

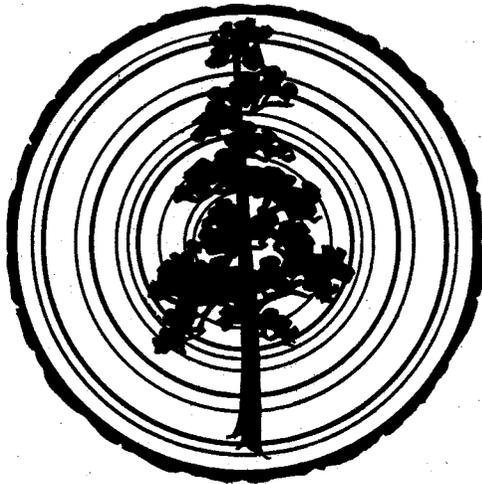
# TREE-RING BULLETIN

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**THE TREE-RING BULLETIN**

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The Tree-Ring Bulletin will publish papers resulting from original research in tree-rings in relation to climatology, archaeology, and other fields. For reports of projects in tree-ring dating, a tabular form as in Vol. 6, No. 1 is suggested. Until funds are available authors will be requested to pay the cost of illustrations. Each contributor will be given twenty-five copies of the Bulletin in which his article appears.

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**SIXTH ANNUAL TREE-RING CONFERENCE****H. T. GETTY**

The Sixth Annual Conference of the Tree-Ring Society was held July 12 and 13, 1941, at the summer field camp of the Arizona State Museum at Forestdale, Arizona. Dr. Douglass presided at all sessions of the conference.

Those attending the conference were: Gordon C. Baldwin, Robert Braidwood, A. E. Douglass, Harry T. Getty, E. T. Hall, Jr., Emil W. Haury, Paul S. Martin, John C. McGregor, Deric Nusbaum, Erik Reed, Albert Schroeder, Edmund Schulman, Watson Smith, W. S. Stallings, Jr., Alfred Whiting, Carleton Wilder. Students participating in the summer field camp were invited to attend the open meetings of the conference.

At the first session of the conference on the afternoon of July 12, the minutes of the previous annual conference were read and approved. Dr. Douglass then reviewed the present status of tree-ring work, calling attention to the feeling common to it and to archaeology as shown in this camp that actual field work is essential to real understanding. Some description was then given of improved methods in handling and dating specimens, with illustrations of the advantage of cell illumination, as shown by rotating a specimen of wood in the sunlight. The possibilities in very small pieces of charcoal were illustrated by a specimen from Kinnikinnick that contained an excellent series of 36 rings within a distance of 11 mm.

The need of conveying in publications the basis of dates presented was stressed and aids suggested as follows: (1) Comparison records from modern trees to show the type of activity normal in the region; for this purpose Mr. Schulman conducted a special party in collecting borings from trees near Forestdale; (2) publication of chronology data by (a) measured and plotted curves, (b) photographs and (c) skeleton or thickness plots; and (3) definite comparisons with other ring records of the same period as shown in the photographic chronology now available in Microfilm A (MFA), prepared by the Laboratory of Tree-Ring Research of the University of Arizona (with aid from the Carnegie Institution of Washington) and filmed by the Bibliofilm Service of the Library of the U. S. Department of Agriculture, and handled by the American Documentation Institute, Science Service Washington, D. C. Document 1298, under the name Southwestern Photographic Ring Sequences.

As usual the methods of preserving fragile charcoal specimens were discussed. Mr. McGregor reported good success with a solution of Alvar, a synthetic resin in alcohol which he tried on finding that bakelite became too hard. Mr. Hall reported that he had successfully handled rotten wood by putting it in a can and turning it into charcoal. Dr. Douglass showed an excellent surface that had been put on a small charcoal piece in 1929 after applying a weak solution of paraffin in gasoline. The quality of such surface greatly depends on the use of a very sharp razor blade.

At the morning session on July 13, discussions were developed around the following points:

1) Need for local chronologies.

