

TREE-RING DATES FROM THE NAVAJO LAND CLAIM

II. THE WESTERN SECTOR

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ABSTRACT

Presented in this article are the dates of specimens collected from the Western Sector of the Navajo Land Claim. Of the 1283 specimens processed, 482 were dated. This is a dating percentage of 38 percent. All but one of these dated specimens were *Pinus edulis* Englm. The Western Sector has been divided into four areas; from west to east they are (1) Havasu Canyon, (2) Navajo Mountain, (3) Lower Little Colorado, and (4) Chinle. Indices for all areas except the Chinle are presented.

THE WESTERN SECTOR

The Western Sector is geographically much larger than the previously described Northern Sector (Stokes and Smiley 1963), and the number of specimens for the area is much larger — 1283 specimens processed for the Western Sector as compared to 237 processed for the Northern Sector. Most of the Western Sector lies within the state of Arizona. The portion outside of the state boundary is located between the Arizona-Utah state line and the San Juan River. The areas within the sector, as listed in the code index (Table 1) are Havasu Canyon Area, Navajo Mountain Area, Lower Little Colorado Area, and Chinle Area.

The northern boundary of the sector is the San Juan River (see Fig. 1) from the four-corners to the junction with the Colorado River. The western boundary follows the Colorado River south and west to the eastern edge of Grand Canyon National Park. From there, the line swings south, passing through Red Butte and Flagstaff to the vicinity of Mormon Lake, then northeast up to the Arizona-New Mexico state boundary. At the southern end of the Chuska Mountains, the line of demarcation swings north to the San Juan River, completing the Western Sector collection area.

The specimens from the three other sectors, the Northern, Southern and Eastern, were for the most part collected from areas peripheral to the present day Navajo Reservation. This was due to the Tribe's interest in attempting to define areas of use and habitation outside of their reservation. The Western Sector, however, includes a large number of specimens collected on and around the Black Mesa region of Arizona, in the middle of the present-day reservation area. The dates from these specimens were used by the Navajo Tribe in presenting their case regarding the Navajo-Hopi boundary dispute. Consequently, more effort was made to collect a greater number of specimens from this particular area. Approximately 1600 specimens were submitted to the Laboratory of Tree-Ring Research, a total of 1283 specimens were examined, and dates were derived from 482 of these. The dates for the specimens are given in Table 2.

Most of the specimens received were *Pinus edulis* Englm. A small number (11) were of the *Juniperus* species, but none of these were dated. Also included in the collection is one specimen of *Mahonia* (barberry), two specimens of *Quercus* (oak), and two specimens of *Picea* (spruce). One of the two *Picea* specimens, NLC 207-8, was dated (see Table 2).

The procedures followed in dating, and in presenting the data derived, are as described in Part I, The Northern Sector. Complete cross-sections were used and every effort was made to find the outermost ring. The area

