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HAWLEY'S STUDY OF CHETRO KETL

A REVIEW BY DONALD D. BRAND*

ONE OF THE recent valuable contributions to the content and technique of Southwestern archaeology is "The Significance of the Dated Prehistory of Chetro Ketl, Chaco Canyon, New Mexico," by Dr. Florence M. Hawley, now instructor in Archaeology and Anthropology at the University of New Mexico. This treatise appeared, July 1, 1934, as volume 1, number 1, (Bulletin 246, of the University of New Mexico and the School of American Research) of the new Monograph Series, issued by the University of New Mexico Press. It constituted Miss Hawleys' dissertation, submitted to the faculty of the division of Social Sciences in the University of Chicago, in candidacy for the degree of Doctor of Philosophy. Miss Hawley, despite the middle-western degree, is a true daughter of the Southwest—born in Cananea, Sonora, and raised from childhood and educated through A.B. and M.A. degrees in Arizona. She has had the benefit of class and field work under Dr. Cummings, at the University of Arizona, where she also was instructor for a time; and has done field work and has taught under Dr. Hewett in Chaco Canyon through several seasons, during which the material for this monograph was collected. Also particularly per-

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and Escalante in 1776, made no mention of Chaco ruins, either in writing or on his map of 1777.[4]

In a few places, e.g., pp. 11, 17, and 65, the author might better have used the term "climate" instead of "weather"; but the misuse is pardonable as the precise definition of climate as "the sum of average weather conditions or integrated meteorologic phenomena, which give character to a specific area" does not have common currency among non-geographers.

The discussion of Chetro Ketl masonry types brings out the salient features of six types (and four building periods), which have been dated through dendro-chronology and thus made subject to arrangement as to sequence —even when not superposed. This substitution of absolute chronology for mere superposition and typologic inference is one of the most concrete contributions of dendro-chronology to the study of architectural development in the Southwest. The types and dates given are:

I. (Type I of Jackson and Judd) Heavy wall, without core, composed of rough and irregularly shaped sandstone slabs laid in abundant clay mortar. Not definitely dated and identified, as yet, at Chetro Ketl, but dated 945-1030 A.D., from cutting dates on re-used logs in dated later portions excavated to date.

II. Rubble core, covered with large sandstone slabs laid in close courses and chinked around by very small spalls laid in a minimum of mortar. Dated around 1030-1070, with a few years overlap with masonry III, thus indicating continuous building.

III. (Type II of Jackson, and III of Judd) The highest type of Chaco masonry. Differed from II in the use of wider bands of spalls, and the use of larger and more symmetrically shaped spalls. Dated from 1062 until nearly the end of Chetro Ketl construction, ca. 1116+. The later III construction, ca. 1070–, was inferior in workmanship to the earlier.

4. "The Emergence of Chaco Canyon in History," in *Art and Archaeology*, 11:1/2, 1921, by Lansing Bloom.

IV. (Type III of Jackson) Rows of brick-like blocks, chinked with one or two rows of small spalls. Banding absent. This type, together with late inferior III, and V, constituted the third building period at Chetro Ketl, 1100-1116+.

V. (IV of Judd) Thin slabs of approximate rectangular shape laid up without spalls.

VI. Crudest of all masonry in the Chaco. No core, banding, or spalls. Slabs thicker and shorter than in I. Not dated because of absence of wood, pilfered from surface exposed rooms. Probably represents latest building at Chetro Ketl, perhaps by an immigrant Pueblo people, e.g., Mesa Verde.

Six pages are devoted to an outline of the history, archaeological application, and accuracy of tree ring analysis. Granting accuracy in the laboratory technique of handling tree ring material, the principal limiting factor seems to be the supply of "sensitive" (amenable to analysis) wood from an actual climatic unit or province. The Western Yellow Pine of the Colorado Plateaus is quite sensitive to climatic and edaphic factors, and has been the mainstay of the dendro-chronologist in the Pueblo Plateau archaeologic region. A master chart, obtained from Chetro Ketl piñon charcoal, however, was found to check quite closely with the pine chart for the central and western portion of the Pueblo Plateau, termed Arizona Zone, by Douglass. Miss Hawley utilized a total of 565 specimens of all kinds—463 from Chetro Ketl.

