906 through Nine Mile Canyon, on the northern border of Carbon County. That particular holiday may have been prompted by student descriptions of cliff dwellings and petroglyphs or by Dr. Henry Montgomery's paper, "Prehistoric Man in Utah," reprinted at Toronto the previous January. In either case the chance visit to Nine Mile Canyon won a champion for Utah prehistory. And thereafter, as long as he remained on the University faculty, Professor Cummings dedicated to archeological field work each summer except the two spent in Europe.

For vacation time, 1907, a visit was planned to the White Canyon natural bridges, in San Juan County, first brought to public notice only two or three years before. Two newspaper men and four university students constituted the Dean's party, plus a guide added at Bluff City. I was taken

along either because I had failed in Latin the previous semester or because I could pack a mule and wash dishes.

Overnight by train from Salt Lake City to Thompson's Spring, a water stop on the D. and R. G.; thence by four-horse freight wagon a day and a half to the cable ferry at Moab; thence two more days to Monticello—the mere approach to our summer's work was an experience in itself.

At Monticello horses and mules were saddled for the trip down Montezuma Creek and thence to Bluff City. En route we thrilled at sight of cliff dwellings and promontory ruins I was to learn several years later had been visited and described in 1875 by W. H. Jackson and W. H. Holmes, of the Hayden Surveys. The playful young Utes that stampeded Jackson's pack train were still present albeit somewhat sobered. In 1907 they were content merely with ordering the Cummings party out of the valley. But the tone of that demand roused the Dean's Irish blood. He told them quite positively he would leave early next morning and not before; invited the deputation to share our supper and, at least outwardly, dismissed the subject. The Dean's Dutch-oven biscuits always have had a way of melting opposition!

It was in the canyon next on the west, Recapture, that Holmes in 1875 recovered his horses and mules after the Utes had run off the entire herd and thus left him and his men afoot 150 miles from their base camp in Colorado.

There was no auto road from Blanding to the White Canyon natural bridges in 1907. Indeed, there was no Blanding. When we camped there on our way back to Monticello in early September, a lone sheep herder's wagon parked beside a juniper proclaimed the town's beginning. Next year a brick house was up and the new settlement was called Grayson for several years until a passing postal inspector, so gossip has it, persuaded the local authorities to substitute his

family name in exchange for a selection of Government reports.

Our journey to the bridges really began at Bluff City. We followed the old Navaho trail across Comb Ridge and rode our horses into spacious Snow Flat Cave to camp for the night. Then, as now, distances and colors proved enchanting. The view at sunrise across endless miles of juniper and pinyon to Elk Ridge and the Bear's Ears, to the Henry Mountains 75 miles away, was indelibly impressed on my memory.

A cave ruin in Coyote Canyon, at the upper end of Grand Gulch, included two adjoining kivas, one of which was still intact. Juniper appeared dominant among its roofing timbers and the hatchway, raised several inches above the timbers, was surrounded by an adobe rim perhaps 5 inches high. Under the slight overhang of what I recall as a detached butte west of Grand Gulch and a short distance north of our trail was a two-story house of more than passing interest. There were four or five ground floor rooms, each with outside door, while the upper story seemed a single room with loopholes in the outer wall.

The White Canyon natural bridges had been known to local cattle men a quarter century but first attracted statewide attention in 1903 and 1905 following visits publicised in the national press. Our purpose, as Professor Cummings stated in his first University bulletin, was to map the immediate surroundings and locate any other points of interest deemed worthy of reservation in the public interest. Maps and all related data were transmitted to the General Land Office in Washington and formed the basis of President Theodore Roosevelt's proclamation of April 16, 1908, creating Natural Bridges National Monument. Subsequently W. B. Douglass, U. S. Examiner of Surveys, resurveyed the area and recommended the enlargements incorporated in a

second presidential proclamation, that of September 25, 1909.

Mr. Douglass thought the family names by which the three bridges were locally known entirely inappropriate and so proposed substitution of Indian designations. Since none was known, Indian names had to be invented. At this point Mr. Douglass enlisted the aid of one of my former colleagues here at the National Museum, a life-long student of the Hopi. Photographs of the three bridges were placed before him and features peculiar to each were indicated.

Thus it came about that the Edwin or Little Bridge was renamed "Owachomo" because a squat cone of weathered sandstone is conspicuous atop the right buttress when viewed from above. The Caroline became "the Kachina, Bridge of the Sacred Dancers," from a nearby petroglyph representing "the Lightning Snake, a symbol—painted on the bodies of the Kachina . . ." Because orthodox Hopi believe all who enter this life from the Underworld come and return through the Sipapu and because all who walk far enough up White Canyon necessarily pass beneath its spreading arch, Augusta Bridge was renamed "the Sipapu, Gateway of Life." Mr. Douglass submitted his report; in due course, the United States Geographic Board found the new designations acceptable and they have since become fixed on Federal maps and in all Government literature.

In 1907, while our surveyors were at work, another student and I were assigned the agreeable task of locating ruins. Memory is no substitute for fieldnotes but certain of those ruins stand out pretty clearly even after 40 years.

Upstream and around the bend from Edwin Bridge, in Armstrong Canyon, and on a narrow shelf reached by a splintery oak log wedged in a crevice, we found a small house, one room of which was walled with juniper and pinyon logs

held one upon another by vertical withes. A short distance below the bridge, and on the right hand side, was a six-pilaster kiva with cribbed ceiling. Storerooms were to be seen everywhere, some in cramped quarters and others larger and more accessible. Those overlooking Caroline Bridge were especially picturesque.

About 15 minutes walk up White Canyon from the Caroline, and on our left, is a rock-floored cave with a dozen or more rooms 25 or 30 feet above stream level. Out in front at the south end, a row of sandstone blocks clearly had been placed with defense in mind. A more prominent feature, however, is a pair of round rooms, perhaps 5 feet in diameter and 6 feet deep, side by side with a roofed masonry bin between and in front. The bin has a square opening in its roof but the round rooms boasted oval doors, framed by protruding collars of adobe and opening at either side of the bin. Both rooms were built largely of mud on bases of upright slabs and I recall no evidence of beam seatings on the convex tops of their walls.

Through the hatchway of a kiva at this site a pair of ladder poles rose, slanting toward the cliff. A companion kiva may have been stripped of its ceiling timbers for a single pine log crossed the middle while quantities of cedar shakes lay upon the shallow fill.

I am still impressed by the number of intact, or nearly intact, roofs among the White Canyon ruins. There was the kiva at the site last mentioned and two others below a lofty cliff dwelling about 20 minutes above Augusta Bridge. These two latter were among a group of dwellings on the canyon floor and close against the cliff. A pair of wattled, lean-to storerooms crowded under the slight overhang are especially remembered because, scratching through the litter between them, I found the doorslab for the right hand one and the wooden wedges that fitted into willow staples on

either side and held the slab in place. These two little granaries, it is gratifying to learn, are still well-preserved.

As for the cliff dwelling 50 to 75 feet above, the feature I recall most vividly is the means of entrance. Two amazingly long fir logs reached up but not quite far enough. Some one before us had nailed on rungs to form a ladder. My impression is the longer log was that by which the ancients had gained access to their cave home and that the other had been provided by the one who made the ladder. At any rate, a 15 foot cottonwood pole had been wired, butt end down, to the tip of the shorter timber as an aid up the final, 60-degree slope to the village gate. With a perversity typical of cottonwood poles, that one held firmly while my companions passed but slipped several inches when my turn came. For reasons unknown to the present writer, Mr. Douglass later named this ruin "Bear Ladder House."

Petroglyphs were numerous throughout the canyon. A very extensive series lies about a quarter mile below Edwin Bridge but, seemingly, every other smooth cliff face proved irresistible to cliff dweller dawdlers. In like vein, every recumbent slab invited the sharpening of stone axes. A great block of sandstone near the Caroline is literally covered with ax-width grooves.

Looking back upon the diverse structures of White Canyon—dwellings and kivas, masonry and wattled granaries, cylindrical chambers with slabstone bases and adobe walls—I presume we would have assigned them all to P. II and P. III had there been such categories at the time. But the cylindrical, bin-like structures of adobe, apparently roofless yet with lateral entrances, scarcely fit in the picture. Structurally, at least, they should be earlier and yet I recall no circumstance to suggest anything but contemporaneity with the others. We did no excavating in 1907.

When our surveys had been completed we turned back toward Bluff City. And what a joy to see once more that green oasis beside the brown San Juan! Its pioneer homes and spreading cottonwoods, its irrigated gardens and lush alfalfa fields were unbelievably welcome to us young fellows after six weeks surrounded by sandstone cliffs. As a change from camp fare the Dean made arrangements with Mrs. Allen for our supper and breakfast. The table in her log-cabin home fairly groaned with good things: roast beef and chicken, fresh vegetables and fruit, homemade jams, jellies, and pickles. Never was there such food! Our appetites certainly complimented Mother Allen's culinary ability although they left her no profit.

The 1908 season opened with a blast of profanity. For the work in prospect, the Dean had purchased four pack burros. One of them, Black Prince, was a husky young brute, fat and sleek but quite unbroken. He protested the rope and rebelled against the saddle. So we packed the gentle animals first and, quite unintentionally, left for Black Prince all the pots and pans and long-handled shovels.

We had the Prince in a short hackamore, nose against the snubbing post and one pannier on the trees, when, in a movement too quick for human eyes to follow and in a way we never fathomed, he caught the Dean under a dangling rope, dragged him across the packsaddle forks, and dumped him head-first on the opposite side. Lightning hoofs twice grazed the prostrate form. The Dean was furious. He sprang to his feet, seized the mule's halter with tense hands, and hissed through clenched teeth a blistering "Damn you." And that is the only time I ever heard Professor Cummings really swear.

After a fortnight's reconnaissance, camp was established at Cave Spring and work begun at a large pueblo on the crest of Alkali Ridge. A half dozen workmen were brought in

from Colorado. Another student and I were volunteers and so was A. V. Kidder, fresh from Harvard. Not until Kidder joined our party at Monticello was it learned that he had been placed in joint charge by Dr. Edgar L. Hewett, Director of the School of American Archaeology, under the Archaeological Institute of America. As in 1907, and again in 1909, Professor Cummings had raised expenses for the expedition from members of the Utah branch of the Institute and had filed his annual request for a Government permit through Doctor Hewett. Hence Hewett's nominal supervision.

Since the season's subvention did not allow the luxury of a cook, Dean Cummings shouldered this additional chore. He is an exceptionally competent cook but cooking in the open for a dozen men is not a light undertaking. It reduced his time at the ruin by half. Too, the Dean was never one to ask assistance. If his student companions were not sufficiently adult to see when water and wood were needed, he fetched them himself. On top of all this, night and morning he had to suffer the camp jesters.

Old Mac had been trying for 20 years to get back to Chicago but each start ended with a farewell bottle. Hence, he welcomed the prospect of a month out in the open, resting and recuperating on the ample bosom of Mother Nature. He discarded his shirt and, when the mid-day sun raised blisters, substituted a potato sack, the bottom slit for head and arms. Nature never intended human feet to be incased so Mac discarded his shoes and put on carpet slippers. In spite of anklestrings to hold them in place, the slippers kept slipping off so they, too, were abandoned. Men were born barefoot; they should go through life barefoot!

Carrying lunch and a waterbag the mile and a half to work each morning was repugnant to Old Mac. Therefore, he left camp early and alone. And invariably he got lost al-

though the trail was traveled by a dozen men and seven horses twice daily. Come Sunday Mac marked the path with strips of a red bandanna tied to willows planted at 5-yard intervals. But, despite this excellent and well-considered precaution, he lost the trail again on his way back to camp.

A week later, like manna from heaven, two of Kidder's classmates arrived unheralded. After 35 miles in a saddle the first day, they rejoiced at sight of Ted and *terra firma*. But, as the shorter of the two slid down the front leg of his horse and clung for a moment's support, plans began to ferment about the campfire. After all, life on Alkali Ridge was pretty dull: breakfast in the morning's chill; walk a mile and a half to work; eight hours or so on a shovel; back to supper and to bed under a pinyon. Our new recruits readily accepted the daily routine but news of Harvard dominated camp conversation. After a few days of this, Nick lost patience. He stood up at supper one evening, raised his coffee cup and, without twitching a facial nerve, proposed "Three chee-ahs for Hahvud. Not too loud but clee-ah."

By this time the Indians were getting bad. Our distance from the nearest settlement was repeatedly emphasized. The yapping of a coyote at sundown, an owl hooting through the night shadows, birds twittering at break of day—all were signals from one Ute to another. Mac's discarded carpet slippers, tied backward over the wrangler's boots as he went out at daylight to bring in the horses, left moccasin tracks pointing toward camp when the crew later filed out the same trail to the diggings. A chance but perfectly natural grouping of trees became a rendezvous for scouts and spies; the tracks of grazing horses, even range cattle, were visible evidence Indians had passed that way. And always there were the mysterious noises of the night.

When this diversion approached the end of its second week, the Professor suddenly called a halt. His keen eyes

saw what we missed: warning of a possible crack-up. Our chief victim had lain awake night after night in the snoring camp, fully dressed and with both a Boy Scout hand ax and a Spanish War trenching blade unsheathed beside him.

Notwithstanding all the horseplay, there was something to show for the month at Cave Spring camp. Of the great E-shaped ruin, three kivas and perhaps a tenth of the living rooms were excavated; its two rubbish mounds were explored and representative collections of artifacts and skeletons recovered. Kidder's summary in a 1910 pamphlet from the School of American Archaeology is, unfortunately, the only report ever published on those excavations.

Upon conclusion of the Alkali Ridge program, the party was dispersed. Kidder and his classmates turned east while Professor Cummings and his student assistants proceeded to Bluff City by way of the McElmo. Not until long after was it learned that, in consequence of their Alkali Ridge schooling, the Harvard visitors never batted an eye when two of our workmen were indicted for murder shortly after leaving camp or, in an Espanola tavern a fortnight later, when a Mexican at the next table was killed during an argument.

On the road to Bluff, an over-night stop at the Aneth trading post just below the mouth of the McElmo, was enriched by sight of a gray-haired Negro, blanketed and moccasined in Navaho fashion. When a young man, we were informed, the Negro was attached to a company of U. S. cavalry passing that way and had been sold to one of the local Indians by a couple of waggish soldiers. Come 1908, the victim of this practical joke had not only acquired the dignity of years but two wives in addition and was recognized as the wealthiest Navaho in that part of the reservation.

At Bluff we met John Wetherill, there to escort Professor Cummings across Monument Valley to Oljato. Wetherill's new trading post, but two years old, was the only one

north of Ganado and Tuba City; it was the gateway to a vast, unexplored country immediately south of the San Juan.

Wetherill was in a hurry and we traveled fast. We forded the river at the mouth of the Chinle; overtook and passed a company of U. S. cavalry just beyond Gypsum Creek (the men had been completely deceived by its clear, running water) and reached Oljato the second day. The place was in a dither with excitement.

Something had disturbed the northern Navaho that year and they were ready for a fight. They had retrieved pawned rifles as far away as Cortez and Durango; their women, children, and flocks had been sent to the high mesas. Troops and a mounted battery had been ordered into their country and were close at hand. Wetherill was needed at Oljato as interpreter and conciliator. But a week later, after threat of hostilities had abated and the troops had turned south, he was free to join in a short archeological reconnaissance. As intent after ruins as a boy hunting birds' eggs, Wetherill had been anticipating the trip as much as we. He guided us to Segihatsosi and then to the Segi. We saw numerous caves and cliff dwellings, visited most of those we saw but did no digging. On the way, we skirted the last of the Laguna Creek lakes, three or four ponds on the flat below Marsh Pass. Cross-sections of other, older lake beds showed in the banks of the new arroyo in Segi Canyon.

It was at Oljato in the late summer of 1908 that Mrs. Wetherill told Dean Cummings of the reported existence of a great stone arch near Navaho Mountain. He requested her to inquire further and to engage as guide anyone who really knew the way. Search for Rainbow Arch was to be one objective of his next expedition.

On our way out a few days later, Mr. and Mrs. Wetherill accompanied us as far as Bluff and the overnight stop there provided the occasion by which W. B. Douglass first

learned of the Segi Canyon cliff dwellings Cummings and Wetherill had so recently visited. On September 11, the day before he began his survey of the White Canyon natural bridges, Douglass wrote the Commissioner of the General Land Office repeating what Wetherill had told him and asking authority to investigate. From his camp near Grayson, now Blanding, on October 7 Douglass again wrote the Commissioner to say his Paiute guide, Mike's Boy, had told him of a larger and prettier natural bridge on the San Juan River 80 or 100 miles west of Bluff and recommended that he be authorized to investigate the report in connection with his proposed examination of the ruins previously described.

Snow, plus the inability to get guides and supplies at Oljato, prevented Douglass from reaching either bridge or ruins that fall but he approximated their location from information volunteered by Wetherill. A copy of his map, and a summary of what he had heard, was sent to one of my co-workers at the National Museum on February 27, 1909. Another copy accompanied Douglass' preliminary report to the G.L.O. under date of March 3.

Back at Oljato in the early summer of 1909, attention was first directed to some of the ruins visited the year before. One occupied a low, shallow cave on the trail to Segihatsosi and included perhaps a couple dozen rooms. A twenty-foot "snake" had been painted in white on the cliff above the dwellings. Small but picturesque storerooms perched precariously on narrow footings, plastered like swallows' nests against the sandstone.

In a large cave at the mouth of Segihatsosi, and rather high up under the north cliff as I recall, was another village. Its walls had mostly fallen but, to our surprise, they overlay the remains of older and ruder structures. Artifacts from the lower rubbish piles differed from those found above. Obviously the occupants of these older houses were a different lot

than the later, so-called cliff dwellers; since we knew no name for them, they quickly became "the cave people" in campfire conversations. Additional evidence of these early folk was uncovered in other Segihatsosi caves.

I do not remember like discoveries in nearby Segi Canyon but, after all, we were merely sight-seeing in the Segi that summer. We glanced hurriedly at Swallow's Nest, Keet Seel, and a number of other ruins nameless at the time. I followed Dean Cummings up a tight crevice and into Ladder House, in Dogozshi Bokho, and thrill even now at recollection of the surprise beneath a squared sandstone tablet in the corner of a room. The tablet lay completely exposed upon the floor although blown sand had gathered under its edges. When I moved it, a quantity of kidney beans in the pod and looking as fresh as though picked the week before, stared out from the depths of a magnificent but undecorated red-ware olla. Beans and olla and the ladder from which we named the ruin were still on display in the University of Utah museum when I last saw them, some 25 years ago.

Returning from examination of ruins near the head of the west fork and not far from Bubbling Spring—a boiling, bountiful fountain ten feet across, since destroyed by arroyo cutting—we chanced to meet a Navaho who said there was a large ruin in a cave around that rocky point. He refused to go with us but sat down beside the trail to await our return. And that is how Betatakin came first to be seen by white men!

We were camped on the Segi opposite the mouth of Betatakin Bokho in early August, awaiting John Wetherill's return and the start of our planned search for the fabulous stone rainbow. As related in my story of that adventure, published in the *National Parks Bulletin* for November, 1927, we were already well out on the trail to Navaho Mountain when Wetherill arrived with our mail, including a letter

from Kumen Jones, of Bluff City, informing Prof. Cummings G.L.O. Surveyor Douglass was on the way from Bluff with Rainbow Bridge his objective also. In order that the Government man might have the benefit of his guide, the Dean immediately directed our return to Oljato. And there we waited two days for Douglass and his crew before resuming our journey by a second, more hazardous route.

This example of unselfishness is so thoroughly characteristic of Professor Cummings. He had in his employ an Indian who had actually seen the Bridge; he was willing to sacrifice his own interests to help one less fortunate. If he ever learned that Douglass had written and wired the General Land Office from Bluff on August 4 asking authority to stop the work of the Utah party and confiscate its collections, the Dean never so much as hinted the fact in my presence.

With university reopening only weeks away, we did not feel justified in waiting longer, so started on without Douglass after two days. But we had ridden no more than ten or 12 miles when a Navaho messenger overtook the party with word Douglass had arrived at Oljato and would follow. So we made dry camp in the hot, shadeless valley west of Organ Rock and waited. Next morning the Cummings and Douglass parties set forth as one, down the Moonlight to San Juan, thence west across Nokai and Paiute Canyons and around the north side of Navaho Mountain. After a ride that exhausted both men and horses we reached our goal shortly before noon on the fourth day, August 14. Rainbow Bridge, colossus among natural phenomena of its kind, 309 feet high, was seen by white men for the first time.

To continue exploration of upper Navaho Creek while in the vicinity, the Dean and his party left the Bridge early next morning after requesting me to remain and guide Douglass to the great ruins in Segi Canyon. This assignment com-

pleted six days later, I hurried on to rejoin the Dean at Oljato and thence to Bluff and Monticello and, ultimately, the classroom again. And so, in brief, ended our 1909 season.

In retrospect, the three Cummings expeditions I accompanied as a student seem productive and entirely worth while. They were path-finding expeditions although we did not then think of them as such. They fell short of their opportunity in accomplishment only when measured by what has since been learned. I, for one, failed to notice on Alkali Ridge the evidences of early occupation brought to light by the Peabody Museum expeditions of 1931-1933 but comparable manifestations in the Segihatsosi caves were too conspicuous to be overlooked. Our fault was that we lacked the experience to realize fully what we had found.

If scoffers protest that anyone should have seen what everybody now knows, let them be reminded our present interpretation of Anasazi history is the fruit of a formulating process fairly recent in origin. Many hands have gathered the factual data; many minds have joined in winnowing the evidence and explaining its significance. There were no Basket Makers in 1909, except in Pepper's unknown pamphlet of 1902. That designation was not really accepted until Kidder and Guernsey, in 1919, published the first results of field work begun in northeastern Arizona five years before. It remained for the Pecos Conference of 1927 to fix the terminology since employed by most workers in the Southwest.

Although Guernsey and Kidder were first to organize and interpret their findings, actually they discovered in the Segi country very little Professor Cummings had not seen previously. He noted the slab-walled structures beneath cliff dwellings; remarked that artifacts from the lower levels often differed from those in the upper. He associated square-toed sandals and jar-shaped, dug storage pits with the earlier in-

habitants. He called attention to the general absence of pottery in the older rubbish piles and correctly attributed both banded-neck and corrugated-coil cooking pots to the cliff dwellers. He was first to note the puzzling absence of cemeteries in connection with ruins south of the San Juan.

If Doctor Cumming's early writings seem insufficient to present-day students, and they are, the reason is nevertheless clear. He sought to popularize his subject; to explain it in words all could understand. He wished to reach both his university students and their parents; to awaken in both an "increasing respect for honest effort and clean living by creating a larger interest in nature's beauties and the steps by which man has climbed to his present plane of achievement." Furthermore, he believed the cliff dwellers and their predecessors in the caves, and those who built pueblos in the open, were all one people whose physical and material remains evidenced a long-continued development. Only a life too filled with service for others repeatedly postponed the writing of those "more detailed papers on special features" promised in his first pamphlet, "The Great Natural Bridges of Utah."

A SEQUENCE OF GREAT KIVAS IN THE FORESTDALE VALLEY, ARIZONA

EMIL W. HAURY*

Pueblo architecture in the Southwest is distinguished, apart from its compact, adjoined, many-storied living rooms, by subterranean ceremonial rooms, called kivas. Still in common use today among the Pueblo Indians, the kiva is known to have had a long history, the origins extending well back into antiquity. Any consideration of the kiva as an architectural unit must first of all recognize the likelihood of two separate origins for the small clan kiva on the one hand and for the so-called Great Kiva, or super-ceremonial room, on the other hand. As to the former, the theory has prevailed that the small kiva of a thousand years ago was an architectural survival of the pit house or living room in vogue during the early and formative stages of the Puebloan peoples. New excavations in the San Juan drainage, such as J. O. Brew's recent report¹ on Alkali Ridge, tend to confirm this theory, placing the development not only with respect to place but also as to time.

For the Great Kiva, the picture is by no means so clear. In the first place only a handful, relatively speaking, have been excavated and the geographic range of those which have been studied is, on the whole, somewhat greater than for the small kiva. Whereas formerly the Great Kiva was considered to be an intimate associate of the Chacoan Culture, F. H. H. Roberts² demonstrated that this feature extended well beyond the limits of the pure Chaco Culture, the presumed center of its development. The Forestdale ex-

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¹Brew, 1946, pp. 203.*ff.*

²Roberts, 1932, pp. 86-98.

amples extend the range still farther to the southwest into Arizona and there are surface indications of Great Kivas south of the Black River on the San Carlos Indian Reservation. A number of large structures, quite certainly not domiciliary, have been found in villages of the Mogollon Culture as well as in the towns of Puebloan folk, both laying claims to considerable age. This raises tantalizing problems as to origin, in time and in space, and as to what relationship, if any, existed between the large and small forms of the kiva. Space does not permit a full inspection of these problems but I do feel it worthwhile to present data which has a bearing on the problem.

This information is drawn from the studies in the Forestdale Valley, near the northern boundary of the Ft. Apache Indian Reservation, conducted in 1939-44 by the University of Arizona. Here we had the unusual opportunity to examine the characteristics of three large kivas through excavation and of a fourth through surface examination, all assignable to different culture levels and representing a span of time approaching 1000 years. To my knowledge we have not had an occasion to view a similar sequence in any other locality so far examined.

The Forestdale Valley lies at an elevation of 6500 feet above sea level just below the Mogollon Rim, the southern escarpment of the Colorado Plateau. It is a short valley, drained by Forestdale Creek which flows successively into Corduroy and Carrizo Creeks, Salt River and finally into the Gila. The habitable portion of the valley is reduced to some three miles in length by a lava flow which long ago blocked the lower reaches. Obviously, the arable land and several unfailing sources of water were the chief attractions to Indians since the early centuries of the Christian era. Our survey noted some 50 sites, large and small, within the confines of the valley, representing an occupational range from the early centuries of the Christian era to about 1400, ex-

cluding the use of the valley by the Apache more recently. Of special interest is the fact that the earliest settlements are attributable to the Mogollon Culture which by 700 was being replaced by Puebloan people who eventually dominated the region.

In order of time, the villages excavated by us and which have supplied the data used here are:

1) Ariz. P:16:20, or the Bluff Ruin, dated by tree-rings to about A.D. 300. This is the oldest Mogollon Village so dated and is distinguished by round to sub-rectangular pit houses excavated into the sandstone bedrock and by a small amount of brown pottery. The single large room, more or less centrally located in the village, and here called a kiva, was completely excavated.³

2) Ariz. P:16:1, the Bear Ruin⁴, a pit house village of about 700 (roughly comparable to late Basketmaker III), showing a fusion of Mogollon and Anasazi characteristics; kiva completely excavated.

3) Ariz. P:16:2, a small 21-room pueblo with adjacent Great Kiva, dating about 1100, or early Pueblo III in the local chronology. About half of this kiva had been washed away by an early erosion channel of Forestdale Creek; what remained was entirely cleared of fill.

4) Ariz. P:16:9. A large pueblo occupied about 1200-1300 (estimated) in which our digging was limited to a few exploratory tests, representing the full local Pueblo III stage.

In all of the foregoing villages there were cleared, or tested, circular structures distinguishable from domiciles by size and in most cases by shape and interior plan. Although this architectural type appears first in a ruin of the Mogollon Culture and later occurs in villages of the Pueblos, I am

³Haury and Sayles, 1947.

⁴Haury, E. W., 1940, 1940a.

assuming, in drawing inferences presented later, that essentially the same social force impelled the construction of all and that they represent various developmental steps of a single architectural form. Whether the idea of a large room presumably devoted to ritual use had already permeated both groups by the early centuries of the Christian Era from some more ancient source, or whether it was inspired by one of the two groups and adopted by the other, is unanswerable now.

The fifth and most recent example used in this series is drawn from Kinishba some 40 miles southeast of the Forestdale Valley. Kinishba was inhabited by the same culture group represented in the Forestdale Valley during the 14th century at Tundastusa, the largest ruin in the area. Although W. Hough⁵ tested Tundastusa in 1901, his work was not extensive enough to prove or disprove the presence of a Great Kiva.

The inclusion of the large plaza of Group I of Kinishba Pueblo in a Great Kiva sequence demands a word of explanation, since Dr. Cummings did not specifically identify it as a kiva⁶. The area in question is designated as a large patio and lies within a massed block of rooms except on the north side where a wall separates it from a smaller patio in which there is located a small kiva-like structure. The area concerned is generally rectangular, the maximum dimensions being about 17.6 x 18.8 m. The whole patio is surrounded by a stone-faced bench from 1.0 to 1.25 m. wide and .50 m. high, suggesting the counterpart of a kiva bench. Heavy posts in the facing walls of the east and west sides indicate that a portico type roof protected the bench proper. Entrance to the area was gained from the southeast through a long covered corridor between living rooms. This passage turned to the west outside the patio wall and lead to a doorway into the plaza itself at the midpoint of the southern wall. Another

⁵Hough, 1903, pp. 290-291.

⁶Cummings, 1940; see map opposite p. 2., also pp. 16-18.

door in the north wall connected with the small patio, thence to the outside through a corridor on the west. Doors of living rooms clustered about the larger patio opened directly into it. Another important feature is a masonry "altar" placed near the southern entrance, consisting of a rock platform flanked on the east, south, and west sides by low walls. Quoting Dr. Cummings, "Here undoubtedly were placed their sacred images, their painted stone tablets, and other proper offerings on the occasion of a sacred ceremony."⁷ No mention is made of a hearth or fire area.

Although this patio obviously was primarily secular in function, the aforementioned features are certainly indicative of other functions, too, and I believe it may be regarded as a late, though altered form of the Great Kiva; hence its inclusion here.

A further word is due concerning the dating of these structures. With the exception of Ariz. P:16:9, all dates are based on tree-rings. Summarized, the information is as follows:

Bluff Ruin

From the kiva: 320 ± 5 (2 trees); 318, Bark date (1 tree).

Range for the ruin as a whole: $285 + x$ to 320 ± 2 (9 or 10 trees).

Bear Ruin

From the kiva: $667 + x$ (1 tree).

Range for the ruin as a whole: $636 + x$ to $667 + x$ (3 trees).

Ariz. P:16:2

From the kiva: $1008 + x$ to $1121 + x$ (9 specimens, ? trees). Roofing logs were badly shattered when superstructure collapsed and specimens probably come from all

⁷Cummings, 1940, p. 18.

parts of radii of large logs, accounting for the great range, actual construction was probably near 1125.

Range for the ruin as a whole: $1008 + x$ to $1121 + x$ (13 specimens, ? trees).

Ariz. P: 16:9. No tree-ring dates; 13th century placement based on presence of ceramic types dated elsewhere.

*Kinishba:*⁸ No tree-ring dates from patio. Range for the ruin as a whole: 1238 ± 5 to 1306 ± 5 (6 specimens).

It is likely that the final abandonment of Kinishba was near 1400. While the few tree-ring dates do not so indicate, the patio was doubtless in use to the last; at any rate, well within the 14th century.

In the accompanying text figure will be found the essential facts covering the various buildings discussed. Omitting the descriptive feature, we may proceed directly to the more general problems. This sequence offers glimpses into the situation over a span of approximately 1000 years, spotted in the 4th, 7th or 8th, the 12th, 13th, and 14th centuries. Large gaps are left in the earlier part of the sequence, but it is likely that few basic changes could be detected until about 1000 or after.

Perhaps of chief importance in recognizing trends is the relationship of the large units to the domestic structures. In the Bluff and Bear Ruins, both pit house villages, the buildings were independent of all others but convenient to them. The nature of pit house architecture does not readily permit any other scheme. This same placement was present even in *Ariz. P:16:2* at a much later date where, while the kiva was associated with a 21-room pueblo, it was located some 25 meters southwest of the living units. For *Ariz. P:16:9* the evidence is clear that the kiva and living quarters have been moved together and probably joined, judging

⁸Baldwin, 1935, p. 30.

from the surface evidence, but the kiva remains open on the west and south, being only partially incorporated within the pueblo.

This situation is paralleled in The Village of the Great Kivas⁹ in Great Kiva No. 1. Kiva No. 2 in the same village was independent of the pueblo, but no time difference could be detected between the two to support, in this case, the idea of gradual consolidation of the Great Kiva and the pueblo.

If the main Kinishba plaza is in fact a late survival of the Great Kiva as is inferred, then complete incorporation in the pueblo has had three notable effects: a) incorporation within the pueblo dictated alteration in form from round to rectangular, so as to take full advantage of the space created by joined rectangular rooms; b) because the plaza was surrounded by living rooms which opened into it, the area became secularized; c) secularization rendered the underground nature of earlier kivas impractical as well as eliminating the necessity of a roof.

It is strange indeed that the Great Kiva, the most spectacular and dramatic feature of pueblo architecture, should have died out by about 1300, as would seem to be indicated by its absence in ruins dated after 1300, but its translation into a plaza, reserved in part for ritual, as suggested at Kinishba, may be the answer. Logically this might be carried one step farther to explain the plazas in modern pueblos where public rituals are still staged.

I am well aware that examples can be cited for Great Kivas *within* plazas. The trend cited here may have applied only to the ruins of the White Mountain area. It is not intended as an argument to explain the origin of the plaza *per se*.

⁹Roberts, 1932, Plate 1.

If the examples we have are typical for the area, then an increase in size, early to late, is apparent, climaxing in Pueblo III, but still retaining large proportions in the un-roofed Kinishba plaza of Pueblo IV. Here the mechanical restrictions of roof spans were lifted and the size could have been expanded at will. The Chacoan Great Kivas vary in diameters from 14.7 to 23.7 m,¹⁰ a range within which this series also fits, excepting the smaller Bluff ruin structure.

As for depth, and again by Chacoan standards, Forestdale kivas were shallow. At that, the Bluff ruin kiva was originally excavated to a maximum depth of 1.45 m. in solid sandstone bedrock, not a simple undertaking. The others, however, were not so limited by nature, yet they did not have any great depth. Evidently the necessity for great depth was not felt so keenly in this area, marginal in kiva distribution, a fact which may have had a bearing in the ready translation of the underground room to the surface patio of Kinishba.

Only in the late forms were stones used to line either the outer wall or as facing for the bench. This probably has no great significance other than reflecting the degree to which stone was used in the architecture as a whole. Upended slabs were not employed at all. With the emergence of the kiva from below ground to ground level, a new problem of walling was posed and this was met by simply letting the walls of living rooms combine to make the enclosure.

While there is no evidence of how entrance was gained to the oldest structure in the Forestdale series I am inclined to regard this as having been through the side. A suggestion of such a feature occurred off the south arc of the Bluff ruin kiva, a position in keeping with the arrangement of the hearth and roof support, but it could not be outlined. The evidence is also unclear for the Bear Ruin Kiva, but access may have been through the large annex on the southeast. In

¹⁰Roberts, 1932, p. 96.

Ariz. P:16:2 side entrance from the southeast was definite, a wide stairway of dirt steps and pole and stone treads having led from the surface to floor level. For Ariz. P:16:9 there are no data, but the Kinishba patio was entered from the southeast corner of the pueblo, leading to a door through the south wall of the enclosure. A fairly consistent pattern of side entry from the southeast is thus indicated for the Great Kivas of the Forestdale area.

The information is not sufficiently representative to say much about interior fixtures, other than that the bench is present, except in the Bluff Ruin kiva. There was no pilastering in those excavated, there appear to be no vents, and there are no sub-floor vaults. A *sipapu* was recognized in only one instance, the Bear Ruin kiva. In short the specialization of Chacoan kivas is absent. This may mean either that Chaco influence was so dilute as to be ineffective because of distance, or more probable, it may be explained on the basis of a local tradition of long standing calling for fewer features.

In presenting the foregoing information of Great Kivas in the Forestdale area and including Kinishba near Fort Apache, I am not endeavoring to make out a case for the independent development of the superceremonial room locally. It is doubtful if the actual growth, step by step, can ever be pinned down to one locale. Rather it would appear that this took place over a wide area and that local developmental patterns will eventually be recognized. I do believe that this series represents one such local manifestation, and that the units listed, whether fitting or not the orthodox definition of a Great Kiva, are nevertheless related historically by actual functions in the religious systems of the times represented.

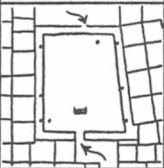
RUIN	PLAN	TIME	DIAM.	DEPTH	WALLS	ENTRY	BENCH	ROOF	HEARTH	REMARKS
KINISHBA ARIZ. V:4:1		1300-1400 PUEBLO IV	17.6 x 18.8 m.	SURFACE	STONE, FORMED BY ROOMS	SOUTH & NORTH	LOW, COMPLETE	PORTICO OVER BENCH	?	GREAT KIVA SECULARIZED BY INCORPORATION WITHIN PUEBLO, CHANGING IT INTO A PLAZA.
ARIZ. P:16:9		1200-1300 PUEBLO III	Ca. 17.0 m.	1.5±m.	STONE ?	?	?	?	?	PARTIAL INCORPORATION WITHIN PUEBLO.
ARIZ. P:16:2		1100-1200 PUEBLO III	19.0 m.	1.25 m.	STONE	STAIRS, SOUTH- EAST	COMPLETE EXCEPT FOR STAIRS	4- POST SUPPORT	?	SEVERAL ANNEXED ROOMS BUT KIVA DETACHED FROM 21-ROOM PUEBLO.
BEAR RUIN ARIZ. P:16:1		600-700 LATE BM III	15.3 m.	1.75 m.	PLASTERED CLAY	SOUTH- EAST	COMPLETE	4- POST SUPPORT	NEAR CENTER	INDEPENDENT OF LIVING ROOMS, SPECIALIZED FEATURES APPEAR.
BLUFF RUIN ARIZ. P:16:20		A.D. 300- 400	10.3 m.	1.45 m.	BEDROCK	?	NONE	5- POST SUPPORT	SOUTH OF CENTER	INDEPENDENT OF LIVING ROOMS.

FIGURE 1. Chart summarizing essential data on Forestdale Valley Great Kivas and Kinishba Plaza. Up is north on all plans.

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ARCHEOLOGICAL SURVEY OF THE LAKE MEAD AREA[†]

GORDON C. BALDWIN*

The Lake Mead National Recreational Area, under the jurisdiction of the National Park Service, includes about 2,700 sq. mi. of land surrounding the lake behind Hoover Dam (formerly Boulder Dam) in northwestern Arizona and southeastern Nevada. Within this diversified region, ranging from lowlying, typical desert sections to elevated, forested plateaus, there has been extensive occupation by several different cultural groups throughout the past 2,000 and more years. Although a great deal of archeological excavation has been carried on in this region, particularly by C.C.C. projects in the Virgin and Muddy River valleys on the northern arm of the lake, very little of the recovered material has been studied and published. Consequently, archeologists know comparatively little concerning the prehistoric cultures of this peripheral area of the Southwest.

In 1940, the National Park Service detailed the writer to learn more about the prehistory of this newly created recreational area, so that more accurate information could be given to visitors. However, owing to the interruption of activities for the duration of the war, a great deal still remains to be accomplished. With the exception of a part of one small ruin in the Muddy River valley, no excavation has so far been done. Surface surveys have, however, revealed 430 archeological sites about the shore of Lake Mead and along the Colorado River below Hoover Dam. These surveys have included a general survey in the Muddy and Virgin

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[†]This manuscript was completed in 1946 and there has been no opportunity for revision since that date. Recent investigation in the Patayan area could not, therefore, be included in the report and consequently certain statements in the text now need revision. G.C.B.

River valleys, and detailed surveys in the Davis Dam Reservoir area, below Hoover Dam, on the Shivwits Plateau on the north side of the western Grand Canyon, and along the upper lake in the western Grand Canyon.

From a preliminary study of the materials secured from these surface surveys and from a review of the literature on this area, the following cultural sequence has been outlined.

Early Man

At least three sites in this region show evidence of Early Man. Most important is Gypsum Cave, well-known from the discoveries of the Southwest Museum, showing man to have been contemporaneous with the giant ground sloth and yielding such artifacts as atlatl and dart fragments, dart points, and scraper-knives.¹ Less well-known are the discoveries at Tule Springs, Nevada, and Willow Beach, Arizona. At Tule Springs, located a few miles northwest of Las Vegas, Nevada, were found a series of charcoal beds containing the bones of extinct horses, camels, and bison, with at least one obsidian flake and a number of camel bone fragments showing use by man.²

The Willow Beach site, situated about 12 miles south of Hoover Dam on the east bank of the Colorado River, is a stratified campsite which was partially excavated by a C.C.C. crew under the direction of the National Park Service in 1936.³ Here at a depth of from six to nine feet, two feet below an early Pueblo layer, were uncovered numerous dart points, knife blades, and snub-nosed scrapers, together with elk bones, representing an early, non-ceramic culture. About a mile downstream on the opposite bank of the river lies a

¹Harrington, M. R., *Gypsum Cave, Nevada*. Southwest Museum Papers, No. 8, 1933.

²Simpson, George G. *A Nevada Fauna of Pleistocene Type and its Probable Association with Man*. American Museum Novitates No. 667, 1933.

Harrington, M. R., "A Camel-Hunter's Camp in Nevada." *The Masterkey*, Vol. 8, pp. 22-24, January, 1934.

³Harrington, M. R., "A Stratified Camp-site near Boulder Dam." *The Masterkey*, Vol. 11, pp. 86-89, May, 1937.

similar and even larger site which may yield further evidence of the presence of early man along the Colorado River.

Anasazi Occupation

The Anasazi, or Basketmaker-Pueblo, remains in the area represent the Basketmaker, Modified Basketmaker, Developmental Pueblo, and Great Pueblo periods (Basketmaker II to Pueblo III). These sites extend north and west of the Colorado River in northwestern Arizona and southeastern Nevada, but are largely concentrated in the Virgin and Muddy River valleys in southern Nevada. During the period from 1933 to 1936, more than 100 of these ruins were excavated by the National Park Service with C.C.C. crews in order to salvage as much material as possible before the rising waters of Lake Mead flooded them forever.

From intrusive pottery types and other materials, it is evident that this peripheral section of the Southwest was settled by Basketmaker and Pueblo peoples coming originally from northeastern Arizona and southeastern Utah. The natural migration route for both people and cultural elements probably lay around the northern end of the Grand Canyon, across southern Utah to the headwaters of the Virgin River, and thence down that stream to the Muddy and Colorado Rivers. From present indications there was a definite time lag of 50 to 100 years, or more, between the Anasazi cultures in this region and their counterparts in the main Southwestern archeological area further to the east in Arizona and New Mexico. Thus, at about 1200 A.D., when the Great Pueblo Period was nearing its height, these Nevada pueblos were culturally still in an early phase of that period.

Following the Gladwin-Colton system of classification of cultural units,⁴ the following "foci" (in the Gladwin classification, "phases") have been tentatively identified for this area:

⁴Colton Harold S., *Prehistoric Culture Units and their Relationships in Northern Arizona*, Museum of Northern Arizona, Bulletin 17, pp. 6-10, 1939.

Moapa—

Represents the Paiute occupation of the area during the past few hundred years. Marked by hundreds of small to medium-sized camp-sites identified by distinctive types of pottery, arrowpoints, and other artifacts. (Associated with sites of early Mohave and Walapai).

Mesa House—

Time—1100-1200 A.D.

This focus was named Parawan phase by Gladwin, but the earlier designation of Harrington's is used as being more descriptive of the area and culture. Characteristics—medium-sized adobe and stone pueblos, with corrugated, black-on-white, and polychrome (intrusive) pottery types. A Pueblo III Culture.

Lost City—

Time—1000-1100 A.D.

This focus was named Moapa phase by Gladwin, but again Harrington's earlier designation has priority.

Characteristics—small to medium-sized stone and adobe pueblos, little corrugated pottery, gray, black-on-gray, some black-on-white, intrusives; a late Pueblo II early Pueblo III culture.

Logandale—

Time—800-1100 A.D.

A Developmental Pueblo focus, Pueblo I and II.

Characteristics—both pit houses and surface structures; black-on-gray pottery.

Overton—

Time—500-800 A.D. (?)

Modified Basketmaker (Basketmaker III) focus.

Characteristics—circular pit houses, from 7 to 16 feet in diameter, sometimes clay-lined, with offset; beginnings of pottery making, Lino Gray and Black-on-gray.

Las Vegas—

Basketmaker culture as typified in Gypsum Cave, Willow Beach, and certain other pre-pottery caves and open sites in the area, characterized by atlatl darts and dart points, scrapers; no pottery.

It should be emphasized that these six foci represent a cultural scheme which has been set up as an aid to the analysis of sites in this area. Upon further research certain of these foci may be merged and others may be added. With the

exception of the Moapa Focus, the above foci seem to be closely linked to the Kayenta Branch of the San Juan Stem.

Although, as previously mentioned, more than 100 sites have been excavated, very little of the material recovered has as yet been examined. Consequently only general statements can be made at this time concerning the various aspects of the culture. However, a few comments can be made on the numerous pottery types found in the area.

Two chief groups of pottery occur; Tusayan Gray and White wares, and Moapa Gray and White wares. The first, as the name implies, consist of about a dozen gray, corrugated, black-on-gray, and black-on-white types closely allied to similar types in northeastern Arizona, with its local center along the Virgin River from southern Utah south into Nevada. The Moapa Gray and White wares, while closely related to the Tusayan wares, are primarily local in distribution. They differ in having, in addition to quartz sand, considerable amounts of olivine and garnet crystals as tempering materials.⁵ Type designations and sequences are still being worked out. Dated black-on-white and polychrome types intrusive from northeastern Arizona indicate that this area was abandoned by the Pueblo peoples some time after 1200 A.D.

The Patayan Culture

The Patayan Culture, named after a Walapai Indian term signifying "the ancient ones," is the newest and, at present, the least known and most poorly defined of the four so-called basic cultures in the Southwest. However, in large measure our lack of knowledge is due to the fact that no relatively pure Patayan site has so far been excavated. Thus, the results of surface surveys, limited chiefly to potsherds and a few stone artifacts, constitute almost our only source of information on this culture.

⁵Baldwin, Gordon C., "Notes on Ceramic Types in Southern Nevada." *American Antiquity*, Vol. 10, No. 4, pp. 389-90, April, 1945.

From the standpoint of area involved, the Patayan culture may prove to be one of the most significant in the Southwest, since it includes the entire Colorado River valley from the vicinity of Hoover Dam south to the Gulf of California. It is logical to assume that there was a great concentration of population in this fertile flood-plain during prehistoric times, perhaps greater than in any other part of the Southwest. In marked contrast to the upper Colorado, where the river flows through deep and narrow canyons, precluding any large settlement, below Hoover Dam the valley widens out, with extensive sandy flats suitable for agriculture. Further, all early Spanish records of the lower Colorado tell of large Yuman-speaking groups along the river.

Just how far back from the river this prehistoric occupation extended is not known, although present indications are that it reached eastward to the vicinity of Seligman, Arizona, and penetrated into the Mohave Desert region to the west. On the basis of present knowledge this Patayan area has been divided into two distinct branches, one centering on the Colorado River from Hoover Dam to the Bill Williams River and the second extending from the latter river south to the Gulf. This division, based on meager archeological evidence, appears to have some basis on other grounds also, since linguistic material shows two Yuman branches, the Delta and River groups. Our present concern, however, lies entirely with the northern division, concentrated in the open river valley south of Hoover Dam.

Since a large part of the Colorado River valley was ultimately to be flooded by the construction of Davis Dam, located about 67 miles below Hoover Dam, in 1943 the writer made a detailed survey of the greater part of this area to determine the number, extent, and importance of the ruins to be destroyed. One hundred and fifty-five prehistoric sites were definitely located, and it is safe to assume that there are at least 100 others in the sections not covered. While there

are a few Pueblo and historic Paiute sites in the northern part of the area, the majority of these sites may be classed as Patayan. Previous surveys in the mountains and plateaus to the east had located an additional 50 or more Patayan sites. Thus, more than 200 Patayan sites have now been recorded.

These Patayan sites include petroglyph areas, small temporary camps, rockshelters, and small to large village areas. Since most of these are situated on sandy flats or benches that were frequently subject to spring floods, direct evidence of habitations is lacking, the houses either having been washed away or, as appears likely in a number of cases, been buried beneath several feet of mud and sand. Many of these ruins would seem to have been quite extensive, pottery and stone materials being thickly strewn over an area measuring 500 by 600 or more feet. If present plans materialize, a number of the larger and more interesting of these sites will be excavated.

From a brief study of the materials recovered by the surface surveys the following information can be given on certain of the aspects of Patayan culture. Pottery was shaped by the use of the paddle and anvil as contrasted to the coiled and scraped technique of the Anasazi. Patayan pottery is usually reddish, buff, brown, or grayish-brown in color, some types having a glazed or crusted surface. Although much of the pottery is plain, there are a number of decorated types, particularly red-on-buffs. Preliminary studies have indicated about a dozen new pottery types in this area, and further research will undoubtedly add a number of additional types.⁶ Stone implements and utensils include a distinctive type of pointed-base mortar, flat metates, manos, arrowpoints, scrapers, knives, pottery anvils, and hammerstones.

⁶Colton, Harold S., *An Archeological Survey of Northwestern Arizona, Including the Descriptions of Fifteen New Pottery Types. Museum of Northern Arizona, Bulletin 16, 1939.*

Through the presence of dated intrusive black-on-white pottery types traded in from northern and northeastern Arizona, it is evident that this Patayan culture had its widest distribution from about 700 to 1200 A. D. There are, however, both earlier and later evidences of these or allied peoples within the area. A few, seemingly early sites without pottery occur. Jeddito Black-on-yellow sherds found in sites along the upper Colorado, and westward into the Mohave Desert, indicate that some groups in this area were carrying on trade relations with the prehistoric Pueblos during the 14th and 15th centuries.⁷ A century or so later, when the first Spanish explorers and missionaries arrived in the Colorado River valley, they found a number of closely related Yuman-speaking groups concentrated along the major part of the valley.

Since these Yuman peoples occupied the same territory and possessed a culture that is, in many respects, strikingly like that of the earlier Patayan, it seems logical to believe that the modern Walapai, Mohave, and Yuma Indian tribes represent the descendants of the prehistoric Patayan groups. This question cannot, however, be definitely answered until a number of Patayan sites have been thoroughly excavated.

Historic Indian Groups

The historic Indian groups today occupying the area about Hoover Dam include the Paiute along the Muddy and Virgin Rivers, the Mohave along the Colorado River in the vicinity of Needles, California, and the Walapai to the southeast, south of the western Grand Canyon. Campsites of the latter two groups occur throughout the area south of the Colorado River, being characterized by small stone house rings, hammerstones, arrowpoints, and fragments of coarse reddish-brown pottery.

⁷Baldwin, Gordon C., "An Occurrence of Jeddito Black-on-Yellow Pottery in Northwestern Arizona North of the Grand Canyon." *The Plateau*, Vol. 17, No. 1, pp. 14-16, July, 1944.

From the large number of Paiute campsites and mescal pits scattered over the region north of the Colorado River the ancestors of the present-day Paiute seem to have occupied the country for several centuries at least. These campsites are distinguished by broken firestones, quartz hammerstones, small triangular-shaped arrowpoints, mescal knives,⁸ fragments of coiled and twined basketry, and an astonishing amount of potsherds. Contrary to general belief, the Paiute in this section formerly made considerable quantities of pottery. Sherds are as common on most Paiute campsites as they are on neighboring Pueblo ruins. This pottery is dark brown to black in color, relatively coarse in texture, heavily tempered with sand, with flakes of mica frequently showing through the surface, and relatively thick-walled. Vessels have quite thick pointed bases and wide mouths with slightly out-curving rims. There seem to be two general types, one with plain exterior surfaces and a second with fingernail indentations. Paiute pottery would thus appear to be closely comparable to the general Ute, Navaho, and Western Apache utility wares.