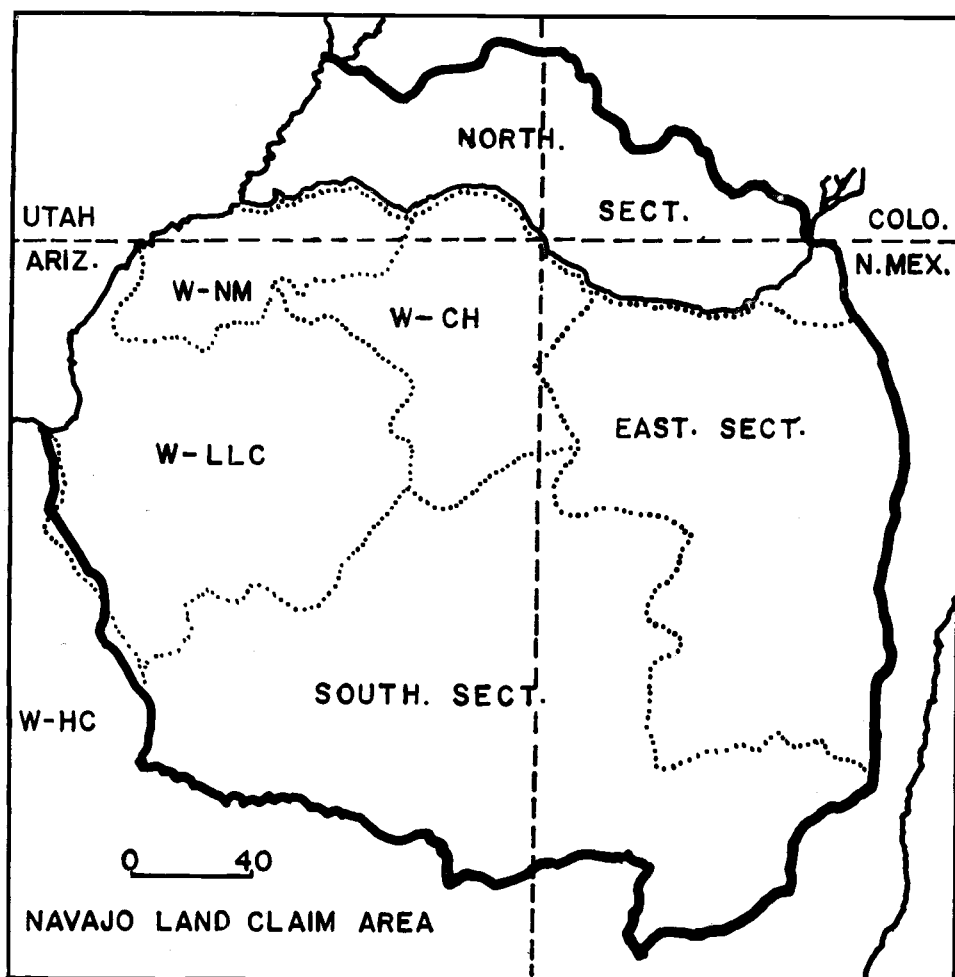


FIG. 1. Map of the Navajo Land Claim. Areas of the Western Sector are indicated by letter designations and are defined by the dotted lines. The three other sectors are also shown. The heavy line shows the approximate limits of hogan collections.

indices, Tables 3 through 6, and Fig. 2, represent the standardized growth curves. Incorporated in each set of indices are the measurements of 4 to 6 old hogan specimens and 3 or 4 modern specimens. For convenience in presenting the data, the Lower Little Colorado Area was divided into an "eastern" and "western" division. All of the eastern division represents specimens collected for use in the Navajo-Hopi boundary dispute. No indices are presented for the Chinle Area because too few specimens were collected from that area to allow a representative selection to be made. Therefore, the Western Sector indices (Table 7) do not contain samples from all of the designated collection areas.

TABLE 1. Index Code for Western Sector.

<i>Western division of Western Sector</i>	
HC: Havasu Canyon area	LLC: Lower Little Colorado area
LH: Lower Havasu	B. Bodoway
NM: Navajo Mountain area	C: Coconino Plateau
NC: Navajo Creek	D: Deadman's Wash
OC: Oljeto Creek	SF: San Francisco Wash
PC: Paiute Creek	
<i>Eastern division of Western Sector</i>	
LLC: Lower Little Colorado area	MO: Middle Oraibi
BC: Burnt Corn Wash	MP: Middle Polacca
DO: Doyanescla Mesa	NJ: North Jeddito
DZ: Dzildajinnah (Black Mountain)	OP: Owl Point
HT: Hooshdodiito Mesa	P: Pinyon
J. Jeehdazaii (Pitch Point)	SM: Salinas Mesa
LM: Lone (Low) Mountain	TS: Tse Chizzi
LO: Lower Oraibi	UC: Upper Dinnebito
LP: Lower Polacca	UO: Upper Oraibi
M: Moencopi Wash	WE: Wepo Wash
MB: Moqui Buttes	
MD: Middle Dinnebito	CH: Chinle area
MJ: Middle Jeddito	LC: Lower Chinle
	UC: Upper Chinle

TABLE 2
WESTERN SECTOR
Western Half

NLC	Group	Specimen	Tree-Ring Laboratory Date, A.D.
HAVASU CANYON AREA			
244	W—HC—LH—P	Hogan 1	1842± p—1918 inc
243	W—HC—LH—P	Corral 1	1850± p—1909 inc
1024	W—HC—LH—U	Structure 2	1824 p—1894 inc G
1754	W—HC—LH—DD	Hogan 3	1707±nc—1793 inc G
1753	W—HC—LH—DD	Sheep Corral	1743± p—1881 +
222	W—HC—LH—II	Hogan 1	1754± p—1862 +
224	W—HC—LH—II	Sweat Hogan	1775 p—1858 + B
1838	W—HC—LH—II	Corral	1621 p—1844 + inc
1750	W—HC—LH—JJ	Hogan 3	1787± p—1866 c
1751	W—HC—LH—JJ	Hogan 9	1646± p—1731 +
1752	W—HC—LH—JJ	Sheep Corral	1760± p—1867 inc
1032	W—HC—LH—Supai 4	Corral	1781± p—1904 + G
NAVAJO MOUNTAIN AREA			
497	W—NM—NC—C	Hogan 1	1721± p—1877 + G
498	W—NM—NC—C	Hogan 1	1751± p—1874 inc
499	W—NM—NC—C	Hogan 1	1723±nc—1885 + G
502	W—NM—NC—C	Sheep Corral 2	1741± p—1881 +
503	W—NM—NC—D	Hogan 2	1805 p—1892 G
505	W—NM—NC—D	Hogan 2	1678± p—1884 +
506	W—NM—NC—D	Hogan 2	1812± p—1894 G
508	W—NM—NC—D	Hogan 2	1763± p—1895 G
509	W—NM—NC—D	Sweat Hogan	1801± p—1887 inc G

TABLE 2. (Continued)