In this general connection one might remark that those who utilize dendro-chronology should be very chary in de-

riving conclusions for one climatic area from the data of another. Archaeologists in general have not erred in this regard, but several anthropo-geographers have sought to support various theses of climatic change in the Southwest with climatic graphs based on the Big Trees of California. Miss Hawley, although making no use of California data, states (p. 17) that "The Sequoia district of northern California showed an extension of the general area (Arizona Zone), with some recognizable variations." This was probably stated on the authority of Douglass himself, who believes a fair assurance in cross dating between California and Arizona can be reached, although he has found only a 50% resemblance between the tree growth cycles in the two areas.[5] Elsewhere Douglass states that only 1 out of 10 or 20 distinct rings are alike in Arizona and California. Antevs has ably summarized the material on the Big Tree and comes to the conclusion that "it appears to be certain that the Sequoia curves do not specifically record precipitation."[6] It should be added here that Russell has found numerous instances of drought years in California being synchronous with an excessive number of humid records from the Southwest, and vice versa, e.g., 1902, 1904, 1909, 1912, 1913, 1919.[7] After all, this is only to be expected when one considers that the eastward path of mean cyclonic intensity fluctuates many degrees of latitude from year to year, thus affecting winter precipitation; and the summer monsoons from the south likewise vary in intensity and penetration. Even the archaeologic Southwest, commonly considered as one climatic area, is a mosaic of desert, steppe and humid cli-

5. "Climatic Cycles and Tree-Growth II," Carnegie Inst. of Wash., Pub. no. 289, 1928, by A. E. Douglass. p. 117.

6. "The Big Tree as a Climatic Measure," C. I. W., Pub. no. 352, 1925, by Ernst Antevs.. p. 140.

7. "Dry Climate of the United States II," Univ. of Calif. Pub. in Geog. 5:5, 1932, by R. J. Russell.

1. Chaco Canyon Ruins and Landscape. 2. Sandstone Cliffs Behind Pueblo Bonita.
3. Great Sanctuary, Chetro Ketl. 4. Ceiling Beams, Kiva K, 1099 A.D., Chetro Ketl

A Juniper Specimen, 884-1048 A. D.

A Pine Tree Ring Specimen Studied from Chetro Ketl, Dated 936-1061 A. D.

mates, with further subdivisions in terms of precipitation regime, insolation intensity, etc.

The results of a stratigraphic study of the Chetro Ketl east refuse dump are presented for the first time in considerable detail, and constitute the major portion of the thesis. Here again the value of dendro-chronology is manifest through the dating of different refuse strata and sections by charcoal fragments. Valid conclusions were obtained as to rate of detrital accumulation, periods of pottery types, and redeposition of dump material—all tending to clarify the actual sequences in this rather complex dump. The technique is thus established for removing primary and often sole emphasis on position in dating refuse-heap material. Only potsherds and datable charcoal were considered in analysing the dump material. The Chaco black-on-white wares were classified, on the basis of polish and slip, into three groups. These wares, plus corrugated wares, Mesa Verde black-on-white, and a Kayenta-like black-on-red (Wingate black-on-red?), constitute the majority of the shards. Miss Hawley gives a detailed description of each ware in terms of such diagnostic items as paste, finish, slip, paint, designs, rims, and shapes. The principal conclusions are:

1. Possible evolutionary succession of unpolished, semi-polished, and fine polished Chaco black-on-white wares.
2. Dominance of polished black-on-white during last years of Chetro Ketl,—about 1084-1122 (in terms of dump analysis).
3. Total deposition on dump covered only 38 years; two strata being old refuse hastily redeposited.
4. No apparent chronologic fluctuations of corrugated ware types.
5. Black-on-red, Kayenta polychrome, Mesa Verde black-on-white and plain redware (polished black interior) the leading trade wares—probably traded in from the northwestern quadrant.