Such chronologies which have been developed for Southern California, Southern New Mexico, Texas, Northern Mexico, Santa Catalina Mts., Santa Rita Mts., Chiricahua Mts., Arkansas, New England and other places.

2) The work of J. L. Giddings, Jr., on Dendrochronology in Alaska received special attention, because of its great archaeological and climatic significance.

3) Probable dates of the transition from Basketmaker II to Basketmaker III. This led to a general discussion of the cultural implications of the archaeological aspects of tree-ring research, in connection with the following items:

Specimens from Du pont Cave, Kane County, Utah, dated by Stallings at 217 A. D., and checked by specimens from Durango, Colo., collected by I. F. Flora and Earl H. Morris.

Date in 300's A. D. from Basketmaker II site, Ign. 7:101, near Durango, Colo.

Lack of dates in the 500's.

4) Shift in foci of cultures shortly after 1100 A. D. involving the Flagstaff, Tsegi, and Chaco areas. Intensive building in some areas, withdrawal from others.

Mention was made of the date of 1105 for the Gallina area in Northwestern New Mexico, and the association therewith of Woodland type pottery.

5) General discussion concerning the nature of material to be published in the Tree-Ring Bulletin, particularly in regard to tables of data for specimens.

At the business session which was held on the afternoon of July 13, Dr. Douglass was reelected president of the Tree-Ring Society, and Edmund Schulman as treasurer. Harry T. Getty was elected secretary of the Society. There was no change made in the personnel of the editorial board of the Tree-Ring Bulletin. Professor H. Arthur Meyer of Pennsylvania State College was elected a Fellow in the Tree-Ring Society.

The Tree-Ring Society extended a vote of thanks to Dr. Haury and his staff at the field camp for the hospitality extended during the conference.

## A BASKETMAKER II DATE FROM CAVE DU PONT, UTAH

W. S. STALLINGS, JR.

Cave du Pont, in Kane County, Utah, eight miles northwest of Kanab, the county seat, was excavated by Jesse L. Nusbaum in 1920. That great rarity, a pure Basketmaker II site, it was historically important in defining the content and range of the culture.<sup>1</sup> This communication reports a date of 217 A. D. from the site, at present writing the earliest cutting date in the Southwest and the first from a pure Basketmaker II deposit.

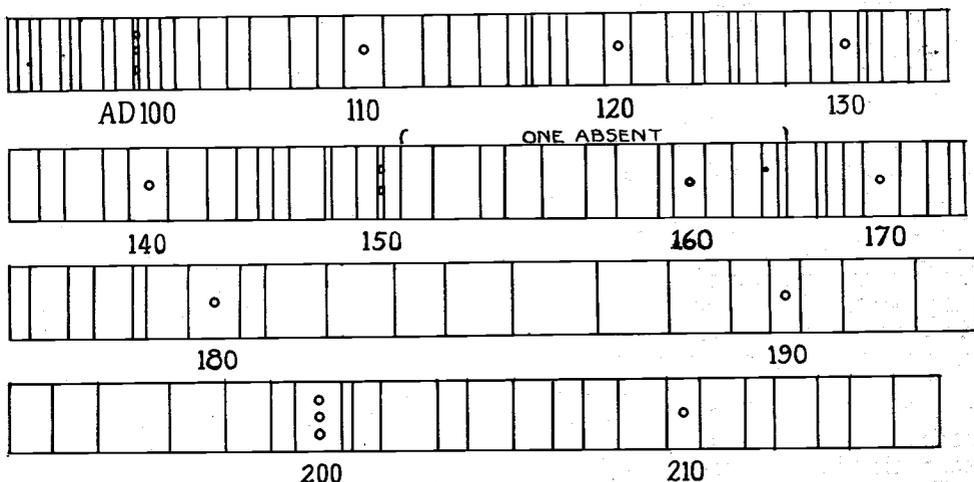
Timbers which had been used to roof storage cists were preserved in the site and at the close of the excavation a number were cached by Mr. Nusbaum in anticipation of possible future value. As the reader is aware, the following years saw the dating of Southwestern archaeological remains by tree-ring studies, and in 1936 Mr. Nusbaum was able to return to the locality and to recover five cached timbers. Duplicate cross-sections of these were deposited in the Tree-Ring Laboratory of the University of Arizona, in Gila Pueblo at Globe, and in the Laboratory of Anthropology, Santa Fe. The site is in a juniper-pinyon-oak zone and the woods reported by Nusbaum from the Basketmaker deposit are characteristic of the zone.<sup>2</sup> The collection recovered in 1936 consists of one specimen of pinyon, one small pole of oak, and three juniper logs. Of the five, the pinyon alone has been dated. The juniper presents special problems of its kind and the oak contains too few rings for dating.