NLC	Group	Specimen	Tree-Ring Laboratory Date, A.D.
511	W-NM-NC-D	Sweat Hogan	1774± fc—1895 G
514	W-NM-NC-D	Sweat Hogan	1796± p—1894 G
526	W-NM-NC-F	Hogan 1	1685± p—1878 +
3530	W-NM-NC-N	Hogan 5	1611 p—1804 + inc
3532	W-NM-NC-N	Hogan 5	1598 p—1788 + inc G
3535	W-NM-NC-N	Hogan 5	1617 p—1776 + inc G
3536	W-NM-NC-N	Hogan 5	1627 p—1788 + inc G
3574	W-NM-NC-N	Hogan 5	1661 p—1815 inc G
3575	W-NM-NC-N	Hogan 5	1626± p—1807 + inc G
3541	W-NM-NC-O	Hogan 1	1524 p—1818 inc G
3537	W-NM-NC-P	Hogan 1	1682± p—1862 + inc
3556	W-NM-NC-V	Hogan 1	1700 p—1819 inc G
3557	W-NM-NC-V	Hogan 1	1718 p—1884 inc G
3559	W-NM-NC-V	Hogan 1	1745± p—1879 + inc G
3560	W-NM-NC-V	Hogan 1	1749 p—1883 inc G
193	W-NM-NC-B	Sweat Hogan	1717 p—1857 +
190	W-NM-PC-A	Hogan 1	1646± p—1883 + c
191	W-NM-PC-A	Hogan 1	1605± p—1835 +
3527	W-NM-PC-K	Hogan 1	1625± p—1882 + inc G
3522	W-NM-PC-N	Hogan 1	1587± p—1782 + inc G
3523	W-NM-PC-N	Hogan 1	1668± p—1848 + inc G
3521	W-NM-PC-O	Hogan 4	1619± p—1799 + inc G
3517	W-NM-PC-P	Hogan 1	1722 p—1864 inc G
3519	W-NM-PC-P	Hogan 1	1751± p—1863 inc G
3551	W-NM-PC-S	Sweathouse 1	1680± p—1820 inc
3553	W-NM-PC-S	Sweathouse 1	1627± p—1806 inc G
3567	W-NM-PC-U	Hogan 1	1611 p—1845 inc c G
3568	W-NM-PC-U	Hogan 1	1576± p—1829 + inc G
3569	W-NM-PC-U	Hogan 1	1723 p—1860 inc G B
3570	W-NM-PC-U	Hogan 1	1629 p—1830 + inc G
3571	W-NM-PC-U	Hogan 1	1623 p—1859 inc G
3572	W-NM-PC-U	Hogan 1	1614± p—1851 + inc G
3573	W-NM-PC-U	Hogan 1	1630 p—1860 inc G

LOWER LITTLE COLORADO AREA

706	W-LLC-B-E	Hogan 1	1783± p—1907 inc
257	W-LLC-B-M	Rockshelter	1711 fc—1898 G
1817	W-LLC-C-A	Hogan 2	1642 p—1833 +
349	W-LLC-C-B	Hogan 1	1614± p—1786 + G
350	W-LLC-C-B	Hogan 1	1647± p—1793 G
351	W-LLC-C-B	Hogan 1	1648± p—1797 G
352	W-LLC-C-B	Hogan 1	1612 p—1793 G
3385	W-LLC-C-B	Hogan 1	1601± p—1709 + inc G
3378	W-LLC-C-B	Hogan 2	1611 p—1787 + inc G
3379	W-LLC-C-B	Hogan 2	1626 p—1772 + inc G
3381	W-LLC-C-B	Hogan 2	1613± p—1794 + G
3383	W-LLC-C-B	Hogan 2	1649 p—1790 + inc G
353-4	W-LLC-C-B	Hogan 2	1657 p—1803 + G
355	W-LLC-C-C	Hogan 1	1625± p—1825 +
356	W-LLC-C-C	Hogan 1	1670 fc—1833 inc
1821	W-LLC-C-C	Hogan 1	1641±nc—1788 +
3422	W-LLC-C-D	Hogan 1	1630 p—1798 +
3423	W-LLC-C-D	Hogan 1	1649 p—1794 +
3424	W-LLC-C-D	Hogan 1	1634 p—1758 + inc
3428	W-LLC-C-D	Hogan 1	1604 p—1745 + inc
3429	W-LLC-C-D	Hogan 1	1626± p—1790 + c
3432	W-LLC-C-D	Hogan 1	1632 p—1812 + inc
361	W-LLC-C-D	Hogan 2	1619± p—1763 +
362	W-LLC-C-D	Hogan 2	1623 p—1782 + G
364	W-LLC-C-D	Hogan 4	1670 p—1789 + inc
3410	W-LLC-C-D	Hogan 5	1665± p—1766 + inc
3412	W-LLC-C-D	Hogan 5	1607± p—1751 + inc G
3413	W-LLC-C-D	Hogan 5	1627 p—1773 + inc
3414	W-LLC-C-D	Hogan 5	1639± p—1828 + inc G
3418	W-LLC-C-D	Windbreak 6	1617 p—1789 + inc

TABLE 2. (Continued)