From this general survey of the various prehistoric and historic groups occupying parts of the Hoover Dam area, it is evident that a great deal more research is needed, particularly in the Patayan field, before definite cultural patterns and sequences can be outlined in some detail. The Patayan area may yet prove to be one of the most important fields in the entire archeological southwest.

⁸Baldwin, Gordon C., "Mescal Knives from Southern Nevada." *American Antiquity*, Vol. 9, No. 3, pp. 330-32, January, 1944.

NOTES ON THE DRAGOON COMPLEX

CARR TUTHILL*

In Cochise County in southeastern Arizona, during the late Colonial and Sedentary periods, the Hohokam and Mogollon cultures came into direct contact with one another, and formed a hybrid culture that borrowed certain significant traits from each of the parents. Archeological knowledge of this area has been at a minimum until recent years, and the picture is still very far from complete. Bandelier made a survey trip through part of the area in the 1880's;¹ and Sauer and Brand made a more recent survey.² The University of Arizona has made numerous reconnaissances in the region. A little digging was done by the late E. J. Hands.

Within the last few years, both Gila Pueblo and the Amerind Foundation have conducted a series of surveys and excavations that have given a picture, incomplete and spotty as yet, of the culture of this area from around 10,000 B.C. through the Salado intrusion, or roughly to 1450 A.D. The San Pedro Valley offers a rich field for a study of the Sobaipuris and post-Spanish developments. The whole area, up until the latter part of the 19th century, was an Apache stronghold.

The Cochise culture with its three stages, Sulphur Springs, Chiricahua, and San Pedro,³ comprises the earliest evidences of human occupation yet found in the area, but it is not inconceivable that yet older remains will some day be found. The shoreline of the now extinct pluvial Lake Cochise has vestiges of many early campsites containing crude stone implements. And it might be mentioned for what it is

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¹Bandelier, 1892, pp. 472-481.

²Sauer and Brand, 1930.

³Sayles, 1941, pp. 8-9, Fig. 2.

worth that a fluted stone point of the Folsom type was picked up on the surface of Fulton ranch near Dragoon.

The earliest pottery-bearing horizon was found by Sayles at the Cave Creek site,⁴ and a similar plainware phase was also found at the San Simon site near Bowie.⁵ At the latter site, Sayles was able to determine a ceramic sequence from a pure plainware horizon through the Sedentary period. The work of W. S. Fulton at the Texas Canyon site⁶ and of the Amerind Foundation at the Gleeson site⁷ and at Tres Alamos⁸ have aided in establishing the ceramic sequence of the later phases. By combining the knowledge gained through the excavation of these sites, we have a picture of the ceramic development from a plainware horizon through the polychrome wares of the Tucson phase of the Salado intrusion.

Tree-ring chronology is absent from this area, largely because the prehistoric builders apparently used the indigenous cottonwood and mesquite in the construction of their dwellings. The most recent phases can be dated readily by means of intrusive pottery from the adjacent areas although confusion could arise because of the differences between the schools of dendrochronological dating. Nevertheless, it is reasonable to say that we have a ceramic sequence from sometime around the beginning of the Christian era through about 1450 A.D.—let the tree-rings fall where they may.

The earliest pottery seems to have been made by people of the Mogollon culture, and it is not impossible that they were the descendants of the earlier Cochise culture people. There is no direct evidence to support this relationship, nor

⁴Sayles, 1945.

⁵Sayles, 1945.

⁶Fulton, 1934, 1938.

⁷Fulton and Tuthill, 1940.

⁸Tuthill, 1947.

is there anything to dispute it as yet, and it must be admitted that there is a resemblance in the basin-shaped metates of the two cultures. These Mogollon people appear to have held sway over this area until late Colonial times, when the Hohokam culture intruded and became dominant. Most of the red-on-brown sites belong to late Colonial and Sedentary periods and thus coincide with the "Golden Age" of the Hohokam development during the Santa Cruz and Sacaton phases.

The culture in the Dragoon region during the period from about 700 A.D. to 1100 A.D. is basically of Hohokam derivation with a strong Mogollon influence. The latter is evident in certain of the pit house types, in various elements of the ceramic development, and especially in the manner of disposing of the dead, which was largely by inhumation. This practice is, of course, foreign to the Hohokam, who used cremation almost invariably. Cremations of the Hohokam type are present in the area, and the closer a site is geographically to the Hohokam area, the more numerous the cremations become. This, of course, is to be expected as the culture of this area blends imperceptibly into that around Tucson, which in turn becomes more and more typically Hohokam as one approaches the Gila Basin.

The inhumed bodies are generally flexed, although both prone and supine burials have been found. The degree of flexing varies considerably from tightly folded bodies to those placed on the back with the knees drawn up into a vertical position and the heels near the pelvis. With some, the legs have fallen over to one side and form an angle of about 90 degrees with the body. The bodies are flexed, lying on the back or on either side, and the arms are placed either across the chest or along the sides. One body was placed face down with the lower legs folded back tightly against the femora. The bodies were not oriented and burials were scattered indiscriminately among the dwellings. Inhumation

tions made within abandoned pit houses are present but not numerous, as are subfloor inhumations. Abandoned pit ovens were occasionally used as places of interment with the body placed in a flexed position on one side on the top of the fire-fractured rocks that usually about half filled the pit.

A few inhumations have been found completely covered with rather large rocks. This was in no sense an attempt to make a cairn, and was rather similar to other inhumations, generally of children, that were covered with a "blanket" of sherds which might or might not belong to the same vessel. Mortuary offerings were present with about half of the inhumations and ranged from a few beads to several bowls and ollas and shell ornaments. The ceramic offerings were not located in any fixed location in reference to the body but were apparently put in wherever there was room in the grave. Some of the bowls and ollas had been "killed" by having a hole punched through the bottom with a sharp implement, while others were apparently "killed" by smashing them and placing the sherds with the body. It is not too uncommon to find only from one-third to two-thirds of a bowl with an inhumation, and the same holds true with cremations.

The pit houses are about equally divided between the Hohokam type with peripheral post holes and the deeper Mogollon type with plastered subterranean walls. Those of the latter type are not as deep as those found farther to the east.⁹ They are generally approximately square in floor plan, with four main roof supports and a long and narrow entrance that is either stepped or a ramp, or both stepped and ramped. A small clay-lined basin-shaped fire pit is located in the floor of the house in front of the entrance. The pits were excavated into sterile soil, and the plaster on the side walls covers both sterile soil and rubbish.

The Hohokam type pit houses are roughly oval in floor plan and are generally not as deep as the foregoing type,

⁹Haury, 1936b, pp. 8-22, 52-63.

although the floor is excavated into sterile soil. The floor is outlined with the peripheral post holes and there are generally two main roof supports in the long axis of the house, with secondary roof supports often being in evidence. The entrances, like those of the Mogollon type, are stepped or ramped or a combination of the two. The clay-lined fire pit is located in the floor in front of the entrance. There is a considerable variation in size in both pit house types, which range from 8 x 10 feet to 18 x 26 feet.

A variant of the Hohokam type is found that seems to be peculiar to the Dragoon region.¹⁰ The entrance opens into a lowered or depressed area around the fire pit which is from four to eight inches below the level of the rest of the pit house floor. This depressed area covers from one-fourth to one-third of the total floor area of the pit house. Its function is unknown, but its effect is the same as that found at Roosevelt 9:6 in which the floor was built up on stilts everywhere except for the area around the fire pit.¹¹ Haury thought this was to overcome the flooding of the pit house floor, as Roosevelt 9:6 was situated close to the bank of the river,¹² but such a condition was not present where this Dragoon type of pit house was found. Except for the lowered floor area, this pit house type is the same as the typical Hohokam pit house.

A distinguishing feature of many of the Dragoon sites is the presence of numerous pit ovens. These were undoubtedly used in cooking and were probably used in the roasting of mescal. They are generally about half filled with large and small fire-fractured rocks and small amounts of ash, and the walls of all of the pits show evidence of having been subjected to extreme heat. Pit oven sizes range from a diameter of two feet and a depth of two feet to a diameter of six feet

¹⁰Fulton and Tuthill, 1940, pp. 14-16, Plate V.

Tuthill, 1947, p. 32. Fig. 3.

¹¹Haury, 1932, pp. 12-19, 34. Plate XIV.

¹²Ibid, p. 40.

and a depth of six and one-half feet. The Dragoon type of pit oven is olla-shaped in contrast to those of the Gila Basin that are flare-rimmed¹³ or those from the Forestdale area that are undercut at the bottom.¹⁴ Some of the Dragoon pit ovens have plain bottoms, but others, notably from the Pearce 7:11 site,¹⁵ have a peculiar arrangement of central and lateral holes whose function cannot be explained. The lateral holes are slanted in such manner that if a post were placed in each one, the tips would converge in the center of the pit opening at ground level. Still other pits were found with a doughnut-like arrangement in the bottom, or with crossed trenches, or a combination of trenches and holes.¹⁶ Animal bones are scarce, even almost completely absent, in the fill material of pit ovens, and it may be deduced that they were used largely in the preparation of vegetable foods. When in use, the pit ovens were undoubtedly preheated by means of a fire built in the pit while the rocks were being heated in a fire on the surface. When both were deemed sufficiently hot, the ashes and embers were raked out of the pit and the heated rocks were rolled into it. The food to be roasted was placed on top of the rocks and the whole was covered with brush and dirt and left for a number of hours, after which the pit was opened and the food removed. Cooking is done in this manner today in parts of Mexico and among some of the Pueblos.

The stone, bone and shell work from Tres Alamos, Gleeson, Texas Canyon and Westfall sites, especially that which is carved or incised, is so typically Hohokam that there can be no question as to the culture that produced it. The three-quarter grooved axe is present but with the addition of a longitudinal groove on the bottom side of the axe that apparently accommodated a wedge to make the hafting more

¹³Ibid, pp. 57-62. Fig. 16, Plate XIX.

¹⁴Haury, 1940, pp. 56-62, Fig. 21, Plate VIII.

¹⁵Trischka, 1933, pp. 427-430, Figs. 4a, 4c, 5, 6, 7, 9, 11, 13.

¹⁶Ibid, Fig. 13.

secure. Stone paint palettes of the Santa Cruz and Sacaton types are quite numerous, as are bone awls and plain and incised bone tubes. Shell work is especially abundant and much of it is carved or incised.

The ball court at Tres Alamos is a further manifestation of the Hohokam influence, although it does not fit into either the Casa Grande or Snaketown type, but is a combination of the two.¹⁷ The stone paddles found in and around this ball court have been unreported elsewhere, and it will be interesting to note if they are found in conjunction with other ball courts in this area.

The Dragoon Red-on-brown¹⁸ ceramic type gives the best clues to the amalgamation of the Hohokam and Mogollon cultures. Vessel shapes, such as flare-rimmed bowls and Gila-shouldered ollas, and curvilinear design elements, especially interlocking scrolls, are a direct importation from the Hohokam. The red-on-brown coloration and the polishing over the design that was occasionally practiced are of Mogollon origin. The slipped and polished exterior of Mogollon Red-on-brown¹⁹ is completely absent on Dragoon Red-on-brown, although it does occur on a ceramic type found at San Simon, Tres Alamos and the Westfall site. Redware is abundant at the three sites just mentioned although it is conspicuously absent at Texas Canyon and Gleeson.

The strange part about the ceramic development of the Dragoon complex is that, although there were Santa Cruz and Sacaton Red-on-buff²⁰ intrusives at the Gleeson site, and Sacaton Red-on-buff intrusives at the Texas Canyon site, the indigenous pottery in these two sites is not the same as that at Tres Alamos. At the latter, the Cascabel phase has

¹⁷Haury, 1937, p. 45, Fig. 14.

¹⁸Fulton, 1934, 1938. Fulton and Tuthill, 1940, pp. 40-44.

¹⁹Haury, 1936a, pp. 10-17.

²⁰Haury, 1937, pp. 171-185.

Santa Cruz Red-on-buff and Rillito Red-on-brown²¹ intrusive, and the Tres Alamos phase has Sacaton Red-on-buff and Rincon Red-on-brown²² intrusives, but Dragoon Red-on-brown is poorly represented among the fictile wares of these two phases. The dominant indigenous type in the Cascabel phase was Cascabel Red-on-brown²³ which shows its Mogollon background in the red slipped and sometimes polished exterior and the purely rectilinear design elements. The most prevalent indigenous type in the Tres Alamos phase was Tres Alamos Red-on-brown²⁴ which is apparently closely related to Three Circle Red-on-white²⁵ in view of its whitish slip on bowl interiors. Design elements are both curvilinear and rectilinear. The bowl exteriors of this type are similar to Dragoon Red-on-brown in that they are unslipped and hand smoothed.

The question now arises, why should these sites that are so close geographically and that have identical intrusives have such different indigenous pottery types? Why is it that Dragoon Red-on-brown is a minor type at Tres Alamos, while Cascabel and Tres Alamos Red-on-browns are practically unknown at Texas Canyon and Gleeson? One answer may be that whereas the Tres Alamos site was continuously inhabited, the Gleeson and Texas Canyon sites were inhabited for only a short period and developed their own pottery type that flourished there but did not spread. This is admittedly a feeble rationalization, because it does not explain why the inhabitants of these sites should develop a distinct ceramic type when, in the same area, there were others that were already well developed. It might be argued that these people were rugged individualists who wanted to develop their own ceramic type, but if so, why did they conform on

²¹Kelly, in preparation.

²²*Ibid.*

²³Tuthill, 1947, pp. 50-51.

²⁴*Ibid.*

²⁵Haury, 1936a, pp. 18-21.

the balance of their culture which is identical to that of Tres Alamos? And if they were such individualists, why is it that the culture at Gleeson and at Texas Canyon which are 40 miles apart is so homogenous, while we find this variation between Texas Canyon and Tres Alamos which are only 12 miles apart?

The answer probably lies in the fact that we do not know enough about the culture in this area for that chronological period, and that more work needs to be done before the solution is found. It might be that the Dragoon Red-on-brown sites are a development of the southern part of this area, and that the Texas Canyon site represents one of its northern outposts. The three sites in which Dragoon Red-on-brown is not well represented, i.e., Tres Alamos, Westfall and San Simon, all lie north of the Texas Canyon site, although the latter is separated from the Westfall site by only a couple of miles. Time and investigation will give the answer.

Sites comparable to those of the Tanque Verde phase of the Tucson region are present but not plentiful in southeastern Arizona, but Salado sites are widespread. In the very southeastern corner of the state, Mimbres and Chihuahua sites may be found. A little known ceramic development is found in the development of Santa Cruz Polychrome²⁶ sites which are rather localized in area. This type seems to be an outgrowth of Tanque Verde Red-on-brown with a distinct Chihuahua flavor. Practically no work has been done on these sites, which warrant further investigation. In fact, it may be safely stated that the whole of Cochise County is still more or less virgin territory and that much archeological work will have to be carried out before the development of its various cultures is more fully understood.

²⁶Hawley, 1936, p. 60.

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CERAMIC TRAITS AND THE NATURE OF CULTURE CONTACTS BETWEEN ANASAZI AND MOGOLLON

E. T. HALL, JR.*

Several considerations concerning the nature of ceramic developments in the southwest are evaluated here:

a. Morris' theory of independent invention of pottery in the San Juan.¹

b. Cultural traditions as implied by a study of ceramic data.

c. The coexistence of Black-on-white and Black-on-red pottery for the Anasazi.

d. Neck coiling and corrugating.

The last word is yet to be written as to the relative antiquity of the Anasazi and Mogollon and as to whether one made pottery earlier than the other. The Southwestern archeologist in this case is often suffering from either a form of archeological ethnocentrism in which relative antiquity is a matter of prestige for his own sites, or a combination of a stake in his earlier training plus endowing the prehistoric red man with his own emphasis on invention and individuality.

Our data from archeological sites are meager at best and lack the cultural detail available to the ethnologist. Yet there is little to indicate that the Pueblo Indian has changed his basic orientations radically from the picture of Zuni as drawn by Benedict.² Recent conversations with members of the northern Pueblos also indicate the older people still hold control and fight change, so that everything we know of the

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¹Morris, 1927 & 1939.

²Benedict, 1934.

Pueblo today shows him as a rather conservative borrower. Changes may be made, but in terms of the past. If new elements are introduced they are usually borrowed. (This process works best when intermarriage is present.³)

In recent years, when Pueblo Indian children have attended Indian schools and met and married either members of other tribes, or other Pueblos, the ceremonies of the outsider have been accepted readily and learned by the Pueblo. Today the variety of dances one can see during the course of the year in a Pueblo is far greater than in the past. Dances are also learned by boys at school and brought home. However, it would seem that Underhill's suggestion that complex culture patterns are transferred most readily in cases of intermarriage is a valid one.

Morris⁴ has presented an impressive argument for independent invention of pottery in the Southwest. However, there are several factors to be considered in this connection:

1. Haury⁵ presents abundant evidence that there existed horizons in the Mogollon where pottery was well developed long before it was in the San Juan. It is highly improbable, in view of the short distance between these two people, and the Indians' penchant for trading, that the pre-pottery Basket Makers did not have at least stories about the pottery making people to the south. Some group in North, South or Central America might have invented pottery, but it is doubtful if this occurred twice.

2. Morris feels the difference between the thick crude sun-dried ware of the San Juan and the later fired pottery, which is as a whole quite thin and well made, is not sufficient to prevent these types from being two steps in an evolutionary process. He says the very scarce, crude, fired specimens represent intergrades, when they could just as well be pieces

³Underhill, Personal communication.

⁴*Op. cit.*

⁵Haury, 1938, 1940.

made by poor potters, (present in all horizons). The transition between the thick, sun-dried, vegetable tempered, crudely moulded ware, and the thin, hard, fired pottery is still too great for this writer to accept as the result of an on-the-spot, independent evolutionary process.

3. Morris points to the use of fine clays to patch cists, the moulding of clay in baskets and the ever present evidence of burned cists, which demonstrated what happened to clay when it was fired. There is one fly in this ointment: the wide difference between the culture of the Basket Maker and the archaeologist. The history of the Pueblos shows them to be exceedingly conservative and far from individualistic. Our culture today is one that stresses individual freedom and incentive, and pays high rewards for successful inventions. The proponent of this theory happens to be one of the most ingenious individuals of this writer's acquaintance, in a culture stressing ingenuity. There can be no doubt but that Morris endowed the Basket Makers with some of his own ingenuity in advancing this theory.

If we knew nothing of the Mogollon it would be difficult to explain the total ceramic picture of the Anasazi as we now know it without looking elsewhere for additional data. Without going into regional variations, the picture is roughly as follows: Basket Maker III;⁶ crude, sun-dried, vegetable-tempered ware, followed by well-made, plain and decorated, fired pottery, with rough gray exterior, often covered with a fugitive red slip.⁷ (Colton and Hargrave⁸ suggest this is an attempt to produce a red vessel from one fired in a reducing atmosphere.) Some pottery started in baskets. Pueblo I; neck coiling, which is of short duration in most regions of the Anasazi and rare or unreported for others. Fugitive red persisting in some areas. Pottery started

⁶The Pecos classification, while not ideal, is simple, understood by all Southwestern archeologists, and will be used throughout this communication.

⁷A clay wash applied after firing.

⁸Colton and Hargrave, 1937.

in baskets still present. Oxidized firing⁹ comes in, along with slipping, polishing, and neck banding. (Oxidized fired vessels were black-on-red, black-on-orange, and in one case a polychrome).¹⁰ Note: firing of pottery in an oxidizing atmosphere in some cases seems to have followed very close on the heels of true pottery, fired in a reducing atmosphere, and may be assigned to late Basket Maker III, depending on the interpretation of the individual worker. Pueblo II; corrugated pinching, with diversity in techniques, black-on-white reduced fired along with black-on-red oxidized fired pottery. More specialization in design by regions.

Pueblo III; even more regional specialization in painted pottery. Oxidized and reduced fired wares still exist side by side, polychrome quite common. Corrugated pottery is even more highly developed than in the preceding period.

Pueblo IV. Large areas of the Southwest abandoned. Reduced firing and corrugating (two Anasazi innovations) become much less common and are replaced almost entirely by oxidized fired pottery, and utility pottery which was just as useful but less esthetic.

To the student of Anasazi pottery who has studied ceramic sequences elsewhere, the following questions present themselves: Why the rapid and radical switch from sun-dried to fired pottery, which was very well made in contrast to the earlier ware? Why fugitive red, so common all over the Anasazi, occurring even on utility vessels at Chaco Canyon?¹¹ Brew¹² suggests it is part of an American Indian complex of smearing themselves and objects with red ochre. If this is the case, we may ask, why does it die out as soon as or shortly after true red pottery is introduced? Why the ap-

⁹The terms oxidized and reduced fired, for southwestern pottery, while not synonymous with laboratory terminology, (Shepard, 1939), are used not only because they are well understood by Southwestern archeologists, but it is doubtful if the Indian potters knew much more than that one type of fire produced red vessels, and another gray ones.

¹⁰Brew, 1946.

pearance of polishing, slipping, oxidized firing and neck coiling almost at the same time, as a cluster of new traits? Why the coexistence of two firing techniques over a period of at least 600 years? As a rule, pottery-making peoples utilize one technique or the other, and may even switch from oxidized to reduced firing or vice versa, as they did in Mesopotamia.¹³ The Southwest is unique, in the writer's knowledge, among pottery making cultures because of its development and maintenance of two types of firing over such a long period. Why the short life for neck coiling in some areas? Why the development of another unique ceramic trait, that of indented coiling (corrugating)?

These are a few of the questions arising from our knowledge of the Anasazi that are not satisfactorily answered if one accepts the theory of unilinear evolution of pottery in this area. If, however, one takes into account what would appear to be strong evidence for earlier pottery-making horizons to the south in which clusters of traits run together, a convincing reconstruction can be made.

Haury¹⁴ presents a wealth of data (still apparently not acceptable to some Southwesterners), to support the view that true fired pottery was made by the Mogollon people considerably earlier than it was by the Anasazi. He also demonstrates that oxidized firing, slipping, polishing, neck banding and smudging occur as a cluster of typical Mogollon traits before these traits appear in the Anasazi area. Scoring, punching and incising are traits, characteristic of at least one Mogollon site, which apparently were not taken up by the Anasazi.¹⁵ In view of the foregoing, the following reconstruction is submitted:

¹¹Roberts, 1929.

¹²*Op. cit.*

¹³Childe, 1934.

¹⁴Haury, 1940.

¹⁵Scoring occurs in the Gobernador in the Rosa phase, but does not seem to be related to the Mogollon types at this writing. Hall, 1944.

A. The sun-dried vessels of the San Juan¹⁶ are either a case of independent invention as the result of either working in clay or carrying clay around in baskets, or of stimulus diffusion¹⁷ on hearing about clay vessels made to the south. This last postulate fits our theory more nearly than the first.

B. Contact between the Anasazi and the Mogollon made possible the making of true fired pottery by the Anasazi. It is assumed that the techniques of pottery making were imperfectly learned and the result was reduced fired pottery, possibly because of the idea that it took *lots* of heat to fire a vessel, so that more than the required amount of fuel was added to the fire, thus shutting out the air. Note: Concerning just how the Anasazi reduced their pottery in firing we have little or no information. The subject is highly technical, yet the knowledge of the Anasazi was sufficient to permit the potter to obtain fairly uniform results. The idea of adding sufficient fuel to the fire to exclude oxygen has been suggested. It is just as possible, however, that the method of construction of the kiln was the deciding factor, or where the kiln was placed; i.e., whether in a spot sheltered from the wind or not. Since the concept of pottery as it should be was red, and since the firing techniques made obtaining red impossible, the red was applied after firing. Hence the common occurrence of fugitive red at this early period, even to the extent of putting it on vessels which were to be placed in the cook fire at Chaco.¹⁸ At this time reduced-firing techniques became well entrenched in Anasazi culture.

C. Either closer or more frequent contacts were established with the Mogollon. As a result, oxidized firing techniques were acquired along with neck-banding, slipping and polishing. Since reduced firing was already established, and the Anasazi seem to be traditionally conservative, this technique was retained, which would explain the parallel devel-

¹⁶Morris, 1927 and 1929.

¹⁷Kroeber, 1940.

¹⁸Roberts, 1929.

opment of oxidized and reduced fired pottery. The practice of using baskets for molds (an Anasazi trait) was retained and appears to be most prevalent in those areas adjacent to the San Juan.

D. Neck-coiling developed into corrugating, with the intermediate step of neck corrugating in the Flagstaff area. Most Southwestern archeologists are mistaken in the idea that coiling comes first and corrugating follows in the logical order of events. As a matter of fact the reverse is the case.¹⁹ It is impossible to attach one fillet of clay to the next without leaving the indentations of the thumb. In order to produce a smooth coil these have to be obliterated by smoothing, which is what we have in the typical neck coil, (sometimes emphasized by a shallow grooved line).

The Mogollon had a long tradition not only for neck-coiling but for polishing over the indentations incidental to manufacture of decorated ware. Examples of this are Alma Neck-banded, San Lorenzo Red-on-brown, and Mogollon Red-on-brown.²⁰ The Anasazi, however, while they had developed a tradition for reduced fired black-on-white pottery, had no cultural stake in obliterating pinch marks or in polishing or smoothing the exteriors of utility vessels. One of two things happened: a. they decided it was senseless to go to the trouble of obliterating the pinch marks on the neck of a vessel, and later saw the possibilities in the pinch marks themselves; or else, b. (without the inhibitory obliterating tradition) saw the possibilities in the pinch marks and very quickly developed the idea of leaving and even enhancing the pinch marks (indented coiling or corrugating). At any rate, the idea of corrugating spread like wild fire and was highly developed by the Anasazi within a short period. It is my

¹⁹The author in an earlier (unpublished) work reproduced not only all of the known styles of corrugated pottery but the neck coils as well. One whole corrugated vessel is on file at the Department of Anthropology, Columbia University. Corrugated type sherds are also on file at the Laboratory of Anthropology in Santa Fe.

²⁰Haury, 1936. These types reproduced by author.

opinion that this rather unique ceramic development was made possible by a transference of techniques with the receiver not being bound by the traditions of the donor. The Mogollon, having been shown what could be done by developing and emphasizing pinch marks, later followed the suit of their northern neighbors (Mimbres Corrugated). At the time of, or possibly shortly prior to Mimbres Corrugated, the Mogollon dropped several well-established customs such as polishing over decoration and firing in an oxidizing atmosphere. The change in firing and polishing techniques, the adoption of corrugating and the presence of wavy hachure all indicate closer contact between the Anasazi and Mogollon some time around 1000 A.D. Note: Walter Taylor of the Smithsonian Institution has dealt with the influence of the Anasazi on the Mogollon in a forthcoming work.

E. Oxidized and reduced firing persisted until the end of Pueblo III when the Anasazi area started contracting. Apparently along with closer contacts with their southern neighbors, reduced firing petered out and one sees black-on-white pottery only where an iron-free clay is used.

In compiling the above the author has not attempted to develop many of the regional questions which constantly emerge as the result of excavation. He has viewed, as nearly as possible, the Southwest in its simpler aspects, as it is easier to get the picture as a whole rather than as a series of interacting regional developments.

Nothing has been said about the Hohokam in this discussion, as the orientation of the whole culture²¹ varies from the Anasazi as defined recently by Reed.²² Hohokam pottery differs from the Anasazi in almost every ceramic trait; i.e., method of manufacture, shape, surface finishing, aplastics (temper) and designs. That there was trade between these two people can be surmised by the presence of reciprocal

²¹Gladwin, 1937.

²²Reed, 1946.

trade sherds from at least 600-700 A.D. on, if not earlier. If we accept Linton's thesis²³ that the two classes of culture elements, exceedingly persistent and resistant to change are: a. objects of daily use which form a part of the equipment of the normal household, and b. technical processes forming part-time occupations for many members of a society, we understand more clearly why the Anasazi did not borrow ceramic traits from the Hohokam, having incorporated a series of techniques radically different into their own culture.

This leads us back to the point at which pottery was first adopted by the Anasazi. The reader may wonder, why the Anasazi chose the Mogollon techniques and not those of the Hohokam since both were apparently available. I believe the answer lies in the closer similarity between the total overt cultures of the Anasazi and Mogollon, a similarity which has caused a number of Southwesterners to deny that the Mogollon was different from or older than the Anasazi. This brings us back to Linton's point, an important link in our thinking, namely, that if; a. objects of daily use, and b. processes forming part-time occupations, are exceedingly resistant to change and are therefore indicative of basic culture, then it may be surmised that three principal cultures of the Southwest were quite separate and unique at about 350 A.D. At this time the Anasazi to the north were not, so far as we know, making fired pottery. The Mogollon were making thin oxidized-fired, coiled, scraped and polished pottery; while the Hohokam were making thicker, paddle-and-anvil, unpolished pottery, also fired in an oxidizing atmosphere.

I would add to Linton's suggestions a factor of precedence and cultural stake in techniques. The Anasazi for instance while taking over neck coiling, polishing, and oxidized firing as an associated cluster of traits, did not have a cultural stake in the obliteration of pinch marks. This lack of tradition left them free to develop corrugating.

²³Linton, 1946. Paper on Tradition and Style. Viking Fund conference.

Taking all culture traits now recorded for the three principal prehistoric groups in the southwest, (Anasazi, Mogollon and Hohokam), we find reciprocal trade between all three, but a much greater similarity between the Mogollon and Anasazi than either of these two and the Hohokam. There is also (if we accept the thesis presented above) a greater amount of diffusion of traits from the Mogollon to the Anasazi and vice versa. We could assume on this basis that there were fewer cultural barriers between the Anasazi and Mogollon than existed for other cultures such as the desert dwelling Hohokam. If we accept Underhill's suggestion,²⁴ "a complicated craft is difficult to acquire unless there is long and close contact such as results from intermarriage," traits diffuse most successfully when there is intermarriage. We can assume that not only was there cultural compatibility between the Mogollon and Anasazi, but probably intermarriage.

Pottery making in the Southwest has been women's work for the past 400 years of recorded history and there is no reason to believe these steady people would have changed.²⁵ This brings up the possibility of warfare and capture of women, between groups of these two people. The main point is, diffusion will not occur unless the new traits can be worked into the general matrix of the receiving culture in some way, even if it be for prestige purposes. People take or accept in terms of their needs, desires and cultural heritage. For example, Woodland-like forms occur in Mera's Largo Phase²⁶ but are not known to persist among the Pueblo. The Navaho, as a result of intimate contact with the Refugee Pueblos between 1690 and 1750, made an orange polychrome which they soon forsook. This type is abundant in the Gobernador and Largo area, and is almost non-existent 50-75

²⁴*Op cit.*

²⁵While there is no known way of sexing portions of finger prints, the writer found that thumb impressions on indented pottery were *much* smaller than his own.

²⁶Mera, 1938.

years later in Keur's sites, 100 miles south of Gobernador,²⁷ (the typical rough, dark Navaho utility ware, however, persists throughout). Other Pueblo traits like weaving, sand painting, agriculture, and some ceremonials were integrated into Navaho culture and persist today.²⁸

The main point to be considered in evaluating the interaction between the three principal cultures of the Southwest is that of viewing cultures as wholes, as to general orientation as well as depth in time. It is not so important to determine whether the Anasazi and Mogollon fought with each other for example, as it is to ascertain the cultural orientations of each and whether the traits of one are compatible with the culture of the other. If so, diffusion is almost bound to take place. If ceramic and other imperishable traits diffused back and forth between the Mogollon and Anasazi, it is inconceivable that social traits were not transmitted also, which leads us to the question: what social traits present in Pueblo culture of today were originally Mogollon? And do we have parallel social traits serving the same purpose, just as we had parallel development of firing techniques?

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²⁷Keur, 1941.

²⁸Underhill, Navaho History. U.S. Indian Service. 1947.

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HISPANIC POTTERY AS A GUIDE IN HISTORICAL STUDIES

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In the field of archeology many years of training and application of field methods and techniques are necessary to understand, evaluate and interpret what is found. Part of the story to be reconstructed may easily be lost by neglecting very important evidence in surveys and excavations. Such failure to exploit the evidence to the fullest may occur in connection with objects of nonaboriginal provenience found in sites of the historic period.

In many instances the archeologist may lack the background of history to help him reconstruct ethnological and historical sequences with the aid of such material. The fact that he overlooked or disregarded a piece of glass or a Chinese-looking sherd is no great blot on his record. Had he known that this modern-looking glass or piece of broken plate might be a clue to some forgotten chapter, he would have gladly included it in the bag of specimens to be washed and cataloged. The purpose of this paper is to familiarize the archeologist with what he might find in the way of ceramics on post-Spanish sites.

Spain colonized large areas in the southern portions of what is now the United States, and evidence from these areas is important because it is here that history, ethnology, and archeology converge. It will take years more of careful and painstaking study and research finally to determine the provenience of some of the many objects found on ruins where history encroached. This knowledge will come from a variety of sources.

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A study of current scientific works in related fields will bring the interested person a great deal of bibliographical material which will help with his problems. Comparative materials in museums are extremely enlightening. All matter of museums, both in this country and in foreign countries contain materials that will bear on the subject. The last source of information is the most difficult to obtain; that is, the archival, historical, written data. These records appear in Spanish, French, Italian, German, and even Latin. Translations in recent years have thrown much light on hitherto unknown data.

With these thoughts in mind, let us approach the problem of Hispanic ceramics found on sites in the United States and on a few sites in northern Sonora. In order that there be no confusion, we must recognize that there are two types of glazed pottery found in the Southwest, native and intrusive. Lead-glazed pottery of native origin has been found in two general areas, the Zuni-Little Colorado area, and in the Rio Grande drainage. This type of glazed pottery has been proved beyond a doubt by stratigraphic evidence to be of pre-Spanish origin.¹ Furthermore, no proven use of Spanish glaze on indigenous pottery has been found, except perhaps in southern Arizona and northern Sonora.² Therefore, all glazed pottery not of indigenous origin obviously must belong to the post-Spanish period.

The Origin and Development of Glazed Pottery

The invention of pottery seems to have taken place in the Near East, perhaps as early as the fifth millennium B.C.³ Man's earliest efforts to make containers of clay resulted in pottery that was porous. Attempts to make pottery that was

¹Haury, E. W., "The Age of Lead Glazed Decorated Pottery in the Southwest," *American Anthropologist*, vol. 34, July-September, 1932, p. 418.

²Tests on green glaze pigments found on post-Spanish Papago pottery lead us to believe that the priests brought the necessary materials to make this glaze and taught the Indians how to prepare it.

³*The Art and Technique of Ceramics*, p. 17.

impervious to water were not successful until glazes were evolved.

It is not known whether the technique of glazing first developed in Egypt or in the Near East, or if the development was in each case independent. An alkaline glaze was developed in Egypt which goes back to the predynastic period of the fourth millennium B.C.

In Mesopotamia another glaze, which adhered to potter's clay more readily than the alkaline, was developed in the second millennium B.C. This glaze contained oxide of lead and was transparent even when colored with metallic oxides.

Another major development in the art of glazing took place when it was found that the addition of tin to oxide of lead produced opacity. At what time this occurred is unknown, but the technical mastery reached by the 13th century B.C. in Mesopotamia indicates a long previous development.

After 660 A.D., this new development was diffused to the Western World with the spread of Mohammedans from Arabia. By the 8th century they had extended their empire into Egypt, North Africa, and across Gibraltar into Spain. The Arabs first entered Spain in 710-712 A.D. A second influx, and the establishment of the Kingdom of Granada, in 1232, initiated a great period for ceramic art as is testified by the tiles and vases of the Alhambra.

This tin-enamelled Hispano-Moresque earthenware was produced in Spain from the 14th to the 18th centuries. The most important potteries were at Cordova, Malaga, Valencia, Talavera, and Seville. At first it was strongly Islamic, with arabesques, stylized animals, and inscriptions in the style of the Near East. After the expulsion of the Moors, in 1492, the ware lost its Islamic character and declined in quality.

The importation of tin-enamelled Hispano-Moresque ware into Italy is shown by the name, majolica or maiolica, an adaption of the name Majorca, the island through which the Spanish product was brought into Italy.

No doubt pieces of maiolica from Spain came to Mexico with Cortes and each succeeding convoy of westbound Spanish galleons.

Maiolica Pottery of Mexico

The native population of Mexico comprised many industrious artisans. In "The True History of the Conquest of Mexico," written by Bernal Diaz in 1568, is found the following reference to the native Mexican potters:

"The city of Cholulu much resembled Valladolid, being in a fertile plain, very thickly inhabited; it is surrounded by fields of maize, pepper, and maguey. They had an excellent manufacture of earthenware, of three colors, red, black, and white, painted in differing patterns, with which Mexico and all the neighboring countries were supplied, as Castille is by those of Talavera and Placencia."

Bernal Diaz was writing of the days of the Conquest. It was not until 1531 that the city of Puebla was founded as a new city by the Spaniards near Cholula.⁴ The manufacture of maiolica was not of great importance in Puebla until about 1550-1570 when the art of glazing was introduced into New Spain by Dominican friars from Talavera, Spain.⁵ After the founding of Puebla the Dominican friars, struck by the aptitude of their Aztec parishioners at making crude native pottery, and desirous also of obtaining tiles for the monastery and church which they were building, sent word to the Dominican establishment at Talavera de la Reina, in the province of Toledo, Spain, that they could make use of five or six of the brotherhood who were acquainted with the Spanish process of pottery-making, if such could be sent to

⁴Cervantes, Enrique A., *Loza Blanca y Azuleja de Puebla*, Mexico, D.F., 1939, p. 18.

⁵Barber, 1911, p. x.

them. Accordingly, a number of Dominican friars, familiar with the clay-working process in use at Talavera, were assigned to the Puebla house of their order, and under them were trained a generation of workmen who for the first few succeeding years produced some excellent pieces.

The locality of Puebla was well suited to the making of this soft earthenware because nearby were two places where red and white clays were obtained for its manufacture. These two clays were mixed together in equal proportions. The use of two clays has been found to occur in the earliest pieces as well as those of recent times. Sherds of maiolica are found to have both white and red-colored paste. Upon first examination it was thought that this might be a criterion for determining age. However, the difference in color is caused by the degree of heat to which the ware was subjected during the period of firing. When fired lightly, the clay appears white and porous, and so soft that it can be readily cut with a knife; but when allowed to remain longer in the kiln, at a high temperature, it becomes harder and turns to a reddish color.

By 1653 this industry had grown to such proportions that it became advisable to organize a potters' guild for the mutual protection and assistance of the master potters. The laws which were adopted regulated the preparation of clays and glazes, the qualities of the different grades of pottery, the character of decorations, the sizes of household utensils, and the sale of products. The marking of each piece with the monogram or initials of the maker was required, penalties being provided for the counterfeiting or falsification of the trade-marks.

In the literature on the subject of maiolica, the greatest emphasis has been placed on the better classes of maiolica, the museum pieces, the large pieces with elaborate designs. This is only natural as they are collectors' items and have

survived because they were not used for utilitarian purposes. However, in the Southwest the more common utility pieces are found and these usually have been broken into very small fragments. In addition, this utility pottery was not considered of enough importance at the time of manufacture to be marked or initialed by the producing establishments. The combination of lack of marks and the small broken fragments make it difficult to establish definite periods for the maiolica found. Occasionally specific styles of designs made during no other period help to definitely date the time of manufacture. However, the following chronology based on design techniques helps in assigning dated periods to the types of maiolica found.

The first maiolica to find its way to the Southwest undoubtedly would have been either that made in Spain or the earliest made at Puebla which reflected the Moresque art of Spain. No definite identifications have been made so far in the Southwest except that at Puaray where some examples of maiolica were found and identified as having been made in Spain.⁶ Puaray was a Tiguex village visited by Coronado in 1540, occupied by Tiwa Indians until 1680, and is now an excavated ruin situated on the west side of the Rio Grande, almost opposite the present village of Bernalillo, New Mexico.

The best known of the earliest maiolica made at Puebla was not only under the direction of Dominican friars from the maiolica center of Talavera, Spain, but had as inspiration the blue and white ware of Talavera imported into New Spain. This second period was approximately from 1600 to 1780. The Spanish influence is strongly marked in these early pieces in which animal, bird, and human forms were introduced. These designs appear more often on the better class of pieces such as urn-shaped jardinieres, apothecary jars, and

⁶Tichy, 1939, p. 158.

barrel-shaped flower jars. The more common utility types usually had only floral designs on them.

The dark blue decoration was the first to be applied and continued throughout the manufacture of maiolica at Puebla up to the present time. However, toward the middle of the 17th century, other colors—yellow, green, brown, and black—were introduced. Examples of this type of decoration have been found at Abo by Toulouse.

Commercial relations between the Philippines and New Spain were established fully as early as 1600 when trading galleons began to sail between Luzon and Acapulco. The importations of Chinese porcelains in large quantities naturally stimulated the artistic zeal of the native potters who soon commenced to imitate the Chinese forms and decorations in their own productions. This third period lasted from about 1650 to 1800. The imitation of Chinese painting was usually in flat color. The oriental blue and white porcelains, which served as models, were painted level with the surface in monochrome or *camaieu*—in different shades of blue—and when the Mexican artist attempted to reproduce these effects alone, he usually employed a thinner color and applied it lightly and evenly. In consequence of this more delicate mode of treatment, the general effect is lighter in shade than that of the heavy silhouette painting. The outlines of figures were traced in a pale, thin blue and afterwards filled in by applying the blue pigment into the freshly and thickly applied viscous glazing liquid, often forming depressions.⁷

A fourth period in the development of tin-glazed pottery, called the Hispano-Mexican, or Pueblan, ran from 1800 to 1860. Polychrome decoration became the main motif showing the influence of the style used by the Italian maiolists. Tumacacori might well be taken as the type site for the earlier part of this period until other sites are more closely

⁷Barber, 1915, p. 9.

studied. From identifications of Tumacacori material made by the Philadelphia Museum of Art it is shown that the Puebla ware continues in the conventional blue and white. However, decoration in other colors was produced at this time. There are dishes of a pale blue overall glaze instead of the white with designs in green, yellow, orange, and occasionally black. The white glaze also continues with the same variegated designs.

The kinds of clays used in Puebla pottery have already been treated. Much information on the composition of Puebla pottery has been garnered from the laws which regulated the government of the members of the potters' guild. The glaze for fine pottery contained four and one-sixth parts of lead to one of tin. For the common wares the glaze consisted of 12 parts of lead to one of tin. The lead and tin were mixed before being applied. The enamel this produced is homogeneous and so hard that it can be hardly scratched with a steel point.

Additional Pottery Wares

In addition to maiolica there are a number of other glazed wares that were produced in Mexico and other sections of the world and found their way to Spanish colonies.

The importation of Chinese porcelains has already been noted in speaking of its influence on maiolica decoration. Exactly what quantities of this porcelain came to Mexico is unknown, but there must have been considerable amounts. It appears on almost all of the earlier sites in the Southwest and Sonora with maiolica. If this condition prevails in other parts of Mexico, there was no lack of Chinese porcelain in use.

Chinese porcelains from the Ch'ing Chen kilns had reached a high degree of perfection by 1600.⁸ Cobalt blue, a color which endures the heat of the porcelain kiln, was used

⁸*The Art and Technique of Ceramics*, p. 81.

on the body of the piece and covered with transparent glaze. The body of the ware was usually extremely thin and translucent. This extremely hard, thin paste with intricate pictorial designs in blue can easily be identified by anyone finding it. Some later types of porcelains with rose, green, yellow and other colors of glaze decorations are sometimes found.

After 1780, in addition to Puebla maiolica, a different glazed ware began to appear in northern Sonora and southern Arizona (Pimeria Alta). A large number of cream-colored glazed fragments with rather crudely applied decoration in green and light brown glazes were found at Tumacacori and at other Pimeria Alta mission sites. The application of the design was done in such a manner that drops of glaze, especially the green, are found where a brush stroke either began or ended. The paste of this ware is usually of very poor quality and the glaze often checks off because of the friable paste.

This ware was apparently made only for table use and had its origin in the small town of Tonalá, Jalisco. The shapes are cups and plates. The fact that Tonalá is some 500 miles nearer to the Southwest than is Puebla may have had some bearing on the finding of this ware in larger quantities than maiolica, in this later period. Another logical consideration for the introduction of this type of green glaze in Pimeria Alta at about 1780 might have been because of the change in religious orders. In 1767 the Jesuits were expelled and the following year the Franciscans took over the area. Perhaps the new order had started the use of the new ware and continued it at their new stations in addition to maiolica. The fact that this is earlier than 1780 would not have too much bearing on the use of that date as an absolute time for the beginning of the manufacture of Tonalá ware.

Sherds of undecorated green glaze plates were found at Tumacacori at this same period, presumably beginning

about 1780. The paste of these pieces is of a much better quality and harder than even maiolica. The green glaze is overall and appears identical with that used on the "olive jars." Some of the plates were very finely wheel-turned with thin walls and a beautiful transparent glaze. Sometimes the green glaze was not applied to all of the exterior but only as a band about one inch below the rim. According to identification by the Philadelphia Museum of Art this ware was manufactured at Guanajuato. From spectroscopic tests made at the Department of Geology and Mineralogy of the University of Arizona the green glaze is high in copper content. Native pottery (Plate IV) made at Tumacacori with native red decoration and green glaze decoration is of interest. This pottery shows the use of organic tempering, probably horse or cow dung. (See footnote 2.)

The most common type of green glaze sherds found over the Southwest and even in other portions of the United States (Florida and California) are those of Spanish "olive jars." (Plate V). These jars often show horizontal ribbed effects from being wheel-turned. The paste is usually tile-colored and varies from three-sixteenths to half an inch in thickness. These vessels were constructed with very heavy walls, constricted necks and small orifices because of their use for transportation and storage purposes. The interiors of the jars were rather liberally glazed, probably by partly filling them with pigments in solution and turning them so all of the interior portions were coated. The excess was poured out and the vessel placed upright for drying. Often a very thick deposit of glaze is found in the bottom of the jar showing that the draining from the walls ran to the bottom before drying. The exterior was usually given an application of brush-applied green glaze, but not always. Sometimes a thin cream-colored slip was applied to the exterior instead of the glaze. In such cases the exterior is semi-porous. Occasionally nonglazed and nonslipped sherds from wheel-

turned jars are found. These are very porous when wetted and their use is not known.

Another green-glaze type was found by Dr. J. O. Brew in the excavation of Awatovi. Seven sherds, all from one vessel, were found and sent to the author, with sherds from "olive jars," for examination. Nothing similar to these has been seen. The paste is soft and whitish in color. The thickness of the vessel is approximately one-quarter inch. The surprising thing about the sherds is the translucency of the green glaze. Even though very thickly applied, in comparison to glazes on vessels from other sites in the Southwest, this glaze is almost jewel-like in appearance. The vessel, from the shape of one sherd, had been made much like one of the terra cotta flower pots used by florists of today for potted plants. Although no mention has been found in any published data, it could be that this green glaze was produced in either Spain or Puebla. The paste is very similar to the soft paste of Maiolica.

All sites visited by the author in Arizona and Sonora produced maiolica and green glaze sherds and in some instances Chinese porcelain sherds. Members of the Department of Anthropology of the University of Arizona have made collections from historic sites in Sonora and in the Papago country of Arizona. The collections are at the Arizona State Museum at Tucson. In addition to green glaze sherds, some brown glaze sherds were found by them and by myself at sites in Sonora. The provenience of these is not known. The brown glaze is sometimes decorated with brown and white designs.

In the 1820's English wares began to make their appearance on mission sites of that period. The familiar blue and white willow wares, English Staffordshire, and other kinds of pottery were shipped directly to Mexico from England and then to the provinces of Sonora, California, Texas, and New Mexico as a result of the Anglo-Mexican trade

treaty of 1824. Mexico was flooded with English wares. They continued to come to New Mexico from Mexico rather than via the Santa Fe Trail because among the articles prohibited by Mexican law from coming into New Mexico were "earth-ware" and "water jars of all descriptions."⁹

In Arizona, sherd collections of maiolica and other Hispanic pottery are found at the Museum of Northern Arizona, Flagstaff, Arizona; the Tumacacori National Monument museum, Nogales, Arizona; and at the Arizona State Museum, Tucson, Arizona. Collections were taken at the following sites:

Imuris, Sonora.	San Marcel (Sonoyta), Sonora.
Fishing village 1½ miles west of	Oquitoa, Sonora.
Guaymas, Sonora.	Fronteras, Sonora.
Alamita, Sonora.	Quiburi, Arizona.
San Ignacio, Sonora.	Babacomari, Arizona.
Pitiquito, Sonora.	Guevavi, Arizona.
San Valentin (San Juan de	Tumacacori, Arizona.
Bisanig), Sonora.	Santa Catalina, Arizona.
Santa Cruz, Sonora.	San Xavier, Arizona.
San Lazaro, Sonora	Tubac, Arizona.
San Luis Bacoancos, Sonora.	Seven sites in the Papago country
Arispe, Sonora.	of southwest Arizona.
Santa Teresa, Sonora.	Shongopovi, Arizona (Hopi).
Tubutama, Sonora.	Awatovi, Arizona (Hopi).

The mission of San Gregorio de Abo (1629-1672) was excavated and repaired in 1938-9 as part of the Works Projects Administration program.¹⁰ During the excavations a considerable amount of Maiolica was unearthed. A thorough study was made by Joseph H. Toulouse, Jr., in the report on the work.

The only important collection of Hispanic material which has not as yet been studied is the one made by Frederick W. Hodge at Hawikuh. This collection is in

⁹Communication from Arthur Woodward. Ref: *Missouri Intelligencer*, August 26, 1821, p. 2, col. 1.

¹⁰Toulouse, 1949, p. 1.

storage at the Museum of the American Indian in New York City.

In New Mexico good collections from various post-Spanish sites are to be found at the Museum of New Mexico at Santa Fe and at the Anthropology Department of the University of New Mexico at Albuquerque. A small collection is to be found at the Laboratory of Anthropology in Santa Fe.

A list of New Mexico sites, which is by no means complete, includes the following areas:

San Cristobal	Jemez Mission
Abo	Gran Quivira National Monument
Quarai	Santa Fe (beneath the Governor's
Bandelier's Puaray	Palace and the Art Museum)
Kuaua	Pecos Mission
Abiquiu	Zia

One sherd from Pecos was, according to identification by Eduardo Noguera of the National Museum of Mexico, of post-Spanish times but of Aztec manufacture.

Undoubtedly careful surveys of the occupied Indian pueblos of New Mexico would show the occurrence of sherds of Hispanic times.

In Texas several mission sites around San Antonio and Goliad have yielded considerable quantities of European and Mexican pottery. Good collections from around Presidio, Texas, and from Aranama Mission are to be found at the University of Texas.

Near Presidio, Texas, J. Charles Kelley excavated two sites. At these he found considerable quantities of green glaze, maiolica, and English wares. One sherd was identified by George Vaillant as Aztec of early colonial provenience.¹¹ The green glaze material consisted of sherds of "olive jars," cups, small bowls and plates. Various shades of green from

¹¹Communication from J. Charles Kelley.

very light olive to dark green occurred. Native ware showed evidence of green glaze application and organic tempering similar to some found at Tumacacori. Considerable Puebla maiolica was found, including one piece which had been manufactured in the period from 1600 to 1650. Many other maiolica-like sherds are in this collection. However, it is my belief that they were made at another location in Mexico than Puebla. Further research in Mexico should bring more light on this subject. Some Mexican potteries of undetermined origin are in the collection. Much English ware was also found.

During Spain's colonial expansion Texas extended over more territory than at present and took in portions of what is now Louisiana. Because of a French attempt to establish a colony in 1699 at Old Biloxi and the founding of New Orleans in 1718 the Spaniards established five missions and a presidio in this territory to protect their eastern frontier. Fortunately, a very good collection of Hispanic material from the site of the Presidio of Nuestra Senora del Pilar de los Adaes, 14 miles east of Natchitoches, in the present state of Louisiana, was collected by Franklin Fenenga and is now at the University of California. This presidio was occupied from 1721 to 1773 and was the capital of Texas at that time.¹² A small mission was also in existence near the presidio for a few years.