*Dendrochronology.* The outer third of the pinyon (LA-U20) is in excellent condition and bark still adheres to the outside. But the wood has been attacked by borers and, of greater seriousness, the inner two-thirds of the specimen contain hundreds of posthumously formed holes, increasingly abundant toward the inner third, which obscure the ring-sequence over the greater part of the area. The walls of the remaining cells in the inner part are well lignified and very hard, however, and within this infected portion occur very narrow radiating areas which escaped infection and which show the ring sequence. None of these, in the sections which I have observed, extends completely from the center to the uninfected outer third, but they are sufficiently numerous so that a transition can be made from one to another with certainty of ring-identification and the ring-pattern can be cross-checked throughout. The accompanying measured diagram of the ring-sequence, from center to the last complete ring (A. D. 91-216) is taken along three radii. It is drawn from actual measures. Between 152 and 165 there is a ring absent, but the pattern of the specimen carries through in such detail otherwise as to leave no question as to the certainty in dating.

Original dating of the specimen was done in 1939 with the publication of Dr. Douglass' diagram of that portion of the Central Pueblo Chronology between 150 and 300 A. D., and of an accompanying photograph of an early pinyon record (MLK 153) from 150 to 238.<sup>3</sup> After 235 A. D. the chronology is covered by a considerable number of specimens but previous to that date it is covered by only five, three pinyons and two rather complacent Douglas firs.<sup>4</sup> These come from Obelisk Cave in the Red Rock Valley in northeastern Arizona and from Mummy Cave, some forty miles to the south, an area roughly 190-200 miles airline from Cave du Pont. Between 150 and 235 A. D., and including the period pertinent here, Douglass' diagram is based on the three pinyons, MLK 153 (A. D. 150-486) and MLK 110 (A. D. 199 on) from Obelisk Cave, and M 159 (A. D. 200-367) from Mummy Cave.<sup>5</sup> The present specimen, from 91 to 216 A. D., adds a long record to this early, terminal period of the chronology.

Previous to 150 A. D. comparative material is restricted to the two Douglas firs, which have been considered to be of poor dating quality, MLK 152 (A. D. 11-477) from Obelisk Cave and M 143 (A. D. 90-358) from Mummy Cave.<sup>4-5</sup> Microfilm records of these now are available in a collection of photographs of specimens forming the Central Pueblo Chronology.<sup>6</sup> MLK 152, tending to complacency, nonetheless cross-dates in satisfactory detail with the present specimen, with strong cross-dating between 91 and 150; thus each serves to corroborate the dating record of the other.

Dr. Douglass has verified the cross-dating of the specimen, comparing it with the actual wood which forms this early portion of the chronology.



LA-U20. Pinyon, Cave du Pont, Utah. Measured diagram, X10. For comparative material see text.

To summarize the clerical data: LA-U20. Pinyon, wood. Full-section. Center and inside dated ring, A. D. 91. Outside dated ring (bark adhering), 217. One ring absent between 152 and 165. Radius, 102 mm.