NLC	Group	Specimen	Tree-Ring Laboratory Date, A.D.
365	W-LLC-C-E	Hogan 1	1657± p-1796 + G
366	W-LLC-C-E	Hogan 1	1719 p-1839 inc
3401	W-LLC-C-E	Hogan 1	1622 p-1820 inc G
3402	W-LLC-C-E	Hogan 1	1604± p-1798 inc G
3403	W-LLC-C-E	Hogan 1	1620 p-1809 + inc G
3404	W-LLC-C-E	Hogan 1	1610 p-1837 + inc G
3405	W-LLC-C-E	Hogan 1	1616± p-1792 + inc G
3406	W-LLC-C-E	Hogan 1	1610 p-1826 + inc G
370	W-LLC-C-F	Hogan 2	1660 p-1759 +
371	W-LLC-C-F	Hogan 2	1660± p-1765 inc
374-5	W-LLC-C-F	Sheep Corral 1	1659± p-1809 +
376	W-LLC-C-F	Corral 2	1661 p-1779 + G
713	W-LLC-C-G	Hogan 1	1635 p-1788 + G
2364	W-LLC-C-H	Hogan 7	1594± p-1735 + inc G
214	W-LLC-C-I	Corral 8	1679± p-1832 +
391	W-LLC-C-R	Hogan 1	1743 fc-1865 G
392	W-LLC-C-R	Hogan 2	1614± p-1869 G
382	W-LLC-C-T	Hogan 2	1648± p-1823 + G
395	W-LLC-C-Z	Hogan 1	1702± p-1858 +
806	W-LLC-C-CC	Hogan 1	1618 p-1795 inc
804	W-LLC-C-CC	Hogan 10	1616 p-1828 + G
3433	W-LLC-C-MM	Hogan 1	1647 p-1746 + inc G
3435	W-LLC-C-MM	Hogan 1	1639± p-1771 + inc G
3436	W-LLC-C-MM	Hogan 1	1683 p-1824 + inc G
3450	W-LLC-C-MM	Hogan 4	1580± p-1744 + inc
3453	W-LLC-C-MM	Hogan 5	1610± p-1792 + inc
3454	W-LLC-C-MM	Hogan 5	1625± p-1788 + inc G
3455	W-LLC-C-MM	Hogan 5	1637 p-1788 + inc G
3456	W-LLC-C-OO	Hogan 1	1614 p-1751 + inc G
3457	W-LLC-C-OO	Hogan 1	1644± p-1786 + inc G
3459	W-LLC-C-OO	Hogan 1	1646 p-1757 + inc G
3461	W-LLC-C-OO	Hogan 1	1625 p-1729 + inc G
3462	W-LLC-C-OO	Hogan 1	1660 p-1814 + inc
3463	W-LLC-C-OO	Hogan 1	1633 p-1757 + inc
3464	W-LLC-C-OO	Hogan 1	1628 p-1726 + inc
3465	W-LLC-C-OO	Hogan 1	1630 p-1711 + inc G
3466	W-LLC-C-OO	Hogan 1	1625 p-1713 + inc
3467	W-LLC-C-OO	Hogan 1	1639± p-1822 + inc G
3468	W-LLC-C-OO	Hogan 1	1630 p-1711 + inc G
3469	W-LLC-C-OO	Hogan 1	1641 p-1809 + inc G
3470	W-LLC-C-OO	Hogan 1	1639 p-1742 + inc G
3471	W-LLC-C-OO	Hogan 1	1656 p-1825 C G
3499	W-LLC-C-OO	Hogan 2	1590± p-1795 inc G
3472	W-LLC-C-OO	Hogan 3	1648 p-1829 + inc G
3476	W-LLC-C-OO	Hogan 3	1699 p-1830 + inc
3477	W-LLC-C-OO	Hogan 3	1638± p-1796 + inc G
3478	W-LLC-C-OO	Hogan 3	1678 p-1805 inc G
3485	W-LLC-C-OO	Hogan 3	1416± p-1776 + inc G
3486	W-LLC-C-OO	Hogan 3	1578 p-1778 + inc G
3487	W-LLC-C-OO	Hogan 4	1540 nc-1782 inc G
3488	W-LLC-C-OO	Hogan 4	1560 p-1764 inc G
3489	W-LLC-C-OO	Hogan 4	1637± p-1756 inc G
3490	W-LLC-C-OO	Hogan 4	1587 p-1770 inc G
3492	W-LLC-C-OO	Hogan 4	1663 p-1786 inc G
3493	W-LLC-C-OO	Hogan 4	1564± p-1781 inc
3494	W-LLC-C-OO	Hogan 4	1593 p-1728 + inc G
3495	W-LLC-C-OO	Hogan 4	1630± p-1776 + inc G
2383	W-LLC-C-PP	Windbreak 1	1656 p-1746 + inc
207-8	W-LLC-D-A	Hogan 1	1834 fc-1911 inc
347	W-LLC-SF-I	Game Corral	1794± p-1884 +
348	W-LLC-SF-I	Game Corral	1679±nc-1885 +
334	W-LLC-SF-K	Hogan 1	1705 nc-1826 + inc
335	W-LLC-SF-K	Hogan 2	1808± p-1875 + G
341	W-LLC-SF-L	Hogan 1	1696± p-1870 G
342	W-LLC-SF-L	Hogan 2	1741± p-1813 + G
343	W-LLC-SF-M	Hogan 1	1781± p-1893 + G
204	W-LLC-SF-O	Hogan 2	1716 p-1854 +