This collection contains Puebla Maiolica, Chinese porcelain, Mexican glass, "olive jar" sherds, and some brown glazed sherds. The Maiolica is very similar to the selection from Presidio, Texas. Several pieces have designs identical to some in the Presidio collection. These, according to Enrique Cervantes, were being made in Puebla in the seventeenth century.

Studies in Florida have produced Maiolica and Chinese porcelain sherds at various sites. Mr. Hale G. Smith of the

¹²Swanton, p. 83.

Florida Board of Forestry and Parks kindly sent representative sherds from all Florida sites for study. The Higgs site, an undocumented historic village located near Wabasso was excavated by Smith in 1946 and was thought to have been a Spanish settlement. Sherds from the Higgs site, San Marcos de Castillo and a mission site near Tallahassee all are similar in paste, glaze and design when compared with collections from Presidio, Adaes, Pecos and Santa Fe. The green glazed "Olive jar" sherds were also found at all Florida sites. Cross dating of historic Indian San Marcos sherds by use of dated Chinese porcelain, Maiolica and English pipes was done at the Higgs site.¹³

In the Californias, both Baja and Alta, considerable quantities of maiolica were used in the mission establishments. Here again, further surveys should bring to light more of it along with Chinese, English and wares from other parts of Mexico besides Puebla. In an account of the Franciscans in Baja California in the year 1771, Puebla pottery is mentioned.¹⁴ I have seen maiolica from Puebla at the San Diego and Capistrano missions. Woodward reports a cache of about five maiolica plates, all broken, from excavations near Carmel mission. They were good specimens of early 19th century Puebla ware.¹⁵ At Capistrano Mission I found that between 1937 and 1946 all of the collection of whole pieces which had been in the museum had been sold to collectors. Only one large platter now remains and it is for sale.

Supply Service to the Southwest

Let us look for a moment as to the possible routes and methods of conveyance for supplies to reach the Southwest in Spanish times. The first expeditions in 1539 and 1540 came over a route which was not used to any great extent in

¹³Smith, p. 315.

¹⁴Bolton, p. 268.

¹⁵Communication from Arthur Woodward.

later times. These were exploring expeditions and probably left very little material evidence in their wakes.

Supply service from Mexico in later times was by at least two routes. One route was by way of the central plateau of Mexico to Chihuahua. From there the supply trains went north by way of El Paso to Santa Fe. According to Scholes, the round trip took about a year and a half. The elapsed time between the coming of supply trains was three years. The remaining part of the three-year period was given to the preparation in Mexico for the outward journey to the frontier. Three years was a long time between receipt of anything new and the coming of the supply trains must have been the time for great rejoicing and fiesta. The caravans also served as nuclei for travelers and colonists going to the frontier establishments. Mules and wagons were used in supply caravans going over this route.

In a list of supplies to be furnished a friar in New Mexico for each three-year period between supply caravans was "one box of loza de Puebla."¹⁶

The other supply route was by way of Guadalajara and up the west coast of Mexico. This was not a wagon supply route. The method of transportation was by mule train because much of the terrain was too difficult for wheels to negotiate. The Sonora missionaries did not have a supply service, so far as is known, like that of their New Mexico brothers. They were paid a fixed stipend, or sinode, of something like 330 pesos per annum, and it was left to them and their superiors to purchase such supplies as were needed and to transport them to the missions.

We do know that freighting became a huge and profitable enterprise.¹⁷ Rates were so high that goods sometimes brought three or four times their original price by the time

¹⁶Scholes, p. 101.

¹⁷Simpson, pp. 160-2.

they had reached their destination. Much of the goods were for the missions and included sacramental wine, vinegar, conserves, honey, and articles necessary for the operation of the church and the welfare of the priests. Many of these items were transported in "olive jars."

Baja California was served by ships sailing out of Acapulco, San Blas, or other west coast towns. Supplies thus delivered were then transported by mule train to Upper California. The trips were long, tedious and dangerous. Many times the supplies did not reach their destination due to shipwreck, attacks by hostile tribes, or accidents.

Florida was supplied by ships sailing out of Vera Cruz.

Conclusions

From the foregoing it is seen that supplying of all kinds of pottery to Spanish establishments in what is now California, Arizona, New Mexico and northern Mexico was big business. Porcelains from China, maiolica from Spain and Mexico, Mexican potteries, and English wares of various kinds all found their way by supply trains to Spain's frontier establishments. And in Mexican times this trade continued until 1846, when the United States took over the Southwest. English and American wares by this time were finding their way to the West over the old Santa Fe Trail.

Much can be learned by careful observation on sites which have evidence of being occupied during Spanish times. The story has many unfilled chapters which will be further worked out when more intensive surveys are made into Mexico to follow the old supply routes to the places of manufacture of still unidentified types of maiolica and other Mexican wares.

Of interest are the following observations which have resulted from these studies:

1) Native Indian pottery making was definitely influenced by Spanish designs, techniques, shapes, and materials. The influence was minor, but still it was reflected in various ways in the Southwest. In New Mexico the Pueblo Indians adopted some of the designs from the maiolica. Naturalistic bird and floral designs on historic Pueblo pottery are surely of Spanish inspiration, as the late prehistoric decoration, and most of the modern, is geometric or highly conventionalized.

The Indians of both New Mexico and Pimeria Alta either were influenced in copying, or copied of their own free will some of the shapes of the Hispanic pottery. Soup plates and cups were copied in the plain redware and glaze-painted ware. In fact, the Indians even imitated, by modeling, the wheel-turned rimmed bases of the maiolica and Chinese cups and plates. These imitations are found only in a few Spanish villages and missions.

2) At village, presidio and mission sites, the native plain wares show the use of Spanish green glaze on their own pottery. This has been noted in Pimeria Alta and at Presidio, Texas. The glaze was apparently compounded after a Spanish formula from materials brought from Mexico. This same conclusion was arrived at by Nelson and the Kidders¹⁸ on some of the Pecos material. Toulouse drew the same conclusion after studying some of the Zuni materials.¹⁹ In each instance the glaze ran during firing. From a study of green glaze jars and table wares it is noted that the glaze ran even when applied and fired by expert Mexican potters.

3) A number of historic wares can be identified and approximately dated. Identification has been made by institutions and individuals where dated collections of such wares exist. Institutions in the Southwest should have their Hispanic collections identified for future research.

4) Voids still exist where some wares have not been definitely dated or identified.

¹⁸Kidder, M. A., and A. V., p. 358.

¹⁹Toulouse and Caywood, MS.

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MS. Maiolica and China ware in the Spanish Southwest.

NOTES ON PLAINS-SOUTHWESTERN CONTACTS IN THE LIGHT OF ARCHEOLOGY†

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With the increasingly clear delineation of archeological complexes or "cultures" in the central Great Plains, there has come a heightened interest in the problems of inter-areal contacts and relationships. It is generally accepted that the semi-horticultural manifestations so far recognized in the region are basically of eastern, or ultimate southeastern, derivation, and that the Plains were thus peripheral to the Eastern Woodland region. At the same time, it is becoming more and more evident that, as is to be expected in an area so extensive and easily traversed, there were contacts on several time levels between Plains groups and contemporaneous peoples in many directions. No insurmountable mountain areas or other impassible natural barriers prevented trade and other meetings with peoples to the west and southwest; and the tangible evidences of such contacts suggest that they were perhaps on a somewhat more lively scale than has sometimes been supposed. To what extent more far-reaching contacts took place, leading to establishment of formerly Puebloan peoples in the Plains or of Plains peoples in the Pueblo area is another intriguing aspect of the problem, but one toward whose solution an explicit answer is not yet at hand.

Within the limits prescribed for this paper, it is manifestly impossible to discuss in detail the matter of Plains-Southwestern relationships, to make the needed analysis of the relevant ethnographic data, to evaluate these data critically in light of broader distributions and relationships, or to

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arrive at anything like a definite conclusion regarding the precise nature and implications of the observed and suggested similarities. The area is vast, the time span long, and the available information still far too sketchy and uneven. I propose rather to review briefly what has been said from time to time concerning these apparent connections, by ethnographers as well as by archeologists, to adduce certain recently discovered bits of relevant information, and perhaps to suggest some explanations as well as leads for further inquiry at a future time.

Any line drawn on the map, purporting to show the division between Southwestern and Plains areas, is of course more or less arbitrary. For present purposes, only that portion of the Southwest included in the Rio Grande and Pecos valleys, eastward and northeastward as far as the territory was at one time held by puebloan peoples, need be considered. The Plains area extends westward up the various tributaries of the lower Mississippi and the Missouri into the eastern margin of the High Plains. The major semisedentary complexes of the Plains, at any rate in late prehistoric and proto-historic times, lay east of approximately the 100th meridian; but it is well established that corn-growing peoples in several places and probably at several periods extended their occupation westward nearly or quite to the Pueblo frontier.

Between the eastern marches of the Pueblo region and the principal area of residence of the semi-horticultural pottery-making peoples of the Plains lay the semi-desert grassland of the High Plains. Beginning in the south as the Staked Plains, this belt extends northward through western Oklahoma, across eastern Colorado and western Kansas, and into southeastern Wyoming and western Nebraska. Here relief is generally slight, except in the butte-besprinkled and canyon-cut district of northeastern New Mexico and southeastern Colorado. Precipitation is light, and evaporation high; surface water is scarce, and vegetation, other than grass and

some yucca and scrub, includes stands of western yellow pine on the elevated portions and juniper along some of the valley "breaks." It is not a region to invite extended residence by a populous group in search of garden lands; neither is it, to the knowing and ready traveler, an impassable obstacle.

Cutting across the broad High Plains belt is a series of river valleys. Rising in the mountains to the west, they descend eastward in flat-floored, bluff-lined trenches to drain eventually into the Mississippi. The Pecos flows south into the Rio Grande and thus around the High Plains; but the belt is crossed successively from south to north by the Canadian, Arkansas, South Platte, and North Platte. Besides these, there are several permanent shorter streams that head in the High Plains or at their deeply serrate eastern front but do not cross them. These include the Colorado River of Texas, the Brazos, Red, Cimarron, North Canadian, and the several headwater tributaries of the Kansas. In short, by picking one's route with reasonable care and some knowledge of the geography, it was perfectly feasible to traverse the High Plains on foot or ahorse in an east-west direction at a number of points.

For whatever clues they may possibly throw on earlier movements, brief notice of some of the principal historic routes seems worthwhile. There appear to have been at least three of these. Best known, of course, but possibly not of primary importance before freighting days, was the Santa Fe trail route. Accessible from both the upper Pecos and the upper Rio Grande, this led around the southern end of the Sangre de Cristo range, thence northeastward across the Las Vegas Plateau to the Cimarron, down that stream to its northernmost bend in present Kansas, overland by any of several tracks across the "water-scape" to the Arkansas, thence down that around its great bend, and so north or east. Along this historic wagon road, suitable camping spots could be found at intervals of 5 to 36 miles (Gregg, 1851, I,

p. 313), except for the stretch between the Cimarron and the Arkansas; and the rigors of this passage may well have been avoided in earlier days by bearing across the upper valleys of Crooked and Mulberry creeks south of present Dodge City, Kansas. It seems rather likely that Coronado's band returned from Quivira on the Arkansas to Tiguex on the Rio Grande over approximately this route in 1541; it may have been an old and well-known one at that time.

A second and easier road, followed through part of its course by Gregg (1851, II, p. 136 ff), led eastward from the Santa Fe district to and down the Canadian. From the point where the Canadian finally swings southeastward in Dewey County, Oklahoma, the traveler could continue downstream to reach the settlements of eastern Oklahoma; he could turn south into other valleys giving access to the Texas region; or he could turn north or northeast through a relatively well-watered country into Kansas.

A third route evidently of considerable importance was followed by Spanish exploring and punitive expeditions to the upper Arkansas and Platte drainages. This went up the east front of the Rockies, through the Raton mesa country, to the Arkansas in the vicinity of present Pueblo, Colorado, and, if desired, on to the South Platte valley. Unquestionably a well-known route to the Indians before Spanish times, this gave relatively easy access eastward from the foothills to the broad and well populated valleys of the Central Plains in present Kansas and Nebraska.

Turning now to the problem at hand, we may summarize with two or three examples the somewhat diverse views of the ethnographers. These, it should be noted, were expressed before systematic archeology had been initiated in the central Great Plains. Kroeber, pointing out in 1928 that even the eastern limits of former Pueblo culture remained undetermined, observed further that Southwestern elements were present in Harrington's Ozark "Bluff-dweller" assemblage

and that additional historically significant links between the two areas involved might be expected. Recognizing the presence in the Plains of "some traits that can presumably be led back to a Southwestern origin," he was nevertheless constrained to say:

"... it is remarkable how little the Plains seem to have taken over from the Southwest. The reciprocal influence seems at least equal; since the introduction of the horse, probably more powerful. Taos, the frontier settlement, is counted Pueblo and essentially is such; but in material culture and dress it is half Plains . . . As normally it is the more advanced culture that affects the other most, Southwestern impulses are indicated as unusually self-contained, centripetal, perhaps weak in all respects save tenacity . . ."—Kroeber, 1928, p. 393.

Parsons, on the other hand, noting a long series of resemblances between Puebloan and Plains ritual practices, took partial exception to Kroeber's view. For the Pawnee particularly, ceremonial resemblances to Southwestern groups led her to suggest that:

"... In the seventeenth century the Pawnee raided for horses into the Pueblo area, but long before that, prior to their northeasterly [sic!] migration, may they not have been in closer and more pacific contact with the Pueblos? At any rate, when the cultivation of maize was acquired by the Pawnee it carried ideology and ritualism similar to the Pueblo. Here, possibly, in a maize complex of ritual together with technique, the Southwest imparted its culture on a more notable scale than Kroeber has allowed for in his last masterly contribution to the distribution of cultural traits in North America."—Parsons, 1929, p. 654.

With reference again to the Pawnee, we may take note also of Linton's (1926, p. 465) suggestion that the Skidi Morning Star sacrifice had a dual origin, part of the ritual reaching the Pawnee by way of the Mississippi Valley and part by way of the Southwest.

Since the foregoing views were advanced, the archeologist's spade has abundantly demonstrated that the "largely negative results of archeology" in the Plains up to 1928 were not due, as was then inferred, to any real absence of antiqui-

ties or to a necessarily late arrival therein of horticultural peoples. A whole series of more or less distinctive, varied, and fairly well-defined archeological complexes is recognized in the area today; others doubtless still await discovery and definition. They are distributed from the banks of the Missouri westward into the High Plains; temporally, they range from the nineteenth century remains of the historic tribes back well into the prehistoric period. Their principal characteristics and some of the views as to their relationships, age, and significance have been summarized elsewhere (Strong, 1933, 1935; Wedel, 1940, 1947; Champe, 1946) and need not detain us here. It may be of some interest, however, to note what the archeologists, in the Southwest as well as in the Plains have had to say from time to time regarding possible interrelationships.

The interests of Southwesternists in what lies to the east and northeast of their area have been primarily in connection with the explanation and interpretation of certain non-Southwestern phenomena in the Pueblo area; and, as would be expected, these are concerned chiefly with the eastern parts of their province. Thus, for example, Kidder (Kidder and Shepard, 1936, p. 596) has noted the possibility of a Plains origin for some of the easterly puebloan groups, like the Tanoans, in a period preceding arrival of the Athabascan Apache and Navaho. At almost the same time, Haury (1936, pp. 124-126) suggested "in a general way" that the Mogollon Culture might have had some connection "with a generalized hunting-agricultural stage of about the type represented by Strong's Upper Republican Culture, or Signal Butte III," and further, "it would appear that the Mogollon physical type is to be derived (prior to A.D. 700) from the east—from a Plains group in a hunting-agricultural stage . . ." Mera (1935, p. 35; 1938) and others have called attention to the curious resemblance between the conical-bottomed pottery of the Largo-Gallina complex (ca. 1100-1300 A.D.) in

northern New Mexico and eastern Woodland wares; and Mera, at least, has pondered the matter in terms of possible ethnic movements. More recently, Keur (1941, p. 74) has suggested the advisability of seeking and defining "... pre-Navaho or Athapaskan traits, possibly out of such an archeological complex as Dismal River, to furnish possible evidence of Navaho origins and migrations" east of the Rockies. Finally, to conclude our incomplete catalog of opinions and suggestions from this quarter, Hall (1944, p. 66) noted certain traits in the Rosa phase (ca. 700-900 A.D.) that somewhat suggest features in "what are believed to be a later Plains horizon," but he properly warned against premature acceptance of "a direct Pueblo-Plains contact" at this point.

The contacts noted from time to time at the Plains end of the problem are mostly of another order. They involve trade rather than a direct genetic connection; and as we might expect, these contacts are most strongly in evidence in the southern Plains. Thus, Pueblo sherds have been recognized at a number of Texas Panhandle village sites, which suggest a degree of Pueblo-Plains culture fusion; and Southwestern sherds have been reported as abundant in the sandhill, lake, and canyon country about Lubbock (Watts, 1939). These and other finds would indicate that Pueblo trading or hunting parties frequently crossed the Staked Plains from the Pecos-Rio Grande region. It is not evident, however, that any far-reaching cultural modifications resulted, unless the Canadian valley sites be regarded as an early step in puebloization of a Plains people.¹

For the region north of Texas and Oklahoma, Strong's observation of 1933, modified in light of certain subsequent developments to be discussed presently, may be cited as a more or less representative view:

¹Publication of field and laboratory results of work in Texas and Oklahoma, and synthesis of the resulting views of workers in that region, may be expected to clarify Pueblo influences on the region between the Pecos-Rio Grande and the lower Red River "Caddo" center. (Cf. Krieger, 1947, which appeared just after completion of the present paper.)

"The lack of any Pueblo influences, at least north of Kansas, is very marked, and it thus appears that prior to the acquisition of the horse the barren High Plains to the west and the Staked Plains to the south served as definite barriers between the central Plains and the Southwest. It may be added that, contrary to various striking ethnological parallels, the material culture of the protohistoric and historic Pawnee seems to be utterly alien to the Pueblo cultures of the Southwest. Apparently these ethnological parallels can best be explained on the basis of a common origin in Mexico and separate lines of diffusion to the north . . ."—Strong, 1933, p. 284.

So far as archeology is any indication, there is still surprisingly little direct evidence of Pueblo influence on the material culture or subsistence economy of the historic Plains village tribes. Despite Parson's suggestion, Strong's comment as to the radical dissimilarity of Pawnee and Pueblo material culture stands. Most of the parallels noted by Parsons, to be sure, relate to non-archeological items; but the techniques, tools, etc., of the Pawnee maize complex, for example, are certainly eastern rather than southwestern. In how far the crop varieties themselves might suggest southwestern rather than eastern forms I cannot say, but Will and Hyde (1917, p. 73) state that the corn varieties grown by the Pawnee and their neighbors were very much like those grown farther north. Whatever ideological and ritual concepts the Pawnee attached to their maize complex, it would be rather surprising if the river bottom crops of this tribe came from the arid Southwest rather than from some much earlier locally specialized strains with downriver antecedents. The arrival after *circa* 1720-50 of such "typical" plains nomads as the Cheyenne, Arapaho, Comanche, Kiowa, and other tribes seems to have severed effectively and with finality whatever intercourse had previously been carried on between the Southwest and the Plains village tribes; and the same new element forced both Pueblos and Plains people onto the defensive so that scant leisure remained for interareal adventures. Kroeber (1939, p. 47) has already re-

marked the fact that the historic hunting tribes nearest the Southwest show very few Pueblo traits.

In the protohistoric period (ca. 1540-1775), contacts between the Southwest and Plains village peoples seem to have been at their greatest strength. During this time, the horse spread throughout the Plains, and the "historic plains-bison culture" was evolving. Equally significant was the florescence of culture that took place among such sedentary groups as the Pawnee and perhaps the Wichita when, for a time successfully, they sought to integrate equestrian nomadism with the older pattern of gardening, earthlodges, pottery-making, palisaded towns, etc. The great villages that grew, probably through necessity, on the middle Arkansas, the lower Loup, and farther north, became for a time focal points for trade, raiding forays, and other meetings. The Spanish records tell us of Navaho raids of some magnitude against the Pawnee before 1700. The widespread unrest attendant on French and Spanish conflict between the Mississippi Valley and the Rio Grande drove occasional groups of intransigent Pueblos into the intervening High Plains for refuge, witness the actual discovery of their ruined houses, irrigation works, etc., as far away as western Kansas (Martin, 1909).

Archeology confirms the documentary evidence of definite Plains-Southwestern contacts on this time level. Thus, while the protohistoric Pawnee and their Siouan neighbors in eastern Nebraska and northeastern Kansas show few or no traces of southwestern connections, other groups farther west present a different picture. The protohistoric Wichita (?) sites on the great bend of the Arkansas in central and southern Kansas have yielded turquoise, obsidian, and glaze-paint potsherds originating in the upper Rio Grande drainage (Wedel, 1942). Very limited quantities of European trade objects, including glass beads, an iron axhead, and chain-mail from two sites suggest that the communities belong to a very early white contact period. This is in line with

the 1525-1650 dating ascribed to the glaze paint sherds excavated at defined sites. Surface finds of puebloan pottery on and about these same sites include types ranging in time from the latter 15th to the early 18th century. They suggest that the semi-horticultural peoples of the middle Arkansas valley were in direct communication with the upper Rio Grande, perhaps via the Canadian or the Cimarron, or both. Aside from these few objects clearly recognizable as importations, however, and perhaps the presence of numerous mealing slabs and manos, there is no evidence of marked or lasting influence from the Southwest. The material culture inventory compares rather well with that of the protohistoric Pawnee, except in lacking the earthlodge and in presence of a much ruder potteryware.

Somewhat later, but still preceding 1775, is the Dismal River complex. Sites of this horizon in southwestern Nebraska have been described in some detail (Hill and Metcalf, 1942); others are known, including one in association with the Scott County, Kansas, pueblo ruin (Martin, 1909; Wedel, 1940a). Again the complex represented is pretty much Plains, with a somewhat simpler and perhaps less sedentary mode of life than that characteristic of the protohistoric Pawnee and Wichita(?). As among the Wichita(?), but unlike the Pawnee or their eastern contemporaries, mealing slabs were used in grinding or crushing corn. Roasting pits have no counterpart among other defined Plains cultures. Tobacco pipes are predominantly of clay, tubular in form, with flared bit, and commonly bear incised and/or finely punctate ornamentation. These are atypical in the Plains, but are strongly reminiscent of some of the late Rio Grande styles from Pecos and elsewhere. Turquoise beads are present, as also obsidian. Puebloan sherds have been reported, but they remain unidentified as to period and the recent excavations disclosed none of these interesting clues. A large sherd of Tewa Polychrome, representing the same

period (ca. 1680-1720) as the decorated pipe fragments has been taken from among a group of caches (Wedel, 1947), normally submerged by an artificial lake, at the Scott County, Kansas, site.

The identity of the Dismal River peoples is still uncertain, but there would seem a good likelihood that they were a semi-horticultural Plains Apache group. Their archeological remains suggest a widespread people living much like the various Apache bands visited in northeastern New Mexico and Colorado, and perhaps farther to the east, by the Spanish ca. 1700 (Thomas, 1935). Archeological and other evidence (Hill and Metcalf, 1942, pp. 205-213; Champe, 1946, p. 90; Wedel, 1947) suggests that the Dismal River sites investigated up to the present time probably date mainly after ca. 1600; I suspect they were abandoned during the first, and certainly not later than the second, quarter of the 18th century, perhaps as a result of Comanche pressure. Distribution of the complex has not been worked out, nor has its relationship to other complexes. If the remains are indeed Apache, they are perhaps too late to be regarded as ancestral to the Navaho-Apache in the Southwest (cf. Keur, 1941, p. 5; Hall, 1944a). At the same time, if the suspected northerly or westerly affinities or antecedents of the Dismal River materials are borne out by future analyses and field-work on a broader basis, the likelihood of an Athapascan provenience would be heightened; and, when more data are at hand, careful comparison of Dismal River and early Apache-Navaho complexes might permit the segregation of the pre-pottery antecedent traits of Athapascan material culture to be searched for along the route possibly followed southward by its bearers along the eastern front of the Rockies.²

For the prehistoric period, preceding ca. 1540, there is as yet no authentic instance of Puebloan objects in direct

²Griffin's suggestion (1946, p. 54) of a Sterns Creek ancestry for Dismal River does not impress me as a very plausible guess.

association with a Central Plains site or burial complex. The widespread Upper Republican horizon of Nebraska and northern Kansas remains undated by direct cross-finds of pottery or other recognizable Southwestern materials. A related complex in the Canadian River valley of the Texas Panhandle—Krieger's proposed Antelope Creek focus—shows not only a pueblويد rather than plains architecture but also a rather numerous series of crossfinds of Rio Grande glaze-paint sherds. From this, and the fact that the Upper Republican sites consistently have no inclusive European trade goods, it seems highly probable that the Upper Republican-Antelope Creek horizon was defunct by about 1500 or before. Here and there in the Upper Republican area surface finds of puebloan sherds have been reported, but their usefulness as indicators of prehistoric commerce or contact is obviously nil.

Still less is it possible to equate the various Plains Woodland manifestations with Southwestern horizons. The Largo-Gallina phase in New Mexico may be evidence of some sort of prehistoric transmission of certain pottery and perhaps other traits, but the easterly sources from which these ideas might be presumed to have come are as yet too imperfectly defined, their time and content too vaguely grasped, and possible routes of transmission too little explored, to permit any very valid inferences concerning direct connections.

The materials from the Ozark "Bluff-dweller" sites (Harrington, 1924) and those from the Basket Maker-like caves of the Oklahoma Panhandle (Renaud, 1930) likewise resist fruitful discussion. They hint at an old, perhaps pre-Woodland and pre-pottery horizon that may once have been widely spread across the southern plains from the Pueblo region to the Mississippi. However, the precise relationship between these materials and the sherd-bearing levels of the intervening area have not yet been stratigraphically established; and their significance with regard to regions to the

north, where caves are lamentably scarce, is uncertain. It is possible, indeed even quite probable, that in certain favorable districts, pre-pottery horizons post-dating the early hunting paleo-Indian cultures will be defined as fieldwork progresses.

On the earliest time levels, similarities between Plains and Southwest undoubtedly involved primitive hunting and gathering groups who had not yet specialized regionally to the extent seen among later groups and whose techniques, as these may be inferred from the exceedingly scanty archeological record, required no great modification from one area to another.

From the materials summarized above, it would seem that the strongest indications of intercourse between Southwestern and Plains groups date after the twelfth or thirteenth century, and that prior to the glaze-paint period on the Rio Grande relatively few influences involved groups north of the Canadian River. This, however, may be in part owing to the comparative recency of such contacts, to the freshness so to speak of the surviving evidences, and to the fact that written history amplifies and enriches much of the meager archeological record. Time and the drastic ethnic shifts of the two or three centuries following the Conquest may well have blurred much more far-reaching events of earlier periods. In light of historical happenings and probabilities, Kidder's (Kidder and Shepard, 1936, p. 596) suggestion of a puebloization of infiltrating semi-nomadic peoples from the east to account in part for the peopling of the eastern Pueblo area in pre-Glaze or early Glaze times seems a plausible one. Documentary sources (Thomas, 1935) indicate that some of the Apache groups of northeastern New Mexico were pueblid in material culture and subsistence economy, and that before arrival of the Comanche and Ute there was a transitional zone, not a sharply defined break, between the Pueblo and Plains areas. Possibly the materials found in rimrock shelters of southeastern Colorado (Wedel, 1939) are

vestiges of the same sort of occupation. Obviously, if the Apache were on the threshold of transformation from Plains to Pueblo culture, there is no sound reason why earlier groups could not have bridged the gap—perhaps several times.

One great difficulty at present in accepting, other than as provocative suggestions, such postulated correlations as Haury's Mogollon-Caddoan, Hall's Gobernador-Plains, or the Largo-Gallina-Plains tie-up, is that the time element in the regions involved has not yet been successfully reconciled. Thus, as Nesbitt (1938, pp. 117 ff.) has shown, the Mogollon-Caddoan affinities seem rather generalized, and there is a discrepancy in time estimates for the two horizons of several centuries. Similarly, the Gobernador materials seem to predate by some hundreds of years the Plains horizon with which they have resemblances of a sort. In the case of Largo-Gallina the time discrepancy appears to be much less, so far as Woodland similarities are concerned, but the ceramic and other resemblances to eastern complexes await further elucidation. This sort of difficulty is not necessarily insurmountable, and future findings may dissolve the apparent discrepancies; but the day of general acceptance is not yet at hand.

The extent of "puebloization" or "southwesternization" of Plains groups during the prehistoric period thus must be left undecided for the present, to await more detailed information from the High Plains and Eastern Periphery, more data on physical types that may have been involved in these movements and transformations, and a more thoroughgoing comparison and correlation of Plains archeological complexes and those of the Rio Grande area. In attempting to present answers to such a complex problem at this time, we may be trying to run before we have even the strength to walk.

With what we know or suspect regarding certain population movements in the respective areas, it may be possible to explain partly the increased influence of later Rio Grande

culture on the contiguous Plains groups. The effects of greater mobility of peoples with introduction of the horse has been noted; no elaboration is needed. Apart from this, it appears that in both areas there was, roughly between 1350 and 1500, a movement from numerous, small, scattered, self-sufficient villages into fewer but much larger and culturally more vigorous communities. This phenomenon has been tentatively outlined for the central Plains (Strong, 1935, p. 297; Wedel, 1940, p. 339); and Kidder (Kidder and Shepard, 1936, p. 610) has summarized it for the Rio Grande:

"... The term 'Regressive' ... conveys a false impression of conditions in the Rio Grande, for the period [old Pueblo IV, ca. 1300-1680] in question was there marked by a cultural vigor in many ways comparable to that of the Great Pueblo period in other parts of the Southwest, during which time the villages of the Rio Grande drainage in New Mexico, though numerous and occupying an extensive territory, were for the most part small and their wares, Black-on-White and Corrugated, were inferior imitations of contemporaneous or somewhat earlier western types. ... [The] development [on the Rio Grande] began at approximately the same time as the abandonment of the great communities of the San Juan. ..."

Apparently, neither the Black-on-White settlements of the Rio Grande nor the contemporaneous and analogous Upper Republican peoples of the Central Plains had the leisure, the cultural drive, or the economic incentives to carry on or attract any appreciable long distance trade; and this may also have been true as between the Pueblo and Red River "Caddo" peoples of the period. Subsequently, with urbanization and a greatly augmented mobility in and coeval with the glaze period, came a noticeable increase in the intercourse between Rio Grande and the nearer central Plains people³; Red River "Caddo" culture, had it reached its peak somewhat later or survived a bit longer the impact of French and Span-

³"Whenever, at Pecos, there appears in the upper strata a new type of artifact which is obviously not of European origin, we have learned to suspect Plains influence."—Kidder, 1932, p. 238.

"... it would seem ... that the Plains influence shown by eastern specimens at Pecos began to be exercised about 1550 ... and became stronger during the next hundred years."—Kidder to Wedel, letter of Nov. 14, 1935.

ish contact, might have shared in such traffic as went on. Eventually, as both Pueblos and central Plains village Indians went more and more completely on the defensive before the rising power of the Comanche and other horse-nomads, the contacts between the two dribbled away by circa 1725 to virtual nothingness. The Plains traits noted at Pecos and other northeastern frontier towns of the later period probably reflected the nearness of the migratory nomads more than the effects of trade with Indian towns on the Arkansas or Platte rivers.

To peoples dependent for communication and trade on travel by foot, the dry High Plains would undoubtedly always have presented a serious barrier. Granting this, I am nevertheless of the opinion that a series of cultural factors involving both Plains and Southwestern groups probably interposed about as effective an obstacle to large scale inter-areal contacts in pre-horse days as did the intervening geography.

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CORAL AMONG SOUTHWESTERN INDIANS

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Despite the fact that the subject of coral among the Indians of the Southwestern United States has been sadly neglected, a few pertinent bits of information are still available. These will be recorded as they have been gathered to date,¹ for what they may be worth. Scattered written notations will be brought together in this paper; numerous facts and comments gathered by letter and personal conference will be presented; and some observations will be made on published data and on cultural materials of both secular and ceremonial nature connected with coral.

Tantalizing references to coral, without supporting evidence of the existence of the same, is encountered in connection with ancient Mexico and the Southwest. In fact, in early post-Spanish literature, there is frequent reference to this material. Doubtless such published data has led many to accept, without questioning, the existence of coral both anciently and in early historic days.

In publications and verbally in conference with or through letters from traders, historians, and archeologists, the report has come to the writer that coral was introduced into the Southwest through trade with Mexico; that it was of South Pacific origin; that it came from the Mediterranean; that it originated along the west coast of Mexico. From similar sources has come word that coral was first brought into the Southwest anywhere from prehistoric to very late in historic times. The problems of origin and time of introduction of coral into the Southwest will be the chief concerns of this paper.

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¹The writer has several clues relevant to the subject, but it will be some time before they materialize. Therefore, to meet the "dead line" for this publication, an incomplete paper is herein presented.

Color is significant relative to problems of both origin and time. Hill² reports that of the many species of coral along the West Coast and West Mexico, one species is purple and the rest bleach out white. He states further that as far as he knows, "the only material which the early Indians used for pink or reddish colored ornaments, etc., was the spiny oyster."³ Spiny oyster is widely available, as its distribution is from the Gulf of California to Ecuador.⁴

It has yet to be proved whether or not coral really existed in pre-Spanish Mexico, and, if it did, was it traded into the Southwest? Caso reports that in Tomb 7 of the Monte Alban excavations (1932), that "besides the gold and silver jewels—were also found an abundance of jade objects, turquoise mosaics, necklaces of rock crystal, amber, jet, coral and shells—." Saville mentions coral several times, including reference to a mask from a tomb in Guerrero, "—the human face being partly covered with an incrustation of small pieces of turquoise, with small bits of coral shell above the eyebrows and below the nose."⁶

In addition to the scanty mention of coral in Mexican archeological literature in general is the following interesting point. Saville, in giving the mosaic material of Mexico, completely ignores coral, listing, "turquoise, jadeite, malachite, quartz, beryl, garnet, obsidian, marcasite, gold, bits of red and other colored shell, and nacre."⁷

It seems improbable that such a rare material (as the few instances of references to coral would indicate that it was rare), would have been traded out of Mexico. Likewise, "bits of red and other colored shell" might well explain the occasional use of the word "coral" in Mexico.

²Hill, correspondence, Nov. 12, 1946. (Pough, correspondence, Dec. 20, 1946, also states, "coral fades in time, its coloring seems to be in part organic.")

³Hill, correspondence, Nov. 12, 1947.

⁴*ibid.*

⁵Caso, 1938, p. 69.

⁶Saville, 1922, p. 54.

⁷*ibid.*, p. 2.

That coral did not appear in prehistoric times in the Southwest would be indicated in the following comments. Morris⁸ writes, "On the basis of my experience, you are altogether correct in judging that coral was unknown in the Southwest in pre-Spanish times. Never have I seen a fragment of it in ruins that date before the Conquest." The extensive experience of Morris in the San Juan drainage would indicate the probable situation there.

Brand,⁹ whose archeological experiences have been concentrated in part in the eastern sections of the Southwest, states, "I know of no find of *real coral* in any prehistoric Southwest ruin." In connection with the same area, Judd made this significant statement:¹⁰ "We found no coral at Pueblo Bonito, and I have found none in other collections." Judd's comment is particularly important because of the wealth of turquoise and other decorative materials found at Pueblo Bonito.

The statements of these men cover the entire period of prehistory so far known in the Plateau area. Further corroboration of these opinions is elicited by Brew¹¹ who mentioned this problem of coral to a recent meeting of archeologists in Cambridge. Of the "sixteen Southwesterners there, including A. V. Kidder, Kirk Bryan, Donald Scott, and Paul Gebhard—none—had any information about coral in the Southwestern sites." Mr. Brew adds that Gebhard had that day passed a final examination on a 1600-page thesis on stone implements in North America north of Mexico, and had no recollection of having seen any evidence of coral in all his investigations. Mr. Gebhard's comment is pertinent as he had "gone completely through the literature on the Southwest and had seen all the Southwestern collections in the ma-

⁸Morris, correspondence, Feb. 15, 1947.

⁹Brand, correspondence, Jan. 15, 1947.

¹⁰Judd, correspondence, Dec. 18, 1946.

¹¹Brew, correspondence, Dec. 6, 1946. (December meeting of Southwestern Platica).

jor museums of the country, many of the minor ones and many private ones."¹²

Hodge, in his work in the Zuni area, supports the consensus that coral was not known in prehistoric days. He "devoted special attention, while conducting excavations at Hawikuh, New Mexico—to a search for evidence of the use of coral by the Zuni in ancient times, but not a trace was found."¹³ Colton reports for the Flagstaff region that there is "no coral in the shell material from ruins in this area."¹⁴

These rather conclusive remarks pertaining to the Plateau are matched by one in like vein from Haury¹⁵ in connection with the southern or Hohokam problem. In fact, Dr. Haury went beyond the Hohokam culture horizon and stated that in sites of early man, particularly at Ventana Cave where the sequence can be carried back some 10,000 years, no evidence of coral had been forthcoming. At no time in the Hohokam sequence, from 100 B.C. to 1400, he continues, was there any indication of coral in prehistoric times.¹⁶ Dr. Haury has done further work in parts of the same geographic area, specifically in Papagueria, and adds that at no time has he encountered coral in historic sites. This covers the post-Spanish period after the "gap," 1400-1700.

A summary of the major references to coral or "coral-like" material in the early writings of the historic period follows, as briefed largely from Hodge.¹⁷

1528-36: Alvar Nunez Cabeza de Vaca crossed the continent. "Reaching what appears to have been the Rio Grande Valley of Texas-Chihuahua, where dwelt Indians—the Spaniards were given 'plenty of beads made out of the coral found in the South sea'—"

¹²ibid.

¹³Hodge, May, 1943, p. 99.

¹⁴Colton, correspondence, Oct. 16, 1946.

¹⁵Haury, conversation, March 8, 1947.

¹⁶ibid. Here Haury refers to Snaketown and other sites.

¹⁷Hodge, May, 1943, pp. 99-103.

1581: Hernan Gallegos, notary of the Rodriguez-Chamuscado expedition to New Mexico, writing of the Jumano said that some of them "carried white and colored coral, although not of fine quality, suspended from their noses—" Again these Indians pointed to the sea as the place of origin of this material.

1604-5: Juan de Onate went from the Rio Grande to the Colorado River and the Gulf of California. He reported that the Zunis had quite a bit of coral. Further, Onate reports, "Having arrived among the Ozaras Indians,¹⁸ as they (the Spaniards) had already inquired of the other (Yuma) nations, and all had said that this nation is very extensive and runs along the coast, and that these are the ones who get from the sea the coral which they call *quacame*, they made inquiry and found a few. They said that since they were a long distance from the coast they did not have many—They (the Zuni) said the Indians of the 'valleys of Senora (Sonora) brought them there to sell'."¹⁹ Onate reputedly showed the Bahacechas near Parker some coral and asked them where there was some and they pointed south, saying it came from the sea. Further, they reported, it was taken out of the sea, or was washed ashore and dug out of the sands by the Indians.

1634: Benavides mentions coral as one of the products of New Mexico.²⁰

1710: Kino refers to the Rio Colorado as the Rio Coral of Francis Drake.²¹

1716: Velarde speaks of small pieces of coral, "not entirely hard of nature," found at the Colorado River outlet.²²

1746: Sedelmayr speaks of a visit to the Gila River (Cocomaricopa) where the men decorate themselves "with

¹⁹Hodge, May, 1943, p. 101.

²⁰Hodge, correspondence, Nov. 29, 1946.

²¹Hodge, May, 1943, p. 102.

²²*ibid.*

necklaces of sea shells intermixed with other things and with round colored shells resembling coral which they work and pierce."²³

A few reflections on the above incidents would indicate the non-existence of coral through these years, and the probability of the occurrence of widespread trade of spiny oyster. Some authorities who have recently excavated in early historic sites would support this contention in their conclusions as follows.

Kelley reports that he and Donald J. Lehmer "excavated sites of the late prehistoric and early historic periods identifiable with the Patarabueyes of the Gallegos account. Our finds checked with the historical data, but we found no actual specimens of coral."²⁴

Concerning the Benavides reference to coral in New Mexico, Hodge²⁵ has this to say: "—this may have been the spines of the spiny oyster, which are still of great importance to the Pueblos, especially to the Zuni." Hodge has the same opinion relative to the Sedelmayr notation of coral.²⁶

Herbert W. Dick,²⁷ working in New Mexico, reports: "I have never found anything that resembles coral or 'coral-like' material in the sites I worked dating from the 1500's to about the late 1700's. These were Indian, Spanish, and a mixture of both."

Dorothy L. Keur writes that she "found no evidence of coral whatsoever, on any Navaho site worked, either in the Cabezon or the Gobernador areas."²⁸ The only beads recorded by Mrs. Keur from the latter area are indicated as

²³Ives, 1939, pp. 108-9.

²⁴Kelley, correspondence, Feb. 19, 1947.

²⁵Hodge, correspondence, Nov. 29, 1946.

²⁶ibid., May, 1943, p. 102.

²⁷Dick, correspondence, Dec. 14, 1946.

²⁸Keur, correspondence, March 3, 1947. The Gobernador sites in which Mrs. Keur worked are roughly from 1670-1770.

"perforated *Olivella* shells."²⁹ Furthermore, at Big Bead Mesa Navaho sites, dating 1745-1812, Mrs. Keur found only four beads, one of shell, the rest of bone.³⁰

Thus, it would seem, recent excavations in sites of early historic dates indicate that material remains of these sites have not yet revealed any signs of true coral.

Likewise, in many of these early references where the material is noted, it is implied that it was not a true coral, for the recorders will use "coral-like" or other similar terms. Sedelmayr speaks of "round colored shells resembling coral." Velarde refers to small pieces of coral "not entirely hard of nature." Gallegos writes of "white and colored coral, although not of fine quality." These qualifying terms and comments lead the writer to believe that the specimens probably were not coral. In his historical studies, Caywood has reached the same conclusion. "Also do not forget material on 'coral-like' beads that are also found in the Southwest and that pass for coral. It took me some time to find out the difference."³¹

On the other hand, it is not entirely beyond the realm of possibility that a small amount of this material may have been true coral. Kelp or seaweed has been known to uproot objects weighing several pounds and carry them for great distances. This might explain the story told by Onate of the Indians who dug coral out of the sands which had been washed ashore by the sea.³²

Concluding, then, that purple coral and coral that bleaches out white do exist on the West Coasts of the United States and Mexico, it is likely that these varieties and spiny oyster were in all probability the materials used by the Indians of the Southwest from the time of first Spanish contacts to the late 1700's. Spiny oyster continues in popularity to the

²⁹Keur, 1941, p. 62.

³⁰Keur, 1941, p. 62.

³¹Caywood, correspondence, Oct. 21, 1946.

³²Hodge, May, 1943, p. 101.

present moment, as indicated by Hodge above, "the spines of the spiny oyster, which are still of great importance to the Pueblos, especially the Zuni."³³ It is most likely that spiny oyster was the coral and coral-like material so often referred to in the pre-1800 reports, as it is pink or reddish in color.

Fewer doubts can be held for the nature and origin of coral beginning with the early years of the 19th century and continuing down to the present time. The majority of facts would point to a true coral, of Mediterranean origin, as known among Southwest Indians in this later period.

The coral commonly used today among the Indians of the Southwest is deep pink, red, or red-orange in color. It is of tubular or round type, varying in both length and diameter of bead. Recently the beads have arrived in the Southwest already strung and polished. Such has probably always been the case. As Mera³⁴ says, "It hardly seems possible that any of the Indians in historic times have been able to drill the tiny lengthwise holes necessary to stringing."

Seemingly, coral is and has been an import,³⁵ and is not from the Gulf of California or the West Coast of Mexico. Mr. McDevitt of the Fred Harvey Company in Albuquerque, says, however, "that to his knowledge, some coral came into the country from the Pacific area."³⁶

According to F. Vitelli & Son: "The red and red-orange coral of the Southwest tribes of the United States Indians, originated off the coast of Sardinia and on the banks off Sciacca, Sicily. It was manufactured in Torre del Greco in the Province of Naples, as well as in Leghorn, Italy.

³³Hodge, correspondence, Nov. 29, 1946.

³⁴Mera, correspondence, Dec. 3, 1946.

³⁵Several samples of coral from old Navaho necklaces were sent to Howard R. Hill, Curator of Zoology, Los Angeles Museum, and he identified them as precious coral from the Mediterranean Sea.

³⁶Adair, correspondence, Dec. 2, 1946. Mr. Adair interviewed Mr. McDevitt and quotes him in this letter.

"As to the time this material was sent into the Southwest, we regret our inability to give you any information. It was shipped by manufacturers from the above centers in Italy in the early 1800's, while coral concerns in the United States started late in that century."³⁷

The above statement regarding the shipment of coral in the early 1800's would fit in with the first known date for the existence of real coral in the Southwest recently published by Arthur Woodward.³⁸ This was taken from the volume *Three Years among the Indians and Mexicans*, by General Thomas James. General James was in Santa Fe in 1822, and was put in charge of festivities in celebration of independence from Spain. "On the second day of the celebration (February 5, 1822)³⁹ a large company of men and women from San Felipe, an Indian town forty miles south of Santa Fe, marched into the city, displaying the best formed persons I had yet seen in the country. . . . They were all tastefully dressed in cotton cloth of their own weaving and decorated with coral beads of a brilliant red color. Many wore rich pearl necklaces and jewelry of great value. I was told by Ortise that the ornaments of stone, silver, and gold which some of these Indian ladies wore were worth five hundred dollars. The red coral was worth one hundred dollars per pound."⁴⁰

In a letter, Mr. Woodward remarks that "coral must have been quite scarce to be valued at \$100 per pound in those days when things were usually pretty cheap." Mr. Woodward further expresses himself regarding the early importation of coral, "I am convinced that most of the so-called 'coral' noted by 16th-17th and 18th century Spanish explorers was red shell beads, probably the spiny oyster, and it

³⁷F. Vitelli and Son, correspondence, Feb. 20, 1947.

³⁸Woodward, 1947, p. 25.

³⁹James, p. 139.

⁴⁰*ibid.*, p. 143.

was upon the demand for the rare red shells that the importation of Mediterranean coral came about."⁴¹

Into the second half of the 19th century, reference to coral is casual and fairly frequent. For example, "In the latter part of September, 1858, a Zuni scout attached to the United States troops killed a Navajo woman in the skirmish at Laguna Negra, headquarters of Zarcillos Largos (Long Earrings) a prominent leader of the recalcitrant tribesmen. From this woman the Zuni 'captured a silver belt worth \$50 or \$75—also \$100 or \$200 worth of coral necklace, precious stones, or other articles greatly prized by the Indians and only possessed by the rich'."⁴²

When among the Hopis in the early 1880's, Bourke reports "The necklaces of the Moquis (Hopis) are of coral, chalchihuitl, sea shell beads, bear claws, olivette shells, hollow silver globes, and acorn cups." Bourke also visited pueblo folk in New Mexico and mentions that "coral necklaces are more rare, but by no means infrequent" in Santo Domingo.⁴³

Today coral is of common occurrence among the Navaho and Pueblo Indians. It is highly prized by most of these people. Coral is particularly "treasured by owners if six or more strands can be obtained."⁴³ The Indians, especially the Navaho, prefer matched coral. One Navaho woman has eighteen strands of a particularly good quality. Twelve strands she purchased at one time from a trading post in Shiprock, New Mexico. Six more strands, of the same quality and color, were added later. These were purchased from trading posts in northern Arizona.

"Even the best coral will change with age, some individual beads more than others. The finest strings of coral in the really old coral have generally been made uniform in

⁴¹Woodward, correspondence, Nov. 1, 1946.

⁴²Woodward, 1938, p. 16.

⁴³Bourke, pp. 48, 241.

⁴⁴Fr. Berard Haile, correspondence, Nov. 8, 1946.

color by restringing.”⁴⁵ This characteristic is met with time and again on the Reservation, further indicating a definite preference for well matched and good quality beads.

That coral is treasured by the Navaho is likewise stressed by the fact that it is passed down in the family. Roman Hubbell⁴⁶ says, “Among the Navajo you will find some very old coral worn down very thin which has probably been handed down in the family for the last ten generations.” Then again, quoting from Mr. Woodward, “They also hand it down in the family. One custom is where a deceased Navajo has more than ten strands of coral, the ten are buried with him or her and the balance is divided among the heirs.” Or this situation may be slightly changed. “. . . frequently a Navajo promises certain of his personal effects to individuals before death. Generally upon his or her death, those who have received the promises, make the claims and take what is due them after the death occurs.”

John Adair verifies the above customs among the Navaho. He feels that the same ideas apply to coral which he found applicable to the inheritance of jewelry in general, silver in particular. In fact, he is inclined to believe that “if the family of the deceased coveted the coral they would keep it.”⁴⁷

In addition to precious coral, which is definitely preferred by the Navahos, there is a considerable amount of imitation coral to be found also. According to Richard Van Valkenburgh,⁴⁸ a trader on the Navaho Reservation began the importation of coral-colored glass beads from Czechoslovakia somewhere about 1910-15. Condon Shillingburg, trader at Chinle, Arizona, states that “The first imitation coral that I observed was in 1924. The Indian Traders of Gallup, New

⁴⁵Woodard, correspondence, Jan. 22, 1947.

⁴⁶Hubbell, correspondence, Feb. 14, 1947.

⁴⁷Adair, correspondence, Nov. 8, 1946.

⁴⁸Van Valkenburgh, conference, Feb. 11, 1947.

Mexico, introduced this commercially." (Correspondence, March 9, 1947.) Samples of one of these necklaces were sent to Hill (see above), and he identified them as glass. The age-old popularity of spiny oyster, shell of a similar color, then coral, would all seem to bid fair for the popularity of a coral-colored glass bead. Probably the Navaho reasons here as he does with turquoise: if he cannot afford the real material, a substitute offering the same appearance but costing less will be acceptable.

The artificial beads are more commonly found in shorter tubular lengths and are proportionately "fatter." There is variation, of course. Reputedly one of the finest of real coral necklaces, one belonging to the late Chee Dodge, had long, heavy, tubular beads. Most of the real coral has fairly slender proportions. The real coral also has a cold and almost "soapy" feel, while imitation glass beads are warm and hard to the touch.

Coral is important in the economy of the Navaho people. Hubbell reports that it is a medium of trade for cattle, sheep, and horses.⁴⁹ It is in and out of pawn along with silver and other items. Good coral brings a high pawn rate.⁵⁰ It is worn with pride as are other items of jewelry. Coral sells more readily among the Indians and brings a better price from them than would the same commodity elsewhere.

As to the ceremonial use of coral, here, too, is a problem. From Fr. Berard Haile comes this word: "I will say, however, that Navaho legends do not mention yolici, red beads, as coral is called, as red is generally tabu in ceremonial colors. Hence too it is ceremonially unimportant."⁵¹

Shillingburg reports that an 80-year-old medicine man, "Claw," says that "coral has no ceremonial significance. That

⁴⁹Roman Hubbell, correspondence, Feb. 14, 1947.

⁵⁰Adair, correspondence, Dec. 2, 1946, says that "the Navahos can pawn a good 5-strand necklace for \$40 to \$80 or more."

⁵¹Fr. Berard Haile, correspondence, Nov. 8, 1946.

it is used only as jewelry."⁵² Like word comes from Miss Mary Wheelwright⁵³—"I know of no ritual use of coral or mention of it in ritual." Wyman⁵⁴ also reports that, so far as he knows, "the Navaho *do not* use coral ceremonially."