The discussion of climate as a factor in Chaco prehistory is one of the most interesting sections in the monograph. Miss Hawley makes an excellent case for the former existence of running water and forest near Chetro Ketl. Need for drinking water and water for mixing mortar, and the water reeds used in building predicate a nearby and constant supply. The charred remains of juniper and piñon firewood, and the many poles and beams of pine, fir, piñon, juniper, and cottonwood, found in the Chaco ruins, indicate a forest nearer than the present one, sixty miles to the northeast. The author suggests that deforestation and consequent increase of aridity (through loss of water storing facilities, possible decrease in precipitation, soil denudation, and lowering of water table) may have been an important factor in the cultural decline and final abandonment of Chetro Ketl. That the present channel trenched in Chaco Canyon is of recent origin does not eliminate the factor of desiccation through lowering of the water table, as it is possible that the Chaco "may have been cut and refilled more than once since the desertion of the pueblos." After quoting Q. Randles, assistant regional forester, *in extenso* on factors in forest recession, Miss Hawley concludes that "We cannot say definitely that Chaco forest recession was the result of human injury . . . the cause might have been any one of those suggested."

Although no general drouth is recorded for the first half of the twelfth century (period of abandonment) in the Chaco canyon, it would have been possible for a succession of only two or three dry years to have been quite disastrous for the inhabitants. Miss Hawley cites the drouth of 1777-1778, which nearly exterminated the Hopi and was disastrous to the Zuñi. However, the author hastens to point out that previous drouth periods, e. g., 900-907, 1035-

1041, 1067-1068, did not depopulate the canyon. The question of why the Chaco was abandoned is left unanswered, but the suggestion is made (pp. 73, 74, 79, 80) that nomadic enemies, cultural degeneration, and deforestation and decreased water supply were concomitant factors.

As Miss Hawley has presented the evidence, deforestation and resultant desiccation and denudation seem to have been the most potent factors in making the Chaco canyon uninhabitable. In this connection, formation of black alkali might be mentioned as a possible item, discouraging agriculture. The author's mention of a possible catastrophic cutting off of water supply is plausible when one considers the numerous springs in Sonora and Chihuahua, known to have been affected by the great Bavispe earthquake of 1887. The suggestion of decline after having reached a cultural peak (pg. 73) might satisfy a follower of Spengler or Petrie, but Miss Hawley herself points out that the canyon pueblos were generally abandoned by 1130—only shortly after the period of high cultural development about the end of the eleventh century (1030-1090). That marauding enemies affected the canyon life is indicated by the walling up of exterior openings in the later building periods. Altogether, the author's presentation of the probable factors conditioning the abandonment of Chetro Ketl and the other Chaco pueblos is sane and unbiased. However, one must take exception to the statement (pg. 65) that "it is at once obvious that the climatic conditions prevalent today certainly did not obtain during the time of pueblo occupation." The only *obvious* fact is that the supply of water has changed, and this may have resulted from the lowering of the water table by channel trenching alone. Human reduction of the forest cover and consequent increased runoff and flash floods, or diastrophic initiation of stream cutting, may be

the answers as much as any change in precipitation or temperature during the past thousand years.

In brief, Miss Hawley has utilized tree ring analysis, and supplementary data on relative dating, to determine the chronology of the architectural styles and building periods at Chetro Ketl, and the tendencies in ceramics; and to eliminate climatic drouth from the factors adduced to explain the depopulation of the Chaco canyon. It is a valuable contribution to the solving of the complex Chaco puzzle.

PRACTICAL MANIFESTATIONS IN AMERICAN ART

A SIGNIFICANT exhibition was held in the "Downtown Gallery," on West 13th street in New York, during December. It was the anwser to the question as to what the artist can do to live when the public stops buying pictures. Some creative artists have been finding channels for their talents, and the objects in this exhibition are a demonstration of this fact. Their names are well known, —Stuart Davis, Ernest Fiene, Yasuo Kuniyoshi, Stefan Hirsh, Robert Laurent, Nakian, Shahn, Sheeler, and Zorach. Besides a painting or piece of sculpture by each one, there are drawings or photographs of some sort of industrial work, as carved furniture or doors, or an advertising poster, book-jackets, illustrations for a book, or such things as salt and pepper shakers, a glass tumbler, knitted wool fabrics and linens for women's wear, and many other useful articles that are made infinitely more desirable by the creative imagination of the artist.

In the catalog announcing this show, Mr. Halpert says, "Artists have a vital influence in the general development of taste. Their creative work is consistently applied in every phase of life. Costumes, homes, utensils, shop windows, automobiles, have shown the influence of all the cur-