TABLE 2. (Continued)
Eastern Half

NLC	Group	Specimen	Tree-Ring Laboratory Date, A.D.
LOWER LITTLE COLORADO AREA			
576	W-LLC-BC-B	Hogan 3	1762± p-1868 inc
578	W-LLC-BC-B	Hogan 4	1803± p-1868 G
577	W-LLC-BC-B	Sheep Corral 5	1686± p-1869 inc
580	W-LLC-BC-C	Hogan 1	1809± p-1868 G
581	W-LLC-BC-C	Hogan 2	1808± p-1868 G
582	W-LLC-BC-C	Sheep Corral	1685± p-1848 +
894	W-LLC-BC-I	Hogan 1	1608± p-1803 +
895	W-LLC-BC-J	Hogan 1	1746± p-1869 B
896	W-LLC-BC-J	Shelter 2	1726± p-1869 G
897	W-LLC-BC-K	Ch'indi Hogan 1	1619± p-1870 inc G
898	W-LLC-BC-K	Ch'indi Hogan 1	1594± p-1842 +
899	W-LLC-BC-L	Hogan 1	1637± p-1853 inc
900	W-LLC-BC-L	Hogan 1	1564± p-1787 +
2212	W-LLC-BC-P	House 3	1610± p-1798 + inc
2213	W-LLC-BC-P	House 3	1602 p-1765 + G
2214	W-LLC-BC-Q	Hogan 1	1625± p-1850 + inc
2216	W-LLC-BC-S	Hogan 1	1555± p-1824 + inc G
2225	W-LLC-BC-T	Hogan 1	1640 p-1844 inc G
2226	W-LLC-BC-T	Hogan 1	1580 p-1819 + inc G
2227	W-LLC-BC-T	Hogan 1	1660± p-1838 + inc G
2228	W-LLC-BC-T	Hogan 1	1628± p-1841 + inc G
2230	W-LLC-BC-X	Hogan 2	1570± p-1808 + inc
2231	W-LLC-BC-X	Hogan 2	1569± p-1846 + inc
2229	W-LLC-BC-X	Smithy 1	1406± p-1830 + G
675	W-LLC-DO-B	Hogan 1	1793± p-1898 G
677	W-LLC-DO-B	Hogan 6	1779± p-1901 inc G
679	W-LLC-DO-D	Hogan 1	1658± p-1874 + G
681	W-LLC-DO-E	Hogan 1	1760±nc-1854 + c
682	W-LLC-DO-F	Hogan 1	1748±nc-1858 + G
699	W-LLC-DO-F	Sheep Corral	1670± p-1798 +
683	W-LLC-DO-G	Hogan 1	1646± p-1788 inc
684	W-LLC-DO-G	Hogan 2	1640±nc-1772 inc
686	W-LLC-DO-H	Sweat Hogan 1	1724±nc-1844 +
667	W-LLC-DO-L	Sweat Hogan 5	1636± p-1808 +
671	W-LLC-DO-P	Hogan 4	1760± p-1874 inc
672	W-LLC-DO-P	Sheep Corral 2	1722± p-1869 inc
904A	W-LLC-DO-Q	Hogan 2	1704± p-1858 inc
909	W-LLC-DO-V	Hogan 1	1649 p-1869 inc G
912	W-LLC-DO-V	Hogan 2	1611± p-1875 inc G
661	W-LLC-DO-V	Hogan 3	1608± p-1878 G
907A	W-LLC-DO-Y	Hogan 1	1700± p-1897 inc G
908A	W-LLC-DO-Y	Lamb Pen 2	1646± p-1899 + inc G
915	W-LLC-DO-Z	Hogan 1	1676± p-1874 + inc G
913	W-LLC-DO-Z	Hogan 3	1640± p-1873 + inc G
914	W-LLC-DO-Z	Hogan 3	1677± p-1871 + G
916	W-LLC-DO-Z	Hogan 7	1615± p-1803 +
573	W-LLC-DZ-B	Sheep Corral 3	1766 p-1843 +
598	W-LLC-DZ-D	Hogan 1	1679± p-1805 +
599	W-LLC-DZ-D	Hogan 2	1812± p-1875 G
600	W-LLC-DZ-D	Hogan 3	1813± p-1874 G
596	W-LLC-DZ-G	Sweat Hogan 1	1691± p-1805 +
935	W-LLC-DZ-K	Hogan 4	1659± p-1808 inc
939	W-LLC-DZ-L	Corral 2	1680± p-1872 + G
940	W-LLC-DZ-L	Corral 4	1694±nc-1893 + G
941	W-LLC-DZ-M	Hogan 1	1625±nc-1856 inc
942	W-LLC-DZ-M	Hogan 2	1624± p-1852 inc
943	W-LLC-DZ-M	Hogan 2	1547± p-1807 +
944	W-LLC-DZ-M	Sweathouse 6	1590± p-1858 G
945	W-LLC-DZ-N	Hogan 1	1594± p-1701 +
688	W-LLC-HT-C	Hogan 1	1815± p-1870 inc
924	W-LLC-HT-C	Hogan 1	1656± p-1872 inc G
691	W-LLC-HT-C	Hogan 2	1726± p-1841 inc
925	W-LLC-HT-C	Hogan 2	1721 fc-1869 inc G
926	W-LLC-HT-C	Hogan 3	1733± p-1870 inc G
689	W-LLC-HT-C	Hogan 4	1772± p-1865 + G