This may well be true of the Navaho in general. Yet it is interesting to note that on the figures of the men who represent Slayer of the Alien Gods and the War God in Matthews' *Navaho Legends*, coral is both represented in illustrations and mentioned in the text. "Like his companion, the personator of Nayenezgani, he (Tobadzistsini) wears a collar of fox-skin; rich necklaces of shell, turquoise, and coral . . ."

In Zuni ceremonial there must not have been this stigma against coral indicated by Fr. Berard Haile above, for such beads occur on several ceremonial objects. On fetishes are tied coral beads along with other things. For example, tubular coral beads appear on the white Mountain Lion of the east, on the spotted Mountain Lion of the upper regions, and on several of the Prey God fetishes.⁵⁶

Likewise on Hopi kachinas which Fewkes had drawn by native artists in 1899-1900 there appear many examples of coral beads. In describing the Palahiko Mana as she appears in the Mamzrauti ceremony, Fewkes⁵⁷ says: "The necklace is of coral beads, and strings of turquoise pendants are shown about the neck." Many additional drawings show red bead necklaces of from two or three to as many as eleven strands. These resemble in every detail the drawing of the described coral necklace.

In conclusion it may be noted that in this brief and far from complete perusal of the subject of coral among the

⁵²Shillingburg, correspondence, March 9, 1947.

⁵³Wheelwright, correspondence, March 5, 1947.

⁵⁴Wyman, correspondence, March 17, 1947.

⁵⁵Matthews, *Navaho Legends*, illus. oppos. pp. 104 and 134 and p. 254.

⁵⁶Cushing, pp. 25, 26, Plates I, IV.

⁵⁷Fewkes, p. 119.

Southwest Indians, a few facts have been established; many questions have been raised. Seemingly, coral did not exist in the prehistoric Southwest. Early historic references (1540-1800) to "coral" abuse the word: all evidences point to the use of spiny oyster or pink shell and not true coral during these years. From the early years of the nineteenth century on, precious coral from the Mediterranean reached the Southwest. Mexico seems never to have been the source of coral, as no true coral exists there. Shipment from the Mediterranean via Mexico is reported, but remains a question. Neumann states in a letter (Jan. 25, 1947), "So far as I know Mexico has sent no coral of any origin to this country at any time." Coral is well integrated in Southwest Indian life, but is not of sufficiently long standing to be fully integrated into ceremonial life.

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NOTES ON NAVAHO ASTRONOMY

SALLIE PIERCE BREWER*

Max Littlesalt, a Navaho living in the Tsegi Canyon of northern Arizona, furnished the following information on Navaho names for constellations and Navaho concepts of their movements. On one of Littlesalt's visits to the National Park Service house on the canyon rim above Betatakin, he became interested in tracing the constellations pictured on our "celestial globe," and in comparing them to constellations recognized by the older Navahos who, in Max's youth, had taught him about the stars.

These notes were made then, in 1940 or 1941, with the hope of an opportunity for more field work on the subject. (Knowing nothing of astronomy, I was chiefly interested in the Navaho recognition of pattern and the seasonal position of constellations, the practical use to which they put the knowledge gained by observation, and in any light thrown on a Navaho concept of the universe.) With no recent opportunity for field work, the notes were checked by correspondence with Max Littlesalt in the winter of 1947—thanks to Bennett Hyde of Kayenta, who found a Navaho to take my letter up to the Tsegi; and to Max, who answered more promptly than we who live within a few miles of a post office generally do.

Recent word from Max Littlesalt emphasizes that his information came chiefly from conversation, and is general knowledge among the Navahos ("anyone who listens to the stories about the stars can learn").

The notes are still fragmentary; but they gained in value from the kind interest of Dr. E. F. Carpenter, Director of the Steward Observatory. Littlesalt had sketched, from memory, the Navaho constellations involved; by comparing these sketches with a star chart Dr. Carpenter was

*Park Ranger, Tumacacori National Monument, Arizona. University of Arizona: B.A., 1932.

Behind the boys who are practising, between them and Atse Ets'osi, are two stars who are boys wrestling to keep each other from catching up with the group. Near them is a red star,⁷ an old man who is angry with the wrestling boys and is scolding them for not paying attention to their practising. The Navaho name for the red star means "the fire of the twin stars."

When Dilyehe shows in the east above the white light of dawn, Navahos know it is too late in the spring to plant.⁸

Atse Ets'osi (Orion?)

This figure is the "First Slender One";⁹ it follows Dilyehe across the sky; when Dilyehe is overhead, the First Slender One will have its feet near the eastern horizon and its head near the Pleiades.¹⁰

In the spring this figure shows in the west; then to the right of the figure is a curved line of stars with a circle of stars above. The curved stars are a digging stick, and the circle of stars is a basket full of corn seeds. Navahos plant when this figure is setting at twilight; it will show in the west sky in late April and May.¹¹

Atse Etso (Scorpio?)

"The First Big One" will appear in the east when the Pleiades have disappeared; this shows that the season of spring is over and it is beginning to be summer.¹²

⁷Possibly Aldebaran. EFC.

⁸Mid-June. EFC.

⁹This seems to be a well known figure; other Navahos have called it "Crooked Man" and "Man Who Stands with his Legs Apart." SPB

¹⁰If this is Orion, in this position the leg of the figure would have to extend through Lepus or Columba to touch the horizon, and it would be nearer the southeast than the east horizon. EFC (Since Max says the Navahos fix East by the sunrise, their East would veer toward the compass Southeast. SPB)

¹¹When Orion shows in the western evening sky it is very early May. EFC.

¹²In the Franciscan Fathers Ethnologic Dictionary, this is identified as the forepart of Scorpio. Dr. Carpenter comments that at this time of year the southeast evening sky is the region of Libra and Scorpio. SPB.

HOGANS VS. HOUSES

CLAY LOCKETT*

A great many people today are seriously thinking about the welfare of the Navaho Indian. Often they acquaint themselves pretty thoroughly with the great health and land management problems. After visiting numerous hogans, they often bring forth the idea that before proper health or range management can be effected, the hogan must go and decent houses substituted. Here an attempt will be made to analyze the problem of the Navaho hogan, enumerating all the pros and cons.

In defense of the Navaho hogan, looking at it primarily from the Navahos' standpoint, it can first be said that Navahos take a racial pride in this, their traditional type of home. The Navahos are and have been for many years a great nation of borrowers and assimilators. Such things as weaving, silversmithing, farming, stock-raising, styles of clothing and kinds of household utensils, are all things that have been taken from other cultures. Possibly at the present time, the two big things which still remain the same with the Navaho as they were when first contacted by the Whites, are the language and the hogan.

Actually, Navahos prefer to live in hogans. There are instances where Navaho men with means have built houses near their hogans. This apparently was done primarily to gain more prestige. In reality, the houses were used for storage and for warehouses and the family lived most of the time in the hogan.

Hogan-type structures are the only acceptable type of house for native Navaho ceremonies. A typical Navaho hogan serves very well for most sings and sand-paintings. Actually, larger hogans are only constructed for ceremonies when the

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sand-painting is too large to go in the home, and this is done only for a small percentage of the ceremonies that are carried on in the reservation.

Hogans are easy to build. Navahos are quite familiar with the process of building them. The hogan is practically the only type of structure possible in a country where pinon and juniper are the only trees available. One can readily imagine how difficult it would be to construct any other type of dwelling with only short lengths of logs. Hogans are easily taken down and set up and can readily be taken along in moving from place to place as if often the case with families who move with their livestock. Where the range is overgrazed in one vicinity, the family has historically moved on to greener pastures. A hogan may, and often is, vacated for long periods of time. When the people return, there is very little loss or deterioration in the structure. It is very easy to repair, only a little chinking between the logs or perhaps a little bark and dirt thrown on the roof. It is easy for a Navaho family to own more than one hogan. In fact, with the semi-nomadic existence that many of them lead between summer and winter range, it is essential to have more than one dwelling-place.

Hogans are relatively easy to heat. By closing the single door at night, with only the smoke hole at the top open, coupled with body heat radiating from many individuals, the temperature is made quite comfortable with a minimum of fire. In many localities on the reservation, there is an actual shortage of wood and in some places even valuable browse plants are being burned for fuel. Hence, heating is a real problem to the Navaho. It would be almost impossible to heat a three-room house with only a little wood or browse.

As a matter of fact, a circular building has more floor space than a square one with equal wall length. For example, a circular hogan with a wall length of 64 feet could con-

tain 326 square feet. In contrast, a square house with a wall length of 64 feet has only 256 square feet—approximately 27 per cent less floor space.

Then, there is the taboo against the further use of a dwelling in which a death occurs which is an argument against a more expensive type of dwelling.

As to the disadvantages of the Navaho hogan as non-Navahos see them—first from a health standpoint. Dirt floors in hogans, coupled with the common practice of spitting on the floors, constitute a serious health menace. Dust in the eyes, dust in the food, probably carrying germs. Flies have a ready access to every hogan through the door and through the smoke hole, giving them a chance to bring in many new germs. Smoke from the open fire gets into the eyes and lungs, causing irritations.

Although the actual source of trachoma is unknown, health experts believe that there may be a direct correlation between acute conjunctivitis and constant eye irritations caused by smoke, dust, and direct sunlight. Personal cleanliness is very difficult in the hogan. This is brought about primarily through lack of water and by sleeping on the dirt floors in the same clothes that are worn during the day. Poor light often brings about eyestrain.

The habit of five to ten people sleeping in one room huddled together on the floor around a single fire naturally helps spread disease. In a one-room hogan, sick patients can not be isolated. Adults who have undoubtedly built up immunity to certain diseases, but who are nevertheless carriers, sleep in the same room with babies and children who have as yet not had the chance to build up any immunity. At night or in the winter, the door is tightly closed and very little fresh air gets in. All in all, there is decided lack of ventilation. The open fire in the center of the hogan is the cause of many serious burns.

One of the disadvantages often raised with regard to the hogan is that it is a one-room structure, conducive to laxness in morals. The question of morals is, of course, a very relative one varying from one civilization to another, and it has not yet been definitely established that what may be conceivably immoral to ourselves is not completely moral in a different cultural setting. This alleged disadvantage of the hogan needs considerable additional study.

From a land management standpoint, there are also many drawbacks. The farmer points out the lack of storage facilities; the forester points out the destruction of the timber resource, which of course is closely linked up with needed watershed protection. The Navaho idea of moving out of a hogan and burning it after a death only adds to this destruction of vegetative cover. Of course, range management men blame the hogan because the practise of bringing sheep in, night after night to a central home corral, makes it next to impossible to keep from overgrazing the range, with the inevitable erosion which follows. However, the fault lies of course not in the house type but in the grazing practice.

After looking at both sides of the case, it appears that the hogan itself should not bring about too much criticism. Certain basic changes in the hogan are being advocated by the Navaho Service, are being taught in the schools and demonstrated in several places over the reservation. For example, hard floors probably do help. These may be of wood or, if the family can not afford lumber, may be made of hard packed clay which will facilitate sweeping out as often as is needed. Windows with screens bring in a great deal more light and keep out the flies. Simple, inexpensive, home-made furniture will ultimately get the Navaho off of the floor which is thought to be fundamental.

Larger, better-made hogans and more permanent types of homes are recommended. For some families, a double ho-

gan will solve a great many of the difficulties. Better and more permanent buildings near a constant supply of water will make a great difference in Navaho health. In some areas where any kind of timber is scarce, it is advisable to build structures from other native materials available, such as stone and adobe. A stove in the hogan makes a great improvement over the open fire.

Desirable as it might be to have all Navahos living in modern two-, three-, or four-room houses, no one is able as yet to state what effect such houses might have upon the economy of the group. Habitations of this type are usually an index of a standard of living with increased desires and wants, and such general change might put so great an additional burden on the reservation resources that only half as many people could be taken care of with these same resources. Substitution of modern houses for the present rather serviceable hogans is a change that should be made only after full consideration of the economic angle of the problem.

However, the first and greatest step in the solution of the problem is not through changes in the habitation but through changes in Navaho thinking. For example, in the health field, the Navaho at the present time has nothing in his native traditions about a home being unsanitary. Diseases are never attributed to domestic surroundings but are the work of spirits which have in some way been offended. There is no word in Navaho for germ. The ultimate solution then, in both health and land management, rests primarily in health education and land management education.

Editorial Note: This paper was prepared by Mr. Lockett in April, 1939, while with the U.S. Indian Service, and he has not had the opportunity to revise it.
E.K.R.

THE MECHANICS OF PERPETUATION IN PUEBLO WITCHCRAFT

FLORENCE HAWLEY*

Juan Jose was my student, a returned veteran from Zuni pueblo. He struggled with bank loans, G.I. subsistence, and the high cost of living in town; he struggled with English composition in his examinations, reports, and term papers—even after locating a white friend to handle the weekly themes of the English class. He struggled with the well-founded jealousies of a wife back on the Zuni reservation, for Zuni monogamy does not necessarily prescribe loneliness and continence when a couple are separated. Juan Jose put up with his problems for a full two years of excruciating effort because he was in college for a purpose: he had come to the university to avoid the witches.

During the several years spent overseas his supposition that witches did not operate in the white man's territory was confirmed. But he was equally convinced that every time he returned to Zuni the witches struck him down with illness. The only remedy, if he remained in the home village, was to join one of the curing societies, a procedure entailing a strenuous initiation followed by periodic religious retreats and personal abstinences. This was not Juan Jose's idea of the good life. The one solution was to move away, which meant arranging some means of subsistence apart from his land and his sheep. The GI bill offered education—in town.

If Juan Jose had not been far more acculturated than the majority of Pueblo Indians he never would have mentioned witchery to a white. Pueblo children learn early that Anglos do not believe in witchcraft: therefore to Anglos

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witches do not exist. But Pueblos do believe in them—and the essence of witchery is belief.

According to Zuni tradition, the witches followed the Indians out from the underworld onto this earth, and hence will continue to live with and plague them. Isleta explains that the Mother (Corn Mother: Earth Mother) first created a medicine man, but finding that he had no one to fight with or to play with, she proceeded to create a witch, his first cousin. After this the witch and the medicine man cooperated and contended with each other to their mutual satisfaction.

Even as man creates the gods in his own image, so he creates the concept of witches who look and even function like human beings, until their malevolence breaks out in evil practices. Pueblo witches are not themselves supernaturals; they do not parallel the Christian concept of the devil. They are not even minions of the devil, because the Pueblos do not believe in any concept of impersonation of all-evil, whether supernatural or human. The Pueblo witch is rather like the Pueblo *katchina*, a creature which carries certain human as well as non-human characteristics and who may do good today and harm tomorrow. He, like the supernaturals, differs from human beings in that his power is greater than theirs. But the witch is not a *katchina*; he lives as a human being with human beings most of the time, and when he uses his power, it is more frequently for harm than for good. At will he can change himself into an animal or, less often, a big bird, or a bundle of rags referred to by the Indians as a "rag doll."

Witchcraft may be done for spite, revenge, or love. Those interested in the effect of military experiences upon the Indians sometimes are amazed to discover that many resume old worries about witchcraft and disease as soon as they return to the home pueblo. But in most cases of partial acculturation, the Indian veteran has combined certain elements of new and old which chance to fit together. As Adair¹

¹Adair, John—A Study of Culture Resistance: The Veterans of World War II at Zuni Pueblo, Ph.D. Thesis, University of New Mexico, 1948.

pointed out, the veterans of Zuni explain that since disease germs are present at all times (according to GI hygiene courses) it is obvious that periodic illness to which one succumbs must be the result of the witches at that time using their power to weaken victims so that germs may enter and wreak havoc. In the last several years witchcraft has increased tremendously in Zuni as the psychological result of and protest against acculturation pressures; the threat of being considered outstanding and hence perhaps a witch even functions to prevent young men from taking the responsibility of such an innocent innovation as opening a garage or a native grocery store in the village. Isleta, where acculturation has been a strong force for a longer period because of proximity to urban white centers, is not quite so witch-ridden. Examples of the cult and of its mechanics here might be taken as an approximate representation for any of the Rio Grande pueblos, especially in view of the intensive borrowing which has taken place not only among pueblos, but also between the Pueblo people, the Navahos, and the Spanish Americans. That Indian witchcraft was borrowed in part from Spaniards in the post-Columbian period has been suggested before.² But an examination of the fundamental features which characterize what might be called the witchcraft cult of the Southwestern tribes, and consideration of the integration of witchcraft beliefs into the culture of those tribes produce a strong argument for its pre-contact existence, although along lines so similar to those of Europe that considerable inter-borrowing could take place in New Mexico during the Spanish Colonial period. Moreover, the secrecy which so closely proscribes our knowledge of Rio Grande witchcraft today is a part of the general secrecy covering native practices in this area, as well as protection against possible danger from witches who might feel that they were being accused.

²Parsons, E. C., "Witchcraft among the Pueblos: Indian or Spanish," *Man*, XXVII, 1927, pp. 106-12, 125-8.

Pueblo methods used in witching people seem to be less clearly conceived than the general idea that illness is brought about by witchery. Images of deer skin, cloth, or wool are claimed to be made, named for the person to be injured, and stuck with thorns or otherwise manipulated.⁴ Such dolls are claimed to have been seen by accident, but the observer dare not speak of what he sees for fear of being injured by the witch. The blood of a coyote, a snake, or sometimes other animals is said to be used, but in what manner is unstated. The clothes or perspiration of the person to be injured supposedly are effective in directing the evil toward the intended victim.

Witch root might be called the specific which is considered most necessary in disposing of witchery, whether in cures or in prevention. The root is an important item of trade among both Indians and Spanish American villagers. Although found to some extent elsewhere, most of it comes from the Jemez mountains. The secret of exactly what shrub produces these roots is carefully guarded by the medicine men. Some individuals carry a small piece of the pungent root in their pockets or tucked beneath a squaw belt. They are supposed to burn one end of the root at once to prevent it from disappearing! Others carry the ground root tied up in little buckskin bags. A medicine society asked to de-witch a person may burn a piece in a bowl to fumigate the patient while the men of the society sing the proper religious songs. A house is blessed and evil people prevented from entering by burying a bundle containing witch root inside the house or, preferably, just outside the door so that persons who step upon it have their possibilities for doing evil automatically removed before going through the doorway. For this use the root usually is ground and mixed with a very small

³Unless otherwise indicated, illustrations described in this paper are from field data on a Rio Grande pueblo which for obvious reasons cannot be named. Further data can be furnished professional anthropologists on request.

⁴This specific use of imitative magic is so similar to that of Europe that its derivation from Spanish American neighbors seems rather certain.

amount of salt, a little ground turquoise, and one grain of corn. If men who come into town to sell curios chew a small piece of the root and spit it out over the articles for sale, whites and Indians alike are sure to exclaim at the beauty and value of these items and to buy them at once.

To obtain the root from the medicine men, a person must accompany his request with one of the corn husk cigarettes which are the official payment for any ceremonial aid or material. The protection it gives is supposed not to come directly from the root itself, but from the supernaturals *through* the root. In ceremonials medicine men sometimes chew the root so that they may obtain power, but one who takes the root too frequently or in too large quantities is likely to so retain it in his system (according to native belief) that later, if he takes a drink of wine or whiskey, the root "may put him into a spell." He will fall down making the animal noises which are heard in the medicine house during witch cures. Chewing the root in moderate quantities keeps one lively and cheerful.

In the Pueblo concept of illness, any lengthy or major physical or psychological distress is the result of evil having entered the body, usually through the maliferous machinations of some witch who has been annoyed or injured and seeks vengeance. Eagle wing feathers are waved over the body of the patient by medicine men to cleanse it because the eagle flies high and has eyes powerful enough to see even small things far beneath him on the earth. The bear leg skin, with claws, is slipped onto the arm of a medicine man so that he may slap the patient on back and chest to give him power, strength, a long life. The mountain lion helps medicine men to trace things by smell, and the badger by burrowing under the ground and locating buried witch bundles.

To quote from one patient: "I had been getting a little weak at the time we got the medicine man to cure me. He was standing in front of me with his left shoe off and he

cleaned me first with eagle wing feathers and then he made a sound like a bear behind my back. I felt just as if he were scraping my back with his fingers, and then he took out a live mouse with two babies and showed it to me in front of my eyes. I could tell because they were all moving that they were alive. The medicine man told me that there was a woman who wanted to talk to me and make love with me but I refused her. I don't know who it was but through her power she sent those mice into my body. The medicine man told me that if I had waited a little longer those animals would eat out my heart. So he split open all those mice with his fingers and then he asked for fire and burned them up. Another medicine man took a live rattlesnake out of one old man's body and after that the medicine man dropped dead for about half an hour. The old sick man sure was excited seeing that snake."

These are cures by individual medicine men called to aid a patient whose illness appears to be neither lengthy nor dangerous. But for a more violent illness the patient is taken to the house of the medicine society for treatment. His relatives, his house, and even the village likewise receive ritual cleansing, purification which presumably drives out evil, contagion, witches.

The medicine men, each wearing prayer feathers on his head and a rock crystal pendant hanging from his neck, gather in their ceremonial house and call on the medicine animals by name, this naming ritual presumably assuring the immediate spiritual presence of these animals in the room. The crystal is raised to the eyes; the medicine man looks in all directions, "all around the world," while the sounds of the animals are made. As soon as a medicine man sees a "bad thing" he shouts and begins dancing around the slat altar at one end of the room. He may, if the War Captain does not carefully watch him, fly out of the room and later be found where witches have caught and tied him up with baling wire,

yucca leaves, or rags. Then the War Captain and other medicine men must go out to bring him back so that he can be washed and purified. But capture of one of their members angers the medicine men, so they go out to find the witch. In a few moments back comes the group, struggling to hold the "witch," represented by a crow, rags, or feathers tied with rags. The people, lamenting the struggles of the medicine men, weep; but the chief stands ready with his stone point to draw a line across the floor of the doorway after the men have entered, so that the creature cannot escape again. The "witch" is laid before the fire; the men sing and smoke and rest. Then they open the bundle to see what it contains. Singing, they circle about the bundle, stepping upon it. It may squeal. Finally it is shown to the people, spat upon, and burned out of doors. Whoever dies first after this ceremony, whether in the home pueblo or elsewhere, is recognized to be the witch involved.

When the first influenza epidemic struck in 1918, the pueblo villages were full of the sick and dying; church bells rang constantly. In Isleta a big and secret ceremony was given by the medicine men to drive the evil from the village. "Putting on his power," the Town Medicine Chief found a bundle of pieces of rattlesnakes and of coyote hair hanging on a tree near the road to the cemetery west of the village. There in the tree this witch (bundle) laughed day and night and made fun of the people who passed carrying their dead relatives to the cemetery. He was making all the people die so that he could watch the funerals.

The procedure of catching and disposing of a witch believed to have caused disease varies little between the Rio Grande pueblos. The descriptions for San Felipe⁵ and for Domingo⁶ are very similar; there is a close parallel in Santa Ana⁷ and an approximation in the other villages. Some medi-

⁵White, Leslie, *The Pueblo of San Felipe*, p. 47.

⁶White, Leslie, *The Pueblo of Santo Domingo*, pp. 126, 129.

⁷White, Leslie, *The Pueblo of Santa Ana*, p. 326.

cine men use obsidian as well as rock crystal for divination. In San Felipe⁸ the witch bundle is referred to merely as a bundle of rags in which the chief medicine man finds a grain of corn, representing the stolen heart of the victim. The corn is given to the patient to swallow. The witch, when brought in, is thought to resemble a small man. This concept, with the addition of a detail in wrapping human hair around the corn, pertains at Domingo.⁹ The heart is cut up, placed on live coals, and held under the blanket which covers the patient so that he may be fumigated with the fumes. Burning cloth from a small rag doll representing the patient is used for such fumigation in Cochiti.¹⁰

The forms which the witch may assume vary somewhat from pueblo to pueblo. In Domingo it may be a dog, coyote, or owl,¹¹ in San Felipe an owl,¹² in Cochiti a coyote, crow, bear, or wolf (especially the first two),¹³ in Santa Ana¹⁴ a dog, an owl, a coyote, or a tiny figure which resembles a man with feathers in his hair, and in Isleta a coyote, crow, or "anything." In Santo Domingo, San Felipe, Santa Ana, Cochiti,¹⁵ and Isleta the witch may appear as a Koshairi, but the reason for such identification has not appeared. Parsons reports only the bundle of rags as a witch form among the Tewas,¹⁶ but admits that her data is very incomplete. There, as elsewhere among the Pueblo people, it is felt that talking of witches and witchcraft is "likely to cause death." Even those whose belief in witchcraft wavers feel that they should not chance mentioning the name of any living witch.

The question of whether a witch actually believes in his own power is answered in the fact that a Pueblo Indian who

⁸White, Leslie, *The Pueblo of San Felipe*, p. 47.

⁹White, Leslie, *The Pueblo of Santo Domingo*, p. 27.

¹⁰Dumarest, *Notes on Cochiti*, p. 158.

¹¹White, Leslie, *The Pueblo of Santo Domingo*, p. 20.

¹²White, *The Pueblo of San Felipe*, p. 42.

¹³Goldfrank, *The Social and Ceremonial Organization of Cochiti*, p. 95.

¹⁴White, *The Pueblo of Santa Ana*, p. 322.

¹⁵*Ibid.*

¹⁶Parsons, E. C., *The Social Organization of the Tewas of New Mexico*, p. 62.

learns witchery must make painful payment for his art. He is not an imposter; he arranges for and buys supernatural power so that he may gain certain desired ends, much as medieval Faust sold his soul to the devil. In Hopi¹⁷ and San Felipe¹⁸ (at least) witches may be people unfortunately born with two hearts. The Hopis feel that witches, moreover, may see to maintenance of their numbers by kidnapping children (always relatives) and secretly training them, if the number of voluntary acolytes is insufficient.¹⁹ In one Rio Grande pueblo two ways of becoming a witch are recognized: the trait may run in a family tradition and be learned without pay, or the secrets and power may be purchased from anyone who has them. The purchase price consists of a sum (\$30 in one case) which is paid during the initial agreement, plus a later and more important fee of which the initiate sometimes seems not to be fully aware. One youth who made his first payment to a Zuni witch (living in the Rio Grande) asked especially for the power to be a successful pitcher in ball games. For years he rejoiced in his skill until finally his mentor called him to say that the witches were in need of a deer to eat, this "deer" being the customary reference in witch parlance to one's most loved relative. Horrified, the boy answered that he most loved his mother but would never sacrifice her: he had been foolish but would pay with his own life instead of hers. The witch was satisfied and nothing happened until a few years later when the boy was delegated to watch the bridge just outside the pueblo, which was threatened by a flood of the Rio Grande. Three persons walked up to him, the witch and two women witnesses. The boy was asked again if he would give up his mother. He refused, desperately offered himself, and within a week began to sicken. Medicine men called to treat him explained that they could do nothing: the blood was being sucked out of his

¹⁷Titiev, M., "Notes on Hopi Witchcraft," *Papers of the Mich. Acad. of Sci., Arts, and Letters*, Vol. XXVIII, 1942, pp. 549-557.

¹⁸White, *The Pueblo of San Felipe*, p. 42.

¹⁹Titiev, M., *op. cit.*

body. To avoid explanations he smilingly told his friends that he was not ill, but merely lazy and resting. In two or three months he was dead—utterly dried up.

A similar tale is that of the woman who bought her power from a Navaho, refused to give up a relative for witch consumption, and finally paid by an illness. For two weeks she lay upon the floor, her body swollen, unable to move, and crying out with the weariness of remaining in one position. Since her recovery she has become a well known doctor among both Indians and Spanish Americans. It is interesting to note that bewitchments caused by Spanish American witches are said by the Pueblos to be curable only by Spanish Americans because such ailments are worse than those of Indians, but that, in contrast, Indian “doctors” can treat bewitched Hispanos.

The Zuni witch mentioned above once tried to buy a handful of valuable roots from an Arizona desert plant, brought back by a returned traveler, by offering in trade a buckskin or instruction in his own art of silversmithing. When he found himself unable to tempt the finder of the roots thus, he offered payment in magical power. Impressed with his bargain, the traveler decided that a good luck charm would be a nice thing to have. He gave the roots in exchange for a little bundle tied up in buckskin, plus some powder to place in the palm of his hand before he shook hands with anyone from whom he wanted something. For several days he carried the little bag in his pocket, but always when he held it tight in his hand it seemed to have life and movement within it. He began to be afraid. The witch, when questioned, explained that the bag did contain life in the form of ashes of a rattlesnake. Becoming ever more fearful, the new owner of the bag opened it and examined the contents. There were ashes and shiny little ground-up stones. Quickly tying the whole back into the buckskin, he attached it to a rock and threw it far away into the river. The river mother would

wash the evil thing away, but if he had lost or buried the bag he would have had to give up one of his relatives to the witch or serve as a meal for the witches himself.

Finally, the Zuni witch, who came to be known as responsible for many crimes of illness and death, was found lurking near a ceremonial house one night when the medicine men were giving a cure. Dashing out in pursuit, a medicine man and his guard caught the witch. The guard wanted to put an arrow through him at once. But the medicine man advised that if he, rather than the guard, shot the witch, the punishment would be worse because death would not be immediate. The wounds would fester until the man decayed. The medicine man shot the arrow; the witch pulled it out of his back and saucily threw it back at the medicine man. But within a few weeks the witch was sick in bed. His flesh rotted and the house had such a smell that everyone knew the invalid must be a witch and no one would go to visit him. Nor would anyone go to the funeral except those four or five men whose duty it was to bury him.

The Pueblo custom of living in a closely packed community insured, in the past, the most efficient possible defense against enemies as well as group cooperation in any large activities affecting the unit. It also, as has been pointed out by several authorities, increased possibilities of inter-personal and inter-factional friction, even though overt expressions of such friction were disapproved and infancy and childhood training minimized the development as well as the expression of personal aggression as far as possible. Where the concept of witchcraft existed, one might expect that the fear of possible bewitchment by someone angered would come to be a primary sanction invoked against irritating neighbors. The related threat of someone accusing one of witchcraft would act similarly. Such accusations served the further purpose of providing the accuser with a sense of his own justification and outraged innocence. That the unity of a pueblo

may become so strained by the stress of long and ever-increasing factional conflict that a split becomes inevitable and a new village must be established by the losing group has been observed in its several stages in modern times. But the fact that witchcraft is used as an important weapon in his group psychological warfare, as well as by individual enemies, customarily has been hidden from the prying eyes of anthropologists through that trait of secrecy which covers all Pueblo religion and, above all, Pueblo black magic.

The very improbability that word of this punishment ever will reach the ears of white sympathizers or advisors of either party enormously increases the possible effects of either the threat or the presumed use of witchcraft. In one of the Rio Grande villages in which the deaths in rapid succession of the cacique and of his principal aid and presumed successor left an open field for the growth of dissension between the two parties already struggling for power, one party managed to force its choice of governor. The man who thus became governor then refused the losing group permission to participate in a ceremony previously always given by the two groups cooperatively. Shortly thereafter the war captain of the first party became ill and it was suspected that the other party had cast a spell over him. He was taken for treatment to another pueblo, reputed to be especially efficient in cures pertaining to bewitchment. The man did not improve. He returned to his own pueblo, requested a curing ceremony from the medicine society of his own party, and died just as he was entering their curing chamber.

The opposition party then openly announced that others of the offending ruling group would follow the fate of the war captain. Soon the dead man's assistant was stricken. He was brought in to the government Indian Hospital and, although the physicians could not decide on the nature of his malady, the treatment there resulted in temporary improvement. After a few weeks, however, he fell in the hospital

bathroom and broke his neck, a proof of the spell which had been cast upon him.

The next victim was second assistant to the war captain. When his illness struck he was taken to another pueblo for treatment and given witch root to swallow. This made him vomit out the evil within him and he survived, but he never has been well since.

The next move consisted of the death of the old man who was chief of the medicine group of the party in power. Looking into the holy water in the medicine bowl during a ceremony, he became ill, foretold his death, and blamed the machinations of the minority group. His assistant followed him in death within a very short period. The second assistant, still healthy, left the pueblo to buy alfalfa seed. Suddenly stricken with pain from his chest to his feet, he returned home for a curing ceremony. This proved ineffective, and he was taken on to the Indian Hospital. His death occurred on the night he was brought back to the pueblo by ambulance. The hospital could not name his malady, but the pueblo people were quite without confusion regarding its origin!

The new chief of the medicine society took office, was warned by the malefactors that he never would be able to see anything when looking into the bowl of medicine water, and became blind within a short period.

After such a series of catastrophes one might expect that anyone would hesitate to aspire to office, but in this village the fight for political power still continues, an expression in itself of a value contrary to old pueblo ideals and customs. Acculturation has taught the pueblo officials, hitherto unpaid but working dutifully for the good of their people, that politics may be made gainful to anyone who quietly pockets fees and funds instead of banking them. But neither the officials nor those they supposedly control are free from the oppressive realization that the best laid plans

are subject to the whims of those of the local citizenry who have set themselves to the acquisition and use of power beyond that of mere mortals.

At this point the question of the part that black magic plays in pueblo life—to the extent that an individual should be willing to sacrifice a close relative or, instead, his own health,²⁰ in exchange for the power and techniques of witchery—becomes somewhat rhetorical.

The Pueblo peoples are sedentary agriculturists whose existence in an arid area through the centuries has been threatened periodically by the exigencies of weather. They developed simple farming techniques suited to the geographic conditions; they developed systems of human cooperation among themselves and with the supernaturals who controlled conditions beyond the immediate touch of man. Agriculture prospered; the Pueblo people spread to cover a large area and their culture rose to a complexity far greater than that of surrounding tribes. But illness and bad luck were as grave problems as famine to people living in close proximity to each other. A system of psychosomatic medicine, dependent largely upon apparent contact with the supernatural, was the best solution they could devise for both physical and psychological ailments. The sphere of psychological problems is unlimited. Even a summary resume of the various types of situations in which witchery is thought to be involved indicates the present breadth of application of occult power.

As has been remarked more than once by field workers, witch fears increase during periods of stress. This means that witchcraft itself increases during such periods, for, as pointed out at the beginning of this paper, the effects of witchcraft depend upon belief. When two cultures exist side by side with values which are, in part, opposed to each other, the

²⁰The high incidence of illness and death in a pueblo easily permits one to postulate demise of someone as payment or punishment related to witchery.

minority people repeatedly is pressed for self justification, even if only subconsciously. This rationalizing process may be relatively easy until acculturation forces become strong, whether merely through minority observation of certain apparently desirable characteristics of the dominant culture or through intentional imposition of some of these values through schooling, government projects, etc. If we say that a culture, like an individual, fights for self preservation, in reality we are simply commenting upon the observed struggle between conservatism and change in the minds and emotions of the culture carriers. Acculturation, whether resisted or accepted, brings a never-ending series of baffling problems, large and small, wearying the brain. New problems are superimposed upon the old, rather than exchanged for them; man still must earn his living and get along with his neighbors. The neighbors, too, are facing new problems. The ever recurrent conflicts between opposed cultural values and old versus new desires produces vague frustrations, vague and variously expressed aggressions.

Magic—the feeling of having some reserve of power, some contact with supernatural forces—increases one's self confidence, one's sense of strength in coping with the external world. A belief so fundamentally rooted in Pueblo culture as witchcraft will not disappear merely because schoolteachers and missionaries tell the Indians that witches are figments of imagination. The Pueblos wistfully concede that witches do not seem to be interested in white people, an observation which thereby nullifies white knowledge of witches and hence of the statement that they do not exist. Until the whites threatened charges of murder, the guardians of public good in the pueblos put witches to death. But witchcraft, protected by the unexplainable exigencies of existence upon this mortal sphere, continues to live. Even in our own highly mechanized culture, with its apparent emphasis upon science and cold reason, we find a great plentitude of palmists, me-

diums, "readers," etc., largely consulted by the depressed, the neurotic, and those unsure of themselves in the face of rapid change of "buffeting fate." When one finds some modern American families attempting to plan conception of their children so that they will be born under a certain constellation (as in Hollywood) and some modern American bankers consulting local astrologers before making loans (as in more than one small town), he is watching the same humble admission of human weakness and need for controllable supernatural aid as the Pueblos who perpetuate witchcraft with its strange combination of consolation and fears. The harder, the more confusing, the more desperate life becomes, the more mankind is tempted by the apparent security resulting from secret formulae which can be learned—if not understood. Science and witchcraft both provide formulae, but those of witchcraft are quicker and easier. And witchcraft, unfortunately, carries fear in itself and hence in its application increases the general state of stress at the same time that it presumably alleviates the single problem. Witchcraft perpetuates witchcraft.

A BRIEF HISTORY OF THE COCOPA INDIANS OF THE COLORADO RIVER DELTA

DOROTHEA S. KELLY*

The Cocopa Indians, a Yuman-speaking people now numbering about 600, represent the single remaining group of a series of important tribes that occupied the delta of the Colorado river in aboriginal times. Being located south of the route to California and east of the area of Spanish missionary activities in Baja California, they were, until recently, little disturbed by the expansion of European culture, and, for the same reason, little known to students of the American Indian.

While their delta habitat was a severe, hot, desert, its aridity was interrupted by the Colorado river, which, entering the delta at Yuma, Arizona, annually flooded some 300,000 acres of bottom-land, creating a region of dense and fruitful vegetation, in spite of a yearly rainfall of less than three inches.

Not all of the delta was equally flooded every year, the western side being most unstable, while the eastern side, along the river itself, and its principal sloughs, was most dependable for gathering and agricultural purposes.

There is also evidence that, prior to the nineteenth century, the Colorado swung from one side of the delta to the other,¹ but since its last change of course occurred before the memory of living Cocopa, it need not be discussed here.

Despite long and intensive investigation of the prehistoric remains in the southern California and Colorado river regions, principally by Malcolm Rogers, this area remains one of the least well known in American archeological literature.

*Minneapolis, Minn.; A.B., University of Arizona, 1936.

¹Sykes, 1937, pp. 169-170.

The key to the difficulty lies in the lack of sites with archeological depth; pottery and stone tools are scattered widely over the surface, but in no case has there been an accumulation of sufficient depth to permit stratigraphic analysis.² This lack of trash depth, however, is of some significance in itself. It would seem to indicate, although negatively, that former modes of habitation were of the same order as at present—that the people lived in scattered, single dwellings of pole and brush construction, which were frequently abandoned and rebuilt at a new site.

According to Rogers, a crude civilization, undoubtedly with some knowledge of agriculture, and with an unique ceramic complex of unknown provenience, appeared without known predecessor in the lower valley of the Colorado about 800 A.D. The pottery found at this horizon (and the culture that it represents) has been termed Yuman I, because, although changes occur, there appears to be a generic relationship with historic Yuman wares.³ Yuman I wares, however, cannot be traced to any single source. Nevertheless, since various cultures to the east and southeast had previously developed highly sophisticated agricultural societies, the general source of agriculture and pottery presents no great problem.

Rogers is inclined to the opinion that, even though they may go back to Yuman I times, Yuman-speaking people first came into the lower Colorado valley at about the beginning of Yuman II (1000-1450 A.D.).⁴

In any event, there is no evidence of a sharp break in the development of Yuman culture, and it must be assumed that the river tribes that were encountered by early Spanish explorers were the descendants of people who had occupied the Colorado valley and adjacent territory for many cen-

²Rogers, 1945, pp. 167-198.

³*ibid.*, pp. 181-182.

⁴Rogers, personal communication, 1942.

turies. The most important of these tribes were the Mohave, Halchidhoma, Yuma, Kahwan, Halyikwamai, and Cocopa.⁵

Fernando de Alarcon, the first European to visit the Colorado river country, was on the river in August and September of 1540, having been sent by Mendoza, viceroy of New Spain, to explore the country and to attempt to carry supplies by water to Coronado's expedition. It is possible that he did not reach a point far beyond the present city of Yuma, since he passed only one mountain-bordered channel, which was probably the pass at Yuma.

He presents a picture of a rather heavily populated river valley, occupied by a series of agricultural tribes. The first tribe that he met is unidentified, but successive ones are the Halyikwamai and Kahwan, with a third, unreached by him, the Cumana.

War, between the tribes, was frequently mentioned, with war parties under the command of a leader with considerable authority. This question of tribal leadership, plus certain details in his description of religious and social practices, must be discounted, in the light of present-day anthropological interpretation, but, on the whole, his characterization of the people, their dress and customs, is surprisingly good, and rich in detail.⁶

There was a lapse of 65 years before another Spaniard, Onate, visited the valley.⁷ Entering from the northeast, he first encountered the Mohaves, in the approximate area of their present location. Below the Mohaves, Onate found the Bahacechas, so far unidentified with any Yuman group, but, since they spoke a Mohave-like language, it is possible that "Bahacechas" might be Spanish for Lower Yuma (Baja Quechan). At the mouth of the Gila, he found another un-

⁵The anglicized spelling of tribal names has been adopted from Kroeber, 1943, pp. 21-40.

⁶Alarcón, pp. 279-318.

⁷Zárate-Salmerón, pp. 268-281.

identified tribe, called Ozaras or Osera. South of them were the Halchidhoma, Kahwan, Haglli (?), Halyikwamai, and Cocopa.

He placed the Cocopa in their traditional seat north of the gulf, but said little concerning any of the river tribes, except that they were practicing agriculture and were fairly densely settled. He estimated the delta population at 20,000, which is, no doubt, too high.

It was almost 100 years later, in 1701, when Kino visited the area. He identified only two of the historic tribes—the Halchidhoma, north of the Gila, and the Halyikwamai. His mention of the Yuma is their first historical reference, and he located them in their established position at the confluence of the Gila and Colorado. He doesn't mention the Cocopa, unless his Coanopas or Hoabonomas and Hogiopas could be Cocopa, which one or both probably were.⁸

The last of the Spanish explorers was Father Garces, who made three extended trips into the Colorado area, California, and northern Arizona, between 1771 and 1776.⁹ He took a census of the Colorado river Indians, and provided information upon the location of neighboring groups, numbering the Cocopa at 3000. His data on the tribes of the delta region are as complete as any given, prior to the time of modern ethnographic investigation.

His diary indicates that in 1771 the Cocopa occupied all of the southern third of the delta, to a point above Colonia Lerdo, but that by 1775 they had been pushed to the west side of the river, so that their territory included "a wide area from the Laguna de San Matheo (probably in the south central delta) to the Sierra and desemboguement of the Rio Colorado."¹⁰

⁹Coues, 1900, vol. 1, pp. 177-189; vol. 2, pp. 443-446.

⁸Bolton, 1919, pp. 252-316.

¹⁰Coues, 1900, vol. 1, p. 177.

Lieutenant Hardy, in 1826, made the trip by boat up the gulf and into the lower channel of the Colorado, where his ship became stranded about 20 miles upstream from Montague Island.¹² There, he met a group whom he called Axua Indians, because their interpreter said that he was a chief of the Axua Indian nation. Hardy assumed that he was a river Yuman, and it is tempting to suggest that he gave Hardy the name of his gens (the native word for gens and tribe being nearly the same), which could have been either *kro?atl*

¹²Hardy, 1829, pp. 312-384.

or *arwa.t.*¹³ If it were the latter, it would make him, in all probability, a river Paipai.

Hardy had a holy fear of Indians, so reported only what he saw from his ship, but he recorded that on one day from five to six thousand Indians assembled along the river bank.¹⁴

The next English-speaking explorer in the delta was James O. Pattie, who accompanied a party of beaver trappers above the mouth of the Gila during the winter of 1827, and on a later trip went down the Colorado below the Gila, at the close of 1827 and in the first two months of 1828.¹⁵ Above the Gila, he found the Cocomaricopas, and above them, the Mohave. South of the Gila, on the west bank of the Colorado, he found the Yuma. At an estimated 76-86 miles below the confluence of the Gila and Colorado rivers, he encountered Cocopas—the territory between them and the Yuma (formerly occupied by the Kohuana and Halyikwamai) apparently being uninhabited. Three days later, “we . . . received a shower of arrows from about fifty Indians of a tribe called Pipi.”¹⁶ There can be little doubt but what these were the same river Paipai whom our informants said were permanently located on the river, with their own settlement, chief, and farm lands.

In 1853, S. P. Heintzelman, commanding officer at Ft. Yuma, wrote that the Yuma occupied an area extending from 60 miles above the Gila to 40-50 miles below it (in Mexico); below them were the Cocopa, on both sides of the Colorado, but principally on the east, and extending into the Baja California mountains.¹⁷ He estimated that there were 300 Cocopa warriors (which may be converted roughly into a population of 2000), in three separate groups, allied with

¹³Kelly, 1942, pp. 675-690.

¹⁴Hardy, 1829, p. 339.

¹⁵Pattie, pp. 131-137, 181-220.

¹⁶Pattie, p. 200.

¹⁷Heintzelman, 1856-57, p. 42.

the Southern Diegueno in a war with the Imperial Valley Kamia and Yuma.

The Indian wars came to an end in the 'fifties, and, for the next 50 years, few Americans bothered to penetrate the delta beyond the banks of the river. Even greater obscurity descended upon the region after 1887, when river traffic came to an end, with the building of the Southern Pacific railroad into Yuma from the Pacific coast.

Sykes estimated the Cocopa population at 300, in the period 1880-1890,¹⁸ but this is certainly incorrect. Lumholtz reported that a resident of Colonia Lerdo took a census in 1900 and placed the tribal membership at 1200.¹⁹ In the same year, Capt. Newton H. Chittenden visited the Wi Ahwir Cocopa and found about 450 of them²⁰—a reasonable number. One of our informants, Oliver Twist, places a Cocopa population of about 600 on the eastern side of the delta in 1900, while Tomas Vicente (another informant) gives a similar figure for those on the western side.

Prior to the break-through of the Colorado river into the Salton Sea in 1905, the Cocopa were distributed in three major groups, the Wi Ahwir, against the base of the Cocopa mountains, and the Hwanyak and Mat Skrui, along the main stream and its principal sloughs. Those most favorably located (relative to soil, flooding, ease of clearing, etc.) practiced agriculture, with corn, teparies, black-eyed peas, pumpkins, and watermelons being the principal crops.

Farm grown foods were supplemented by gathering wild seeds, roots, and fruits such as mesquite beans, upon which there was great dependence, while game, fish, and eggs were quite important. A major source of food to those with poor or no agricultural plots, was the pine nut harvest in the mountains of Baja California. This necessitated a

¹⁸Sykes, 1937.

¹⁹Lumholtz, 1912, pp. 250-252.

²⁰Chittenden, 1901, pp. 196-204.

journey of no mean proportions, undertaken by groups of families, who camped with or near relatives among the mountain tribes. Another crop of great value was the spring "wild rice" (*Uniola Palmeri*) harvest. Whole families moved to the area (in brackish water near the head of the gulf), some of them living upon log and brush rafts, others in temporary brush shelters placed upon nearby sand hills.

Nearly all their vegetable foods, and some fish, were dried and stored for the winter. Nevertheless, there were periods of hunger, if not actual famine, in which the Yuman practice of total destruction of property, upon the death of a member of the family, was no doubt a contributing factor, since it would motivate the people against an accumulation of possessions, even food-stuffs.²¹

On the social side, there was a loose division of labor, with primary responsibility falling upon adult men and women with established families. The women did most of the gathering, the men were responsible for most of the planting, hunting, and fishing, while everyone participated in the work of harvesting. Boys and girls of courting age, and for the first few years after marriage, were not held to an adult pattern; children were not expected to do more than occasional chores.

With resources, both natural and social, practically unlimited, the lack of Cocopa adjustment presents a series of interesting problems:

1. Within a potentially fruitful environment, they did not solve their food problem.
2. Their attitude toward food gathering and production, with one very interesting exception (their use of magic *only* in relation to planting *one* wild grass), remained completely rational.

²¹For additional factors, and an analysis of the situation, see William H. Kelly, *Cocopa Ethnography*, in press.

3. In an area of relatively dense population, the nature and extent of social contacts remained at the simplest level.
4. Emerging from at least 400 years of war activities, with formalized war patterns and leadership, they did not expand the concept of leadership to their political and social systems.
5. With death and the hereafter their principal cultural interest, they yet failed to develop a system of priesthood or of ancestor worship.²²
6. While their culture contained patterns of generosity and wealth-destruction, this behavior was not related to a system of social classes or individual rank.

Disintegration of Cocopa culture and economy probably began with the disruption of war in the 'fifties, which removed a major field of interest for which, apparently, no substitute was found. Then came the river boats, and an appetite was created for American goods and foods. Finally, after 1900, when the irrigation companies began harnessing the Colorado, the Cocopa served as a source of cheap labor, and a wage economy was inaugurated. During the years between 1905 and 1907, when the Colorado was flowing into the Salton Sea, the Cocopa were left high and dry in their delta habitat. Not only was there no water for their farms, but that same lack prevented the growth of wild plants, and reduced the fish and game supply. It was a question of move or starve.

Physically, the Cocopa are badly hybridized. For several generations, according to our oldest informants, members of four tribes from the mountains of Baja California (Southern Diegueno, Paipai, Kwatlwa and Kiliwa—all Yuman-speakers, like the Cocopa) came and went freely in Cocopa territory, some remaining on the river with Cocopa wives,

²²Kelly, 1949, pp. 151-164.

others returning with them to their mountain homes. The Paipai even went so far as to establish a permanent settlement on the river, where they inter-married with the Cocopa.

After the river boats began running on the Colorado, in the 1850's, Cocopa girls discovered that a night spent in company with the ships' men was rewarded by gifts of American blankets, coffee, sugar, and flour. Later, when the canal and dam systems of the Imperial and Yuma Valleys were under construction, prostitution in Calexico and Yuma served the girls as a means to ready cash. Mexican-Cocopa marriages began in the early days of the cattle industry, and, in addition, we have record of three Cocopa families in which an American man was an ancestor, and one in which a Negro male was involved.

At the present time, there are approximately 300 Cocopa in Arizona, and about the same number in Mexico. In 1917, President Wilson issued an executive order setting aside certain lands, in the vicinity of Somerton, Arizona, for a Cocopa reservation. This land includes a little over 500 acres, of which only 200 are suitable for agriculture. In 1944, there were 102 Cocopa living on the reservation, comprising 18 families, with an average annual income per family of \$666.55, derived from agriculture, outside labor, and native products.²³ About 200 live off the reservation, making a living as day laborers, whose income fluctuates with the rise and fall of farm wages, and the availability of work.

Those in Mexico in 1947 work only seasonally, chopping and picking cotton, at a daily rate of seven pesos (\$1.40 American), although a few cut and sell wood. In spite of their low income, not more than a handful raise any of their own food, and most of them are perpetually hungry.

Malnutrition is prevalent, even among the Arizona Cocopa, while syphilis, tuberculosis, and other diseases are caus-

²³Department of the Interior, Indian Bureau, Cocopa Indian Reservation Program, prepared, March, 1944.

ing a rather high death rate among all age groups. At the same time, the Cocopa are gradually being absorbed, both physically and culturally, into the Mexican population.

Note: This paper is based upon ethnographic investigations among the Cocopa Indians, sponsored by Peabody Museum, Harvard University, and conducted by myself and my husband, Dr. William H. Kelly. I wish to thank him for much of the factual material, and for his help and advice in the preparation of the manuscript. D.K.

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THE MILITARY ORIENTATION IN YAQUI CULTURE†

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At present, some 20 years after the last open fighting with Mexicans, the Yaquis of Sonora still exhibit institutions oriented toward warfare. In the Sonora villages they maintain functioning military organizations which are vitally important parts of the village government. Moreover, the naming of things with military names and the organizing of people in military ways is not confined to the military societies. The symbolism of war and patterns of military organization are pervasive in the ceremonial societies and in ritual activities. The nature of the military interest and its place in the culture of the Yaquis is the subject of this paper.

Much of the field data on which this paper is based was gathered during the period September 1941 to July 1942, while the writer was a Fellow of the John Simon Guggenheim Memorial Foundation.