*Archaeology.* Sites of periods later than Basketmaker II (Basketmaker III into Pueblo II) are common in the region but no trace of them was found in Cave du Pont.<sup>7</sup> The site was stratified as follows: 1) 12-18 inches of sterile wind-blown sand and fallen rock; 2) a man-made layer, 3-5 feet thick, of tangled grass, oak leaves, juniper bark, corn-husks and other vegetal material (presumably successively discarded packing and other debris from storage cists), and; 3) the sandy floor of the cave into which were sunk thirty-one storage cists, often filled with the matted debris. Animal bones were rare. The cave was dry, sunless, well hidden, and presumably was used primarily for storage of crops, also as a cache for other property, and, in six cases, for burials, some of which showed signs of ancient disturbance. A rather large collection of material, described in detail by Kidder and Guernsey, was recovered.<sup>8</sup>

The relation of the date to others may be briefly indicated. The earliest previously established dates come from Mummy and Obelisk Caves in northeastern Arizona. Mummy Cave, which appears to contain Basketmaker II as well as Basketmaker III deposits, has yielded a series of dates between 348 and 398 from loose poles and a later series between 643 and 666.<sup>9</sup> A critical site has been Obelisk Cave, the archaeological remains in which appear to be typologically very early Basketmaker III, and from which dates from 473 to 480+x have been obtained.<sup>10</sup> The typological indications of Obelisk Cave have suggested that the earlier dates from Mummy Cave may be assignable to Basketmaker II; on this evidence a working terminal date for Basketmaker II and III commonly has been estimated at various points in the fifth century. Recently Morris more conservatively has estimated the transition to be sometime between 150 and 475.<sup>11</sup>

There are no means at present for judging accurately the duration of occupancy of Cave du Pont or of the position of the 217 date in Basketmaker II. The thick layer of matted debris easily could have been formed in a few years or the cave could have been reused over a much longer period. The site itself is geographically marginal to the larger and better known Basketmaker concentrations east and south of the Colorado River and

there may or may not have been cultural lag. Although Morris has made a beginning toward the definition of material changes within the period there is still little by which to place du Pont, except that it does not appear to be extremely early.<sup>12</sup>

Most suggestive of a late date is the unfired pottery. Unfired pottery is relatively common in Basketmaker III cave sites along with fired pottery but, so far as I know, Cave du Pont is the only site where unfired pottery alone has been found.<sup>13</sup> In Obelisk Cave, unfired containers were in use along with fired pottery, both the familiar Basketmaker undecorated Lino Grey and a pottery "superficially indistinguishable from the San Francisco Red" characteristic of the Mogollon culture.<sup>14</sup> Either two or three unfired, finger-molded specimens are represented from Cave du Pont. One is a bowl decorated with black painted zig-zags, incisions and punctations. The other sherds represent one or two small, thick-walled, sub-conical vessels.<sup>15</sup> But aside from the fact they are unfired, and that one bears incisions, the du Pont specimens are aberrant in shape and treatment from the described unfired pots of the San Juan drainage;<sup>16</sup> which complicates an estimate of their chronological and historical affiliations.

This is not the place to enter the discussion over the native or foreign origin of Basketmaker-Pueblo pottery and similar cultural problems, but simply to indicate, for purposes of archaeological chronology, the associations of tree-ring dates. The present date is unfortunately only one, with its inherent limitations. A large collection of Basketmaker II tree-ring material recently recovered by Morris from near Durango, Colorado, and now being studied by Douglass, may be expected to outline temporal changes there in some detail.<sup>17</sup>