TABLE 2. (Continued)

NLG	Group	Specimen	Tree-Ring Laboratory Date, A.D.
936	W-LLC-HT-C	Hogan 5	1740± p-1869 inc G
690	W-LLC-HT-C	Hogan 6	1729± p-1870 G
927	W-LLC-HT-C	Hogan 6	1722± p-1866 inc
698	W-LLC-HT-D	Hogan 3	1659±nc-1797 +
693	W-LLC-HT-D	Hogan 4	1686± p-1817 inc
1725	W-LLC-J-B	Hogan 1	1627± p-1795 +
1726	W-LLC-J-B	Hogan 2	1648 p-1828 + inc
1731	W-LLC-J-C	Hogan 2	1633± p-1724 +
1733	W-LLC-J-C	Hogan 3	1692± p-1854 +
1738	W-LLC-J-E	Sheep Corral 3	1657± p-1808 +
876	W-LLC-J-H	Hogan 1	1639± p-1840 +
877	W-LLC-J-H	Hogan 3	1643± p-1798 +
880	W-LLC-J-J	Hogan 1	1601± p-1723 inc G
882	W-LLC-J-K	Hogan 1	1650± p-1778 + G
1723	W-LLC-LM-G	Hogan 2	1640 fc-1773 +
1724	W-LLC-LM-H	Hogan 1	1800± p-1891 inc
886	W-LLC-LM-M	Hogan 1	1563± p-1858 c
887	W-LLC-LM-M	Hogan 1	1645± p-1807 G
888	W-LLC-LM-N	Hogan 1	1718±nc-1926 C G
889	W-LLC-LM-N	Hogan 1	1837 p-1926 c G
890	W-LLC-LM-N	Sheep Corral	1679±nc-1926 c G
891	W-LLC-LM-P	Hogan 1	1803 fc-1932 c G
892	W-LLC-LM-P	Hogan 1	1603± p-1932 B
893	W-LLC-LM-P	Hogan 2	1620± p-1932 G
2610	W-LLC-M-D10	Hogan 1	1651 p-1811 +
2611	W-LLC-M-D10	Hogan 1	1634 p-1817 + G
2612	W-LLC-M-D10	Hogan 1	1631 p-1804 + G
2427	W-LLC-M-B24	Hogan 1	1690 p-1878 inc G
2662	W-LLC-M-B24	Hogan 1	1795 p-1878 c G
2663	W-LLC-M-B24	Hogan 1	1820 nc-1878 c G
2592	W-LLC-M-D7	Hogan 1	1743 p-1860 c G
2600	W-LLC-M-D8	Windbreak 1	1706± p-1895 c G
2602	W-LLC-M-D8	Corral 3	1824 p-1898 inc G
2615	W-LLC-M-D12	Hogan 3	1786± p-1900 + G
2623	W-LLC-M-D13	Hogan 1	1693± p-1823 +
2624	W-LLC-M-D13	Hogan 1	1745± p-1838 + G
2632	W-LLC-M-D13	Hogan 1	1630 p-1871 inc G
2626	W-LLC-M-D13	Hogan 2	1699 p-1871 inc
2627	W-LLC-M-D13	Hogan 2	1705± p-1853 inc G
2628	W-LLC-M-D13	Hogan 2	1702 p-1846 inc G
2629	W-LLC-M-D13	Hogan 3	1642± p-1809 +
2630	W-LLC-M-D13	Hogan 3	1609 p-1804 + G
2199	W-LLC-M-E	Hogan 1	1709± p-1875 inc G
2200	W-LLC-M-E	Hogan 1	1673± p-1805 inc
2904	W-LLC-M-E8	Hogan 1	1762 p-1860 inc G
2905	W-LLC-M-E8	Hogan 1	1730± p-1859 inc G
2906	W-LLC-M-E8	Hogan 1	1774 fc-1857 + G
2907	W-LLC-M-E8	Hogan 1	1762± p-1857 + G
2908	W-LLC-M-E8	Hogan 1	1784± p-1860 inc G
2909	W-LLC-M-E8	Hogan 1	1768 p-1852 + G
2910	W-LLC-M-E8	Hogan 1	1737± p-1859 inc G
2911	W-LLC-M-E8	Hogan 1	1788 nc-1859 inc G
2913	W-LLC-M-E9	Hogan 1	1570± p-1759 +
2915	W-LLC-M-E9	Hogan 1	1580 fc-1782 + G
2919	W-LLC-M-E9	Hogan 4	1515± p-1789 +
2922	W-LLC-M-E9	Hogan 6	1743 p-1860 c G
2922A	W-LLC-M-E11	Hogan 1	1800 p-1897 c G
2923A	W-LLC-M-E11	Hogan 1	1761 p-1898 + c G
2924A	W-LLC-M-E11	Hogan 1	1807 p-1898 + c G
2975	W-LLC-M-E21	Hogan 1	1743± p-1898 c G
2977	W-LLC-M-E21	Hogan 1	1724 p-1888 + G
2979	W-LLC-M-E21	Hogan 2	1720± p-1897 c G
2980	W-LLC-M-E21	Hogan 2	1826 p-1897 c G
2981	W-LLC-M-E21	Hogan 2	1798 p-1898 inc G
2982	W-LLC-M-E21	Hogan 2	1829± p-1898 inc G
2983	W-LLC-M-E21	Hogan 2	1814 p-1898 G
2984	W-LLC-M-E21	Hogan 2	1783± p-1898 G
2756	W-LLC-MB-BB	Hogan 1	1776± p-1887 inc G B
2236	W-LLC-MB-G	Antelope Corral	1687 p-1849 inc G
2237	W-LLC-MB-G	Antelope Corral	1684± p-1819 inc G