Yaqui Military History

The military history of the Yaquis, insofar as we know it, may be conveniently thought of in four periods of rather unequal length: (1) the pre-Spanish period up to 1533; (2) the period of sporadic warfare with the Spanish from 1533 to 1610; (3) the Jesuit-Franciscan period of peace from 1610 to 1823; and (4) the period of warfare with the Mexicans from 1823 to the present.

Pre-Spanish Period. There is some evidence that the Yaquis fought at least occasionally in this period, and probably in the succeeding one, with neighboring tribes such as

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the Lower Pima and the Seri and possibly the Mayo. We know very little about how the warfare was organized and can only guess as to how much warfare there was. Beals¹ believes that it was a moderately important cultural interest, probably shared with other Cahita-speaking tribes to the south. We know, however, only the probable nature of a few odd bits of custom tied up with warfare, such as ceremonial cannibalism, dances centering about the heads of enemies killed in battle, and the challenge as a preliminary to fighting.

Early Spanish Period. The 77 years of earliest contact with the Spanish began and ended with hostilities. A show of force on the part of the Yaquis against Diego Guzman when he appeared at the southern border of Yaqui territory in 1533 was sufficient to turn the Spanish back without a real battle. From then until 1608 there was no fighting between Spanish and Yaquis. In that year Hurdaide attempted to carry his successful conquest of the west coast of Mexico into the Yaqui country. His soldiers were routed and he was forced to retire. The Yaquis remained unconquered, but nevertheless in 1610 requested voluntarily that some priests be sent to them.

The Jesuit-Franciscan Period. In 1617 the priests, Perez de Ribas and Tomas Basilio, arrived on the Yaqui River. They were Jesuits, calling themselves "soldiers of the militia of the Company of Jesus."² They carried out a campaign of conversion, marked by triumphal mass baptisms; established churches; and "reduced" the Yaquis to villages centering around the churches without arousing tribal resistance. There is no record of any fighting during this period until 1740, when an uprising occurred under the leadership of a Yaqui named Muni. Fighting occurred at different times over the

¹Ralph L. Beals, *The Aboriginal Culture of the Cahita Indians*, Ibero-Americana 19, Univ. of Calif. Press, Berkeley & Los Angeles, 1943, pp. 40-43.

²Andres Perez de Ribas, *Historia de las Triunphos de Nuestra Santa Fee, en las Misiones de la Provincia de Nueva Espana*, Madrid, 1645. See title page and pp. 283 ff.

course of about a year. Yaqui forces were severely defeated in the battle of Otamcahui, and the Yaqui leaders were executed in 1741. The succeeding 80 years, during which the Jesuit missionaries were expelled and the Franciscans came in, seem to have been as peaceful as the preceding century and a quarter. Thus, this whole period of about two centuries was one of general peace, except for the brief rebellion of 1740.

The Mexican Period. The War for Independence and the changes in civil administration of the Yaqui following it touched off a period of hostilities which lasted for more than a century.³ In the 1820's a Yaqui named Juan Banderas, motivated by a vision of the Virgin of Guadalupe, organized Yaquis, Mayos, and other Sonora Indians to fight for independence from the newly established Mexican government. There were initial successes, and Opatas, Lower Pimas, and Mayos seem to have joined with the Yaquis under Banderas. There were fights and skirmishes over a large area of southern Sonora for several years. In 1831, however, Banderas was captured and executed. What tribal unity there was broke down. Nevertheless, portions of the tribe took up arms in every decade thereafter until 1930. The State of Sonora was politically disorganized and Mexican factions warred on each other. Yaquis fought on various sides in the successive conflicts. Just before 1880 a real leader named Jose Maria Leyva (Cajeme) arose among them, organized all the Yaqui villages and at first some Mayo villages for war, introduced a type of warfare which involved the defense of fortified points, and for a time held state and federal Mexican troops at bay. Decisive defeats for the Yaquis came, however, in the late 1880's and early 1890's, primarily at Buatachive and Masokoba in the mountains north of the river villages. From that time on fighting was a sporadic

³The most useful publication dealing with Yaqui military history is that of Francisco P. Troncoso, *Las Guerras con las Tribus Yaqui y Mayo del Estado de Sonora*, Mexico, 1905.

guerrilla warfare, the last incidents of which took place in 1926.

The Mexican period saw the development of warfare as a constant preoccupation of some portions at least of the Yaqui tribe. This presented a sharp contrast with the peaceful interests of the preceding two centuries. As warfare rose to a place of high interest, there was a development of military leadership and important adjustments of military tactics to the type of organized warfare which the Yaquis were combating. Little data has yet been collected concerning the details of military institutions during the early nineteenth century. However, Yaquis living today testify that the current institutions are closely similar to those that existed in the days when they grew up in the river villages in the 1870's and 1880's.

Present Day Yaqui Military Organization

At present both Yaquis and Mexicans are organized for warfare in the Yaqui country. Each of the important Yaqui villages⁴—Pitahaya, Potam, Vicam Station, Torim, and Bataconsica—have garrisons of Mexican soldiers with Mexican officers in command. In addition, there are permanent garrisons of Mexicans at various strategic points on the edges of the Yaqui territory, such as Peon, Tetacombiate, Bacatete, Huichori, Torocobampo, Jori, and Cocorit. In each of the five Yaqui villages mentioned the Mexican garrison is matched by a Yaqui military organization with its own officers and headquarters. The men of the Yaqui garrisons call themselves *yoem sontaom* (Yaqui soldiers) in distinction from the *yori sontaom*, or Mexican soldiers.

⁴The eight traditional villages, in terms of which Yaquis still think, are no longer all occupied by Yaquis. Belen at the western end of Yaqui territory is deserted and descendants of the former occupants live at Pitahaya and elsewhere. Huirivis and Rajum in 1942 were being reoccupied; Rajum was just being organized again along the lines of the old established villages, but had a population of less than a hundred. Vicam was almost deserted, and most if its inhabitants were living in Vicam station. Bacum and Cocorit had been completely taken over by Mexicans, and the Yaqui population of Bacum had established itself at Bataconsica.

In Potam the situation is complicated by the presence of 300 Yaquis who are serving in the regular Mexican army. They maintain their own headquarters apart from those of the Mexicans and also apart from the *yoem sontaom* of Potam. The latter, rather disparagingly, call these Yaquis by the same term applied to the Mexican soldiers: *yorì sontaom*. It should be said also that the *yoem sontaom* in each village have lately been carried on the rolls as auxiliary troops and paid monthly by the Mexican army. They do not, however, consider themselves as part of the Mexican military organization; they do not participate with the Mexican soldiers in such patriotic ceremonies as those of the Mexican Flag Day.

The Military Society (Yoem Sontaom). In each village the preservation of the Yaqui military tradition lies in the hands of specially dedicated persons. In times of peace the Yaqui soldiery is composed of men who have been promised ceremonially to military service. Only when war breaks out do the ordinary, undedicated men of the village enter the fighting ranks.⁵ The dedicated men become soldiers as a result of a vow made, most usually by their parents, to the Virgin of Guadalupe. The vow is ordinarily made as a result of illness and results in establishing a life-long obligation for the individual. He must serve as a Yaqui soldier in payment to the Virgin of Guadalupe for having cured him. Thus, the primary obligation of a soldier is a religious one.

The Virgin of Guadalupe is the patroness of the soldiers. She is regarded as the leader of their organization.⁶ Beneath

⁵In his *Contemporary Culture of the Cahita Indians*, BAE Bulletin 142, Washington, 1945, Ralph L. Beals says that the military organization of the Yaquis includes every male over the age of adolescence in the tribe (p. 51). Certainly there is a strong sentiment that every male should fight to protect his village, but only a relatively few are ceremonially dedicated. In Potam in 1942 there were not more than 30 men serving as soldiers out of a population of about 3000. Beals' one informant who said no ceremony occurred until "a rank is taken" (p. 51) stated the case as the writer has found it in Potam, Rajum, and among the Huirivis people now resident in Potam.

⁶In some of the sacred orations, the Virgin of Guadalupe is referred to simply as the mother of a male child who seems to be regarded as the real supernatural commander of the military society. The vows at present seem, however, to be made to the Virgin of Guadalupe rather than to this infant supernatural.

her are six ranks which may be held by ordinary mortals: flagbearer, captain, drummer, lieutenant, sergeant, and corporal. The order of ranking of these officers is as listed.⁷ Each has a distinctive insignia of rank. Men may be dedicated specifically to any one of the ranks, but they may also be dedicated simply as soldiers and win or be assigned a rank when they begin to serve in the society.

The flagbearer, while rated as of the highest rank, is ordinarily a young man who may have very little to say in the making of any decisions whether in war or peace times. He is a ritual leader and said to have as his major function in war the establishment of a place for the soldiers to stand, a place which became sacred when the flag was planted there. He wears a fox-skin headdress like that of the captain which is described below. The flag which he carries is blue with a reddish cross in the center.

The drummer, although likewise of high rank, is ordinarily also a young man. His headdress is like that of the flagbearer. His drum, beaten with two wooden sticks, is about 18 inches in diameter and 3 inches deep with a double head of hide. The ritual of drum and flag are inseparable and will be discussed below in connection with the functions of the society.

The administrative head of the organization is the captain, called *wikoi yaut* in Yaqui. There are usually several men of captain's rank in each Yaqui village, but one of them is recognized as the ultimate human authority and holds his office by common consent, or sometimes, it is said, by formal election, if there are disputants. The captain wears a head-dress made of fox skin to which are attached four tufts of hawk feathers. The skin is worn over the head and back, extending below the waist at the back. It is attached to a head-

⁷Beals (op. cit. p. 52) describes the captain as having highest rank. The captain is certainly in Potam and Rajum the nonsupernatural commander, but the flagbearer outranks him and is deferred to by the captain.

band at the forehead made of red cotton cloth. The band is decorated with commercial mother-of-pearl buttons sewed in a zigzag pattern. This much of the headdress is uniform for captain, flagbearer, and drummer, but each has distinctive insignia in addition on his headband.

The captain's headband is characterized by a whole unworked valve of a cardium or similar shell sewed on with two cross stitches. In addition there are small rayed discs of shell (probably sun symbols) in the angles of the zigzags formed by the buttons. The headbands of the flagbearer and drummer differ from that of the captain in the absence of the shell sun symbols. The captain carries as additional insignia in all formal ceremonies a skin quiver of arrows and a five-foot bow.

The lieutenant wears a red headband without the fox-skin headdress; a white shell cross with a white shell crescent moon below or near it constitutes the special insignia. Lieutenants may also carry bows and quivers of arrows in ceremonies, but more commonly carry rifles. The sergeants and corporals have no distinctive headdress. The sergeants carry rifles in ceremony and the corporals carry slender sticks about four feet long carved with crosses near the handle ends. The corporals are very much in evidence during any formal meeting of the soldiers. It is their duty to run errands, to escort individuals to their proper places, to transmit orders of higher officers, and to transfer paraphernalia when necessary from one individual to another. The handing of paraphernalia is always carried out by the corporal with a brief ritual. He touches his hat or doffs it and makes a little curtsy as he hands the article to the officer. The officer replies with a curtsy but does not return the salute.

This organization maintains a headquarters in its village, sometimes a rectangular adobe building, sometimes a mesquite and carrizo ramada. Essential at the headquarters are benches, for it is the scene not only of meetings of the

military society, but also of the civil officials of the village. There are a rifle rack and a wooden cross a few paces in front of the building. The latter serves as a center of various rituals which take place during civil and military meetings. It is called the *tebatpo kus*, or patio cross, the same term applied to the crosses in the family houseyards. In some villages beside the cross stands a mesquite pole which is the whipping post, used still in punishing individuals who are condemned by the civil officials. The headquarters as a whole, the joint meeting place of military and civil functionaries, is called sometimes the *guardia* (body of armed men), sometimes the *cuartel* (barracks). It is the scene not only of formal meetings such as trials and village deliberations, but also of weekly informal meetings of the men in which there is general discussion of village affairs and gossip. It is one of the two important centers (with the church) of the public life of the village.

The Duties of the Society. In time of peace the members of the Military Society are constantly busy. The society has so many ritual and civil duties that its members are occupied almost as constantly as are the members of the more strictly ceremonial societies. The soldiers serve as a sort of guard for the civil governors, escorting them to and from church ceremonies and to household fiestas at which their attendance is required. The soldiers always march in two lines, with the flagbearer at the head of one and the drummer at the head of the other, the officers marching behind them in order of rank. The governors and their assistants are never seen as a group anywhere in the village except in the company of the soldiers and, if they are going from one place to another, between the two lines. The soldier's drummer is also regarded as the village crier of all civil functions as well as military. His drum gives the call for a court trial, a Sunday *junta*, or the Mexican Army pay-day. The soldiers are also guards for accused or condemned persons, in the rare

instances when they give trouble. The military organization has its special seating place behind the civil governors at any village meeting, and its officers are expected to take a prominent part in the discussion along with the civil and church officials.

The soldiers have important ritual duties, which constitute the most prominent of their peacetime activities. There is supposed to be a guard constantly on duty at the *guardia* (although this custom is not rigidly carried out) whose duty it is to give salutes to the sun, three times in every 24 hours. The salute is given at dawn, at noon, and at sunset. The salutes are given by the drummer as he stands at the patio cross before the *guardia*. The sound of the drum is thus a frequent and picturesque feature in Yaqui village life.

The important ritual character of the salutes to the sun comes out clearly when they are given during formal village gatherings. Thus if a court trial begins in the morning and lasts through noon, the whole procedure is stopped at noon for the purpose of making the salute. The soldiers' drummer and flagbearer go out to the patio cross as the bells at the church are sounded indicating noon. All the people attending the trial, except the women officials of the church, stand and face eastward, the men taking their hats off and the women covering their heads with their rebozos. The church officials kneel facing the church, which is usually to the west. The soldiers' flagbearer proceeds to wave his flag in the four directions, waving first towards the east. As he waves the flag, he advances a few steps in each of the four directions, thus describing a cross by his movements in front of the patio cross. The drummer follows behind the flagbearer. As soon as the flag has been waved in one direction, the drummer advances to the spot just vacated by the flagbearer and beats his drum in the characteristic soldier's call. The two performers describe the cross in this manner three times. When they have finished, men put their hats

on and women sink back off their knees. The same ritual takes place during a ceremony which lasts through dawn or sunset. Whatever the nature of the ceremony, it is stopped completely and all participants and nonparticipants pay their respects, along with the soldiers, to the sun.

Each Sunday the soldiers go through a ceremony which is regarded as of great importance in every Yaqui village. It is called *konti*, meaning literally in Yaqui "surrounding," and consists of a procession in which the church images are carried from church to village graveyard and back. In it the civil officers, as well as the church groups, such as *matachinis* and *fiesteros*, take part along with the soldiers. A service in the church precedes the procession, during which the captains take positions at either end of the church altar. They stand there in full regalia while the maestros chant the service. Each holds a bow and has a quiver of arrows over his shoulder. In the left hand the bow and two arrows are grasped while with the right hand the captain tells a rosary which hangs from the end of the bow. In the course of the service, this altar guard is changed, the lieutenants replacing the captains, the sergeants the lieutenants, while the corporals escort each pair to and from the altar.

After the service the soldiers march in their usual two lines as a guard on either side of the procession of dancing *matachinis* and chanting church functionaries. Two of the captains march at the head of the procession abreast of the Virgin patroness of the *matachinis*, each carrying an image of the soldiers' patroness, the Virgin of Guadalupe. The Sunday *konti* constitutes the weekly airing of the dominant supernaturals of the village.

The third major ritual function of the soldiers consists in the performance of the Coyote Dance. This dance is essential at large church ceremonies, such as Easter and the name days of the patrons of church and pueblo. On these

occasions it is performed in conjunction with pascola and deer dances. All the members of the Military Society must perform. As one man described it: "The captains must dance and then every one of them out to the last soldier." It is a ritual obligation. The dancers dance in groups of two or, more properly, three, wearing the captain's headdress, the skins hanging down their backs and the feathers bobbing. Between their legs they straddle the captain's bows, held in the left hand with bowstring down. With the right hand each grasps a piece of carrizo split at one end and with the split end beats the shaft of the bow. The dance consists of a prancing step, with successive advances and retreats in unison before the musician. The latter beats a soldier's drum with a single drumstick while he sings into a hole in the wooden frame of the drum. The music consists of songs which have war themes, such as "Challenge to the Seris" and "The Pimas are Running." Informants say that it was danced after victories of the Yaquis over Mexicans, such as Cajeme's defeat of General Topete at Anil in 1884. It is also said that it was danced preceding a battle. It seems likely that, war dance though it was, it was also during the nineteenth century a ritual religious devotion as it is now and was used during Holy Week and in connection with household ceremonies.

The War Functions of the Military Society. Any man may be promised to any of the offices in the Military Society, but whether he serves in the office depends actually on his abilities. Most of the duties are fairly simple, so that almost anyone seems to be able to master them. The office of captain, who has the responsibility for command in both peace and war, is the only one which requires exceptional ability. Thus, although a man may be promised as captain, he may never serve as such even though he may wear a captain's headdress occasionally in ceremony. There seem to be only two captain's headdresses in each village and these usually are worn by the

oldest of the captains and the actual functioning head of the organization. The latter assumes office, as has been indicated, either through simple dominance of personality or by election of the society. He may have been promised to some other office in the society and drafted for the captaincy. For any member is eligible to become a captain.

When war broke out the leaders of war parties were chosen from the officers of the society. These men were regarded as being in constant readiness for such occasions and as being fitted by their training and discipline to assume positions of leadership over the undisciplined men of the village who volunteered to fight when war broke out. The specialists in military ritual, the flagbearer and drummer, were also in constant readiness to carry out their important duties. The Military Society thus appears to have been a specially dedicated group prepared and disciplined to take over the organization of a fighting force consisting of the full male strength of each village.

During the nineteenth century and up to the present time there has been a tribal military organization which functioned during some of the periods of hostility with the Mexicans. A rank above that of captain was created, namely general, and two individuals seem to have held such rank at the same time, one commanding the men of the eastern villages—Cocorit, Bacum, Torim, and Vicam—and one commanding the western villages—Potam, Rajum, Huirivis, and Belen. This organization is reputed to exist still in underground form and it is said that there is one man still alive with the rank of general. There was no evidence of his participation, however, in the military societies in the villages in 1942.

Other Expressions of the Military Interest

It is apparent from this description of the Military Society that its activities are closely integrated with those of

the church organizations and the village government. The activities of the members of the society are ritual and political, as well as concerned with purely military matters.

It must now be pointed out that even in activities where members of the Military Society do not officially take part there is also considerable expression of interest in military ways of acting and in military things. Thus, at a number of points in the ritual, the symbolism is that of warfare. There are ritual battles in three important Yaqui ceremonies. One of these is a battle between ceremonial groups, one carrying male images and one carrying female, on Good Friday night as a part of the elaborate Holy Week ceremonies. The two groups start around the ceremonial circuit of the Way of the Cross in opposite directions, accompanied by masked performers (*Chapayekas*). When they meet, a sham battle is enacted.

More important as an indication of the focus on war symbolism because it is a climatic, rather than incidental, events in a ceremony is the "Battle of the Moors" which takes place between opposed groups of *fiesteros* during the annual ceremony in honor of the village's patron saint. The groups are organized in military fashion and carry out a virtual battle. One group of *fiesteros*, who wear blue head cloths, is always described as fighting "in behalf of the soldiers," that is, the Military Society.

Still more important because it is the climax of the most elaborate set of ceremonies in the annual round is an "attack on the church" carried out on Saturday morning of Holy Week. This is a ritual battle which has an even more definite military character than either of the others described. The Judas ceremonial society⁸, marching in its conventional two-

⁸The equivalent of the ceremonial society, usually called *Fariseos* in Arizona by the Yaquis who have migrated there. Compare Edward H. Spicer, *Pascua, A Yaqui Village in Arizona*, Chicago, 1940, pp. 124-126. Yaquis speak the name of the Society in Sonora in accordance with sound shifts characteristic of the early period of linguistic borrowing, saying *huras*.

line military formation, advances on the village church three times, is repulsed by little children dressed as angels, and is ultimately defeated as a result of being pelted with flowers. This is a carefully dramatized ritual battle with marching, military formations, individual challenges, advances, and retreats. These three annually recurring ceremonial battles may be regarded as representative of a traditional element in Yaqui ritual which was evidently shared with other tribes in the Southwest, e. g., the Opata, the Yuma, and some of the Pueblos.⁹

The military forms which ceremonial activities take are apparent in other ways, particularly in the men's ceremonial societies. This is clearly apparent in the Caballero Society (Yaqui: *Kabayum*). As the name indicates, this society is thought of by Yaquis as "the cavalry" (although they do not use horses at present in any village except Vicam station). Yaquis speak of the members as soldiers, just as they speak of the members of the Military Society as soldiers, but it has not been possible to discover any functions for them at present except purely ritual ones.

They appear only during Lent and Holy Week (except in the case of a death of one of their number), their activities reaching a climax on Holy Saturday morning. They constitute a guard for various images and other manifestations of Christ during this period. As the drama of Christ's persecution is enacted in various scenes, the Caballeros march in protective fashion on either side of the crucifixes and images, much as the Military Society marches on either side of the civil governor group in political and ceremonial activities. The Caballeros also ritually defend the church when the Judas Society advances on it on Holy Saturday. Thus, they

⁹See Ales Hrdlicka, "Notes on the Indians of Sonora, Mexico," *American Anthropologist* 6 (Jan.-March, 1904), pp. 51-89; C. Daryll Forde, *Ethnography of the Yuma Indians*, Berkeley, 1931, pp. 237-38; and E. C. Parsons, *Pueblo Indian Religion*, Chicago, Vol. II, pp. 761-764.

are protectors and guards of the church and its images. Their organization is almost identical in structure and use of titles with that of the Military Society. The church is said to be under command of the captain of the Caballeros during Lent and Holy Week. The "cavalry" may be thought of as the church's counterpart of the pueblo's "infantry" (Military Society), having similar protective functions, but in an exclusively ritual sphere.

The Judas Society is, like the Caballeros, organized in military fashion with a hierarchy of officers ranging from common soldier and corporal to captain. They carry as necessary paraphernalia metal or wooden swords. There are flagbearers who lead all actions and drummers who give signals for marches and ritual activities. The rank and file membership are called *sontaom* (soldiers). Moreover, the Caballero and Judas Societies are, precisely like the Military Society, made up of persons dedicated to service as a result of vows or *manda*. They are dedicated to the service of the supernatural commanders of their organizations, in both cases certain manifestations of Christ. It appears, therefore that the Military Society and the two men's ceremonial societies are based on the same model.

A third men's ceremonial group, whose major function is to carry out the *matachin* dances as a part of church ceremonies, also shows military symbolism. Although it is not organized in terms of hierarchy of military officers, its rank and file members are usually spoken of as soldiers. In the myths concerning the origin of the *matachin* dance, the dancers are described as soldiers who went to sleep and failed as a result in the task which had been set them of guarding Christ from his enemies. They are dedicated to the service of a supernatural, the Virgin Mary, and are regarded as "soldiers of the Virgin."

The Nature of the Military Orientation

The data so far presented indicate that the Military Society has a large number of ritual functions, carried out in conjunction with the ceremonial organizations; that ritual in several important instances takes the form of military actions; and that military and ceremonial societies follow similar patterns of organization. The ceremonial societies which carry out the annual round of rituals are oriented around the idea of organized service for the major supernaturals—Jesus and the Virgin. The men and women of the village enter into such service under vow in return for service rendered them by the supernaturals. Discussions with members of the Military Society disclose almost identical attitudes towards their service as soldiers. They serve a supernatural—the Virgin of Guadalupe—on the same basis. They regard their service as work, in the same way that members of the Caballero, Judas, and Matachin Societies regard their ceremonial activities. Their vow is sacred in the same way and their participation as soldiers is a result not of personal preference for military activity, but rather of their parents' action in securing supernatural aid for them.

Moreover, it becomes apparent, in discussions with individuals who fought in the various battles from Anil in 1884 to Oros in 1926, that these attitudes are associated with war-time as well as peacetime activities of the Military Society. Fighting is talked about in terms of disciplined group action, not in terms of the individual exploit. Individuals, except in the persons of a few commanders, do not emerge in the accounts of battles. The emphasis is on group tactics and the behavior of various units under fire. Warfare, moreover, if these accounts are representative of those who were killed, as well as those who have survived, was carried on primarily as a duty and usually as a burden. Its purpose was to keep the Mexicans out of the Yaqui territory or to keep one's family from being killed. It was not felt to be, according to accounts

so far obtained, an opportunity for personal glory or something to be welcomed as a sport or desirably exciting experience. Individual prestige did not come out of it, except for an occasional captain regarded as fulfilling his duties with unusual ability. Even flagbearers, whose duties must have called for exhibitions of great courage, seem not to be remembered as individuals. The evidence so far accumulated points to an evaluation of warfare in somewhat the same terms that the annual ceremonies are valued.

Yaqui warfare thus had a very different orientation from that of the Plains Indians. Plains Indian warfare was a highly organized group activity, but it emphasized the individual exploit and aimed ultimately at creating opportunities for such exploits. Yaqui warfare placed no emphasis on the individual exploit, and did not become an important source for individual prestige. The basic Yaqui attitude toward fighting was that successful attacks or defenses gained nothing new for Yaquis. The winning of a battle merely preserved and protected. It fulfilled individual duties to the supernatural protectors of the villages. In this, warfare was very much like the ceremonies and might be regarded itself as a sort of ritual. Like the soldiers who worked for the Virgin as Matachin dancers and those who worked for Jesus as Caballeros and Jurasim, the soldiers of the Military Society worked for the Virgin of Guadalupe and her infant son. When they fought, they fought for her and in so doing contributed to the general Yaqui welfare.

The Military Society and the ceremonial societies thus appear to be similar in more than the superficial features of titles and organization. They are not only built on the same structural model, but also function in much the same manner and give rise, in the Yaquis who participate in them, to similar attitudes towards the activities performed. Yaqui warfare and Yaqui ceremony, in so far as the latter is carried out by ceremonial societies, show the same orientation.

THE PHYSICAL STATUS OF THE PAPAGO

NORMAN E. GABEL*

This discussion concerns itself with three main points. The first objective is a physical description of the Papago Indians of Arizona by means of the usual anthropometric techniques (the Harvard University anthropometric forms). Secondly, comparisons are made with several other tribes of the Southwest: the Yaqui, Hopi, Zuni and Navaho. These comparisons result in an impression of the status and relationship of the Papago in regards to the other tribes, at least as far as anthropometric devices can take us. Finally, where the data warrant it, more general racial questions will be re-examined with the view to confirm or qualify some of them.

American Indians in General. Anthropologists generally recognize numerous resemblances between the American Indian and the "Mongolian" race. For example, the straight, coarse, dark hair of the Indian is a "Mongolian" trait. Likewise, in skin and eye color, in projection and size of the cheekbones and in alveolar prognathism, the American Indian is more like the "Mongolian" than any other major human division.

On the other hand, when other physical features are examined, it is evident that Indians may or may not resemble Mongoloids. Indians are, in other words, quite variable in regards to some traits. This is true of stature and body build. It applies also to certain proportions of the head, the face and to the structure of the nose and lips. Thus, there are tall Indians and short ones; there are long-heads and round-heads; some Indians have high, aquiline noses while others have low, flat ones; lips may be thick or thin.

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This relatively great variation of certain physical traits among Indians may be interpreted variously. It can be regarded as the result of specialization away from a generalized Indian "type," or on the basis of mixed ancestry, or owing to local specialization. No one of these explanations is entirely adequate.

Papago Background. The modern Papago Indians who are the nucleus of this article, live in southwestern Arizona and the adjoining parts of northern Sonora, Mexico. They are a part of the Piman language group which in turn is commonly identified with a greater language stock, the Uto-Aztecans. The Papago are closely allied with the Pima tribe immediately north of them; the cultural differences between the two are relatively minor.

The habitat of the Papago is one of the less favorable in the United States. For the most part it is hot and arid. Broad valleys separated by low mountain ranges form the usual topography. Vegetation is typically desert. Creosote predominates in the low, dry plains; mesquite and palo verde line the usually dry stream beds; and the hill slopes are variably covered with cactus. A summer rainy season permits a limited amount of farming.

Culturally, these desert people compare favorably with other Southwestern tribes, remarkably so, in view of their environmental handicaps. The Papago are somewhat less sedentary than the related Pima; during the winter months they occupy more permanent villages in the foothills where water is available, and in summer they move to lower areas to take advantage of increased opportunities for farming and food gathering afforded by the rains.

The origin of the Papago is unsettled. Relationships between the prehistoric Hohokam and the modern Indians of the same area are not yet fully determined.

The first description and history of these people came with the missionary efforts of the Jesuit Fray Eusebio Francisco Kino at the turn of the seventeenth century. Kino found the Papago living essentially as they are today. The Hohokam had disappeared, the large adobe houses and compounds of the fourteenth century were already melted into the ground, and then, as now, conflicting Indian stories accounted for the ruins.

The Spanish control of the Papago area began with Kino and ended with the Gadsden Purchase in 1853. Spanish influence was not intensive, and this area was considerably less affected by European Spanish culture than was the region to the south.

The purchase by the United States of this area divided the Papago area between this country and Mexico. This political move had no great affect on the Papago for some time. As more white people penetrated the southern part of the Southwest, especially in attempts to reach California after the fabulous gold strike, they naturally favored the more congenial route along the Gila Valley and avoided the less hospitable region to the south. Thus the Papago remained undisturbed for a longer time than did many of their northern neighbors.

Apparently the nature of the Papago habitat has helped preserve the natives from white aggression and white intermixture, and this same factor has made the Americanization of the Papago a relatively peaceful and unhurried process. It was not until the twentieth century that miners and cattle men among the whites began to encroach in sufficient numbers to create the need for a reservation. Although a small tract of land south of Tucson, Arizona, was reserved for a minor part of the tribe as early as 1874, the present reservation was not set aside until 1917. Two subsequent enlargements resulted in the present area of over two and a

half million acres which is now occupied by more than five thousand Papago.

MEASUREMENTS AND INDICES OF 219 PAPAGO

<i>Measurements</i>	<i>Range</i>	<i>Mean</i>	<i>S.D.</i>
Weight (lbs)	101-260	157.30	24.20
Stature (cms)	158-184	168.81	4.95
Span (cms)	161-190	174.63	5.64
Sitting height (cms)	78-95	87.34	2.19
Shoulder breadth (cms)	34-45	38.69	1.74
Bi-iliac breadth (cms)	24-39	29.56	2.28
Chest breadth (cms)	26-37	30.18	2.19
Chest depth (cms)	18-29	22.16	2.04
Head circumf. (mms)	505-594	552.65	13.80
Head length (mms)	164-205	186.66	5.89
Head breadth (mms)	138-164	150.25	5.10
Head height (mms)	110-149	130.26	6.28
Min. frontal diam. (mms)	93-124	106.70	4.96
Max. face breadth (mms)	125-154	142.25	5.20
Total face height (mms)	115-149	133.50	5.90
Upper face height (mms)	60-94	79.30	4.90
Bigonial breadth (mms)	90-121	106.86	6.20
Nasal height (mms)	52-71	61.06	3.36
Nasal breadth (mms)	31-51	40.46	2.97
<i>Indices</i>			
Stature-span	94-109	103.52	2.34
Sitting height-stature	48-57	51.82	1.54
Shoulder breadth-stature	20-27	23.02	1.10
Shoulder-hip	62-91	75.93	5.07
Thoracic	57-84	73.02	4.76
Head length-breadth	71-91	80.52	3.57
Head length-height	58-84	69.77	3.60
Head breadth-height	73-102	86.45	4.77
Fronto-parietal	63-83	70.54	2.94
Cephalo-facial	85-105	94.25	3.15
Zygo-frontal	68-87	74.58	3.00
Total facial	80-109	93.55	5.10
Upper facial	43-69	55.28	3.81
Fronto-gonial	80-119	99.90	6.00
Zygo-gonial	63-83	74.65	3.81
Nasal	52-83	65.90	5.44

The Other Tribes. The Yaqui, Zuni, Hopi and Navaho tribes furnish the comparative material on which the inter-tribal summaries presented later are based. These tribes represent varying parts of the Southwest. The Yaqui are southernmost.

They are a farming group centered in the lower Yaqui River Valley of Sonora, Mexico, with outlying communities scattered about in southern Arizona and Mexico. The Zuni and Hopi are Pueblo people and show many distinctions from the Papago and Yaqui in habitat, speech and general culture. The Navajo are at the north end of the distribution; they are set apart by their Athapaskan speech, semi-nomadic, pastoral economy and associated ways of life.

Comparative data is drawn from unpublished material of Dr. Carl Seltzer on the Hopi, Zuni and Navaho, and from Seltzer's report on the Yaqui in the Texas Technological College Bulletin, vol. XII, No. 1.

Physical Description of the Papago

Nearly all the men who comprise the Papago series given below were in the employ of the Indian Division of the Civilain Conservation Corps when the survey was made in the summer of 1938. The work of the CCC included fencing of grazing areas, construction of irrigation and flood controls, road building and repairs. These projects were scattered throughout the reservation. The Indian labor was drawn from all parts of the Papago reservation; consequently, the survey is not biased by local geographical factors and the sample is probably a fair cross section of the adult male population.

Morphological Traits of the Papago

Skin. The unexposed parts of the body are light brown, less often red brown. These shades are deepened by sun and wind, so that face skin is dark brown and sometimes chocolate.

Hair. Straight, black, coarse hair of moderate thickness is usual among the Papago. Baldness is very uncommon even among older men. Face hair is lacking or sparse, and body hair is usually absent, at least from the chest.

Forehead. Though not receding, the forehead is more often somewhat sloping than straight; in height it is not distinctive. Brow ridges are not pronounced and the temporal areas are often rather flat.

Face. Prognathism of the middle portion of the face is not typical; only about ten per cent show it and these mostly to a slight degree. Alveolar prognathism is more common, but not often pronounced. Projection of the cheek bones approaches the popular picture of Indians, anterior and lateral malar development being commonly pronounced, particularly the latter. In contrast, the gonial angles range between medium and small.

Eyes. A dark shade of brown is the common eye color. Nearly half of the Papago have external eye folds though not usually pronounced. Lesser developments of median eye fold are not uncommon. The internal epicanthic fold is relatively scarce among adult males, though common to children. The eye usually tilts somewhat at the outer edge and the eye opening is not as wide as among Europeans.

Nose. As far as general size is concerned, the nose is large. Nasion depression is moderate to small. Root heights are medium to high and the roots are commonly broad. The bridge is convex or straight, more often the former. The tip may be thick or medium and is usually inclined slightly upward. Very often the nasal wings are flaring. Some degree of nostril visibility is usual. The nostrils are medium to round in shape, and their axes are moderately oblique.

Lips. Well-developed lips characterize most Papago. The integumental parts are medium to heavy and the membranous portions also incline to thickness. Lip eversion is average and a lip seam is not often marked.

Chin. In contrast to the upper face, the chin region is more conspicuous for its lack of development. Submedium and medium chin prominence is the rule.

Teeth. Overall judgment of Papago teeth is that they are better than most Caucasians,' but not as good as those of other Southwestern Indians. Caries are common, crowding is often moderate, wear is not excessive and tooth loss is not unusually high.

Ears. Large ears are common and large lobes characterize nearly half of the series. The lobe is attached more often than free.

Occiput. The back of the head is commonly somewhat flattened.

Body build. Medium types of body build are the most frequent and lateral types are much commoner than linear.

Intertribal Comparisons

The comparative data indicate that the Papago are physically distinct from the Yaqui, Zuni, Hopi and Navaho. The differences are, of course, variable. In general, the Papago and Yaqui are least dissimilar, while the Hopi are farthest removed from the Papago.

The Papago. The distinctiveness of this tribe is largely a matter of greater gross size. They are the tallest except the Navaho, and the heaviest of the groups considered. They exceed in shoulder breadth and chest diameters. As for cranial features, the Papago have longer faces and especially longer noses, both absolutely and relatively. They are also significantly longer headed.

Numerous qualitative characters set the Papago apart. Their skin color is darker, although they share this condition with the Yaqui. They show a higher incidence of low, wavy hair and more beard; external eye folds are more frequently developed and foreheads more sloping. The nose shares a high bridge and convex profile with the other tribes, but it is commonly broader across the bridge and more thickened at

the tip. A greater flare of the nasal wings is apparent. Thick lips set them apart from the northern tribes, but not from the Yaqui. These characters, combined with some alveolar prognathism and a tendency to smaller chins, results in the "typical" Papago face. There are also some variations of the external ear that mark the Papago: the ears are larger and more protrusive and the lobes are more often attached.

Papago-Yaqui. The individuality of the Yaqui compared with the Papago is less a matter of size and more of proportions. Their main distinction in linear diameters is low sitting height. In body ratios, the Yaqui stand out for their relatively long legs, narrow shoulders and deep chests. Important cranial variations include narrower foreheads and faces, coupled with broader noses and relatively wider jaws. The Yaqui are also the only people in the series who commonly possess a protrusive occiput.

The skin and eye color of the Yaqui are darker than any other group, and their faces are least often beardless. More common, too, is an upward tilt of the eyes. A combination of pronounced brow-ridges and sloping foreheads marks the frontal area. The nose is high, broad and convex, and the wings flare more strongly than any other group. Lip thickness and eversion are especially marked.

Papago-Zuni. Compared with the Papago, the Zuni have particularly small and slight bodies. Their deficiencies in chest and hip diameters also stand out. Body proportions indicate that they have relatively longer trunks and shallower chests. The Zuni are much more broad headed than the Papago, but deformation accounts for much of this difference.

In pigmentation, the Zuni show the strongest contrast to the darker Papago. The Zuni nose departs from the Papago and Yaqui pattern by its smaller size, especially by narrower width and less flaring nostrils. Marked lower fre-

quencies of thick and everted lips are shared with the Hopi and Navaho.

Papago-Hopi. Like the Zuni, the Hopi are much shorter than the Papago, but they are heavier-set. Despite their considerable inferiority in stature, their hip breadth exceeds that of the Papago and their chest diameters are nearly as great. This excess in lateral diameters also occurs in the cranial aspects. Their heads are relatively broader and lower, their faces are wider and they have broader noses.

The morphological traits that distinguish the Hopi from the Papago are similar to the Zuni differences, that is, lighter skins, smaller and less flaring noses and thinner lips.

Papago-Navaho. The Navaho are somewhat taller than the Papago but they are a good deal lighter in weight. They also exceed the Papago in arm span, shoulder breadth and hip width as far as absolute values are concerned; relative to stature they are less broad of body. Their chest diameters described them as less thick-set as well as shallower-chested. They are superior to the Papago in head circumference. Relative to head length their heads are broader and higher. Face width is likewise greater.

Qualitative comparisons ally the Navaho with the Pueblo against the Papago. Their skins are lighter, their noses are smaller and they have thinner lips. The Navaho show an interesting superior soundness of teeth.

Geographical Considerations

There is an interesting geographical trend involved in some of the differences indicated by these comparisons. The Yaqui, who are the southernmost group, have the darkest skins. Their heads are the narrowest and, excepting the Papago, the longest. Narrow, sloping foreheads with pronounced brow ridges are more common to the Yaqui. They

possess distinctively wide jaws, narrow faces, and their nostrils are characteristically flaring. Eversion and pronounced thickness of the lips mark their faces. Their bodies are relatively the most long-legged, their shoulders the narrowest, and their chests the deepest. It is interesting that most of the characters which give the Yaqui individuality are variations away from the Mongoloid complex.

The Papago adjoin the Yaqui to the north and they share with them more of these so-called non-Mongoloid traits than do any of the other tribes considered. This is especially true in regards to darker skin color, lower cranial indices, more face hair, flaring nostrils and thicker lips. Their relatively narrower faces, longer legs and narrower shoulders are also cases in point. In some of these characters they are intermediate between the Yaqui and the Pueblo groups.

Thus, it appears, as one proceeds from the Pueblo country, through the Papagueria to the home of the Yaqui, there is an increase in non-Mongoloid traits. Whether or not this trend ends with the Yaqui is unknown as yet. Apparently it does end among the central plateau people of Mexico, those associated with the complex civilizations around the Valley of Mexico. Among these and related groups, there is a return to smaller body size, more broad-headedness, less rugged features, narrower noses and less flaring nostrils.

Racial Considerations

The physical variations in the Southwest as presented bear upon some of the problems of racial history in the Southwest and North America generally. The data emphasize the presence among all of the Southwestern tribes of several traits that are Indian but not "Mongolian," a condition that has been demonstrated by others. The geographical distribution has a further implication.

Dixon¹ was of the opinion that a less Mongoloid type of man was the earlier in America. Hooton², for different reasons, arrives at a similar conclusion, and he also points out that some of the less favorable areas of America are refuge spots where earlier strains of Indians have persisted with less "Mongolization." A similar explanation can be advanced to explain some of the tribal differences that exist in the Southwest. This applies particularly to the greater intensity of non-Mongoloid traits among the Papago and Yaqui. It has been pointed out earlier that the historic Papago have remained relatively unmolested because their habitat offered so little to be coveted by either Indian or white neighbors. Similarly, in earlier times, if a less Mongoloid people lived in the Southwest, later immigrants with different combinations of physical features would tend to avoid this less congenial part of the country and consequently leave less physical imprint of their presence. Such later, more Mongoloid people, would have skirted the desert areas of Papagueria and proceeded southward along the plateau.

Present Position of the Papago

The place of the Papago in the general anthropological setting of the Southwest can be tentatively assigned. Geographically they are intermediate between the lowland Cahita-speaking tribes that include the Yaqui, and the Pueblo and Athapascan groups to the northeast. Papago speech affiliations place them closer to the Sonoran Uto-Aztecan tribes than to the northern peoples. Culturally they show considerably more resemblances to Uto-Aztecan groups than to any other neighboring complex. By their greater retention of earlier racial elements they share with the Yaqui a distinctive physical position.

¹Dixon, R. B., 1923.

²Hooton, E. A., 1946.

The physical position of the Papago as presented here adds some argument to the antiquity of the tribe in its present habitat. If they are physically distinctive partly because their environment made them a refuge group, they must have lived where they now are a very long time.

To summarize broadly and briefly then, in the light of present information, the Southwest was first peopled by a human variety which was not as "Mongolian" in appearance as were their successors. Later, there were infiltrations of more Mongoloid peoples who gradually dominated the earlier inhabitants. The southwestern part of the Southwest, including the habitat of the modern Papago, was less affected by this infusion because environmental factors operated than as they have in historic times to discourage newcomers. Therefore, the Papago are a closer approximation to the earlier population of the Southwest, a distinctiveness which they share with the Yaqui.

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ETHNIC HISTORY OF TUCSON, ARIZONA

HARRY T. GETTY*

Introduction

This is a brief ethnic history of a modern community. Most histories are primarily political, with economics figuring secondarily, and with little, if any, attention paid to the social development of the community. In this paper the social, or ethnic, aspects are given primary consideration. The purpose of this study is to examine the development of a modern community in the American Southwest and determine the roles of its ethnic components.

The data in this paper form a part of the background material for a study of "Inter-ethnic Relationships in the Community of Tucson," a research project being carried on by the author as a part of the Ph.D. degree requirements of the Department of Anthropology of the University of Chicago.

The choice of terms for designating ethnic groups constitutes a definite problem. Citizens of the United States are commonly referred to as "American citizens" or just as "Americans." However, these two terms are also used in a more restricted sense to refer to that portion of the population of the United States which is English-speaking and is of European ancestry.

As this author uses the various ethnic designations he does so with the idea in mind that all citizens of the United States in the community of Tucson are Americans. Since all Tucsonans are to be considered Americans, each of the

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terms should be used in combination with the term American, so that they would appear as: Mexican-American, Indian-American, Anglo-American, Negro-American, and Chinese-American. But for the sake of simplicity and convenience in writing, and to be consistent, the term American is dropped from each of these terms in this paper.

The term Mexican-American is used here rather than Spanish-American because it is preferred by most of the people so designated in Tucson. They prefer to use the term on the basis of national origin, pointing out that only a handful of their group have come direct from Spain. The term Anglo-American is used to denote the English-speaking people of European ancestry. The term is not a good one but it is commonly used, and there seems to be no other term which is any better.

The several ethnic groups are discussed in this paper in the following order: Mexican, Indian, Anglo, Negro, Chinese. That seems to be the order in which they appeared on the scene in what is now the main part of Tucson. The possible conflict in priority in regard to the Mexicans and Indians is discussed in the section on the Indians.

There is an uncertainty regarding the time of the arrival of the first Negro residents, therefore the Anglos have been given priority, since we have a definite date for the latter.

In so far as data are available, we shall consider the following points in regard to each major ethnic group in Tucson:

- 1) When the group first took up residence in Tucson.
- 2.) Population data, including: proportion of the total population; changes in ratio.
- 3.) Economic roles in the community.

General Historical Sketch

Tucson¹, the modern community known as the Old Pueblo, is located in one of the basins, or valleys, of the basin-and-range country of southern Arizona. It stretches contentedly, and not too gracefully, in the warm winter sun, but hugs the cactus-strewn desert floor to escape the searching heat of the summer sun. Some of the mountain ranges that stand guard around the valley are lofty enough to be crowned with pine forests, while others are low, barren, desert ranges with serrated profiles. The stream beds are dry, and slumber peacefully until they come alive during the late summer thunderstorms with torrents of water that rage across the desert floor. Tucson lies astride one of these periodic waterways, the Santa Cruz River.

Men have been coming to the valley of the Santa Cruz for many a century. At least from the beginning of the Christian Era—and probably for some span of time before—Indians have built their homes and villages along the Santa Cruz and its tributaries. Desert woods were used to make the frames of these houses, that were plastered over with mud made from the desert soil. These early inhabitants farmed the desert valley, gathered the desert plants, and hunted the desert animals. They adapted themselves to the desert, they were a part of it.

One day there was a new sound in the desert air, the rattle and clank of metal on metal. Strange men were in the valley. New kinds of animals were seen; horses and cattle, brought by the newcomers. New plants were growing in the desert soil, planted by the new people. Whereas there had been only the low Indian houses blending into the desert, there came to be great structures raised by the hands of the

¹The word Tucson is derived from the Papago *chuk shon*. *Chuk* means "black," and *shon* may mean either "flat place at the foot of a mountain," or "place where there is water." (This information was obtained from W. A. Kurath, Head of German Dept., Univ. of Ariz., who is making a study of the Papago language.)

newcomers and their Indian friends. These were the missions of the Spanish Catholics—Guevavi, Tumacacori, San Xavier, San Jose de Tucson, and others—where lived, worked, and prayed the long-robed priests. Also communities were built which were occupied by the men-in-steel; these were the presidios.

The rancheria occupied by the Indians, known as San Jose de Tucson, and the site of the mission of the same name (known also as San Cosme del Tucson), was apparently one of the earliest Spanish settlements located on territory that is now (1947) included in the community of Tucson. Another early Spanish settlement on territory now included in the total community of Tucson was El Rancho de Tucson (later known as El Rancho de los Padres), established by Father Garces in 1776 at a location very near the present site of the El Paso and Southwestern Stockyards in southwest Tucson. However, the Spanish settlement which formed the core of the later community of Tucson was the Presidio de San Agustin de Tucson. When it was moved from Tubac, Arizona, this presidio was first located northwest of the present city of Tucson, and then was moved to a location that was more central to the various Spanish settlements north of San Xavier Mission in 1776. This final location included the site of the present city hall and extended west to what is now Main Street.

Under the Spanish regime Tucson continued to be mainly a military post. Nearby ranchers, miners, and civilian populace often sought protection inside the walls of the presidio when the Apaches were raiding. Little is known of life in the military post of Tucson during the years of Spanish and, later, Mexican control.

The flag of the United States was first raised over the Old Pueblo in 1846 by the Mormon Battalion, which passed through Tucson on its way to California. Although the

Gadsden Treaty was promulgated in 1854, bringing southern Arizona, including Tucson, into the United States, it was not until 1856 that troops of the United States army took over the presidio from the Mexican troops. Several American citizens had preceded their army into Tucson and were on hand to welcome it to the presidio.

Mexicans

The historical sketch presented in the preceding paragraphs makes it clear that the people who established the military post—the Presidio de San Agustin de Tucson—that developed into present-day Tucson were the Spanish. They were here first.

POPULATION DATA

To 1856

When we try to form some sort of a picture of the people who lived in Tucson in its early years, and of the life they lived, we find the information rather sketchy. Captain Zebulon Pike² reporting on Tucson in 1807 says that it was garrisoned with one hundred dragoons. From time to time priests visited the community; bands of trappers, pack-trains, and military expeditions, all tarried a while and then passed on. But information is scarce concerning the civilian population. Lockwood³ says in reference to these early days:

“In early days Tucson was a military community. It was occupied almost wholly by soldiers and their families. Ranchers, mining men, and travelers, of course, often sought its walls for supplies or protection. But the population up to the time that the Americans came was never large. The regular garrison very likely numbered about fifty.”

The Mormon Battalion which entered Tucson in 1846, immediately after the Mexican garrison had temporarily

²Coues, Elliott, *The Expeditions of Zebulon Montgomery Pike*, in 3 volumes, (Francis P. Harper, New York, 1895) vol. II, p. 773.

³Lockwood, Frank C., *Tucson—The Old Pueblo*, (The Manufacturing Stationers, Inc., Phoenix, Ariz., 1930), p. 28.

retired⁴, reported that they were well treated by approximately one hundred inhabitants who remained.

John R. Bartlett, U. S. boundary commissioner,⁵ makes this statement concerning Tucson in 1852:

"It has always been, and is to this day a presidio or garrison; but for which the place could not be sustained. In its best days it boasted a population of a thousand souls, now diminished to about one-third that number. . . . the encroachment of the Apaches compelled the people to abandon their ranches and seek safety within the town. The miserable population, confined to such narrow limits, barely gains a subsistence, and could not exist a year but for the protection from troops."

And he further states that the average number of soldiers stationed in Tucson for several years previous to 1852 had not been more than twenty.

1856 to the end of the Civil War

Apparently the earliest American citizens to take up residence in Tucson arrived on the scene in 1854. So that when Charles D. Poston visited Tucson in 1856 he found it to be a town of "300 to 400 Mexicans and about 30 Americans."⁶ By 1856 the population had broken through the presidio wall and spread to the south and west. In 1858, Bishop Machebeuf⁷ speaks of Tucson as "a village of about 800 souls, built around an ancient Mexican fortress." Sam Hughes⁸ says that he came to Tucson in 1858,

"... when the town was on the other side of the river and the garrison on this side. . . . Outside of the walls there was a village of Pimas and one of friendly Apaches. Across the river, near the village, was a church.

⁴Tyler, Daniel, *A Concise History of the Mormon Battalion*, (Sgt. Daniel Tyler, 1881) pp. 227-8.

⁵Bartlett, John R., *Personal Narrative of Explorations and Incidents*, (D. Appleton and Co., New York, 1854), p. 295.

⁶Hinton, Richard J., *The Handbook to Arizona*, (Payot, Upham, and Co., San Francisco, Calif., 1878), p. 265.

⁷Howlett, Rev. W. J., *Life of the Right Reverend Joseph P. Machebeuf, D.D.*, (Franklin Press, Pueblo, Colo., 1908) p. 246.

⁸McClintock, J. H., *Arizona—The Youngest State* (S. J. Clarke Publishing Co., Chicago, 1916), vol. 2 pp. 577-8.

... Though there was nothing saintly about the burg, time was determined by the bells of the cathedral. . . . The cosmopolitan character of the place best was shown around the gambling saloons, where there were Americans of all degrees, Mexicans, Chinese, and 'civilized' Indians. . . . The flavor of the old town, however, was distinctively Mexican and there were many pretty Spanish-Mexican customs that had been adopted in the daily life of the town. Many of the more prominent Americans had married into the good Mexican families and the home life of the settlement thereby was affected."