#### FOOTNOTES

- <sup>1</sup> Jesse L. Nusbaum, A. V. Kidder and S. J. Guernsey, "A Basket-Maker Cave in Kane County, Utah." Museum of the American Indian, Heye Foundation, *Indian Notes and Monographs*. New York, 1922.
- <sup>2</sup> *Op. cit.*, passim.
- <sup>3</sup> A. E. Douglass, "Estimated Tree-Ring Chronology: 150-300 A.D." *Tree-Ring Bulletin*, 5 (3), pp. 18-21. Tucson, 1939.
- <sup>4</sup> Collections of early material made by Earl H. Morris and I. W. Flora in the vicinity of Durango, Colorado, and being studied by Douglass, will cover the pre-235 period more adequately, both quantitatively and qualitatively. They were not available as comparative material when the present study was made.
- <sup>5</sup> Douglass, *op. cit.*; and, "The Central Pueblo Chronology." *Tree-Ring Bulletin*, 2 (4), pp. 29-30. Tucson, 1936.
- <sup>6</sup> A. E. Douglass, "Southwestern Photographic Ring Sequences." American Documentation Institute, Science Service, *Document 1298*. Washington, 1939.
- <sup>7</sup> Nusbaum, *et al.*, *op. cit.* Julian H. Steward, "Archaeological Reconnaissance of Southern Utah." *Bur. Amer. Eth., Bull. 128, Anthro. Paper 18*. Washington, 1941.
- <sup>8</sup> Nusbaum, *et al.*, *op. cit.*
- <sup>9</sup> E. H. Morris, "Archaeological Background of Dates in Early Pueblo Chronology." *Tree-Ring Bulletin*, 2 (4). Tucson, 1936. A. E. Douglass, *op. cit.*, 1936; also, "Southwestern Dated Ruins: V." *Tree-Ring Bulletin*, 5 (2). Tucson, 1938.
- <sup>10</sup> Morris, *op. cit.*, 1936. Douglass, *op. cit.*, 1936, 1938. Emil W. Haury, *Southwestern Dated Ruins: II.* *Tree-Ring Bulletin*, 4 (3). Tucson, 1938.
- <sup>11</sup> E. H. Morris, "Archaeological Studies in the La Plata District." Carnegie Institution of Washington, *Pub. 519*, p. 5. Washington, 1939.
- <sup>12</sup> Morris, *op. cit.*, 1939, pp. 12-19.
- <sup>13</sup> Cp. Morris, 1939, p. 157.
- <sup>14</sup> Morris, 1936, p. 35; 1939, p. 5, p. 23.
- <sup>15</sup> Nusbaum, *et al.*, pp. 138-144.
- <sup>16</sup> E. H. Morris, "The Beginnings of Pottery Making in the San Juan Area." *Amer. Mus. Nat. Hist., Anthro. Papers*, XXVIII, Pt. II. New York, 1937. S. J. Guernsey and A. V. Kidder, "Basket-Maker Caves of Northeastern Arizona." *Peabody Mus. Amer. Arch. and Eth., Papers*, 8 (2), p. 98, pl. 25a. Cambridge, 1921.
- <sup>17</sup> Carnegie Institution of Washington, *Yearbook*, 38, pp. 245-246. Washington, 1939.

## AGE OF FORESTDALE RUIN EXCAVATED IN 1939

A. E. DOUGLASS

Oct. 13, 1940.

A part of the Forestdale ruins near Showlow, Arizona, was excavated in 1939 by an expedition under the direction of Dr. E. W. Haury of the University of Arizona, a work sponsored by the American Philosophical Society and the Arizona State Museum. Dr. Haury and his associates assigned a date in the late 600's to the charcoal found there. In view of forthcoming publication he asked the writer to review this dating. As the latter had only seen two or three specimens from that site, a detailed study of them was made. Forty-two specimens from eighteen different trees were carefully examined. They are all charcoal of western yellow pine and the common pinyon. In 1939 two or three of them had been examined; they were roundish pieces, the largest being about four inches in diameter; the rings were generally rather thin and there were many doubles. This latter character is strongly sustained by modern trees in that vicinity.