TABLE 2. (Continued)

NLC	Group	Specimen	Tree-Ring Laboratory Date, A.D.
2238	W-LLC-MB-G	Antelope Corral	1640± p-1840 + inc G
2852	W-LLC-MB-JJ	Hogan 2	1719 p-1900 + G
2853	W-LLC-MB-KK	Hogan 1	1670 p-1898 inc
2822	W-LLC-MB-NN	Hogan 1	1720± p-1817 inc G
2825	W-LLC-MB-NN	Sweathouse 4	1726± p-1887 c B
2827	W-LLC-MB-OO	Hogan 1	1796 p-1902 + inc G
2829	W-LLC-MB-PP	Hogan 1	1790± p-1875 inc G
2836	W-LLC-MB-PP	Hogan 3	1670± p-1875 inc G
2842	W-LLC-MB-QQ	Shelter 2 Yei'i Baghan	1773 nc-1886 + inc
2843	W-LLC-MB-QQ	Hogan 4	1770 nc-1887 inc
2844	W-LLC-MB-QQ	Hogan 4	1598± p-1777 + inc
2342	W-LLC-MD-GGG	Hogan 4	1697± p-1916 inc G
2343	W-LLC-MD-GGG	Hogan 4	1694± p-1916 inc G
2643	W-LLC-MD-JJJ	Windbreak 4	1450± p-1760 +
2645	W-LLC-MD-KKK	Hogan 1	1503 p-1782 +
2650	W-LLC-MD-KKK	Hogan 4	1571± p-1790 +
2652	W-LLC-MD-KKK	Hogan 4	1621 p-1770 +
2653	W-LLC-MD-KKK	Hogan 5	1624± p-1795 inc
2647	W-LLC-MD-KKK	Corral 2	1633 p-1811 inc
2656	W-LLC-MD-KKK	Corral 6	1497 p-1740 +
2742	W-LLC-MJ-A3	Sweathouse 1	1800 fc-1884 inc B
2744	W-LLC-MJ-A3	Hogan 2	1731± p-1892 inc G
2745	W-LLC-MJ-A3	Hogan 2	1820 fc-1893 inc G
2747	W-LLC-MJ-A3	Hogan 2	1812± p-1892 inc
2749	W-LLC-MJ-A3	Hogan 3	1720± p-1856 inc G
2751	W-LLC-MJ-A3	Hogan 3	1750± p-1856 inc G
2770A	W-LLC-MJ-A7	Hogan 1	1719± p-1878 inc G
2771A	W-LLC-MJ-A7	Hogan 1	1770 nc-1873 inc G
2250	W-LLC-MJ-DD	Antelope Corral	1637± p-1772 inc G
2252	W-LLC-MJ-DD	Antelope Corral	1699± p-1798 + inc G
2253	W-LLC-MJ-DD	Antelope Corral	1701± p-1795 + inc G
2254	W-LLC-MJ-DD	Antelope Corral	1699± p-1806 + inc G
970	W-LLC-MJ-G	Hogan 1	1711 nc-1878 + G
972	W-LLC-MJ-G	Hogan 1	1687± p-1864 + G
973A	W-LLC-MJ-H	Sweat Hogan	1686 p-1876 + G
2279	W-LLC-MJ-HH	Game Corral 1	1691± p-1809 inc G
2286	W-LLC-MJ-HH	Game Corral 1	1694± p-1811 inc G
2292	W-LLC-MJ-HH	Game Corral 1	1663 p-1804 + inc
2268	W-LLC-MJ-II	Game Corral 1	1624± p-1822 + inc G
2272	W-LLC-MJ-II	Game Corral 1	1655± p-1810 + inc
2273	W-LLC-MJ-II	Game Corral 1	1685± p-1817 inc G
2274	W-LLC-MJ-II	Game Corral 1	1694± p-1826 G
2418	W-LLC-MJ-III	Yei Hogan 7	1593 p-1797 inc G
2667	W-LLC-MJ-QQQ	Hogan 1	1670 fc-1811 + inc
2675	W-LLC-MJ-QQQ	Hogan 1	1670 fc-1804 + inc
2681	W-LLC-MJ-QQQ	Hogan 3	1647 p-1807 inc G
2693	W-LLC-MJ-SSS	Hogan 3	1600± p-1720 inc
2694	W-LLC-MJ-SSS	Hogan 3	1644 p-1854 + inc G
2696	W-LLC-MJ-SSS	Hogan 3	1635± p-1879 inc G
2697	W-LLC-MJ-SSS	Hogan 3	1609± p-1867 +
2698	W-LLC-MJ-SSS	Hogan 3	1695± p-1868 + G
2699	W-LLC-MJ-SSS	Hogan 3	1690 p-1882 + G
2700	W-LLC-MJ-SSS	Hogan 4	1611 nc-1797 +
2706	W-LLC-MJ-SSS	Hogan 4	1519± p-1793 c
2707	W-LLC-MJ-SSS	Hogan 4	1610 fc-1806 + G
2718	W-LLC-MJ-WWW	Windbreak 2	1716 nc-1858 inc G
2728	W-LLC-MJ-XXX	Hogan 1	1656± p-1880 + G
2730	W-LLC-MJ-XXX	Hogan 2	1829 fc-1878 G
2731	W-LLC-MJ-ZZZ	Hogan 1	1780 nc-1861 + inc G
2735	W-LLC-MJ-ZZZ	Hogan 3	1729 nc-1883 + inc G
2736	W-LLC-MJ-ZZZ	Hogan 3	1644± p-1887 + B
2871	W-LLC-MO-L	Hogan 4	1708 p-1835 inc G
655	W-LLC-NJ-AA	Hogan 1	1680±nc-1855 inc
1710	W-LLC-NJ-B	Sheep Corral 2	1609± p-1703 inc
657	W-LLC-NJ-BB	Hogan 1	1684± p-1816 inc
1713	W-LLC-NJ-D	Hogan 2	1617± p-1730 +
1714	W-LLC-NJ-D	Hogan 2	1649± p-1776 +
872	W-LLC-NJ-DD	Hogan 3	1765± p-1868 G
871	W-LLC-NJ-EE	Corral	1568± p-1800 +
863	W-LLC-NJ-F	Hogan 1	1623± p-1795 +