Regarding the situation three years later, Lockwood⁹ says:

"There were only sixty-eight American voters in Tucson in the summer of 1861 . . ."

"By the time the war was at an end the population had leaped to twelve or thirteen hundred people, and counting the military population perhaps one-fourth of this number were Americans."

In this connection, the 1864 Census of the Territory of Arizona lists the names of the people living in Tucson. There are 1165 Spanish names, 120 English names, and 23 individuals listed whose father had an English name and the mother had a Spanish name, and 255 soldiers. The English names comprise about ten percent of the civilian population, and with the military make up the one-fourth that Lockwood mentions.

From Civil War to the end of the Century.

Farish¹⁰ commenting on the situation in Tucson just prior to 1867 says:

"During the rule of Maximilian in Mexico, there was a considerable influx of Liberals here from Sonora, so that the town at one time numbered perhaps 1500 souls. But with his 'taking off' and the rise again of Juarez, many had returned thither; so that the population was then only about a thousand or so . . . of whom fully two-thirds or more were Mexicans, originally or by descent."

⁹Lockwood, op. cit., pp. 41-2.

¹⁰Farish, T. E., *History of Arizona*, 8 volumes., (Filmer Bros. Electrotyping Co., San Francisco, 1918), vol. 6, p. 12.

Hinton¹¹ wrote in 1878:

"The population is not definitely estimated, but exceeds, it is claimed, 4500, predominantly of Spanish origin."

"It still stands as the representative of the old semi-Spanish-Indian civilization; for the Mexicans comprise two-thirds of the resident population . . ."

The introductory section of the Tucson City Directory for 1881 has this statement, "The city has an estimated population of ten thousand souls, mostly Mexican and English speaking people." (The U.S. Census for 1880 gives Tucson a population of 7007.) An analysis of this city directory shows 934 English names, 399 Spanish names, and 12 Chinese names. However, several facts should be kept in mind in connection with the use of such listings of names in Tucson. The English names include Negroes, obviously unidentifiable by name. In this regard, the 1880 census shows 23 Negroes in Tucson. Also the English names would include an indeterminate number of individuals who are, in varying degrees, partly of Mexican origin. These mixtures being due to the intermarriages pointed out (above) by Sam Hughes. Finally, the Spanish names would include many Indians, since a majority of those in Tucson would have Spanish names.

If the population of Tucson in 1881 was really 10,000, or closer to the 7000 of the 1880 census, the city directory must have been compiled on a highly selective basis to have listed less than 1400 people.

End of the Century.

In a section of the Arizona Daily Star for May 7, 1899 that advertises the characteristics of Tucson is this statement, "Tucson has a population of ten thousand, about one-third of Mexican descent." Apparently the population is still ten thousand after an interval of ten years. Actually, the U. S.

¹¹Hinton, op. cit., pp. 267, 270.

Census figure for 1900 is 7531. One can only wonder whether or not the figure for the ethnic ratio is correct. In the Tucson City Directory for 1901, there is this statement, "The city has a population of 7731" And it goes on to say that this figure is derived from the census for 1900. In another part of this same introductory section of the 1901 directory this statement is made, "About half the population is American and half Mexican." Since there is an error in the use of the population figure, it may be that the ethnic ratio is incorrect. Another statement in this directory claims 4000 names for the publication. The author of this paper made a count of the Spanish names in this directory, obtaining a figure of 1074, but made only an estimate of the total number of names listed, 3450.

1930

The next set of figures which the author has available is from the U. S. Census for 1930, when the Census Bureau attempted to get a separate count of Mexican people in the United States. How this was handled is indicated by this statement in the report of the U.S. Census for 1930¹²:

"Persons of Mexican birth or parentage who were not definitely reported as white or Indian were designated 'Mexican' in 1930, and included in the general class of 'Other Races.' In prior censuses most of these Mexicans have been classified as white."

In this census the figure for the Mexican population in Tucson was 10,235, or approximately thirty percent of the total population of Tucson, 32,506. However, there may well have been "persons of Mexican birth or parentage" who were reported as white rather than Mexican.

The U. S. Census for 1940 did not follow the 1930 Census in designating Mexicans separately, but included them under the heading "white," as had been done before 1930.

¹²Fifteenth Census of the United States: 1930, Population Bulletin, Second Series, Arizona, Composition and Characteristics of the Population, 1931, p. 4.

1946

The Tucson City Directory for 1946 furnishes the next set of population figures. A count was made¹³ of all Spanish names in the alphabetical section of this directory, which yielded a figure of 9,602. On the basis of spot-counts made on various pages throughout the directory, the author of this paper estimates that the alphabetical section lists approximately 53,000 individuals. However, before attempting to state the proportion of people of Mexican origin in the population of Tucson in 1946, the following facts must be considered.

1. An indeterminable number of people of Mexican birth or parentage, either wholly or in part, have English type names.
2. Spanish names are used by the Indian population.
3. This issue of the city directory does not include listings of individuals under 18 years of age. If available, the number of individuals under 18 might alter the ethnic ratios based only on over-18 figures.

Whether or not the facts mentioned above would alter the ethnic ratios appreciably remains uncertain, owing to the difficulty of determining quantitatively the effects of these factors. Therefore, using the figures obtained in the directory count, the people of Mexican birth or parentage would be close to eighteen percent of the population of Tucson in 1946.

The foregoing population data concerning the Mexicans in Tucson is summarized in the following table. It should have been apparent in the preceding discussion that most of these figures represent estimates. The census figures cover only the corporate area of Tucson, and thus probably cover less area than figures obtained from directories or in quotations from individuals.

¹³The author wishes to acknowledge the very substantial aid given by the Alianza Hispano-Americana in making the analysis of the 1946 directory.

TABLE 1

	Mexican		Anglo		Source of data
	Number	Percent	Number	Percent	
1856	300	90	30	10	Poston (in Hinton)
1861	?	?	61	?	Lockwood
1864	1164	90	128	10	Census
1867	670	67	330	33	Farish
1878	3000	67	1500	33	Hinton
1881	399	43	934	57	City directory
1899	3300	33	6700	67	Ariz. Daily Star
1901	3750	50	3750	50	Census
1930	10235	31	20814	62	City directory
1946	?	18	?	70	City directory (see the text above re- garding lack of numbers here.)

Note: In order to properly evaluate these figures, the reader must refer to the preceding text where they are shown in context.

ECONOMIC ROLES

The table which follows presents in summary the data concerning the economic roles of the Mexican people in Tucson.

TABLE 2

	1864(a)	1901(b)	1946(c)
*boilermaker	—	2	101
*carpenter	9	8	111
cement worker	—	—	48
clerk	7	27	(d)403
farm worker	104	3	60
foreman	—	—	34
gardener	—	2	80
helper—Sou. Pacif. Ry.	—	18	143
laborer	149	61	746
laundry worker	—	—	90
*machinist	—	1	131
miner	17	16	61
*painter	—	5	60
*plasterer	—	2	56
sheet metal worker	—	4	66
teamster	40	11	—
truck driver	—	—	209
Total number of persons with occupations shown	377	246	4964
Total number of occupational categories shown in the counted items	25	47	159

Notes:

*The figures for these occupations include the helpers.

- (a) Includes all persons with Spanish names whose occupations were given in the Census of the Territory of Arizona.
- (b) Includes all persons in the 1901 Tucson City Directory with Spanish names beginning with the letters G, L, M, R, whose occupations were given. The author was unable to make a complete count through the alphabetical section, so he selected these initial letters as the categories including large numbers of Spanish names.
- (c) These figures were obtained from the 1946 Tucson City Directory, including all persons with Spanish names whose occupations were shown.
- (d) It was impossible to determine how the term clerk could be defined for the 1864 and 1901 figures. The 1946 figure includes: clerk—125, office clerk—53, bookkeeper—23, salesman—68, saleswoman—134.

In evaluating the occupation figures given above, the reader should pay particular attention to the notes shown below the table. The figures are not intended to be exhaustive, but merely indications of trends. It should be emphasized that the figures for 1901 are based on a sample only, while the figures for the other two years represent complete counts made of the data available. Therefore, the total number of categories for 1901 would unquestionably be larger if a complete count had been made.

A careful inspection of the above table will reveal the following characteristics.

- (1) A definite decrease in farm workers living in Tucson.
- (2) Skilled workers such as boilermakers, machinists, etc., were not present in 1864 due largely to the fact that there was little or no need for them in Tucson at that time.
- (3) Gardeners have become more numerous in recent years due to a demand for such help arising among the Anglo population.
- (4) The teamsters of other years have become truck drivers; an indication of a changing culture pattern, and also of acculturation on the part of the Mexicans.

In the occupation categories for 1946, the data which the author has on file show that these categories range from executive at one extreme to laborer at the other. However, the number of individuals in the professional and business-ownership categories is negligible.

Indians

As pointed out previously in this study, Indians, both prehistoric and recent, have been building their homes in the valley of the Santa Cruz for many centuries. Undoubtedly, some of their villages have, from time to time, occupied various portions of the area now included in the community of Tucson. But, while the Indians were first occupants of the Santa Cruz valley, they are not considered to be the founders of the community of Tucson because none of their villages continued on to become a part of early Tucson as did the Spanish Presidio de San Agustin de Tucson. El Rancho de Tucson, previously mentioned, was founded by Father Garces in 1776, and consisted of one adobe dwelling and a time-keepers office. It served the dual purpose of controlling agricultural work in the Santa Cruz bottomlands, and also of educating the Indians. Lockwood¹⁴ says concerning this development, that 'a little village of Sobaipuris, Pimas, and Papagos sprang up just east of the stockade that has survived to this day in Papagoville.' If this settlement was occupied continuously to the present time, it might lay claim to being the earliest part of Tucson. But the presidio was established in the same year, and it did form the core of the main development of Tucson.

The present Indian population of the community of Tucson consists primarily of Papagos and Yaquis. There are no population figures available for either group at the present time, but there are probably six hundred Papagos, and at least nine hundred Yaquis.

¹⁴Lockwood, op. cit., p. 19.

Papagos

The Papagos and their relatives the Sobaipuris have between them occupied the Santa Cruz valley for several centuries. At present, the Papagos living in Tucson are somewhat scattered through the southwest part of the community. They figure largely as day laborers and to a lesser extent as semi-skilled or skilled workers.

Yaquis

The Yaquis have been in the Tucson area only since 1900 for the most part. They left their homeland in southern Sonora because of difficulties with the Mexicans. Those Yaquis living in Tucson are mainly in two separated districts, but are also scattered through parts of the intervening area. One district lies south of the Papago concentration in southwest Tucson, and the other is the settlement of Pascua on the northwest edge of Tucson. They, too, are laborers and semi-skilled or skilled workers, many of them employed by the Southern Pacific Railway. Also, they are much in demand as gardeners.

Anglos

The earliest Anglos¹⁵ who came to Tucson—beginning in 1854—started business enterprises such as stores, a bakery, a flour mill and a butcher shop. Immediately they became dominant in the economic life of Tucson. In 1857 the Overland Stage came through Tucson, affording a contact with the outside world. As the most convenient point on this stage route, Tucson became the center of trade with Sonora. In 1880 the Southern Pacific Railroad came through from the west coast, and in 1903 the El Paso and Southwestern Railroad came into Tucson from the east. The two railroads gave Tucson connections with New Orleans and Chicago as

¹⁵The population data for the Anglo is included in the Mexican section of this paper, since both bodies of data are derived from comparative statements in the same source materials.

well as the west coast. The rail line which was built down the west coast of Mexico had Tucson as its northern terminus, which continued Tucson's importance as a trade center for Sonora.

Other major economic activities that had a rather early development in the Tucson area were mining and cattle-ranching. World War I carried these two industries to a peak of development. But neither of these two activities, nor the merchandising mentioned above, required the building up of an Anglo labor force in Tucson. The required labor force was recruited largely from the resident Mexican and Indian population, augmented by immigrants from north-western Mexico. So, throughout most of Tucson's history the Anglos who have come here have been in the middle and upper economic levels.

Prior to the first World War the beneficial qualities of Tucson's climate became widely known and healthseekers began to arrive. This aspect of Tucson's development received a real boost when the U.S. Government established a large hospital for veterans here following the World War. The healthseekers who have come to Tucson through the years have been spread through the various economic levels.

The same qualities that have made Tucson's climate a boon to healthseekers have also made it attractive to certain leisure groups. These groups include those who are on a retirement status, and those whose income is not dependent on occupational activity. Some of these people have established themselves in Tucson on a year-around basis, others are here seasonally. Some have entered actively into the economic and social structure of Tucson and others are merely in the community without becoming a part of it. In connection with these leisure groups guest ranch operation has become a thriving business in the area immediately adjacent to Tucson.

The University of Arizona has brought an increasingly large number of students (mainly Anglo) to Tucson through the years— approximately 4500 in 1946-47. This group affects the economic structure of Tucson, but, of course, remains outside the local social structure.

The Anglo portion of the population of Tucson increased tremendously during the recent war years, and is continuing to grow. The army camps and airplane modification plant established in the Tucson area during the war required the importation of some Anglo labor. Some of this group has remained in Tucson since the close of the war. However, the over-all pattern of the Anglo portion of the community has not been altered fundamentally. There is no industrial development, so that no large Anglo labor group is needed. The Anglo population in Tucson consists largely of those people who are here to enjoy the climate, and those who are here to provide services to the group just mentioned. Climate is still the main commodity in which Tucson deals.

Negroes

The first Negro to enter southern Arizona was a man by the name of Estevan. He and three Spaniards were the only members of a Spanish naval expedition, that was wrecked on the coast of Florida, to return to a Spanish settlement. These four men made their way westward along the coast of the Gulf of Mexico, through Texas and northern Mexico to the Spanish frontier settlement of Culiacan on the west coast of Mexico. In 1539 Estevan was sent north as guide and advance agent for Fray Marcos de Niza, who was to check on reports of wealthy cities to the north. Estevan pressed on to what we know today as the Pueblo Indian community of Zuni, whose inhabitants slew him shortly after his arrival there. Whether Estevan passed through the Santa Cruz valley and near present-day Tucson is uncertain.

The first Negroes to reside in Tucson apparently arrived sometime between 1850 and 1855. This first couple bought a home on Convent Street, and the husband engaged in stage-coach driving, manual labor in Tucson, and prospecting for mines. Another Negro who arrived in 1866 was a cook; he purchased a home on North Tenth Street. The next Negro is mentioned as arriving in 1869, and he also was a cook and handyman. Another early Negro arrival in Tucson owned a barbershop which he operated with the help of a Mexican assistant. In addition he homesteaded 160 acres where he ran a chicken farm as a sideline. Fairly complete information is available¹⁶ concerning twenty pioneer Negroes who came to Tucson before 1900. While they worked at all sorts of jobs at various times, the majority worked, at least for a time, in domestic service. Several of them were in the barbering business.

The U.S. Census shows nine Negroes present in Tucson in 1870, and it was not until 1900 that they became one percent of the population. Since many Negroes now live outside the corporate limits of Tucson they must be considered in relation to the population of the community of Greater Tucson. They probably form a little better than three percent of that population.

A recent survey¹⁷ indicates that a majority of them are in domestic service in homes or as janitors, with the category of laborers next. The one outstanding lack among Tucson's Negroes is in the merchandising category. They have not opened up businesses of their own. But there is some indication that this situation is changing. The Negro labor force has never been large, for the same reason that the Anglo labor force has not been large.

¹⁶Yancy, James W., *The Negro of Tucson, Past and Present*, (University of Arizona, Master's Thesis, 1933).

¹⁷Lies, Eugene T. (Survey Director), *A Study of the Negroes of Tucson, Arizona*. (An Interracial Committee, Tucson, Arizona, Feb. 1946). (A mimeographed report.)

Chinese

According to the U. S. Census records there were no Chinese in Tucson in 1870. But the next census, 1880, shows 159. However, it is reported¹⁸ that:

"A little before 1870 marked the arrival in the Old Pueblo of the first Chinese ever to come here. These pioneers were the three Wongs; . . . The Wongs came to Tucson and decided to settle here. On the south-east corner of Church Plaza and Mesilla Street they started the first Chinese restaurant of Tucson, the O.K. Restaurant."

". . . since the arrival of the first Chinese in the Old Pueblo in the late 1860's."

Yee Hoy, generally agreed to have been the oldest Chinese in Tucson until his death a few years ago, apparently was preceded only by the three Wongs. He said that Sum Yip (district in South China) people came to Tucson before the railroad, walking here from Yuma. He himself came by wagon train. The great majority of the early Chinese in Tucson came in with the railroad from the west about 1880, working as laborers or cooks. They continued largely in the same capacities when they settled in Tucson.

In a short time, however, these early Chinese became house servants, started small laundries, or small stores, or even prospected for gold. Subsequent Chinese arrivals in Tucson followed pretty much the economic pattern just indicated. Very early in the 1880's some of the Chinese developed truck farms along the Santa Cruz, which provided sufficient water in those days. However, it was the failure of this water supply at a later date that forced them out of this activity. The grocery stores which a few of the Chinese had started, primarily for handling of the produce from the truck farms now became the mainstay of the Chinese in Tucson. The continuing importance of the grocery store

¹⁸The quotations concerning the Chinese, and also the figures showing the types of Chinese business enterprises in Tucson in 1935, are all taken from: *Arizona Daily Star*, Rodeo Edition, Chinese Section, Feb. 22, 1935.

business to the Tucson Chinese is indicated by the following figures on Chinese businesses in 1935: groceries—60, restaurants—9, laundries—2, truck farm—1. These Chinese grocery stores are now to be found in all parts of Tucson, and range in size from very small stores to the super-markets. Many of these stores have non-Chinese employees. Most of the Chinese storekeepers in southwest Tucson are tri-lingual, using Chinese, English, and the Spanish spoken by their customers in that area.

Despite the fact that the Chinese have been living in Tucson for more than 70 years there is no real Chinatown. The nearest thing to a Chinatown existed in the early years of the Chinese in Tucson, when they occupied the area north of what is now West Congress Street, and between what is now Main Street and the river. This very area later became the location of a very high class residential development, the Paseo Redondo. There was also, and apparently somewhat later, a concentration of the Chinese populace in the area along South Main and South Meyer Streets, just south of Broadway. Today, when you ask about a Chinatown in Tucson, the area just described is the one mentioned. But Tucson's Chinese are now scattered throughout the entire community, many of them living in their store-buildings.

The 1940 census gives 347 as the number of Chinese in Tucson. Of course, that figure applies only to the corporate area. There are probably close to 500 Chinese in Greater Tucson at present.

Summary

The following statements are offered more as a summary than as a set of conclusions. In the introduction it was indicated that three main points should be considered, so this summary will be stated in terms of those three points.

Earliest Residents—by Ethnic Group

The evidence introduced in this report shows the following chronological order:

- 1) The Spanish established in 1776 the presidio which, with later expansion, became the Mexican village of Tucson.
- 2) Papago Indians became established in what is now the southwestern part of Greater Tucson in 1776. For the most part the Yaquis did not come here from southern Sonora until around 1900.
- 3) Anglos arrived to take up permanent residence in 1854.
- 4) Negroes first took up residence in Tucson between 1850 and 1855.
- 5) The Chinese first came to Tucson "a little before 1870."

Population Figures—Ethnic Ratios

A summary of this data for the Mexican and Anglo groups is provided in Table 1 of this report. Incomplete as these figures are, they indicate in a rough way the change from a community (1856) in which the Mexicans formed ninety percent of the population and the Anglos ten percent, to a community (1946) in which the Mexican people formed about eighteen percent and the Anglos over seventy percent. This shift in the ratio is not due to any decrease in the Mexican population, but rather to the great increase of the Anglos.

Population figures for other ethnic groups are shown in Table 3, which follows this summary. The Negroes show a steady increase. There is a net increase in the figures for the Chinese and Indians, but each set of figures shows a temporary recession. The figures for the Indians are considerably lower than such a figure for Greater Tucson would

be because a very large percentage of the Indians live outside the city limits.

Economic Roles

Down through the years, the Mexican population has furnished the bulk of Tucson's labor force, as is indicated in Table 2. They have become semi-skilled and skilled workers as demands arose in those lines. At present, people of Mexican origin are in a wide range of occupational activities from executive to laborer, with a minimum in the professional and business-ownership categories.

The Indians are mainly in the labor force, with some semi-skilled and skilled workers. Many Yaquis are gardeners.

The Anglos are probably dominant numerically in all parts of the occupational structure in Tucson except for the labor and domestic service categories.

The Negroes are, and have been, in domestic service and related categories. They are beginning to open up businesses of their own.

The Chinese have been laborers and cooks, truck-gardeners, cafe-operators, and storekeepers. They have never operated many laundries in Tucson. At present a few run cafes, but the bulk of them operate grocery stores.

TABLE 3

Population of Tucson, Arizona, according to U. S. Censuses								
	1870	1880	1890	1900	1910	1920	1930	1940
White	3,215	6,701	4,712	7,057	11,989	19,477	20,824	34,353
Mexican	—	—	—	—	—	—	10,235	—
Negro	9	23	40	86	222	346	1,003	1,678
Chinese	—	159	215	194	—	—	228	347
Indian	—	124	183	189	—	—	175	417
Others	—	—	—	5	982	469	41	23
	3,224	7,007	5,150	7,531	13,193	20,292	32,506	36,818

Note: The population for the community of Greater Tucson during 1946 is generally considered to be about 95,000. The figure for Tucson proper, comparable to the figures given in the table, is about 45,000 for 1946.

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GROWTH TRENDS IN NEW WORLD CULTURES†

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Introductory Statement

Distinctive cultural patterns of the New World have been characterized by anthropologists in a number of different ways, and the functionings of these patterns as they affect the lives of the individuals within their matrices have been compared in considerable detail. On the other hand, the long growth and development behind these patterns has received somewhat less attention from this comparative point of view. Archeologists, by necessity, have devoted their efforts during the past 50 years to the piecing together of the specific prehistories which lie beneath the modern societies or their documented records. Perhaps only now archeological data is attaining a richness and completeness necessary for the study of the formation of cultural patterns through the centuries of the native American past. This paper is an attempt to consider, briefly and in a trial way, the trends of culture growth and development as these are exemplified in certain New World prehistoric culture sequences. What are the parallels and divergences in these configurations of cultural direction through time? And to what extent can we reconstruct the determinative factors which are responsible for these vertical patternings?

The two great areas of aboriginal horticultural society, Middle America and the Peruvian Andes, have been selected for these comparisons. Not only are the available data more fully presented, especially at the documentary level, but the life basis for both areas, the cultivation of native food plants

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(in many instances the same plants), has remained the same for at least 1500 years of the pre-Columbian past. Within each area two specific regional sequences were chosen. For Middle America these are the Mayan and the Mexican, and for Peru in the North Coast and the South Coast.

The Maya Sequence

In its major outlines the Mayan archeological sequence applies throughout the lowland jungle country of the Peten and Yucatan and in the Guatemalan highlands. The Goodman-Thompson correlation dating places the beginnings of the sequence somewhere in the First Century A.D. (see (Fig. 2,A)). As the earliest periods represent well-developed farming communities with respectable technological accomplishments it is reasonable to suppose that an interval of several centuries of horticultural experimentation and practice in the sedentary arts preceded such complexes as the Mamom, Chicanel, and Miraflores. These periods have been grouped together by Thompson (1943, pp. 106-134; 1945, pp. 2-24) into what he has called the Formative Period of Maya prehistory, with the implication that such a Formative Period extends back for an unknown earlier time span. Ceramic skills in the Maya Formative were well-advanced. The pottery runs to monochromes with incised decoration although simple positive and negative painting also occur. Villages were small to middling in size, and represent, presumably, autonomous political units. Dwellings were constructed of perishable materials. There is no inferential evidence for marked status differentiation or social classes. Judging from appearance most artifacts were for household use and their manufacture was probably the work of each family rather than restricted to specialized artisans. The beginnings of organized religion and religious control are exemplified in the building of small mounds. Art existed chiefly, as embellishment for utility artifacts although there are exceptions to

this such as the famous "cat-faces" on the temple "E-VII-sub" at Uaxactun. Intellectual achievement, as differentiated from technological knowledge, was presumably under way, astronomical, astrological, and historical lore contingent upon the Mayan calendar must have been in formation during this time.

In the succeeding Initial Series Period of Maya development (300 to 1000 A.D.), technology, architecture, art, and religion reached their apogee. Population was undoubtedly much greater at this time than in the Formation Period. These same centuries saw a similar regional classicism in other parts of Middle America. Monte Alban, Teotihuacan, and La Venta are examples of contemporaneous intensely localized florescences. Among the Maya the elaborate temple center exercised nuclear socio-political and religious jurisdiction over the scattered and outlying populations from which their support was derived. Quite possibly some of these centers established hegemony over others in religious and intellectual prestige. There is a strong religious overtone to Maya society of this period, with marked class and rank distinctions. Widespread trade with other regions was carried on, particularly in ritual objects. In manufactures a distinction arose between ritualistic and mundane products. Art was both representational and discrete with religious subjects predominating. In the calendar and history this appears to have been the highpoint of intellectual activity.

In the Mexican Periods of the Maya region, beginning at about 1000 A.D. and continuing to the Spanish Conquest, Maya ceramic and sculptural arts underwent a decline; architecture maintained, perhaps, for the first part of this period a high quality and then lapsed; minor technological gains were registered in the advent of metal ornaments and metallurgical techniques. Populations were probably as large, if not larger, than in the Initial Series Period, and

there was a trend toward their concentration in fortified, permanently-inhabited towns. Strong militaristic tendencies appeared with the invading Mexicans, and militaristic ruling-group and serf class distinctions were established. Larger political groupings, "empires" or confederacies, came into being under the leadership of the fortified towns. Intellectual achievement appears to decline, with the "long-count" dating and the mental abstractions which it involved being lost. Trade was more widespread than ever before. Toward the end of this period there was a partial resurgence of the old Maya ideas and values, particularly those centering about religion, yet this aborted renaissance was followed by a very abrupt decline and desertion of the towns in the closing 80 years prior to 1540.

The Mexican Sequence

The cultural sequence in the temperate and fertile Valley of Mexico (see Fig. 2, B) opens on a subsistence, technological, and sociological level quite comparable to the Maya Formative (Vaillant, 1941). The Mexican "Middle Cultures" begin with El Arbolillo and Zacatenco in probably the First Century A.D. and extend through Copilco, Gualupita, Ticoman, and Cuicuilco up to an estimated date of about 500 A.D. Pottery of these periods although differing in many features of style from that of Mamom or Chicanel, was predominantly monochrome and incised. Solid, hand-made figurines were produced in abundance. Villages were quite large, and dwellings were made of perishable materials. An absence of social classes and specialized artisans is implied in the lack of prominent politico-religious buildings, elaborate tombs, and excellence in manufactures. The beginnings of organized religion and a priesthood are, however, presaged by the great mound of Cuicuilco and the sculptured idols or deities made toward the close of the "Middle Cultures." It is difficult to make any inferences about intel-

lectual attainments, but it is quite possible that rudimentary calendrical knowledge was in process of systematization.

The Mexican "Middle Cultures," or Mexican Formative, closes with the rise of the great site of Teotihuacan and the Classical Toltec culture.¹ For 500 years this brilliant regional development held sway in the Valley of Mexico. Excellence was attained in polychrome, negative painted, champléve, and intaglio ceramics; figurines were manufactured with the use of the mold; fine cotton weaving was known; and stone sculpture flourished. The differentiation between household and ritualistic manufactures was marked. Implications of class and rank are strong. A warrior group arose, and there is evidence for an emerging distinction between the priesthood and secular authority. A mammoth religious center was built with huge and elaborate pyramids. Residential dwellings were constructed of imperishable materials, and a big urban town was located a few miles distant from the sacred precincts of Teotihuacan. There is an artistic climax during the occupation of Teotihuacan, but a decline sets in later in the period when there is a shift to another religious center at Azcapotzalco. It is probable that any intellectual attainments arrived at during the "Middle Cultures" were increased and elaborated upon by the Classic Toltecs.

The final 500 years of the Mexican sequence saw the interim "Chichimec" Period of warring tribes, the culminant rise of the Tenochtitlan group, and the spread of Aztec culture. Technologically, this "New Toltec" and Aztec Period maintains the level reached under the Classical Toltecs and, in addition, metallurgy is acquired. In general, there is a greater uniformity in ceramic production, and the use of the mold for figurines continues. Quantitatively, production

¹The use of the term "classical Toltec" in this paper refers throughout to the culture of periods Teotihuacan 2-4, *not* to the Toltecs or New Toltecs as associated with the site of Tula, Hidalgo.

seems to increase even though quality of individual pieces may be somewhat inferior to the preceding period. Between 1100 and 1300 A.D. population pressure was increasing; new semi-nomadic tribes were making their way into the valley; and political conditions were chaotic with several tribes fighting for control. Tribute systems of conquest for profit and sacrificial captives were the rule, but with a late trend toward the incorporation of the conquered into an "empire" unit. Social classes and individual status differences were marked. Religious and political leadership remained related but the drift toward a cleavage noted in the Classical Toltec Period was even stronger. Religious pyramids were still constructed, but these were usually placed within the community center which was a defensible city. Picture writing was introduced in the Aztec Period, as well as a calendric system based on the tonalamatl. Throughout the entire period the cultural and linguistic unification of the valley was proceeding rapidly.

The Peruvian North Coast Sequence

In the rich Chicama, Santa Catalina (Moche), and Viru Valley of the Peruvian North Coastal desert the introduction and development of fundamental horticultural, ceramic, stone-carving, and architectural techniques are dimly seen arising above an earlier pre-ceramic base in the First Century A.D.² (see Fig. 2, C). By the time the Chavin Periods³ are well advanced, Peruvian coastal culture presents a developed horticultural economy, good incised and simple painted pottery, and rather elaborate stone and plastic

²The estimated dating used here is slightly earlier than that usually given (see Bennett, 1946, p. 80). It is my opinion that what connective evidence exists between Peru and the more securely dated Middle American sequences argues for an equation of the Chavin horizon with the Formative Maya levels.

³Bennett (1946, pp. 81-92) uses the name "Chavin Periods" to designate a series of cultures, both coastal and highland, which are demonstrably early and are linked by the Chavin feline art motif and an incised ceramic style. Cupisnique and the presumably earlier and simpler "Basic Chavin" cultures of the coast fall within this horizon. Salinar, in my opinion, does not.

sculpture. Even metallurgy is seen in its beginning stages. As such, the Cupisnique Period is comparable to, or in advance of, the similar Formative Stage cultures of Middle America.⁴ Communities at this time were small to moderate-sized, and temples were constructed at Guanape (very simple) and in the Nepena Valley (quite ornate). It is probable that irrigation had its beginnings in the Chavin Periods; certainly a little later, in Salinar times, it was quite well established. There is only slight evidence for class distinction and political prestige, but some type of theocratic control is inferable. Cupisnique art is discrete, conventional, and probably highly symbolical in religious content. There is little evidence for a dichotomy of ritual and profane goods for Basic Chavin but ornate sculptured burial pottery was made in the Cupisnique Period. With the transition to Salinar, at the close of the Formative, there is a shift in artistic canons to rather crudely conceived and executed realism, and there is much less concern with religious or mythical representations. There is no evidence for intellectual activity aside from technological knowledge.

In the Mochica Period (500-1000 A.D.)⁵ there is a brilliant rise in technology and art. This regional florescence is paralleled elsewhere in Peru at the same time, with Early

⁴Recently both R. Larco Hoyle and W. D. Strong (see *American Antiquity*, vol. 12, no. 2, pp. 132-134, for a report of the *Chicla Conference on Peruvian Archaeology*) have used the name "Formative" as one term to describe the simpler cultures which precede the outstanding regional growths such as Mochica. (See also, Strong, "Finding the Tomb of a Warrior God," *National Geographic Magazine*, vol. XCI, no. 4, p. 464.) Steward (N. D.) has also used the term in summary articles included in both the 4th and 5th volumes of the *Handbook of South American Indians*, Bulletin 143, Bureau of American Ethnology, Smithsonian Institution. Although their uses of the term vary, and do not completely coincide with the way I have employed the concept here, it should be noted that in the main they refer to cultures which resemble in content and organization the cultures called "Formative" by Thompson in the Maya region (Thompson, 1943, pp. 106-134).

⁵I include here, along with Mochica, the Negative or Gallinazo culture, best known from the Virú Valley. Although pre-Mochica in the Virú Valley, the Negative or Gallinazo culture represents the technical and artistic maximum of the local cultural development in Virú. It probably developed coevally with Mochica, being over-run by the Mochicans toward the end of the Regional Classic Stage.

Nazca, Classic Recuay, Early Lima, and Classic Tiahuanaco providing such examples. Ceramic art is varied and masterfully executed; the use of the mold in the manufacture of both vessels and figurines is the rule rather than the exception; carving in wood, stone, and shell is extremely competent; and such metallurgical techniques as welding, casting, and gilding were known. Architectural accomplishments were outstanding and chiefly in the field of large adobe pyramids, public buildings, and "castillos" or fortresses. Irrigation and road-building projects were undertaken. Huge politico-religious centers were constructed and residential sites became larger than in the Formative Stage. There is ample evidence for a well-controlled social and political order with class and status concepts highly developed. Considerable emphasis and prestige were accorded to warfare, and the beginnings of empire are seen in the Mochica conquests to the south. Secular authority would seem to command more attention in most aspects of the culture than ecclesiastical sanctions. There was considerable increase in populations over the Formative Stage. Inter-valley and coastal-highland trade flourished. The art shift from the strictly esoteric, probably religious, motives of the Cupisnique style to profane subjects, begun in the Salinar Period, is completed in Mochica. Although religious, mythological, and fantasy subjects are still represented they are in the minority. In both painting and ceramic sculpture there is realism of high quality, even portraiture. Intellectual activity is represented by what appears to be a form of ideographic writing (Larco Hoyle, 1946, p. 175).

The Middle and Late Peruvian Periods on the North Coast are represented in succession by Coast Tiahuanaco and its derivative, Chimu, and Inca. The inception of the Coast Tiahuanaco invasion is placed at about 1000 A.D. and the beginnings of the Chimu state at about 1300 A.D. The Inca reached the North Coast relatively late in the 15th Century.

The outstanding technological gain during these periods was the appearance of bronze, a metal used for ornaments and for tools and weapons. Although there was an aesthetic decline in ceramics and the arts, there was a production increase suggesting primitive "mass-production" methods. Beginning with Coast Tiahuanaco there was a trend toward population concentration in what became urban centers, and architectural energy was directed toward their construction. Chanchan, near Trujillo, the great Chimu center, is such a city. Public works, such as roads, irrigation systems, and great walls, are very common. Pan-Peruvian political and cultural conquests probably began with Coast Tiahuanaco and certainly continued with Chimu and Inca. Definite empire building with tight incorporation of conquered territories and populations is the result. Inter-valley road communications were perfected, and trade and wide contacts were further stimulated. The building of fortresses continued and some of these are examples of military genius. Standing armies were organized and maintained by rulers. Class and wealth distinctions were very obvious. Religion was definitely subordinate to temporal power. Temples and pyramids were still constructed but these were placed within the urban centers. There seems to have been little in the way of abstract intellectual achievement. The quipu mnemonic system was spread by the Inca conquest.

The Peruvian South Coast Sequence

The South Coast region is known from the valleys of Chincha, Pisco, Ica, and Nazca. The agricultural potential was much less for these valleys than for those of the North Coast, and the general conditions for life more difficult. The earliest archeological period for the region is the Paracas Cavernas (see Fig. 2, D), a culture which has certain stylistic correlates with the Salinar of the North and is equivalently dated at about 400 A.D. It is possible that still earlier horti-

cultural-ceramic periods for the south, probably of a Basic Chavin type, will eventually be disclosed. Pottery of Paracas Cavernas combines poorly applied polychrome pigments and incision as decorative techniques. There is also simple negative painting. Little is known of Cavernas sites, but it is certain that no large mounds or big habitation clusters were constructed. Most likely social and political life revolved around small independent villages. Religious motives are suggested in ceramic art.

The South Coast flowered in a unique regional classicism following the Paracas Cavernas Period. This was the Nazca Period dating at about 500 to 1000 A.D. There is a technological excellence in weaving and textiles for this period that outstrips anything in the Andean area. Ceramics are finely made and beautifully painted in polychrome. The mold was not used. Simple hammered goldwork appears, but metallurgical techniques were unknown. Very little is known of Nazca architecture, but apparently no large politico-religious or residential sites were constructed. The emphasis on burial elaboration suggests organized religious cults and some degree of status and rank differentiation. Warfare is indicated by trophy-head representations on pottery and textiles. Population undoubtedly increased over the Formative Stage. Pottery and textile art has naturalistic representations of life motives but these are quite stylized, in some cases bordering on the discrete. Religious symbolism would seem to be expressed in many instances. Intellectual achievement is unknown.

Pacheco Epigonal marks the Coast Tiahuanaco invasion of the Nazca region. Subsequently, a local style, divided into a Middle and Late Ica prevailed with the Inca conquest following sometime in the mid-15th Century. Technological improvements are noted only in the advent of copper, silver, and bronze. It is possible that organized irrigation was best

developed in the South at this time although this is uncertain. There appear for the first time a number of large stone or adobe buildings which seem to have been politico-religious centers rather than urban cities. Living sites probably continued small or moderate in size and remained scattered. Art, as expressed in ceramics and textiles, became rigidly geometric and repetitive. Intellectual achievement, other than that common to the Inca Empire, is unknown.

A Comparative Interpretation

The four synopsized culture sequences have been divided into three horizontal categories of characterization: Formative, Regional Classic, and Political Expansion and Conquest. That these characterizations may take on somewhat different meanings in each culture growth is also obvious, but, in general, the gross configuration holds. We can see for each sequence an opening stage in which a sedentary horticultural way of life was being adapted to a particular natural environment. This was succeeded by a second stage of technological and artistic richness, one in which the maturing regional culture strove to fulfill its boundaries and exhaust its potentialities. Finally, a third stage is characterized by mounting conflict among the formerly localized but now expanding culture growths; and this is accompanied by a greater emphasis on enlarged socio-political forms.

Of these three stages, there is a striking similarity in both cultural direction and cultural content among all sequences for the Formative level. It is a time of technological progress, and there is another strong bond of likeness in that the village community was the basis of the social and political order. This is to a great extent inferential, yet it is clear that there were virtually no great central sites of authority in any of the four regions during their Formative Stages. Sites were simple habitation places. Some of these are fairly extensive, as in the Valley of Mexico and the North Coast of Peru, but most of them indicate only small com-

munities. In the Maya zone, Mexico, and North Peru the appearance of ceremonial mounds and temple centers, especially toward the close of the Formative, implies a directional trend toward theocratic control over the scattered village farmers. On this early level it is impossible to say that any one region appears to be placing a greater emphasis upon religion or religious authority. The Nepeña temples, "E-VII-sub, and Cuicuilco are about on a par in the impressiveness with which they would be viewed from their cultural backgrounds. Only Paracas Cavernas, in South Peru, is lacking in specialized religious sites. The art of the Formative Stage shows greater divergence than the technological, socio-political, or religious trends. Peruvian Formative art seems concerned with religious themes; Middle American art, not particularly so. In abstract intellectual achievement the probabilities are that Middle America, particularly the Maya region, was already far ahead of Peru even on this Formative level. In the matter of cultural content as apart from cultural direction, the Formative level also shows decided uniformity. This is true even between the Middle American sequences and those of Peru. On the whole, the Andean and the Central American-Mexican cultures seem to have developed quite independently of each other, but on this early pre-specialized horizon there are a number of specific resemblances, such as in certain basic food plants, a predominance of monochrome and incised pottery, negative painting, and stone carving techniques, which are lost or obscured by an overlay of intricate cultural complexity as we go up in the time scale.

The determinative factors operating for a similarity of both cultural patterning and content on the Formative level would seem to be of two kinds. First, the content parallelism noted for all four sequences can, I think, be attributed in large part to common historical origins. Second, the relatively unspecialized nature of New World horticultural societies at

this stage of their development and adaptation to their particular settings makes for some uniformity of cultural direction. At the same time it is quite likely that important potential differences in trends, latent within the cultures, are now just beginning to emerge. At this subsistence level the natural resources of the Valley of Mexico and the North Peruvian Coastal valleys were more favorable than those in the Maya region or on the Peruvian South Coast. This seems to have been the basis for the much larger population concentrations in the two former regions and all that this eventually entailed in the succeeding stages.

It is with the Regional Classic Stage of development that divergent tendencies begin to give special directional character to the different culture growths. In this second stage all four regions enjoy a technological and artistic flowering, but with differing connotations as to cultural significance. With the Maya, both art and technology are devoted to the glorification of a priestly hierarchy whose position within the society is further reinforced by its control of highly esoteric and ritualized knowledge. Mochica art and technology appear to have had a broader basis of vulgar appeal and common utilization among the total population. The Classical Toltecs fall somewhere between these two. Art must have had strong religious motivations in Nazca culture, but unlike Maya or Toltec one has the feeling that popular folk incentives, rather than "high church" directives, lie behind it. But it is in the spheres of social, political, and religious organization that the fundamentally different channeling of cultural forces now impresses us. Maya society is priest-controlled and built around the imposing dignity of the theocratic temple center. In North Coast Peru and the Valley of Mexico great religious sites were constructed; but large residential communities were also in process of formation. The power and pomp of warfare, the warrior, and the secular arm are as much in evidence as religious symbolism.

In Peru, the Mochica, in their closing periods, were no longer a tribal state but an inter-valley empire. Nazca, forming still another pattern, had neither the all-powerful temple cult nor the war-state but probably retained the simple autonomous village system. There is less evidence for actual and significant cultural contact among the various regions during the Regional Classic Stage than either before or after. As the regional cultures grew and specialized, each developed distinctive content within the limits of the basic inventions that were made common knowledge during the Formative Stage. In spite of the fact that trade was active and widespread in the Regional Classic, it accounted for the inter-regional exchange of only a limited amount of material goods and, apparently, ideas. To judge from the archeological evidence trade at this time was mainly in ritualistic, unusual, or costly items, not in the everyday possessions of the people.

Apparently evolving out of a related basic culture the four unique growths of the Maya, Teotihuacan, Mochica, and Nazca attained a regional classicism essentially as a response to the interaction of their horticultural technology with their respective environments. Vaillant (1940, pp. 295-305) has pointed out that in adapting intensive horticulture to the Guatemalan and Yucatecan jungles the Maya were led to pattern their community life in small scattered or mobile villages. Tribal solidarity was maintained by the focal point of the temple center rendezvous. In this way, the concept of the ceremonial mound or sacred shrine, a Formative Stage component of at least three of the four culture sequences considered, became extremely important in Maya life in its period of Regional Classic crystallization. The social limitations which this imparted restricted also the political form of the culture, and the original religious sponsorship of the shrine centers quite easily took over leadership in a self-perpetuating system of theocratic control. Under such an arrangement an amazing degree of abstract intellectual

activity was possible in the great temple capitals. Luxuriously supported by their subjects on the many jungle farms, freed from the pressure of devising social and political controls for large groups of people living in urban-type contact, the Maya priest-leaders in peaceful and sanctified isolation devoted their full energies to the generation and codification of ritualized learning. Maya art reflects such an existence. For almost 700 years the growth of Maya culture was held in such a mold.

The Mochica pattern is in greatest contrast to this. With irrigation techniques, which appeared in the Formative Stage, the Valleys of the North Coast of Peru had a great potential for stable horticulture. In actual acreage suitable for cultivation these valleys are relatively small, compact units, and their water supply, coming down from the Andes in narrow gorges, is easily controlled at a few key points. For maximum utilization of a valley with canal distributary and related techniques a single or master irrigation system for each valley was mandatory. With the mounting population pressures of the late Formative and early Regional Classic Stages, deriving out of the increased food supply concomitant with full exploitation of the agricultural potentialities of the valleys, the inhabitants were forced into concentrated, face-to-face, living conditions. Unlike the Maya, the Mochica leaders were forced to turn their efforts to the problem of the social organization and control of the large masses of people who were actually clustered within sight of the temple pyramids and upon whose close social control the maintenance of the complicated and highly centralized life-giving irrigation systems was dependent. In consequence, secular authority soon overtook religious authority. Possibly the two were combined, and no doubt religious sanctions were always used to support temporal mandates; but the practical manipulations of force politics must have begun to outweigh religious prestige gained from the control

and mastery of ritual. A combination of population pressures within the North Coast Valleys and firm political control of these increasing numbers of people opened the way for inter-valley war and conquest, a major feature in the Mochica way of life. This, again, further elevated force over religious prestige. By the close of the Mochica Period the orientation of North Coast culture was unmistakable. Both the popular quality and the representational themes of Mochica art are reflections of these trends.

Mexican culture follows a course intermediate between these two during the Regional Classic Stage. Although their art and technology are closer to those of the Maya, undoubtedly for historical reasons, the formation of the Teotihuacan or Classical Toltec religious and socio-political institutions derives out of an environmental situation more comparable to North Peru. The rich Valley of Mexico made large, permanent horticultural communities possible as early as the Formative Stage. But because of the much greater size of the valley, congestion of population was seemingly not as great during the Regional Classic as it was in the narrow North Peruvian valleys. Large habitation communities and sacred temple centers are both developed, and religious prestige and secular authority are both strong. There is, though, a differentiation between the two. Presumably, as the population increased in late Classical Toltec times warfare and conflict became more common and with this there was probably a rise in political and military authority.

On the South Coast of Peru the relatively poorer and drier valleys, although geographically and geologically similar to those of the North, clearly limited community size and total population. Unlike the Mochica the pressure for social planning was not great; and unlike the Maya wealth and population were not sufficient to sustain large scale religious centers. An adjustment to allow ample leisure for

the production of fine art and craft goods seems to have been won by the beginning of the Regional Classic Stage. After this, a balance was maintained in South Coast culture, without marked social, political, or religious change, until the Tiahuanaco Period.

In the last stage, that of Political Expansion and Conquest, two of the culture growths under consideration develop the conquest-state configuration through a combination of internal direction and outside pressures, whereas the other two were modified by conquest patterns enforced solely from without. In North Peru we have seen that the trends toward military power were formulated in the Regional Classic Stage with the rise of the Mochica. Then, during the Coast Tiahuanaco Period there is a blanking out of Mochica culture. That a growing war-state, such as the Mochica were fast becoming, could be so completely submerged in its nationalistic symbols is a strong argument for representing the Tiahuanaco wave as a military conquest. In any event, from this point forward all the tendencies of Peruvian North Coast culture are toward a heightening of political imperialism. Planned communities, public works, evidences of military activity, and an increasing homogeneity in material culture continue on to a climax in the Chimú Period; and both archeology and legendary history attest to the extensive sovereignty and power of the Chimú government until it was incorporated into the Inca Empire. Of the other regional sequences the closest parallel to North Peru in the stage of Political Expansion and Conquest is the Valley of Mexico. In the Toltec Period organized war for conquest seems to have been only little developed; but the succeeding "Chichimec" Period was one of fierce, though petty military rivalry for power. Aztec dominance probably represents only the beginning of coordinated government based on force rather than a refined culmination of the system produced after centuries of experimentation as was

the case for the Chimu and Inca. Many of the same trends are present, though, including the subordination of religion to the war cult and a leveling uniformity in artistic and technological production. In the other regional growths, the Maya and South Peru, the expansive military power of alien peoples struck cultures rigidly set in their Regional Classic molds. For both, the old cultural directives were radically changed and the old symbols perished. South Peru appears to have "come-back," during the Ica Periods, after the Coast Tiahuanaco invasion and before being swallowed up by the Inca. Maya culture, on the other hand, after an attempt at re-establishment, falls to pieces trying to adjust to the war-state ideology. Both regions, as with the Valley of Mexico and North Peru, undergo a technological and artistic unification and leveling. The culture content of the Political Expansion and Conquest Stage attains, between those regions within the same major culture area, a similarity as great, but of a different order, as that of the Formative Stage. Similarity appears as specific likeness of style obviously imposed as a process or byproduct of the social and political amalgamative tendencies, not as in the Formative, because of linkages of origin of the basic technologies. Thus, between Middle America and Peru, where there was as yet no inter-activity of the growing political empires, there is very little common cultural content on this final level.

The direction and shaping of the four culture growths during the Regional Classic Stage became a crucial factor in determining the outcome of events on the subsequent level of Political Expansion and Conquest. By the end of the Regional Classic, the North Coast of Peru and the Valley of Mexico seemed to have developed military traditions of sufficient strength to sustain war-states, either internally or as the result of outside conquest. As Bennett (1945, pp. 95-99) has remarked concerning the Mochica, the socio-political essence of their culture, as expressed in such insti-

tutions as corvée labor and organized military conquest, was not destroyed by the Coast Tiahuanaco expansion but reasserted itself in the Chimú Period. In like manner, the Inca conquest would appear to have had very slight effect on the general cultural orientation of the North Coast as its objectives and methods were assuredly those which had long been in operation in the region.⁶ In the Valley of Mexico the period of the petty war-states following the Classical Toltecs was probably more destructive of the old patterns formed in the Regional Classic Stage than the Tiahuanaco dominance was in North Peru; yet a modified Mexican culture continued on into the Tenochtitlan state which was fast adapting to war institutions and conquest patterns.

The Maya, without a Regional Classic orientation toward war and conquest, were unable to make a successful adaptation to it on their home ground. Mexican conquerors succeeded temporarily in fusing their type of military authority to Mayan traditions, but eventually this proved unsuccessful and a rather complete breakdown of higher social, political, and religious forms ensued. The peculiar and precarious balance by which the Old Mayan theocratic society had been maintained upon a base of jungle horticulture not only was destroyed by the Mexican institutions, but these institutions of the invaders apparently could not be supported in the new environment. Nazca culture seems to have been completely eclipsed by the Tiahuanaco deluge, and, subsequently, there is evidence of more complicated social and political systems in the Peruvian South Coast valleys. There is, however, no breakdown comparable to that of the last pre-Columbian century in the Maya region. Late Period cultures in the South Coast valleys, though never rivaling those of the North Coast in power or spread, seem to have flourished in a modest fashion. Perhaps the less rigidly

⁶Benedict (1943, pp. 207-212) has pointed out that the deeply implanted traditions of corvée labor and empire techniques made easy the still later conquests by the Europeans who helped continue these same trends.

specialized character of the old South Coast Regional Classic culture allowed for a greater flexibility in the face of the sudden changes brought in during the stage of Political Expansion and Conquest; and, although never excelling in the institutions of empire, culture growth continued.

To conclude, we have noted that in four distinctive natural regions, two in each of the major culture areas of the New World, a surplus economy of a horticultural type was established upon a similar technological plane. This is the Formative Stage. Following this, the interaction of this subsistence technology to four differing natural environments produced four separate types of cultural growths or patterns. This has been designated as the Regional Classic Stage. In a third stage, one of Political Expansion and Conquest, various historical factors come to impinge upon these four culture growths bringing about alterations. It is probable, I suppose, that if there had been no outside conquest of the Maya region, or the Nazca region, that these self-contained, rather static cultural forms would have continued relatively undisturbed for several centuries more. But cultures do not exist in a vacuum, and change from within or without proceeds. What is particularly interesting and important is that the molding and channeling forces of the Regional Classic Stage, those forces growing out of the interaction of technology and environment, give terrific impetus to the culture; and this impetus, mounting snowball fashion, carries the society along in its momentum. Sooner or later historical forces concur to smash or disarrange these dynamic patterns. The result, cultural death, deflection, or a new integration, depends to a great extent on the rigidity and velocity with which the original culture growth has been molded and propelled toward its fate.

FIGURE 2A — THE MAYA

Compare with:

Strong, 1943, chronology chart

Thompson, 1943, p. 106 ff.

1945, p. 2 ff.