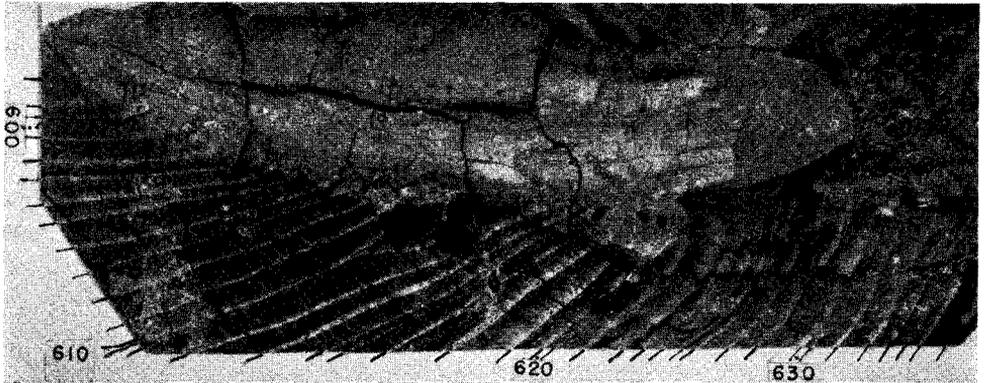
Some time previous to the recent examination they had been sectioned to a thickness of one-half inch to one inch which left them very fragile and many were broken. Sectioning a charcoal piece is a serious matter for the archeologist and in the writer's opinion should never be done unless the piece is so large that it is difficult to handle. In a long experience we have found large numbers of cases in which a small fragment that contained the outermost rings has become detached. To the student of prehistory any loss of these rings is unfortunate because it is the late rings on the piece that date the ruin. So the unnecessary loss of any part of a charcoal piece endangers the value of the piece and may destroy it altogether. Only a minimum of surface cutting or chipping or sometimes breakage along cracks is justified. Some of this is necessary for the identification of the rings.

The surfaces which the returned pieces presented had been deeply abraded in a manner that raised the tougher rings into great prominence and largely obliterated the fainter rings and made it impossible to see the cellular structure by which the false or annual character of rings is judged. Hence every piece had to be chipped to reveal the ring structure.

Immediately on examination crossdating became evident with a good display of the JCD signature (611-620 A. D.). Based on that and on many other satisfactory patterns, dates were assigned, and times of beginning and ending of each specimen's ring-sequence were recorded after carefully identifying doubles as such; in difficult cases powers up to X-100 were used and the shape of the cells and changes of shape on the outer edge of each possible ring were noted.\*

This crossdating was carried through 18 specimens from six different trees and seemed to the writer to establish their identity by excellent similarity to the well known chronological sequences in the 600's. The Forestdale ring series begins about A. D. 574 and extends to an approximate date A. D.  $720 \pm 10$ ; 587-8 form a coarse pair, 590-1 form a closer pair, 599 is small as usual; 603 is apt to be small as usual but 605 is mostly smaller than usual; 610 is a large double, 611 is very small and sometimes microscopic and rarely absent. Rings are apt to be complacent out to 628 at which point to 634 they are small with 628 and 630 smaller than the rest; 636 is very large, as is usual; 639-40 are small, as usual; 645-6-7 have one absent ring probably 646

\* Usually in pines of the Southwest a small red (latewood) ring with hazy outer edge frequently located just inside a heavier latewood ring, is a "double," that is, non-annual; if it is just outside a heavier latewood ring and has a sharp outside edge like the obvious annuals, and does not end somewhere in mid-air, in some cases merging into the preceding annual ring, it is itself almost always an annual.



FSTD-36 (Haury, 1939) Forestdale charcoal showing ring sequences from A. D. 598 to 636.

and the two that show are small and faint. The signature at 660-4 appears in half a dozen pieces. In rings of normal size, 660 is very small and 661, 662, 663, and 664 are nearly equal. In minimized rings where absences are apt to occur this group shows one absence at 660; 663 is slightly smaller than the others. From here outward the rings are smaller, with successful checks at 677-8, 686, 690 and a count to about 713 in micro-rings. It was inferred long ago that allowance must be made for outside losses in the Forestdale specimens and that the actual cutting dates could be in the early 700's. The single piece, Haury's 70B of 1939, that showed rings later than 700, had strongly marked diminishing ring-size near the outside and probably had very little loss there; hence the outside date already given,  $720 \pm 10$  is considered fairly near. These results support the previous dating of the Forestdale pieces. A photograph is shown of the JCD signature, 611-620, and the adjacent ring patterns from A. D. 598 to 636, in specimen EWH-36, 1939. These dates give the first and last complete rings. Ring 610 is suppressed to microscopic size in part of its course. For further study of the rings of this period reference is made to Southwestern Photographic Ring Sequences, American Documentation Institute, Science Service: Document 1298, Washington, D. C., 1939.