Vaillant, 1935, see Table III

The Maya and Their Neighbors, 1940, Tables X and XI

Estimated Dates	Culture Periods	Stage Characterization	Cultural Synopsis
1540 1400 1300 1200 1100 1000	Mayan Disintegration Mexican Absorption Mexican Contact	Political Expansion and Conquest	General decline in ceramic and sculptural arts, although metal and metalurgical techniques appear (used for ornaments only). There is a trend toward concentration of populations in fortified, permanently-lived-in towns. Strong militaristic tendencies appear with invading Mexicans. Militaristic ruling group-serf class distinctions. Larger political groupings, "empires" or confederacies come into being. Religion subordinated to the war-state. New deities appear. Intellectual achievements remain static or decline. Long-count dating system disappears. Trade widespread and more active than before. Toward the end of this period there is a partial resurgence of old Maya ideas and values, particularly religion, but there is a relatively abrupt decline and desertion of the towns in the closing 80 years.
900 800 700 600 500 400 300 A. D.	Tepeu Tzakol Esperanza	Regional Classic	Technology increases rapidly to a climax in this period. There is evidence of specialized handicraft work in ceramics, stone-carving, and architecture. Rise of politico-religious temple centers, each supported by its outlying population. Evidence of class and rank. Population steadily increases. Each temple center maintained nuclear socio-political and religious control over outlying inhabitants with, possibly, some centers establishing hegemony over others in religious and intellectual prestige. There are strong religious overtones to the society with theocratic leadership. Art both representational and discrete and highly conventionalized. Aesthetic climax in ceramics, minor artifacts, sculpture, and architecture. There is a marked difference between ritualistic and mundane goods. Great strides in intellectual achievement as seen in astronomy and history. A period of religious, artistic, and intellectual, but not political, coherence.
200 100 0	Chicanel Miraflores Mamon	Formative	Establishment of competent techniques in ceramics (monochrome incised styles, hand-made figurines, simple positive negative painting), household goods, and New World agriculture. Moderate-sized villages, presumably autonomous. Beginnings of organized religion and religious control exemplified in small mound centers. No evidence of marked differences in class or rank. Art exists chiefly as an adjunct to utility artifacts. Intellectual achievements presumably well under way as astronomical, astrological, and historical lore contingent upon the calendar and a time-counting system must have been in formation in this period.

FIGURE 2B — THE VALLEY OF MEXICO

Compare with:

Strong, 1943, chronology chart

Vaillant, 1941, chart, p. 26

The Maya and Their Neighbors, 1940, Table XI

Estimated Dates	Culture Periods	Stage Characterization	Cultural Synopsis
1540 1400 1300 1200 1100 1000	Aztec Period "Chichimec" Period	Political Expansion and Conquest	Technology maintains itself and metallurgical skills are added. Greater uniformity in ceramic production with use for figurines continuing. In general, technological and artistic production appears to have been greater than ever before if somewhat lavish. Early periods show chaotic political conditions with several tribal states fighting for control. Population pressure increasing with new semi-nomadic tribes entering valley. Tribute systems of conquest for profit and scarificial predominates but with late trends toward incorporation of the conquered into an "empire". Social classes and status. Religious and political leadership still related but with trend toward continued differentiation. Great religious pyramids still constructed but usually placed within the community center which was a defensible city. Introduction of picture writing in Aztec Period. Calendrical system based on tonalamatl. Cultural and linguistic unification of valley proceeding rapidly.
900 800 700 600 500 A. D.	Teotihuacan 4 Teotihuacan 3 Teotihuacan 2	Regional Classic	Excellence in cotton weaving, ceramics (4-color polychromes, negative painting, chanpleve, and intaglio ritualistic jars), and stone sculpture. Advent of mold in figurine art. Marked differentiation between household and ritualistic manufacturers. Implications of class and rank. Definite warrior group. Differentiation between "priests" and "kings" or the religious and the secular beginning to emerge. Great religious center of Teotihuacan built. Huge and elaborate pyramids. Large communal residential sites are located a few miles distant from Teotihuacan. Aesthetic peak occurs with artistic conventionalization. In the late periods there is a shift to Azcapotzalco. It is probable that any intellectual attainments arrived at during the Formative Stage were increased and elaborated upon at this time.
400 300 200 100 0	Cuicuilco-Ticomán Gualupita Copilco Zacatenco-Early El Arbolillo	Formative	Establishment of competent techniques in horticulture and ceramics (essentially monochromes but with painted decoration appearing toward the close; incising common). Figurines are hand-made. Large villages with perishable dwellings, presumably socially and politically autonomous. Absence of social classes or specialized artisans implied. Evidences of trade in upper periods. Beginnings of organized religion and religious control exemplified by great Cuicuilco mound and by formalized representations of deities. Figurine cult art well controlled but simple. Little known of intellectual attainments but it is quite possible that some calendrical knowledge was in process of systematization.

THE FIGURE 2C — THE NORTH COAST OF PERU

Compare with:

Bennett, 1946, p. 80

Kroeber, 1944, Figure 6

Rowe, 1945, pp. 265-284

Strong, 1943, chronology chart

The Maya and Their Neighbors, 1940, Table XI

Estimated Dates	Culture Periods	Stage Characterization	Cultural Synopsis
1540 1400 1300 1200 1100 1000	Inca Conquest Chimu Black - White - Red Period Coast Tiahuanaco	Political Expansion and Conquest	Technological improvements seen only in appearance of bronze. A general aesthetic decline in ceramics and arts but a production increase. Rise of great urban communities or true cities, such as Chanchan. Religious structures smaller and within urban site. Pan-Peruvian political and cultural conquests, probably beginning with Coast Tiahuanaco. Empire building and incorporation techniques. Well developed roads and communication. Architectural energies directed toward urban centers, great fortresses, public works. Standing armies. Class and wealth distinctions. Religion subordinate to temporal power. Little abstract intellectual achievement. Quipu mnemonic system, verbal history and lore.
900 800 700 600 500 A. D.	Mochica Mochica - Negative	Regional Classic	Brilliance in ceramics, metallurgy, carving in wood, stone, and shell. Remarkable architectural accomplishments and great irrigation and road-building projects. Excellent evidence for a well-controlled social and political order with class and status concepts highly developed. Huge politico-religious centers such as Moche. Residential communities probably still of moderate size and scattered in distribution. Warfare developed and beginnings of "empire" amalgamations seen in Mochica conquests to south. Art shift to profane completed with actual portraiture in ceramics. Religious and mythological subjects in minority. Peak of realistic sculptural art. Two and three color painting in pottery. Intellectual activity seen in ideographic system of writing.
400 300 200 100 0	Salinar Cupisnique Basic Chavin (Guanape) Pre-ceramic levels	Formative	The beginnings and development of fundamental agricultural, ceramic, stone-carving, and architectural techniques. Ceramics begin extremely simple and increase in form and decorative complexity. Monochromes predominate. Incision-punctuation techniques more common than use of color. Ornate religious art expression in some Cupisnique pottery. Also crude beginnings of life form sculpturing in both Cupisnique and Salinar. Small to moderate-sized communities. Probable beginnings of irrigation. Little evidence for strong class distinctions or political prestige but beginnings of religious dominance and theocratic control. Art is discrete, conventional, and probably high in religious symbolism (Cupisnique). Intellectual achievement unknown.

FIGURE 2D — THE SOUTH COAST OF PERU

Compare with:

Bennett, 1946, p. 80

Kroeber, 1944, Figure 6

Rowe, 1945, pp. 265 - 284

Strong, 1943, chronology chart

The Maya and Their Neighbors, 1940, Table XI

Estimated Dates	Culture Periods	Stage Characterization	Cultural Synopsis
1540 1400 1300 1200 1100 1000	Inca Conquest Late Ica Middle Ica	Political Expansion and Conquest	Technological improvements only in advent of metallurgy. Is possible that organized irrigation was best developed at this time. Some large adobe or stone buildings which appear as politico-religious centers, not urban communities. Living sites probably small or moderate in size and scattered. Increased emphasis on socio-political organization implied in earlier periods and known from Inca Period. Art becomes rigidly geometric and repetitive. Intellectual achievement other than that known to Inca unknown.
900 800 700 600 500 A. D.	Pacheco Epigonal Nazca B Paracas Necropolis Nazca A	Regional Classic	Technological excellence in weaving and textiles that surpass any in the Andean area. Ceramics decorated in beautiful polychromes. Goldwork appears but true metallurgy still lacking. Adobes used in building but no known examples of Nazca politico-religious building or large residential sites. Great emphasis on burial elaboration suggests organized religious cults and some degree of status and rank differentiation. Warfare of a sort indicated by trophy-head representations on pottery and textiles. Art has representations of life motives but these are quite stylized and in some cases discrete. Religious symbolism would seem to be expressed in many instances. Intellectual achievement unknown.
400 300 200 100 0	Paracas Cavernas	Formative	Agricultural-ceramic first culture of the south known at present time. It is quite possible that earlier ceramic horizons underlie Cavernas. Pottery combines poorly applied polychrome painting and incision as decoration. Little is known of sites, but there are no evidences of large mounds or habitation groups. Most likely social and political organization revolved around small independent villages. Religious motives suggested in ceramic art (feline concept).

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GALLERY-PATIO TYPE STRUCTURES AT CHICHEN ITZA

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The object of this paper is to discuss structures of the gallery-patio type at Chichen Itza, Yucatan. A report on six of these buildings has already been published.¹ Since the report appeared the writer spent six weeks in the spring of 1946 examining minor structures shown on the map of the site as surveyed by Carnegie Institution.² Five additional buildings of the type were identified (Fig. 3). They are highly specialized and their appearance in Yucatan, only at Chichen Itza, is of particular importance.

A description of the five new structures follows:

STRUCTURE 3B3

PLATFORM

Condition: Not exposed. Not over 2 m. high.

GALLERY

Condition: Almost entirely covered with debris. Only occasional wall surface exposed.

Size: Approx. 7 m. wide.

Interior: Apparently two rows of round columns with rectangular capitals. Vault stones specialized.

PATIO

Condition: Poor state of preservation.

Size: Approx. 17 m. square.

Interior: Sunken area in center surrounded by columns, diam. 46 cm.

Number and placement not known.

Back or north side limited by simple wall.

East side has gallery with sculptured rectangular columns. Vault stones specialized.

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¹Ruppert, 1943.

²Ruppert, 1935, fig. 350.

West side has gallery with columns, diam. 48 cm. Approx 2 m. apart. Capitals 68 cm. diam. Section of wall seen separating gallery from patio. Vault stones specialized.

STRUCTURE 3B8

PLATFORM

Condition: Seen only on west side where it has a width of 2.15 m., height not over 25 cm.

GALLERY

Condition: Poor state of preservation.

Size: Length, 23.50 m.; width, 4.20 m. No vault stones noted in shallow debris.

Facades: No basal batter. Eight columns across front, diam. 45 cm. No capitals seen.

PATIO

Condition: Only traces of walls are exposed.

Size: Approx. 17 m. by 15.60 m.

Interior: Column drums all displaced. The area in the center is 50 cm. lower than around the sides.

SHRINE ROOM

Condition: No walls exposed. Room indicated by debris in which are specialized vault stones.

STRUCTURE 3C13

PLATFORM

Condition: No platform indicated.

GALLERY

Condition: No trace of a gallery. Building may have been under construction.

PATIO

Condition: Poor state of preservation. Traces of walls only.

Size: 13.70 m. by 14.20 m.

Facades: No basal batter. Now stand not more than a meter in height at northeast corner.

Interior: Unusual use of round and rectangular columns. Round columns, diam. 48 to 50 cm. Rectangular columns, 42 cm. by 50 cm. Area 3 m. square in center of patio is 50 cm. higher than surrounding area.

SHRINE ROOM

Condition: Much fallen.

Size: Inside measurements, 2 m. by 3.40 m.

Facades: Basal batter, and in some places topped by a 19 cm. beveled molding in position. No facade above the molding. The batter seen on all four sides of the shrine room, the east wall of the patio abutting the north and south walls of the shrine room.

Interior: Specialized vault stones in surface debris.

STRUCTURE 5C11

PLATFORM

Condition: No platform indicated. Structure seems to rise directly from great terrace of the Initial Series Group.

GALLERY

Condition: Poor state of preservation. Walls do not rise more than 50 to 60 cm. above the floor.

Size: Interior; 3 m. by 17.60 cm.

Facades: No basal batter. Across west are four columns, diam. 50 cm. Capitals, 72 cm. by 57 cm. by 34 cm. In spaces between either jamb and adjacent column is a row of capitals or column blocks.

Interior: Doorway into patio is not clearly defined. On floor of doorway is a row of stone blocks serving as a step. No vault stones seen in shallow debris.

PATIO

Condition: Only traces of walls.

Size: Interior, 14 m. by 17.60 m.

Facades: Small exposed sections show no basal batter.

Interior: Floor level 50 cm. higher than in gallery. In center is rectangular area outlined by columns. Measures approx. 6 m. by 8 m. Column drums average 38 cm. in diam. Location somewhat conjectural except for one in southwest corner. Old Spanish wall made up of 70 drums extends diagonally across patio from southeast to northwest.

SHRINE ROOM

Condition: No exterior walls exposed. In surface debris are specialized vault stones.

Size: Interior, 2.50 m. by 7 m.

STRUCTURE 5D3

PLATFORM

Condition: Fallen or covered with debris.

Size: Must have been at least one meter high on north and due to slope of terrain approx. two meters high on south.

Stairway: Slope of debris suggests a single wide stairway on the north.

GALLERY

Condition: Filled with debris to top of columns.

Size: Interior length 24 m.; width 4 m.

Facades: Basal batter with beveled molding exposed on west where gallery joins the patio. On north a series of eight columns. Diam. 38 cm. Capitals, 60 cm. by 40 cm. by 20 cm.

Interior: Doorway from gallery to patio approx. 2 m. wide as indicated by depression in the debris. Vault stones specialized.

PATIO

Condition: Very little standing.

Size: Approx. 16 m. by 17 m.

Facades: Walls surrounding patio rise with basal batter.

Interior: No vault stones seen. No column drums. Floor slopes downward toward the middle.

SHRINE ROOM

Condition: Only traces of walls exposed. Room indicated by height and amount of debris. Lack of debris between this extension and the south wall of gallery suggests a passageway.

Summarizing the information we now have on the eleven structures, we see that six face west, three north, one east, and one south. As only 3D11 (Fig. 4) has been excavated the facts presented are, for the most part, from surface observation.

The buildings may rise directly from the large terrace, or from a platform a few centimeters to as much as two meters in height. The plan of the platform, when present, coincides with that of the building, which in eight cases is Tau-shaped, the cross arm of the Tau forming the gallery.

The galleries vary in length from 14 m. to 72.75 m. In only two cases is this length and that of the patio the same.

The gallery is absent in one structure. With one exception all have partially standing or fallen columns across the facade. In the case of the single exception the column drums may have been removed or timbers were used for roof supports. Seven galleries have a single row of columns, one has two rows and one has four. Columns are round except in 3D11 where round and rectangular alternate. Only in two cases were no vault stones found in the debris of the gallery.

The patios show considerable variation in size, ranging from 13.70 m. by 14.20 m. to 33 m. by 39 m. Entrance from the gallery is generally through a single doorway but one example of a triple doorway occurs in Structure 5B17. Three pairs of jambs show sculpture; one with human figures, one with hieroglyphs and one with plant motifs.

There is a sunken area in the middle of eight patios. The center of one is 50 cm. higher than, and of another is on a level with, the surrounding area. However excavations may show all to be sunken. The columns are round with one exception (3C13), where round and rectangular are used. In three structures two rows of columns surround the center area and in two, no column drums were found.

A small chamber called a shrine room occasionally gives off from the patio. It appears in seven of the eleven buildings. Strangely enough the two buildings most conspicuous in their position in the city do not have a shrine room. When present it is always on the east side of the patio. Usually this is the back wall but in two cases where the building faces north it is the side. Only in Structure 6E3 were excavations undertaken in the shrine room. Vault stones were seen in the surface debris of all such rooms and the lower facades of five definitely rise on a batter.

These buildings are widely distributed in Chichen Itza. The two largest and most elaborate (so far the only two where ornaments formed decoration on the roof) rest upon

the vast terrace upon which were built the Castillo, the Great Ball Court, the Temple of the Warriors, and the Court of the Thousand Columns, in fact the most elaborate part of the Nahua portion of the city. In the Principal Group of the Southwest, which is relatively small though compact, there are two gallery-patio type structures. At the Group of the Initial Series one appears between the Temple of the Phalli and the Late Initial Series Temple, which is contrary to a previous statement.³ The others are more distantly located but in all cases occur associated with other buildings, never by themselves. Structure 3C13, the smallest, appears on the map of the site as an isolated building but there are low artificial mounds directly north and northwest.

As yet no structures definitely definable as of this type have been reported or noted anywhere except at Chichen Itza. The excavations at Tlamimilopa, Teotihuacan, by S. Linne revealed several small chambers with columns around a sunken area.⁴ During 1942, the third season of exploration at Tula, Hidalgo, Sr. Jorge R. Acosta uncovered Edificio 1, which has a central plaza with impressions of twelve rectangular columns surrounding a patio.⁵ So far there does not seem to be sufficient evidence to suppose that this is the patio of a gallery-patio type structure. However it shows the use of columns in a patio and may be the forerunner of such structures.

Buildings of this type are placed in the Mexican Period at Chichen Itza because of the use of columns, basal batter and specialized vault stones. This period is after the opening of the 12th century when Mexican tribes invaded Yucatan and Chichen Itza became their principal ceremonial center.

No new information has come forth to justify any assumption respecting the use of these structures. A number

³Ruppert, 1943, p. 231.

⁴Linne, 1942, fig. 188. ,

⁵Acosta, 1944, fig. 15.

of uses have been suggested: as Palaces of Justice; as Markets for the sale of produce, slaves or offerings for the temples or shrines; as Living Quarters for dignitaries, pilgrims to the city, sacrificial victims or prisoners; as Gymnasiums or Robing Quarters for persons in processions and ceremonies or for contestants in games. It is doubtful if we shall ever know with certainty, but the excavation of several of the structures may possibly throw some light on this question.

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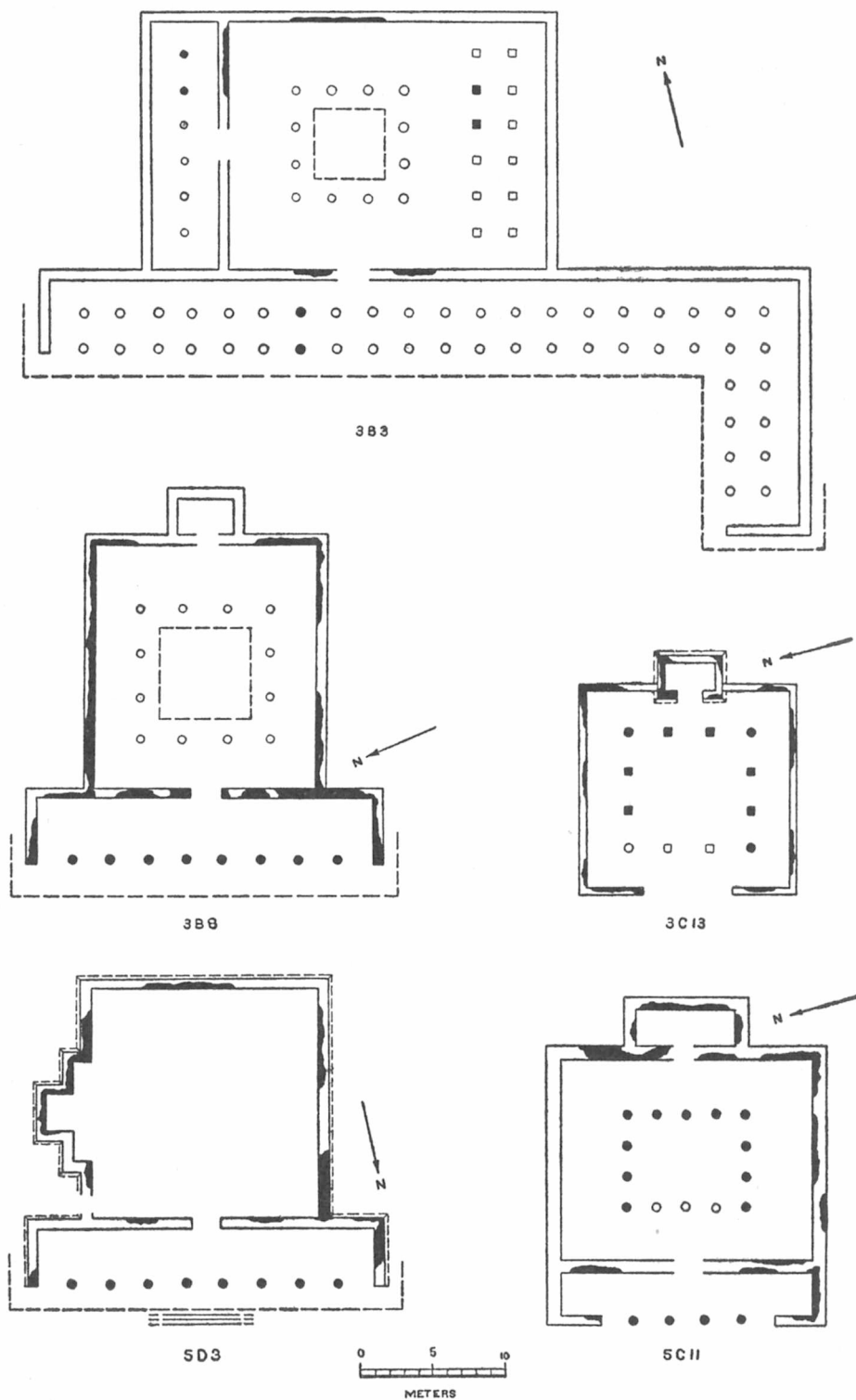


FIGURE 3. Five galley-patio type structures at Chichen Itza.

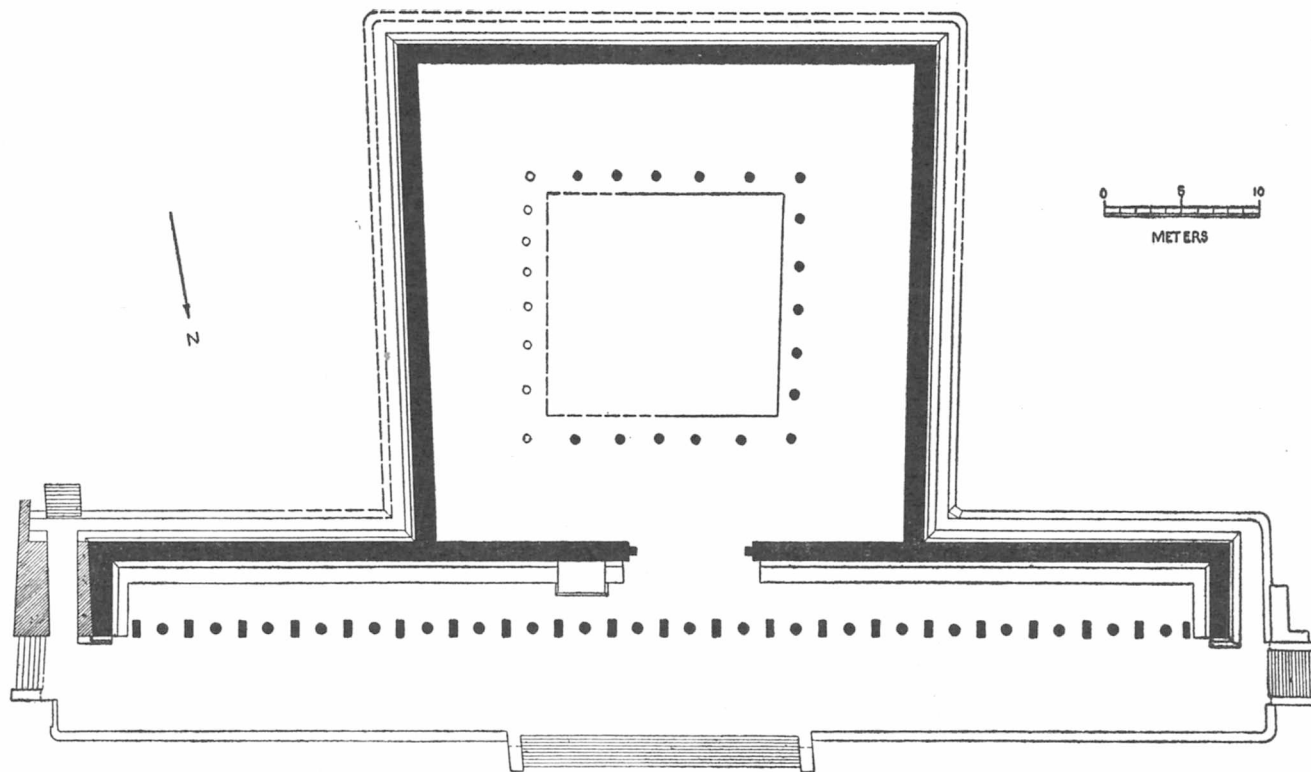


FIGURE 4. Structure 3D11, the largest galley-patio type structure at Chichen Itza.

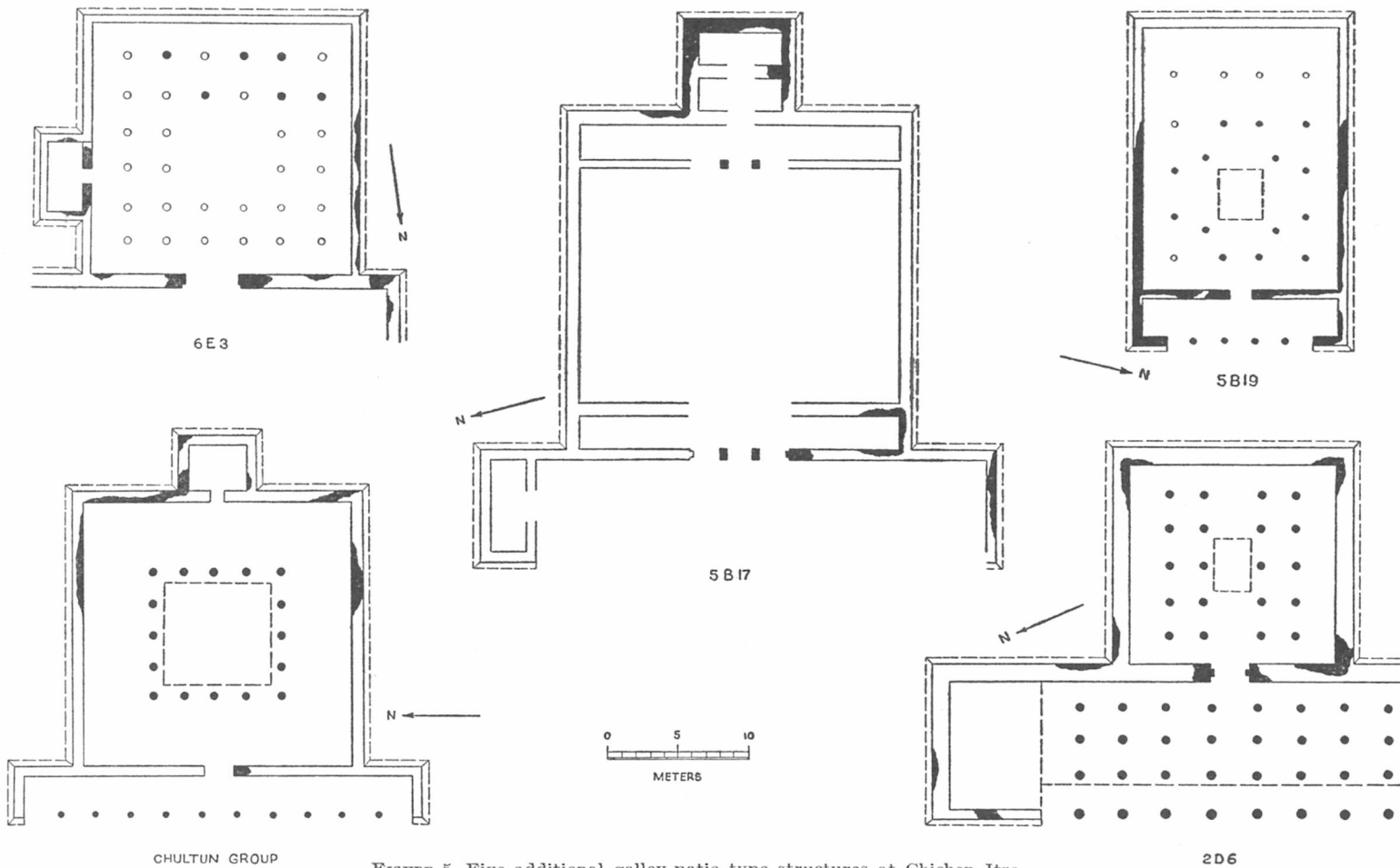


FIGURE 5. Five additional galley-patio type structures at Chichen Itza.

ARCHEOLOGICAL EXCAVATIONS IN EL SALVADOR

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Intensive archeological investigation in Middle America has been concentrated up to the present time mainly in that portion of this area which lies north of the supposed southern frontier of the Maya. This has been, though at first somewhat unconsciously so perhaps, the first step in a logical attack on the problems of deciphering the complex civilizations which arose and intermingled in the geographical bottle-neck between North and South America.

The Classic Mayan, the southern and central Mexican civilizations, with their many recorded historical contacts with Europeans and their at least partially deciphered written languages, furnish to students of prehistory much information which is not yet available, if ever it existed, from cultural areas lying to the south and east. However, as more and more information has become available from excavation, from written records both historical and pre-Cortesian, and from legends and verbal history recounted by descendants of the great civilizations, the need for study of these neighboring areas has become imperative. Not only must such research produce interesting material on what we may call "minor" cultures themselves, but also will furnish leads of aid in explaining the sources of certain stimuli which influenced profoundly the great centers.

In the following I shall summarize very briefly the archeological excavations thus far completed in the Salvadoran portion of the Mayan frontier area, discuss a proposed sequence and suggest a possible program for future study.

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1.

The Republic of El Salvador, smallest territorially, most thickly populated and probably the most mixed racially in Central America, occupies slightly more than 13,000 square miles of the Pacific slope of the continental Cordillera, and is bordered on the west by Guatemala, on the north and east by Honduras, and on the south by the Pacific Ocean. Its climate is tropical, oppressively hot only in the narrow costal zone at certain times of the year and its rainy to dry seasonal changes are sharply defined. The topography is chiefly mountainous but altitudes are moderate, generally 2000 to 4000 feet in elevation above sea level. At present, the country is badly deforested and includes large areas deeply cut by erosion. Nevertheless, wherever at all possible, its land is cultivated intensively.

Large, occasionally active volcanoes are salient features of the principal mountain range of interior El Salvador, a chain whose axis extends east-west parallel to the coast a short distance inland. Earthquakes are frequent and have often been extremely destructive.

The principal drainage system of the Republic is that of the Lempa River and its tributaries. The lower course of this stream divides the western three-fifths of the country from the eastern zone and furnishes a convenient line of demarcation for the approximate southeastern limit of once predominantly Mayan territory.

2.

So far as published information is concerned, the first archeological excavations in El Salvador conducted with scientific care were those by Lothrop, in 1926. At that time, his investigations on the Cerro del Zapote, near the capital city of San Salvador, brought to the public attention two extremely interesting strata which contained the remains of

ancient artifacts. Contents of the lower, earlier, of these strata included solid, hand-modeled clay figurines, Usulután ware¹ sherds and other objects, all believed to be assignable to the rather vague "Archaic" culture of Middle America and dating to perhaps as early as the time of Christ. A thick deposit of white volcanic ash overlay this horizon, separating it from an upper ash level containing evidence of much more recent human occupation. This later material was characterized by much pottery, many sherds of which were decorated with Mexican or Mayan painted or incised designs, and by clay figurines which seem developments of Archaic styles.² Discoveries made some eighteen years later in San Salvador and on the Cerro del Zapote suggest that Lothrop's "Upper Level" components were covered by white ash which fell about the end of the 8th century and that many of these specimens are of Mayan manufacture.³ Mexican-style pottery found here may be intrusive since one easily identifiable ware in this category of decorative design can be dated to little, if any, before the 12th century.⁴

In 1929-30, the late Antonio Sol, then Director of the Salvadoran government's Department of History, headed a one-season excavation at the imposing ruin of Cihuatán,, a site situated north of San Salvador on the southern edge of the middle Lempa valley. Unfortunately, very few artifacts recovered by this expedition are today available for

¹Lothrop, 1927, pp. 175, 176 and Figs. 5, 6. "Usulután ware" is so-called from its common occurrence in the Department of Usulután in eastern Salvador. The principal characteristic of this pottery is its decoration by the "Usulután technique," a process which must have involved the following steps: Painting of groups of wavy parallel lines with wax or some other substance not resistant to heat; thereafter covering the vessel with an orange slip. Firing melted the wax and the resulting appearance of the decoration contrasts the clay colored lines with the darker slip. True Usulután ware may have originated in eastern Salvador and may be restricted in time to the Archaic Period. For examples of ware, see also Longyear, Pls. VII, XI, 25. The technique, however, was employed on other wares as late as the 8th or 9th centuries of the Christian era. For some non-Archaic examples, see Fig. 1, k, and Longyear, Pl. XIV-A, 6.

²Lothrop, 1927, pp. 182-187.

³Boggs, 1944b, 1945.

⁴Boggs, 1944b, p. 11.

study and the brief published reports supply few details on the ruin itself or of the finds from it.⁵ It is clear, however, that Cihuatlan is one of the few ancient centers in the country constructed of cut stone blocks. A large, terraced, pyramidal temple base, a ball court and several walled plazas containing small buildings are reported. Small objects encountered at the site suggest that at least one phase (supposing more than one exists: probably the last) may be equated with the late period of Mexican influence. Earlier periods can be defined only after further excavation.

Ten years after Sol's studies, an expedition financed and directed by John Dimick and sponsored jointly by the Middle American Research Institute of Tulane University and by the Carnegie Institution of Washington undertook excavation and repair of the Main Site of the Campana Group ruins in the San Andres Zone, an area rich in ancient remains lying twenty miles northwest of San Salvador in the Zapotitan valley. This work was suspended at the beginning of World War II and has not been resumed.

It is believed that the San Andres mounds total more than 200, of which some twenty compose the Campana Group, the most important of the Zone from the standpoint of individual mound size. The entire ruin has not been surveyed thoroughly, nor has the final report on the excavations completed yet appeared. Two short papers which summarize the more interesting discoveries have been published, however.⁶

Apparently fairly typical of large western Salvador ruins of Old Empire Mayan times, the Main Site of the Campana Group includes two principal, adjoining, plazas, the southern of which (that excavated) was elevated above surrounding land and inclosed on its south and east sides by

⁵Sol, 1929, a, b: Summary in English included in Longyear, pp. 14-16 and Pl. XIII, 2, 5, 9.

⁶Ries; Boggs, 1943.

pyramidal terraced temple platforms. Characteristic features of the style of San Andres construction may be seen in Fig. 1a.⁷ Core material employed was adobe in the form of mold-made blocks, while wall facing was of a hard, cement-like, coarse mortar with smooth surface finish. The edges of all structural features were smoothly rounded and terraces were embellished only by simple cornices and upright mouldings at the outside corners of the largest buildings. The north side of Structure 1 probably had been decorated with a huge modeled masonry mask, but most of this was missing. No clear evidence of painted surfaces was encountered.

Atypically, Structure 8, a small platform detached from the Main Site building complex, was found to have been built of carefully squared stone blocks facing over a rubble core. There is reason to believe that this was constructed slightly after the adobe block and mortar architecture.

At least four building phases came to view during partial excavation of the principal structure of the Main Site,⁸ but the time span covered by them cannot have been long. Pottery from graves and from fill permits a minimum date of about the 7th century, for earliest construction. The chief building activity probably took place in the 8th and 9th centuries, a termination of this work being reached no later than about 1000.

Occasional post-construction occupation is suggested by the presence in superficial deposits of a few plumbate⁹

⁷Ries, Pl. 3; Boggs, 1943, Fig. 1.

⁸Boggs, 1943: "Perfil Compuesto de Plaza Sur—Parte Sur y Monticulo 1—Parte Norte."

⁹Plumbate ware of the developed type most commonly present in El Salvador is characterized by special features of design, form and slip. Elaborated "lamp chimney" shapes such as that shown in Boggs, 1944b, Fig. 3, c, animal effigies such as those in Lothrop, 1927, Figs. 18, b, 21, a, and Longyear, Pl. XI, 29, human or god effigies and faces, as in Lothrop, 1927, Figs. 21, b, 22, tripodal jars as in Lothrop, 1927, Fig. 22, b, and Longyear, Pl. XI, 32, 33, are fine examples of the variety of forms and designs. Modeled, incised and

sherds and of fragments of wares similar to those made during Aztec times in central Mexico.¹⁰

Several stone sculptures¹¹ were recovered from late positions but all had been re-used. Because several effigy parrot heads of this category of material possessed tenons, we may suppose that they were originally employed in the decoration of buildings, but whether they should be assigned to the time-destroyed adobe block temples, to Structure 8, or to an unknown, third, type of building cannot be proved.

Along with several finely carved jadeite ornaments and stucco vessels, found in graves and caches in the axial north line of Structure 1, were a few whole pottery containers. One of the latter, a fine polychrome vase¹² from a late grave, plus many fragments of supposedly imported Copador polychrome pottery¹³ discovered in fill, permit us to correlate the main period of occupation of San Andres with one phase of Tazumal. Other wares which point to connections between San Andres and ruins lying to the north and west are

appliquéd decorative features are common. The distinctive over-all slipping of this ware accounts for its name: although sometimes a bright orange, olive or lead colored seem more typical and the metallic lustre of many of these induced the belief that the slip contained lead. This pottery is thought to have originated in the highlands of western Guatemala, whence it was traded over much of Central America during the late period of Mexican penetration. A report on the ware by Miss Anna Shepard is soon to be penetrated. A report of the ware by Miss Anna Shepard was published by the Carnegie Institution of Washington in 1948.

¹⁰An example of one of these wares is illustrated in Longyear, Pl. XI, 10.

¹¹Boggs, 1943, Fig. 2.

¹²Ibid., Fig. 3.

¹³Ibid., Fig. 3, j. This term, "Copador," suggested by A. V. Kidder, implies the location of the principal area of distribution of this style, namely, Copan and the area around it of southwestern Honduras, and at least the western and central portions of El Salvador. Although complete definition of the ware is yet impossible, the embellishment of vessels with non-functional Mayan glyphs or glyph elements and human figures in profile, painted in a distinctive, expert, style, and involving the use of specular hematite red paint is considered typical. Red and black designs on orange-slipped backgrounds are customary, though occasionally vessels are unslipped. More rarely, five colors are applied. For typical examples, see Fig. 1, c, and Longyear, Pls. X, 20, 23, XI, 9, 19, 21, 22; Boggs, 1943a, Fig. 5, i, 1945, Fig. 2, d, j, k, n, 1945a, Fig. 5, g.

Scraped-slip¹⁴ and Fine-line polychrome.¹⁵ Later southeastern ties are hinted by the occurrence in late debris of Nicoya polychrome.¹⁶

A plain stone yoke and a profile animal figure¹⁷ from debris should eventually prove helpful in the tracing of foreign influences on the San Andres culture. These two objects perhaps were imported from eastern Mexico, or, more likely, they were carved locally by sculptors from that area.

In 1941-42, the Institute of Andean Research granted funds for a program of field work in El Salvador under direction of John M. Longyear. The general purpose of this project was to check reported sites, reconnoiter previously unknown ruins, and to explore such of these as appeared

¹⁴Typical examples of this ware were slipped with a heavy white paint, a part of which was then raked or scraped off in more or less parallel, broad, wavy lines, presumably by the potter's finger tips in most cases. Sometimes a secondary thin orange slip was applied after the scraping process was completed. This technique seems to have been developed not long after Archaic times, possibly as a labor-saving imitation of or outgrowth from the Usulután technique. See early examples found at Tazumal in Fig. 1, h, j, and in Longyear, Pl. XIV-A, 4, 9. For later (Copador Phase), similarly decorated specimens, see Boggs, 1943, Fig. 3, k, l.

¹⁵Fig. 1, g, shows interior design of a typical example of this ware, as copied in color by Antonio Tejeda. Bowls of Fine-line (or Rapid, "Short-hand" style) polychrome are typically tetrapodal, with high, tubular "cascabel" feet, shallow-round bottoms, narrow basal flanges or low basal ridges, concave side-walls and flaring rims. Colors employed include red or dark orange and black on an orange-over-white slip. The conventionalized designs are generally outlined by very thin, black, rapidly drawn lines and include human figures in profile, feathers, birds, geometric patterns, "twist and bud," or rope, elements and "counters" below the rim on the interior surface. Distribution of this ware, so far as now known, seems limited to El Salvador, but many of the characteristic design elements can be seen on sherds and bowls from western Honduras. For illustrations of specimens from El Salvador, see Boggs, 1943a, Fig. 5, g, 1945, Figs. 2, f, 3, u; Longyear, Fig. 25, l-n, Pl. IX, 6.

¹⁶Many specimens of this pottery have been found in Nicaragua and Costa Rica, apparently the area of their origin. Probably it is a contemporary of plum-bate. Red, black and orange designs on white or light grey slip constitute the principal color combinations found on Salvadoran examples of Nicoya polychrome, while the forms of this ware are often similar to those of plum-bate: "lamp chimney" vases, animal effigies, tripodal jars, etc. Serpents, humans, birds and animals, as well as many highly conventionalized, unidentified naturalistic, and geometric, design motives are common painted decorations. See Lothrop, 1927, Fig. 14, a, and Longyear, Pls. IX, 17, X, 18 24, 33, XI, 3, XIV-B, 7.

¹⁷Boggs, 1943, Fig. 2, b.

likely to yield archeologically interesting material. Oriental El Salvador was investigated by Longyear, who conducted brief excavations at the site of Los Llanitos, while the writer pursued similar aims in the central and western areas of the country, excavating at Hacienda Tula and at Tazumal. The final report of this work has been published.¹⁸

Los Llanitos was found to include a ball court and an assemblage of small structures, all rather crudely constructed and badly damaged by the action of time. Most of the building platforms were outlined by rough stone walls, back of which fill had been dumped up to the level desired. No certain evidence of wall facing was obtained. The I-shaped ball court, located the farthest south and east of any hitherto reported in Central America, possessed low, sloping side-walls faced with stone slabs above low benches.

Unfortunately, most of the pottery and other small finds were of types until then unknown to archeology, many of the former bearing painted designs which suggest local developed or imported ideas. A few fragments of Fine-line polychrome ware and of vessels with vaguely Mayan designs lead one to believe that this site saw its principal development about 700 to 900 A.D.¹⁹

Hacienda Tula was of importance strictly from the aspect of establishing contemporaneity of certain pottery types, and of associating these with a local volcanic eruption. Excavation revealed that the mounds were modern, unconnected with the cultural stratum underlying them. Scraped slip, Purple polychrome²⁰ and a possible relative of Copador

¹⁸Boggs, 1944.

¹⁹Longyear, Part III.

²⁰Fig. 1 f; Longyear, Pl. XIV-B, 1; Boggs, 1945, Figs. 2, i, m, 3, r, t. This ware is typified by annular based or tripodal bowls, usually with composite silhouettes, painted red and purple (Ridgeway colors: Hematite Red to Diamine Brown) on orange slip. The purple and red painted decoration is composed of geometric elements: lines, dots, scrolls, steps, waves, but rarely depicting any figure recognizable as a natural-form derivative. Purple polychrome seems to be unknown outside of El Salvador.

polychrome ware were found in a layer of white volcanic ash. Since these wares were not intrusive, and because comparisons with similar sherds from San Andres and Tazumal permit their dating to the 8th or 9th centuries, the stratum in which they occurred must bear such a position in time.

Following the first season of Andean Institute-sponsored explorations of the Chalchuapa Archeological Zone, with principal attention to the Tazumal Group, the Salvadoran government granted a small sum of money annually to permit continued excavation and essential restoration of Structure 1 of that site. This work continued through the season of 1945 and has been reported superficially in publications of the Salvadoran National Museum.²¹ The final report is in preparation.

The Tazumal ruins, consisting of thirteen badly damaged structures and including an unexplored ball court, lie at the south end of the archeological zone. This Zone extends for more than two kilometers along the east and north sides of the city of Chalchuapa, near the Guatemalan border in western El Salvador, and includes four other groups of prehistoric buildings: Casa Blanca, in the center, El Trapiche at the north, Pampe to the west and Las Victorias to the east.²²

The importance of this ancient center was made evident many years ago by the discovery of a Chac Mool figure in the Casa Blanca Group and by that of a stela, the sole example of this type of monumental sculpture yet known in El Salvador, at Tazumal.²³ Furthermore, examination of locally collected pottery and figurines intimated that the Zone had been inhabited throughout many years. These collections commonly included Archaic Usulután ware, Mayan polychromes, effigy plumbate vessels and native made figurines

²¹Boggs, 1943a, 1943b, 1945a.

²²Longyear, pp. 17-19.

²³Lothrop, 1939, Fig. 2.

with European facial features, these last presumably fabricated by native potters under Spanish domination. In addition, historical records showed that the Pokoman dialect of the Mayan tongue was still spoken in and about Chalchuapa many years after the Conquest.

After a brief survey of the entire zone, work was concentrated on the north and west sides of Building Complex I of Tazumal. For purposes of comparing the architecture, minor excavations and repair of Building Complex II were also undertaken. These two complexes are to be distinguished by differences in their architectural style and construction and by their stratigraphical position.

Stylistically, buildings of Complex I are extremely similar to those of the Main Site of San Andres and are embodied at Tazumal by Structure 1. Here an immensely complicated series of super-imposed and altered buildings was found to have been built up over a period of approximately six hundred years. The earliest construction discovered so far consisted of a large rectangular platform with battered walls. On this were situated several small buildings whose size and form suggests their use as ceremonial dancing platforms, as altars or perhaps as small temples. Later, the original platform was enlarged greatly so that it finally covered about four acres of land and in late phases provided the base for a large temple substructure. The maximum height of the final edifice must have reached over eighty feet above surrounding ground level.

The surface facing of this complex closely resembled that of San Andres, except that early phase buildings were more smoothly finished than the later and were often painted white. Adobe block cores were rare as the great quantity of stone available in the vicinity of Tazumal permitted use of boulders and slabs laid in adobe to impart the wall and step outlines. Cornices, as other modeled decorations, were un-

common at Tazumal. One fragmentary early building, probably a temple, based on the earliest platform and later covered over by two reconstructions, was distinguished by a row of rectangular, white-painted columns at its entrance. Two of these columns bore incised designs.²⁴

The principal approaches to Structure 1 were on the west and north sides via wide staircases, the earliest of which were characterized by broad flanking balustrades.²⁵ Step and wall lines appear to have departed more and more from true north orientation from early to late in the ruin's history.

Building Complex II included the final building phase of Structure 1 and all of Structures 2 and 2A. Here the core composition was almost entirely of boulders placed in only enough adobe to bind. Terrace faces were formed by roughly cut stones, covered by a primary facing of small rocks or crudely finished lava slabs set in mortar. Thereafter, a fine white lime plaster had been spread over the surface and carefully smoothed.

Although both building complexes possess battered basal terraces, only those of Complex II are characterized by projecting vertical cap-mouldings. Structure 2, for example, shows a succession of three battered terraces, each topped by a broad moulding.

Stratigraphically, Complex II overlies Complex I, and apparently represents the last building activity undertaken at Tazumal. That the time occupied in this later construction cannot have been long is implied by the existence of only one building phase of this Complex, as contrasted with at least six for Complex I.

Undoubtedly, the most valuable finds from the standpoint of dating and general cultural comparisons were furnished by discoveries from a succession of graves in Struc-

²⁴Boggs, 1943b, Fig. 9.

²⁵Baratta, illustration at end of article.

ture 1. The furniture of these interments included many pottery vessels, hundreds of jadite ornaments and a number of textile impressions, a few bits of metal and some carved stone. Graves 1, 3, 4, 7 and most of 2 belong to the "Copador phase," here characterized by a pottery complex which includes Copador, Fine-line and Purple polychromes, Ring-and-dot dichrome jars²⁶ and Coarse brown monochrome bowls. The stratigraphically earliest burial of Grave 2, and Grave 6, were slightly earlier, while Grave 8 was the most ancient discovered.

Comparisons of the pottery from these Tazumal graves with finds from burials, tombs, and caches of Copan, Uaxactun and Kaminaljuyu allow Grave 8 to be assigned in time to some portion of the Esperanza-Tzakol period, perhaps not later than the 6th century, while graves of the Copador phase must be roughly contemporary with the Copan Acropolis and Uaxactun Tepeu horizon, little, if any, later than 900 A.D. Both Burial J of Grave 2, and Grave 6, were clearly intermediate stratigraphically, and to some extent in the typology of their ceramic contents, between these two periods.

The Copador Phase graves seem to be late in Building Complex I as they had been cut through the last floors of the enlarged platform. Sherds from late levels of Complex I fill, though still incompletely analyzed, seem to bear out this observation. However, Grave 8 may not denote the time of the earliest building activity. Presence of Archaic type sherds and figurine fragments in early fill, and on the surface near Tazumal, may signalize the existence here of yet more ancient construction.

Building Complex II was begun well after Complex I had been abandoned, to judge from the accumulation of de-

²⁶See examples in Longyear, Pl. X, 19; Boggs, 1945, Figs. 1, e, f, 3, c, d. Characteristics of this ware are: constricted-neck jar forms, grooved, out-turned rims, thick white paint used to give typical rings and dots design on a cracked red-painted background.

bris over the last Complex I floor at the base of Structure 1. Both Structures 2 and 2A rested on this accumulated rubbish. How long the supposed hiatus persisted cannot be fixed precisely, though the presence of effigy plumbate and Nicoya polychrome potsherds in connection with Structure 2 hints at a possible gap in occupation of two to three centuries.

More or less complete abandonment of Tazumal took place probably during plumbate times, perhaps during the 12th or 13th centuries, but occasional visits to the site must have continued throughout the immediate pre-Conquest years. Graves dug into late debris of Structure 1 and furnished with non-Spanish pottery are difficult to explain from any other point of view.²⁷

The temporal reference of the Tazumal stela to the sequence of construction is by no means clear. Its original position²⁸ on the western slope of Structure 1 is so questionable that it may rather have been atop Structure 2A. Stylistically, this monolith's carved designs seem more similar to Mexican than to Mayan motives. Probably the stela is late at the site since it was found on the surface and perhaps is no older than Complex II and plumbate times.

3.

As a result of Lothrop's discoveries on the Cerro del Zapote and those made at Tazumal, we may propose the following tentative chronological sequence for excavated Salvadoran sites west of the capital city:

I. "Archaic" Period—Unknown beginning to perhaps 400 A.D.

Sites: Cerro del Zapote—lower level.

Chalchuapa Zone—scattered finds.

Characteristics: Include solid, hand-modeled figurines of Mexican Archaic type and Usulután ware.

²⁷Boggs, 1944, pp. 60, 61.

²⁸Ibid., pp. 60, 71.

Basis for dating: Stratigraphic position at Cerro del Zapote.
Comparison of figurines with central Mexican Archaic and
Guatemalan Miraflores forms and styles.

II. Middle Period—From about 400 to 900 A.D.

- (a) Salvadoran version of Esperanza-Tzakol Phase—From about
400 to 600 A.D.

Site: Tazumal—Building Complex I: Grave 8 and early struc-
tural fill.

Characteristics: Include Early Scraped Slip ware, annular-based
bowls with Usulután-technique decoration, tripod red-
on-buff painted vases, jars with appliqueed faces on necks,
finely polished black, brown and white small bowls with
occasional incised decoration, footed bowls decorated with
Usulután technique designs and later repainted with red
designs, "mushroom stones."

Basis for dating: Stratigraphic position. Comparisons of Scraped
Slip ware pitchers, of bowls with Usulután technique deco-
rations with Esperanza Phase finds from Kaminaljuyu,
Guatemala.

- (b) Transitional Phase—From about 600 to 700 A.D.

Site: Tazumal—Building Complex I: Burial J of Grave 2.
Grave 6.

Characteristics: Include Tazumal Glyphic, Tazumal Geometric
polychrome wares and Scraped Slip jars with red painted
lines.

Basis for dating: Position of graves stratigraphically. Styl-
istic features of design motives on cited wares compared
with Grave 8 and Copador Phase decorative elements.

- (c) Copador Phase—From about 700 to 900 A.D.

Sites: Cerro del Zapote—non-intrusive "Upper Level," Main
Site, Campana-San Andres—Most fill and graves.

Tazumal—Building Complex I: Grave 2, Burials A-I,
Graves 1, 3, 4, 7. Some late fill.

Characteristics: Include Copador, Purple, Fine-line poly-
chromes, Late Scraped Slip, Ring-and-dot dichrome, Coarse
brown monochrome wares and, probably, flat, profile stone
figures.

Basis for dating: Occurrence of Copador polychrome in caches of Stelae I and M and Altar of Stela J, Copan. One Tepeu Phase (Uaxactun) polychrome bowl from Grave 1.

III. Late Period—From about 1100 to 1525 A.D.

Early Pipil Phase—From About 1100 to 1300 A.D.

Sites: Cerro del Zapote—intrusive "Upper Level" Main Site, Campana-San Andres—debris.

Tazumal—Building Complex II and debris.

Characteristics: Effigy plumbate ware. Large vase incense burners with annular bases and Tlaloc and other modeled faces on sides. Probably also large stone jaguar effigy heads, Chac Mool and other figures.

Basis for dating: Stratigraphical position of finds. Comparisons of plumbate with already dated finds in other sites.

Four defects, all arising from our lack of sufficient carefully excavated material, are immediately noticeable in the above sequence: (1) The rather blurry limits of the phases proposed; (2) The several gaps, whether due to local abandonment of the sites dug or ignorance of a general emigration from the whole area in the times involved; (3) The uncertainty of how applicable this sequence may be to the sites in eastern El Salvador; (4) Nomenclature of the periods and phases.

To decipher more efficiently the involved prehistory of El Salvador, future explorations, I believe, should follow some long-range systematic plan, rather than to continue the more or less hit-or-miss spot digging projects common in the past. One plan which might be considered involves the following four steps:

First: To concentrate effort on ruins in the western part of the country, where both historical contact sites and dateable Mayan remains are to be found without difficulty. At this stage, large ruins, which generally produce long sequences, should be excavated before small sites. This step

may be considered finished when a sound sequence can be formulated for the area.

Second: Small sites in central El Salvador should be tested next, to check on the sequence established for the west, to supply information on eastern contemporaries of western key traits, and to extend applicability of the trial sequence geographically to the lower Lempa River.

Third: Large sites in eastern El Salvador can be explored and materials obtained from these excavations compared with those from the west and center sequence, in order to provide a general framework of time and space relationships for cultures of the entire country.

Fourth: Given the temporal position and the distribution of the many traits discovered, the civilizations of ancient El Salvador can be fitted into their proper position in Central American history and detailed studies pursued of the many facets of their cultural attainments, behavior and contributions to human life.

Until this, or some similar program is followed to its logical conclusion, Salvadoran archeologists must face the gloomy prospect of a future of almost purely antiquarian activity and of dealing with minutiae whose position in the general scheme of things may never be explained.

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POTTERY TYPES FROM KITCHEN MIDDENS OF DUTCH NEW GUINEA†

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Comparatively little of the archeology of many outlying places was known before the beginning of World War II. This is particularly true of Dutch New Guinea. This war has opened vast areas to the world which were practically unknown, or which were not thought to have archeological information. This is true not only for archeology, but also for ornithology and other sciences. Some of the contributing factors which previously inhibited earlier exploration are: topography, climate and the natives' dislike of outside influence.

Aboriginal pottery is known to have existed prior to this time in British New Guinea and reported by various missionaries and early explorers of this area.¹ However, the existence of kitchen middens was not reported until the writer came across a couple of middens at Cape Kassoe, Humboldt Bay, Dutch New Guinea. These mounds had just recently been cleared of their jungle growth by the Japanese

† Paper submitted to editors September 1946.

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¹ Anthropological reports of the Territory of New Guinea Nos. 1-6, Melbourne, 1926 et seq. Notes on the natives of certain villages of the Mandated Territory of Australia.

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who had bivouacked in the area, later dispersed by the U. S. troops.

While walking along the beach one day, the writer noticed a few scattered sherds. This immediately attracted his attention and he looked around for more. In doing this he came across a couple of mounds about two hundred yards from the present beach. One mound adjoined a thirty-foot cliff, while the other mound lay about fifteen feet away partly surrounded by the swamp. These mounds averaged twenty-two feet in length, and twelve to fourteen in width. Their height varied from three to five feet above the surrounding area. The long axes of both mounds were in a northwesterly-southeasterly direction.

Since time for investigative purposes was not too plentiful, the writer chose the mound adjacent to the cliff as it was the drier and not too many mosquitoes and ants to contend with. A test pit three feet square was put down in the southeast slope of the mound and particular care was taken to notice any stratigraphy. The composition of the mound consisted of intermingled shells, ashes, potsherds, broken stones, bones and earth. As each six inch layer was taken off, the sherd types were examined. It was noticed that the sherds from this first layer were all plain ware with the exception of a few bearing incised decoration. The next several layers increased the number of incised decorated sherds, but the predominant type was still the plain ware. Later, punctate decoration made its appearance, but was noticed to occur only on a certain type of vessel. The pit was sunk a little over three feet in depth, and from this area one thousand and fifty potsherds were recovered. Since neither the base of the mound nor virgin soil were found, it is not known just how much deeper the deposit extended. During this time no stratigraphy was noticed.

As there was not time to study the results of this test pit, representative sherds from all levels were packed into ten

parcels and shipped to the writer's home for later study. Out of ten packages shipped, only one survived the long trip half-way around the world to arrive at its destination. This package contained one hundred and twenty-four sherds. It is upon the basis of these sherds that this study is made.

As no comprehensive pottery study from this region is known to the writer, and the preliminary study while in the field indicated no stratigraphy, it is thought best to group the sherds into a single lot and to study them as a whole.

The sherds were grouped according to vessel type. Eighty-seven percent of all sherds belong to various bowl types. All bowls are wide-mouthed. Some forms include the saucer, the shallow semiglobular, the shoulder, and the deep semiglobular. All these forms have rounded bottoms. Other bowl forms share two common characteristics—namely, flat bottoms and flaring sides. This group includes the basin and funnel-shaped bowls.

Two types of ollas were found. One form is the narrow-neck, wide-mouthed globular body type, while the other has a smaller mouth and a bulbous neck with a globular body. This latter form is better described as a gourd-shaped olla.

A number of charts were prepared which show the major characteristics of each rim sherd in cross section. All cross section drawings bear the number of the sherd.

The word "tempering" is used to indicate the material which has been added to the clay by the potter in order to insure against the varying stresses and strains brought to bear on the vessel by the drying and firing. Hardness was calculated according to the method recommended by March.² Texture was noted by an examination of the cross-section which takes into consideration the texture of the paste itself and the size, kind and amount of tempering material. The lip area is considered that portion of the vessel marking the

²March, B., *Standards of Pottery Description*. Ann Arbor, Mich., 1934.

meeting place of the inner and outer walls of the vessel. A rounded lip is one which is gently curved with no perceptible lessening of the width of the rim as the lip is approached. A flattened lip is one which is noticeably flattened with square or sharp edges. A beveled lip is one with the lip sloping either towards the interior or the exterior of the vessel. A combination of these three tend to make up other types of lip forms, such as: flattened-beveled, flattened-rounded, and beveled-rounded. (See Figs. 7-9 showing cross sections of sherds.)

Tempering material in practically all sherds is fine beach sand used in varying amounts. As no other type of tempering material was noted, it appears that the entire collection comes from a single component or cultural horizon which evidently persisted for quite some time. The paste of the entire collection is fairly uniform and the average sherd is a brick-red color. Some sherds deviate from this color norm being either a dull gray or a black depending on the amount of firing they received.

Pottery Types

The first type is an outflaring funnel-shaped bowl (see illustration) with a small flat base measuring 7.5 cm. in diameter. The mouth of the bowl measures 24 cm. in diameter while the height of the bowl measures 17 cm. The paste is brick-red in color, uniform, medium fine in texture and with a hardness ranging from 2 to 4. Some of the bases of this type are well polished which brings the finer particles of the paste to the surface, while other bases appear to have had a slip applied and later polished. This is the only polished surface of the entire bowl. Some specimens are well fired as the walls are of a uniform color throughout, while others have a dark core which is due to incomplete burning.

The distinguishing features of this group are the wide flaring sides of the vessel, incised geometric design, punctate

decoration which may or may not penetrate the walls of the vessel and small flat bases. Lip treatment is not uniform, but varies from vessel to vessel. The walls of the vessels are smoothed. Thickness of body pieces ranges from 0.6 cm. to 0.8 cm. This group is represented by seven lip sherds, eleven base sherds and twenty-eight body sherds.

The second type bears small horizontal bands of clay "cording" either ticked or pinched. These bands are placed parallel to the lip of the vessel averaging 1.5 cm. below the lip. The bands range from 0.5 cm. to 0.8 cm. in width and protrude about 0.2 cm. from the sides of the vessel. There can be one, two or even three parallel rows of these bands. This group comprises mostly semiglobular bowls. The entire surface has been well smoothed, and where the bands have been ticked the ticking was made by some sharp pointed instrument slanting either to the left or right. Paste is a brick-red color. Hardness ranges from 3 to 4.5. Walls measured 0.3 cm. to 0.5 cm. in thickness. Twenty specimens form this group. Out of this number, fifteen have the ticked cords and five have the pinched cords. Four specimens have a well-polished red-slipped interior which is almost burnished.

Three handles are found among the specimens of this group. One specimen has its lip pierced in two places where a handle could be tied to it or the use of fibers to form a handle. Another has a lug handle 4.5 cm. from the lip of the vessel while the third has a large lug handle 4.5 cm. in length attached to the lip of the vessel and protruded out at a right angle to the neck of the vessel. Just before the handle terminated, the ends have been curved down towards the body of the vessel. A wide variety of lip forms is to be found in this group.

A third type bears the marks of brushing on the exteriors of bowls. One sherd showing partly obliterated brush marks on the interior of the bowl. This type is represented by four

rim sherds which come from semiglobular bowls. Color of paste ranges from a reddish gray to almost black. Lips vary from rounded insloping bevel to square to flattened. Hardness ranges from 2 to 4. Thickness ranges from 0.3 cm. to 0.9 cm.

A fourth type bears no decoration. The color ranges from a buff to brick-red to black. Hardness ranges from 2 to 4. Lip treatment consists mostly of an inward sloping bevel. The only attempt at decoration is shown on Sherd No. 13 where a scalloped collar effect is found on the outside of the lip portion of the sherd. Thickness ranges from 0.3 cm. in the olla specimens to 0.85 cm. in the bowls.

A fifth type resembles the second type in that they both share a common characteristic: the horizontal bands of clay on the exterior of the vessel below the lip. The exception is that the former is either ticked or pinched and the bands on this group have not been treated. The bands of clay occur at varying distances from the lip ranging from 2.5 cm. to 3.5 cm. This type has been slipped with a maroon-colored wash on the inside of the bowl with the slip carrying over to a band on the outside, contiguous to and parallel to the lip and about 2 cm. wide or extending down to the top of the clay band which lies parallel to the lip. The slipped surfaces have been well polished giving a burnished effect. The slip, while fairly thick, is well burned into the bowl and does not readily chip off, but forms an integral part of the bowl. The sherd shows a blackened core while the unpainted exteriors are smoothed and are of a brownish color. The texture of the paste is medium fine. Hardness ranges from 2 to 3.5. The walls vary in thickness from 0.6 cm. to 0.8 cm.

The remaining types are determined by individual sherds that may or may not constitute wares. It is thought wise to report these types now for the benefit of those who may later investigate this phase of archeology. The first type is

a sherd that bears a pinched lip which forms a pronounced bevel which slopes towards the outside of the bowl. (Sherd No. 2) The exterior has been smoothed and is of a dirty pinkish-cream color, while the interior of the bowl and the inside of the lip is covered with this same color, well polished. The marks of the polishing tool are easily seen. The texture of the paste is medium fine with particles of very fine sand. The core of the sherd is black. No form of decoration can be noted on this sherd outside of the polished interior. The piece is 0.8 cm. thick. Hardness is 3.5.

The second type comes from a wide-mouthed olla and is a fragment containing a small portion of the neck and a part of the body. The exterior surface as well as the interior surface has been slipped with a purplish-red pigment and the surfaces well polished. On the exterior just below where the body joins the neck is a strip of dull black paint. Immediately under the slipped exterior the paste is a brilliant orange color. The paste which is practically a homogeneous mass with only an occasional fragment of sand showing is light gray in color and its texture is fine. This sherd is 0.6 cm. thick. Hardness is rated at 4.5 (Sherd No. 55.)

The third type is a fragment of a semiglobular bowl showing the lip and a part of the body of the bowl itself. This sherd, like the one described immediately above, has a different type of paste from any of the other one hundred and twenty-four. The paste is lighter in color ranging from a buff to a very light gray (Sherd No. 14). Texture of the paste is fine and of a uniform consistency. The outside is encrusted with a heavy black formation as though it has had considerable contact with open fires. The interior of the bowl is of a burnished black. The lip is slightly rounded and measures 0.7 cm. in thickness, while the walls are 0.35 cm. thick. Hardness is rated at 4.5.

The last type is distinct in that it bears on the exterior of the vessel, probably a jar of some kind, a stamped design

as though applied by a paddle. The design is curvilinear and is raised only a fraction above the surface of the vessel. The exterior surface was well smoothed before the decoration was applied. The paste of this piece resembles in the color and texture the majority of the sherds found.

Bowl-shaped vessels accounted for the majority of the sherds. One hundred and six sherds—85% of the collection—come from bowls.

Pottery Traits

PASTE:

TEMPER

Sand

TEXTURE

Fine

Medium fine

Medium

COLOR

Brick-red

Gray

Black

Pinkish-cream

HARDNESS

2.0 to 4.5

VESSEL CHARACTERISTICS:

BOWLS

SURFACE FINISH

Smoothed

SHAPE

Semiglobular—wide mouthed

Flaring rim funnel shaped, flat base

Flaring rim flat base, basin shaped

Saucer shaped

Shoulders

HANDLES

Lug

Bar

DECORATION

Slipped
Burnished
Polished
Brushed
Incised line—broad
Incised line—fine
Punctate
Pierced
Painted
Stamped
Plain cording
Ticked cording
Pinched cording

OLLAS

SURFACE FINISH

Smoothed
Slipped
Painted

SHAPE

Globular
Gourd shape
Wide mouthed

DECORATION

Black on purplish-red

HANDLES

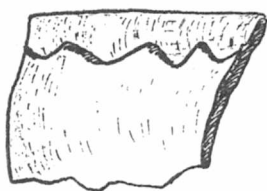
None

POTTERY SPINDLE WHORLS

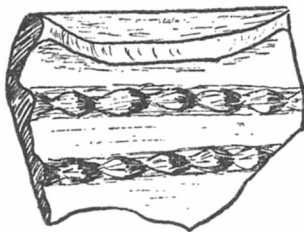
Disc shaped
Globular

STONE OBJECTS:

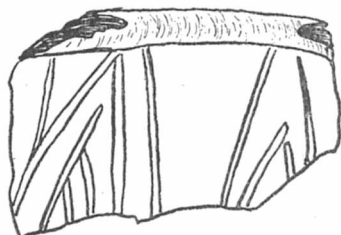
Doughnut-shaped
Perforated
Polished



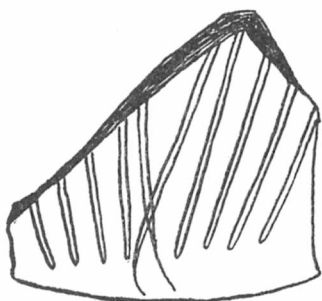
13



20



7



73



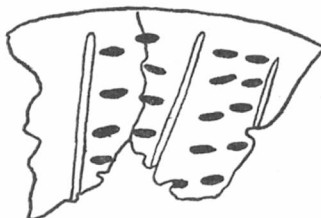
7A



8



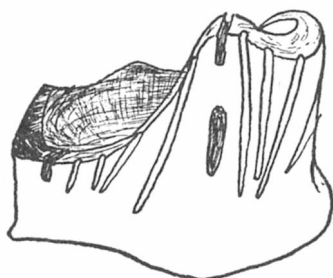
55



37 & 41



65



69



76

FIG. 6. Decorated sherds: No. 13, plain ware; 20, plain ware showing a double band of cording; 7, incised line design used at top of flaring rim funnel-shaped bowl; 73, incised line at base of flaring rim funnel-shaped bowl; 7a, paddle-stamped decoration; 8, diagonal brushed design; 55, black on purplish red; 37 and 41, incised line, punctate and pierced decoration; 65, incised lines and pierced design; 69 incised lines and pierced design on base of flaring rim bowl; 76, incised line and punctate design.

CHART 1

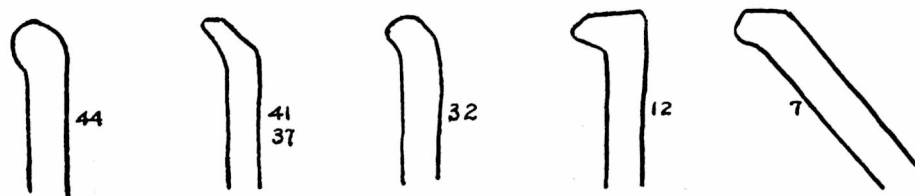


CHART 2

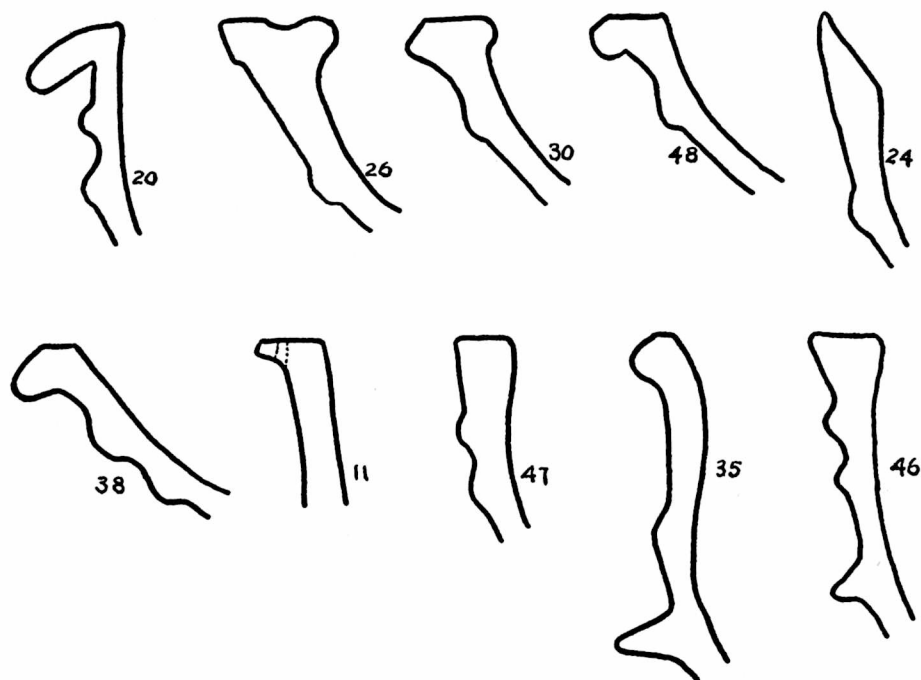


FIG. 7. Charts 1 and 2 of major characteristics of each rim sherd in cross-section.

CHART 3

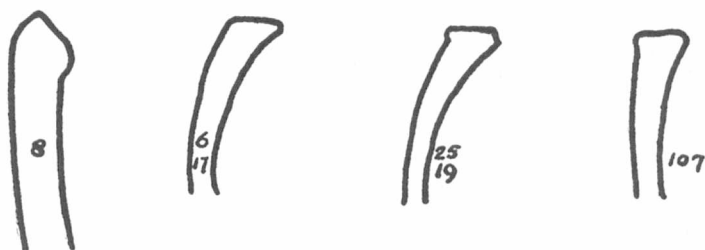


CHART 4

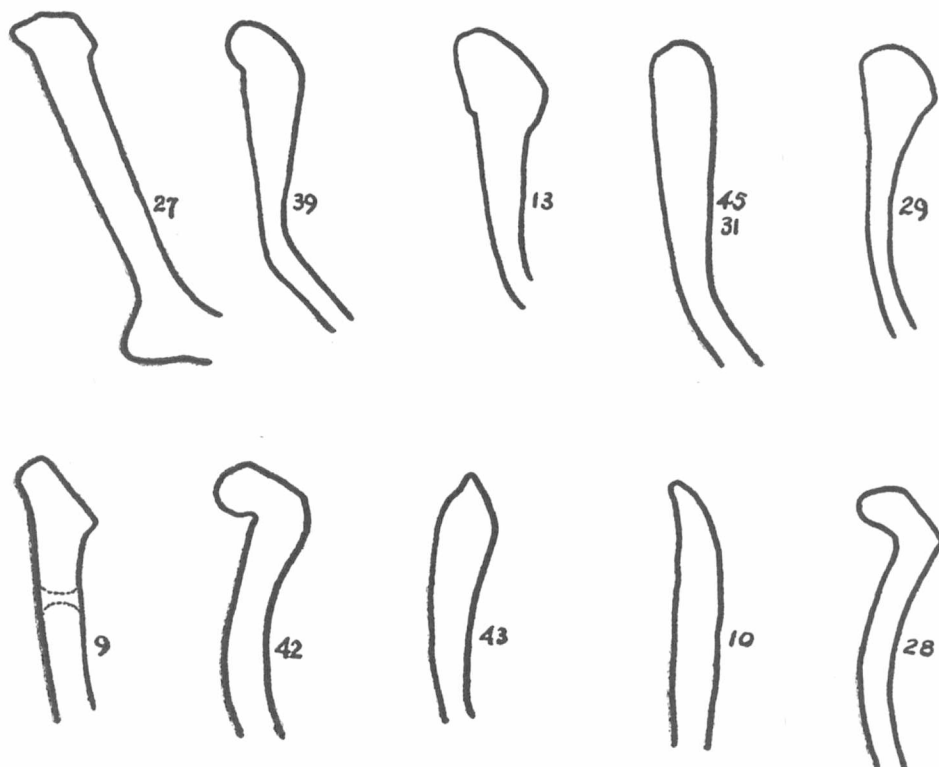


FIG. 8. Charts 3 and 4

CHART 5

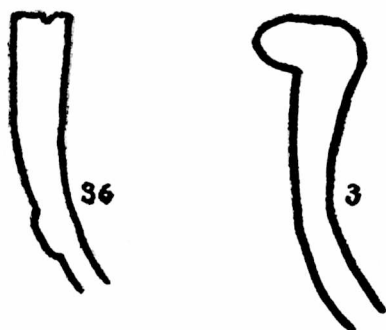


CHART 6

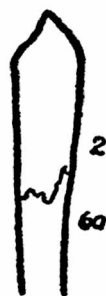


CHART 7

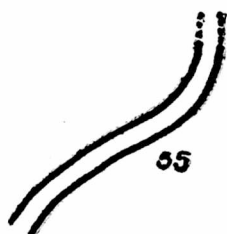


CHART 8



CHART 9

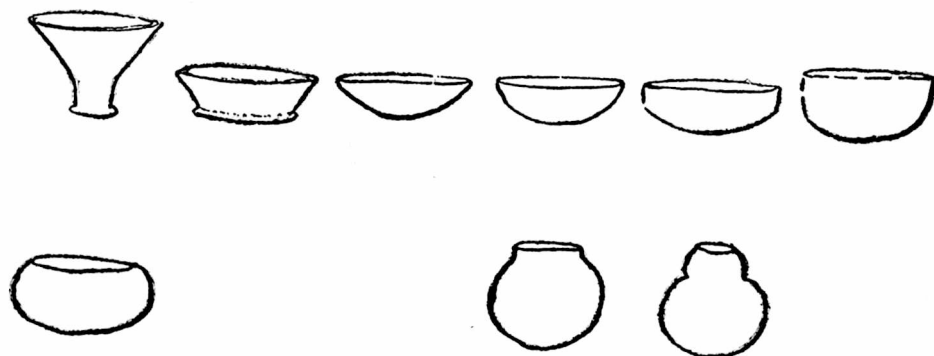


FIG. 9. Charts 5-9. Chart 9 shows vessel shapes represented in collection.

WEIGHTED TRAITS AND TRADITIONS†

JOHN C. MCGREGOR*

Several years separation from the Southwestern archeological field has given the writer a slightly different perspective, and during the past months led to a re-consideration of some of the problems confronting this field. Discussions with archeologists working in other areas has encouraged evaluation of some of the methods, procedures and assumptions employed by, or subscribed to by, Southwestern workers. Perhaps such a perspective, and some of the resultant reflections, may be of interest to others. It is of further interest that many of these views more nearly parallel those held by Dr. Cummings when the writer, as a student almost two decades ago, labored under his tutelage.

As study is undertaken in a new area certain distinguishable, or distinctive, cultural units gradually achieve clarity. These may then be isolated by definition, but they must be compared by some prescribed scheme if they are to be demonstrated as distinctive. Once they are isolated as distinct units it is then possible to study the degree of similarity, and dissimilarity, between them. Thus divisions, or other units of culture, may first be more or less subjectively classified, and then tested for reality as objectively as possible. As this first division is in any case arbitrary all classification rests on subjective "general impressions."

Since, as anthropologists, we are dealing primarily with humans, their actions and reactions, and as archeologists with their products, sight must never be lost of the personal element in these studies. A tenet of anthropological thought has been that although individuals act as individuals they

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at some times, or perhaps at most times, conform to certain broad socially sanctioned patterns. If this assumption is acceptable it is then possible to make certain other deductions, as based on available facts.

The first of these is the idea that at least some human characteristic attitudes are reflected by the products of the individuals making up the society. This implies that by a study of the products, or material traits of a group, some idea of the concepts underlying the production of these objects may be had. It may also be expected that certain of the material traits, or material products, of the American Indian will be found to be so generally shared that they will either be universal with the Indian, or nearly so. Such traits might be netting, basketry, etc. These, if they may be demonstrated as universal, may simply be canceled out in any comparative study. A third, and important assumption, in regard to the prehistoric and historic Indian, is that with the increase of contacts and the mutual sharing of widespread knowledge of others, particularly in the later more advanced groups, greater technological similarity would develop. This would theoretically also be true of exceedingly simple manifestations of material culture. Therefore, any study of significant similarities, or differences between gross cultural blocks, must be demonstrated, so far as possible, in more inclusive, deducted, non-material characteristics of the group or groups studied. These are what the writer has called traditions, and are more or less deeply rooted human characteristics which are passed on from one generation to another.*

It has also generally been assumed that complex, or exotic, (meaning odd or unusual), trait identities indicate derivation from one common source. If this postulate is to

*Many of the ideas embodied in this paper have been reported on more fully, and tested in practice, by the writer in a previously published paper. Development and Inter-relationships of Certain Southwestern Cultures. A Method for the Study of Culture Dynamics. By John C. McGregor. In microfilm. University of Chicago. Chicago, Ill. 1946.

be workable a distinction should be made between identity and similarity. Identity would mean identical in every discernable respect, (in the case of pottery a consideration of paste, temper, firing techniques, methods employed, designs, etc.), while similarity would only imply suggestively similar gross form, pattern, or perhaps function without all detailed identities. This assumption, based on fine distinctions, is of the greatest aid in certain kinds of comparisons, particularly those which are of a minute order, or are directed toward a prescribed detailed end.

Recently stimulated interest in broad comparisons has, however, raised new problems in the judgment of relationships. Such comparative studies as that between the Southwest and Mexico, the Southwest and the Mississippi Valley, or of the Mississippi Valley and Mexico are of this order. They are comparisons of such scale as roots, and perhaps stems, or patterns and roots.

It is one matter to compare obviously related culture units, such as foci of a known branch, and another to compare roots. Here, as in all other studies, methods must be adjusted to best achieve the desired ends. Individual trait comparison is most useful in distinguishing or relating small units, such as foci, while in broader comparisons units more inclusive than traits are necessary.

The problem of just what constitutes an individual trait unit is always a perplexing one. Is it the wheel or the watch; both of which involve mechanical principles as well as objects? There seems to be no definite answer to this question, other than that such units must be considered traits which seem best to adequately answer the requirements of the degree of detail of the comparison undertaken. It has just been suggested above that the more detailed the study, or comparison, the more detailed must be the trait. However, it has also been suggested earlier that not all traits are apparently

significant in any comparison. Some may be universally shared traits, of such an ordinary or usual character that they may be expected in any human society, or culture, and so, as such, and except for individual details of variation, have no particular comparative value. Basketry would be such a trait.

Certain traits, or objects, were obviously of more importance, or significance, than others to the people who made use of them. Since it is, or should be, our endeavor to study people rather than objects alone some effort must be made to designate these more important traits. Certain traits must therefore somehow be weighted. The problem is, how!

It is suggested that at least two classes of traits are indicated. Ordinary traits would be those which apparently did not have any deeper significance to the people who made and used them than simple utility. They would be such common objects as baskets, digging sticks, hammer stones, and a vast list of other similar items. Separable from them would be certain other more fundamental traits. These would be traits, or objects, which had a more important bearing on and part in the lives of the people. Fundamental traits would be on the whole more complex than ordinary traits, more of the watch than the simple wheel, and would include house types, ceremonial structures, disposal of the dead, certain ceramic types, etc.

Another tenet of anthropology, which is widely subscribed to, is that any social, or other structure is more than a simple sum of its total parts. Certainly a society is more than the sum of its traits. Elsewhere the writer has suggested a third category of culture constituents which is more inclusive than the trait.* It has been termed a tradition, and is conceived of as a persistent attitude, or way of doing things, on the part of the people. Most traditions would therefore

*See paper referred to in previous footnote.

be made up of recurring fundamental traits, with perhaps the inclusion of ordinary traits. They consist of attitudes on the part of the group being studied, which it is assumed may logically be arrived at by a critical examination and evaluation of the total ordinary and fundamental traits of that group. This represents a progression from the more detailed to the more generalized data, and is most clearly applicable to comparative studies of broad groups, such as roots.

Archeologists are confined in their source material largely to material traits, but in the total culture there are also many non-material traits which make up the whole. As has been implied above, it is believed possible to deduct from a study of material traits some non-material traits by analogy with other known human groups. Since the determination of traditions represents an effort to establish preferences and ingrained habits of the people being studied, some non-material traits, deduced from material traits, must be relied upon to define them.

Unfortunately evaluation of culture may not be achieved by simply relying on certain pre-selected fundamental traits and traditions. It is only possible to determine what traits are, or were, fundamental to any group after a full study is made of all the available data concerning this group. The use of traditions does not therefore represent a shortcut, but a more balanced method of comparing larger units of culture. As has been repeatedly suggested herein archeology is, after all, a largely subjective subject, although certain methods may be objective, for it is dependent at many points on evaluation and judgment.

Any comparison of two culture units must be shaped by a consideration of the available traits, and as has been stated procedures must be shaped by the objective, or end desired. Although there are many specific ends striven for in various studies certain of the more common aims might

be mentioned here. One of the most important and intriguing problems is that of the degree, direction and extent of relationships. A second problem is the comparative, or relative stage of development, or evolution. A third problem is the establishment of, or dating of, relative ages; and there are many more. In each of these types of investigation, on various degrees of detail, and to varying extents, different specific methods must be employed. The generalization previously alluded to may therefore be restated as; the more detailed the study, particularly of minute closely related groups, the more minute units of culture must be employed; whereas the larger the problem the more broad the units which must be used.

To be more specific, as regards the suggested segments of culture units which may be employed as tools in any study, they might be more fully described at this point. Fundamental traits are distinctive traits which are believed to have been of importance to the people who made use of them. They are those traits which are not readily substituted for by other traits, and so tend to be the interlocking media which tie together and give significance to other traits. Many are non-material traits, represented by material traits. Examples would be the kiva, whether circular or rectangular, etc.; the use of cremation or inhumation, and the inclusion or lack of offerings with the dead; the methods of pottery manufacture; distinctive house types; etc.

Traditions may be roughly explained as broad but fixed ways of doing things, and usually are represented by persistently recurring fundamental and other traits. They are the ingrained and transmitted methods by which people did things. Those which the writer believes to be useful in the broad study of Southwestern archeology are as follows: 1. The economy, or the broad pattern of life followed by the people. 2. The presence or absence of definite villages, or

indications of a permanent or temporary form of village life. 3. The type preference of dwellings. 4. Ceramics, the presence or absence of, and the general methods of manufacture practiced. 5. Preference regarding the production of articles of ground stone, whether excellent or mediocre, indicates a field of work interest of the people who made them. 6. Chipped stone articles, for the same reason as indicated above. 7. Soft objects, such as basketry, skin work, etc., for the reason listed above. 8. Disposal of the dead, by what means they are disposed of, indicates an ingrained or deep seated concept of after life. 9. The presence or absence of ceremonial structures reflects the sort of formalized ceremony practiced.

It is reliance on such broad characteristics as these to which the writer had reference in the opening sentences of this paper. They are perhaps the most important questions which must be answered in connection with any study of ancient cultures. If a clear understanding of prehistoric people is to be had an attempt to make history of prehistory must be made. History is certainly a long stride removed from consideration of material traits alone, but it is felt that something of history may be deduced from a study of such culture units as fundamental traits and traditions. Certainly if true history is to be achieved there must be some attempt to weight traits, and to go beyond them to traditions, whatever they may be called.

To achieve history some such methods of comparison on any level must be employed. If the dynamics of culture, or change, is to be studied, units of the same time must first be compared, to establish relationships at one period; then comparisons made through time to determine the extent and nature of the change; and last an attempt made to determine how the change was effected.

THE PROFESSIONAL INTERPRETER OF SCIENCE

EARL JACKSON*

The study of man interests every human being from the cradle to the grave. Converted into anthropology it immediately becomes a science, and acquires a specialized terminology. The field of interest then narrows to the few who can understand the lingo. Man becomes *Homo sapiens*, an erect biped with nonapposable hallux, a highly developed gluteus maximus, powers of articulate speech, and of late a growing tendency toward steatopygia.

Without persons capable of translating the findings of science into ideas and language that can be grasped and used by the people to enrich their existence, science becomes an aimless thing. So let us dignify the task of interpreting science by regarding it as the vitally essential job it is, and giving it suitable place among the other honorable professions.

My purpose here is not to discuss the infinite variety of ways in which the learning of science is brought to the people, but rather to consider in some detail the special problems of interpretation which I have encountered in National Park Service work. One way of going about this would be to examine each of the various media of interpretation used in these areas. But in the final analysis museums, nature trails, trailside exhibits, special lectures and campfire talks, Park Service libraries, mimeographed nature notes and trail-side notes are nothing more than devices to extend the work of the naturalist or historian guide. Clever and intelligent labels for exhibits in a park museum or other stationary

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B.A., 1932; M.A., 1934.

interpretive feature function only in different degree as the guide does toward the park as a whole.

The other way to consider Park Service interpretation is from the angle of the guide himself. The most important principle I have learned in this capacity is that one must stress presentation of concepts instead of bare facts. How trial and error brought out this idea, as well as others, can be presented most graphically with a few personal experiences first.

I entered the National Park Service as custodian of a national monument, with the bright hopes that here would be the entering wedge to a career as an archeologist. But like many another fledging graduate, I found I was pinned down to a routine existence which gave no opportunity for igniting the scientific world. Much to my chargin I found I was expected to spend the greater part of my time talking about my precious science to the public. Here, I felt, was a promising young career blighted and wasted in the sterile field of public apathy, while over the horizon luckier graduates were making headway in pure science.

Nevertheless, I pitched grimly into the task of trying to educate the people. My archeological area was rich in unwritten human lore, and I thought the people needed this knowledge. Soberly and intently, in the language of numerous scholars I had read, I tried to conduct my guided visitor trips as outdoor classrooms. At first I neglected to follow the method of Byron Cummings, who was the best teacher I ever had. He had always striven in his classes to use the language of the people, feeling nothing was too dignified to be described in simple words. But this type of language wasn't, I thought, sufficiently impressive.

Occasionally I found a visitor party which seemed to eat up the full-dress knowledge I dished out. But more often than not a high flown discourse would be broken at the peak

of its theme by some such interruption as "Ranger, don't you get awfully lonesome, working here so far from anywhere?" or "Oh, looky. See the poisonous lizard climbing that cactus!"

Such reactions prompted my resolution to try another tack. Thus came a time when I talked the simplest possible language. But apparently it was my destiny to make all the mistakes in the book, for I "talked down" with too much enthusiasm. This bored them just as much.

Accordingly, I tintured later talks with frequent attempts at humor, but because I was unhappy at prostrating science for clay feet to trample on, my humor spoiled on exposure to the atmosphere, acquiring a vinegary flippancy which jarred the senses.

Science was still failing to go over with the people, so something was obviously wrong. I decided to be indirect, with no formal talk at all. I would simply accompany the visitors, answering questions when asked, enlarging on a subject as interest was clearly apparent. This system went over well enough with a lot of hurry-up visitors, especially during the summer, but the more thoughtful and leisurely ones must have been disappointed, for I could tell they weren't satisfied.

Any student knows the value of method for logical and orderly handling of facts and artifacts. So I gathered together all the facts I could for the archeological story of the place, and hammered them together into an almost letter-perfect talk. This I proceeded to hand to the tourists with considerable pride, until one day I realized this mechanical talk would have been given just as well by a portable phonograph which the visitor could push along on wheels. In fact, this might have been better, for then he couldn't have perceived the boredom of a guide who was doing an endless job of rote repetition.

After a time I concluded salvation lay in the deliberately informal talk, elastic enough to be expressed in any number

of different ways. This not only gave me enough variety to prevent self-hypnosis, but provided an evolutionary status considerably above that of the phonograph and the parrot. I worked hard at this new system, and had better success.

Since then a lot of water has flowed under the bridge. I have learned during these years that the vacationing American is spending his time and money for far more than a mere temporary separation from the physical scene of his daily work. Although he may be only ten miles from home, mentally he is completely adrift for the duration of the pleasure jaunt. He wants only relaxation, recreation, and inspiration. He wants freedom from all habit-patterns except the basic ones necessary for comfortable civilized existence. Failure to understand this attitude causes many inexperienced contact persons to get an idea the tourist is stupid. He is not. His mind is simply relaxed, and is actually highly receptive to the right kind of stimulus.

Here is where the Park Service interpreter has to specialize. He has to find the right way and the painless way to put over as much education about our natural and historic wonders as he can.

It has already been indicated that the visitor gets bored with a too formal talk, and is not attentive to one which is loose and rambling. Either of the extremes can be the result of ignorance of the guide. A moron can learn a formal piece by rote; and the haphazard talk is often the betrayal of inadequate preparation and study. The ideal guide has completely in his mind the facts and ideas that he should put over to the average interested party, so that his presentation can be fluid enough to allow time out for brief chuckles, and a few questions and comments by listeners, without being thrown off his stride.

Of course, once we concede the visitor should be allowed to ask questions (and it is pointless to debate the need for

this) we run head on into a tough problem. Once a certain type of tourist gets the floor he decides to enlarge by introducing personal experiences and opinions. This is good up to a point, but that point is reached very quickly. For instance, an old-timer brings relatives to see the area, and from the start he regales them with anecdotes and comments. It is not fair to other visitors, unless they are all obviously enjoying this, to allow anybody to use up an undue amount of the scheduled trip time. Sometimes it requires a great deal of tact to taper off these irrelevancies without offending the talker. Perhaps the best way is for the guide to keep his wits racing so that he can "pick up" a comment made by the windy one and say "Now that illustrates the point I am just about to make." Then he swings into some part of his explanation, and if it is done right the impromptu orator scarcely knows he has been pushed back into the audience.

Before leaving this matter of digressions we should think about the well informed visitor who is interested in some special field. Suppose at Tumacacori National Monument some member of the party is a botanist, with only slight interest in the principal feature, which is a historic old mission church. This person asks some question about the flora of the area, and then steers the talk into an absorbing discussion of desert plants. His comments are very informative and doubtless worthwhile, but since the guide must assume that most of his visitors came here to learn primarily about missions, he has to get the talk back on the track again. If he cannot conveniently divert the theme back into mission history channels, he has to convey the impression that he would be delighted to go more into detail with the botanist after the trip. Usually if the specialist is acute enough to know his subject well he is also acute enough to realize by such a hint that the major purpose of the trip should not be thwarted.

A question which any intelligent guide should ask himself often is, "How can I put over the greatest possible amount of knowledge?" At this point he should carefully evaluate the factual versus the conceptual talk. To illustrate, let us take Tumacacori National Monument as the locale. Here is where Father Kino, a famous 17th Century Jesuit priest, opened the Christian era in southern Arizona with his missionary work among the Sobaipuri Indians of the Santa Cruz Valley. Jesuit missionaries were expelled from the New World by royal edict in 1767, and a year later the Franciscan priests came into this valley. Under their direction the famous old mission church of Tumacacori was constructed. The guided trip covers this, as well as many details of construction and use.

The factual talk about Tumacacori would be a pure narrative account, covering the 255 year period since Father Kino came to the Santa Cruz. An incredible number of facts and dates can be given by a fairly rapid talking guide in the course of a 45 minute trip. I have heard one or two such talks at this area, in the days when I was a tourist visitor. Afterward my head reeled with the impact of all that had been said. Dates, names, events, place names, all whirled in kaleidoscopic confusion in my mind's eye. I quickly forgot nearly all that I had heard.

The conceptual talk, as the name implies, places primary emphasis on thoughts and ideas. Periods are clearly indicated, but with only a skeleton of dates. In this type of talk we want the visitor to grasp at least one, and preferably three or four, basic ideas.

One idea would answer the question "Why is Tumacacori a national monument?" The significance of the church, as an excellent and typical example of what Spanish colonial enterprise was able to accomplish on a very wild and hostile frontier, with explanation of how church and state combined to effect the civilizing miracles symbolized by this

building, must be brought out. Another concept is given by pointing out how this old church, over which have waved the flags of three nations, is a vivid reminder that our present civilization here has roots that go very deep, from the American period back through Mexican and Spanish times, into the native Indian occupation, so that our present South-western culture is beyond question a blend from every one of the racial strains which fought and lived and loved and died across this piece of the map. Another thought provoking concept emerges when the guide shows how and why the Catholic church and Spanish law and custom left such a permanent and dominant influence on more than half the population of the western hemisphere.

After such a conceptual talk is given to the visitors, along with description of details of the old building as they are being viewed, the party leaves. The guide doesn't worry about the paucity of dates and names that were given, for the tourist quickly forgets most of them anyway. If the visitor carries away as much as one solitary concept, the time was not wasted, and he can obtain all the facts and names he may desire from the free informational leaflet he receives as he departs.

It seems to this writer that there is nothing more important in this civilization than concepts. Facts are like the scattered parts of a clock. They are essential, but it takes concepts to make them work and stick together. Such treatment of facts in National Park Service areas ensures that visitors will leave with conceptual grasp of the fundamental significance of them, and will have something of permanent value to discuss among themselves and to become a sub-conscious part of their attitudes toward existence.

It may be remarked that not all visitors are interested or capable of developing interest, and that there is no use trying to put over concepts to such individuals. "You can't pour a

gallon of information into a pint sized mind," is often heard. But the interpreter who is on the job is going to assume, as a first premise, that the visitors, if not interested, can be made so. Such an attitude is challenging to the guide, and his interest is often contagious. If only part of the group reacts, the others should not be neglected on that account. If the entire party is restless in spite of the best opening efforts, the guide should then be a philosopher and drop the idea of trying to put over anything special, unless an inviting opportunity suddenly comes. He wants to give the visitor enjoyment, recreation, and useful concepts, but if the concepts don't seem to go over, perhaps the other two will. Besides, a lot of clever people have before now succeeded in picking up their own concepts by combining memory with visual perception, completely unaided by talk.

While the tourist is open to impressions, he resents being lectured at. The moment he decides the guide is trying to reform his viewpoints or preach to him he turns completely cold, as well he should. The Park Service interpreter is in civil service, free of politics, and the taxpayer has the right to expect unbiased information, without personal opinions.

It can be argued that with such limitations on powers of expression the guide is hamstrung at the start. But such reasoning is fallacious. The limitation actually makes his a dignified profession, in the same class with all honest historians and other scientists. He is freed from the necessity of issuing propaganda. All he has to do is tell the truth, insofar as he knows it, and make his visitors think. If he does this well, and nothing more, he has been highly successful.

Of course, to be strictly honest about this, it must be admitted that no talker can present his material without it being colored to some extent by his own personal reasoning. If nothing but an outline of bare facts were given, the mere act of selecting which facts should be spoken about constitutes, in the eye of a skeptic, an expression of bias or opinion.

If this be propaganda, let it be. No human can make a talk without selecting and organizing his facts and ideas. To eliminate this process would be to eliminate interpretation altogether. So the best the Park Service guide can do is use his intelligence as best he may to put over stimulating facts and concepts, and use his conscience at all times with the intent not to distort or propagandize.

A sense of humor is a life saver in interpretive work. The moment the average visitor finds himself in the hands of an overly serious guide who is completely immersed in the gravity of his work, he knows he may be in for a boring session. This guide is apt to be a perfectionist who will consider it his holy duty to get over a specified amount of information, and will not be side tracked from his objective by interruptions. Little does he realize that a joke at the end of his explanation is often like clinching a nail through a board, fastening the concept in the visitor's mind so that it will not work loose.

Again comes a danger. The guide who uses too much humor, or treats his subject with levity, might just as well wear the cap and bells of the court fool. It detracts from the dignity of the ideas offered, and reflects against the area and the organization for which he works. He who is wise uses humor as a spice and not a basic ingredient in his talks.

The last point I would like to stress about successful interpretation is the matter of knowing when to be quiet. There are times in the course of most guided trips in our parks and monuments when the incessant patter of a guide's voice is sacrilege. The first view of an inspiring waterfall, stupendous natural rock formation, or imposing building, is often much more effective if the guide has sense enough to keep his mouth shut for a few seconds, so that for at least a fleeting instant the visitor may have the chance to expand his senses and feel something of Nature's majesty or of man's heroic past without having to listen to words.

PLATES



(PHOTOGRAPH BY TAD NICHOLS)

PLATE I. Byron Cummings was the first white man to see the Rainbow Natural Bridge.



PLATE IIA. A mescal pit in western Grand Canyon.



IIB. Petroglyphs, Arizona F:6:1, Colorado Valley below Eldorado Canyon.



PLATE III. Pueblo site and mescal pit, western Grand Canyon.

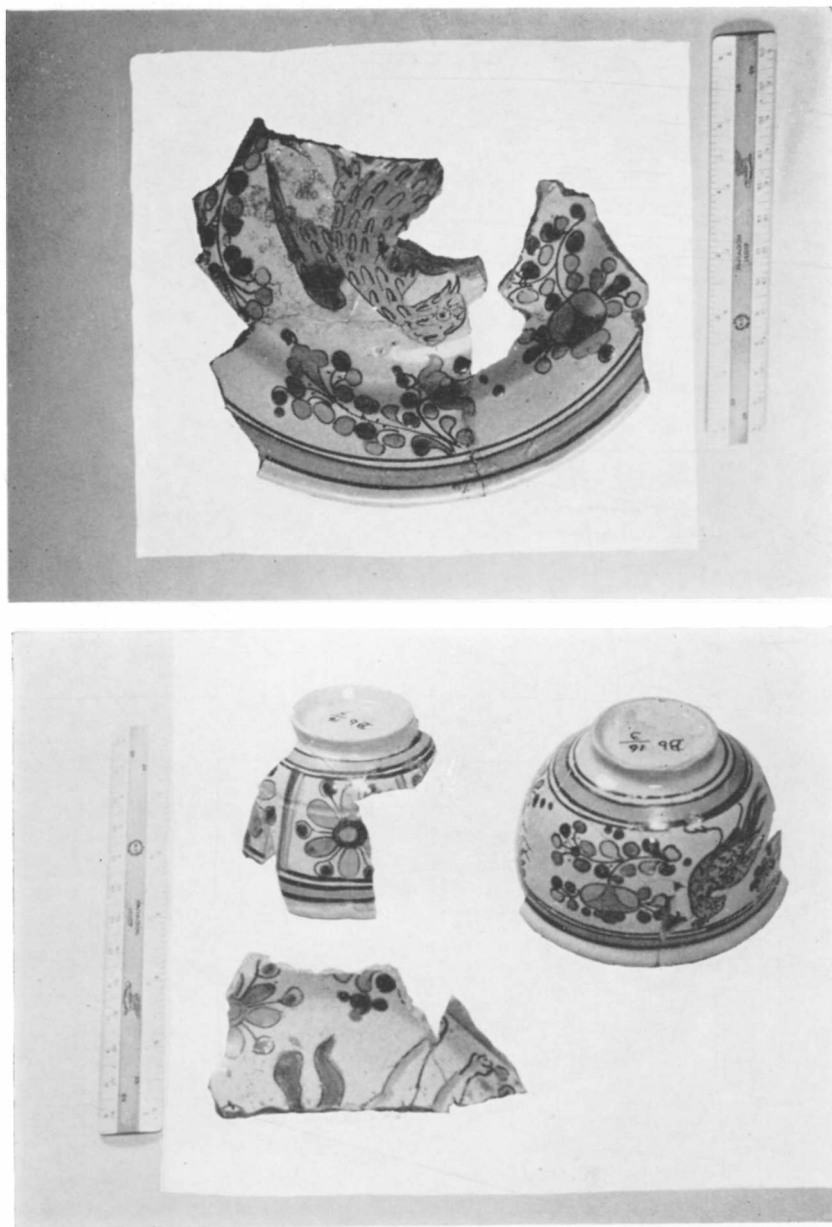


PLATE IV. A—Papago glaze-decorated bowl. B—Bowl sherds from Tumacacori showing use of green glaze and red decoration on pottery of native manufacture.



(COURTESY MUSEUM OF NEW MEXICO)

PLATE V. Spanish "olive jar" used for the transportation and storage of liquids and conserves.



(COURTESY JOSEPH H. TOULOUSE, JR.)

PLATE VI. Pieces of Puebla maiolica found during the excavation of San Gregorio de Abo, New Mexico.



PLATE VII—A: East side of Structure 1, Main Site, Campana-San Andres; B-K: Jadeite ornament and pottery objects from Tazumal graves. B: Jadeite bird-effigy pendant (Max. br. 9 cm.), Grave 2; C: Copador polychrome bowl (Rim diam. 16.5 cm.), Grave 2; D: Tripodal polychrome vase of Uluá-Yojoa style (Rim diam. 13 cm.), Grave 2; E: Polychrome deep bowl with Uaxactun Tepeu Period style glyphs (Rim diam. 17 cm.), Grave 1; F: Purple polychrome annular-based bowl (Rim diam. 24.1 cm.), Graves 3; G: Interior design of tetrapodal fine line polychrome bowl (Rim diam. 28.3 cm.), Grave 7; H: Scraped-slip ware jar (Ht. 21.5 cm.), Grave 6; I: Tazumal Glyphic polychrome deep bowl (Rim diam. 12 cm.), Grave 6; J: Scraped-slip annular-based pitcher (Ht. 11.3 cm.), Grave 8; K: Annular based bowl with Usulután technique decoration (Rim diam. 24.3 cm.), Grave 8.