TABLE 2. (Continued)

NLC	Group	Specimen	Tree-Ring Laboratory Date, A.D.
864	W-LLC-NJ-F	Hogan 1	1646± p-1858 inc
865	W-LLC-NJ-F	Sheep Corral	1600± p-1860 + G
874	W-LLC-NJ-FF	Hogan 1	1720± p-1867 G
875	W-LLC-NJ-FF	Hogan 3	1630± p-1857 G
866	W-LLC-NJ-H	Hogan 1	1804± p-1888 inc G
867	W-LLC-NJ-H	Hogan 1	1727± p-1893 + G
868	W-LLC-NJ-H	Hogan 3	1808 p-1860 + G
869	W-LLC-NJ-J	Hogan 1	1769± p-1890 G
870	W-LLC-NJ-J	Hogan 1	1693± p-1898 c G
1783	W-LLC-NJ-K	Hogan 1	1650± p-1757 +
1784	W-LLC-NJ-L	Hogan 1	1792± p-1900 inc G
1785	W-LLC-NJ-N	Hogan 1	1810± p-1858 inc
1788	W-LLC-NJ-N	Hogan 4	1686± p-1843 + G
638	W-LLC-NJ-P	Hogan 2	1660± p-1814 G
641	W-LLC-NJ-P	Hogan 7	1573±nc-1748 +
642	W-LLC-NJ-P	Sheep Corral	1606± p-1802 +
651	W-LLC-NJ-W	Sweathouse 1	1651± p-1784 +
1706	W-LLC-OP-P	Hogan 1	1712± p-1804 inc
1728	W-LLC-OP-T	Hogan 2	1644± p-1711 inc
1729	W-LLC-OP-U	Hogan 1	1786±nc-1860 inc G
1718	W-LLC-P-F	Game Corral	1593±nc-1710 inc
1717	W-LLC-P-I	Game Corral	1628± p-1754 +
1744	W-LLC-P-N	Hogan 1	1602± p-1804 +
1747	W-LLC-P-N	Hogan 4	1682± p-1807 +
904	W-LLC-P-R	Hogan 3	1634± p-1817 + G
705	W-LLC-SM-A	Sheep Corral 4	1649± p-1760 +
603	W-LLC-SM-B	Hogan 1	1600± p-1738 +
606	W-LLC-SM-D	Hogan 1	1661± p-1773 +
607	W-LLC-SM-D	Hogan 3	1620± p-1732 +
614	W-LLC-SM-E	Hogan 1	1610± p-1711 +
615	W-LLC-SM-E	Hogan 2	1617± p-1756 +
619	W-LLC-SM-G	Hogan 2	1769± p-1879 G
623	W-LLC-SM-I	Sheep Corral 2	1612± p-1817 +
633	W-LLC-SM-N	Hogan 1	1641± p-1756 +
632	W-LLC-SM-N	Sweat Hogan 3	1618± p-1722 +
1759	W-LLC-SM-P	Hogan 2	1720±nc-1821 +
1762	W-LLC-SM-Q	Sweathouse 1	1653± p-1784 +
1764	W-LLC-SM-T	Hogan 1	1630± p-1813 + inc
1765	W-LLC-SM-T	Sheep Corral 2	1644± p-1752 +
1770	W-LLC-SM-U	Hogan 4	1619± p-1826 +
1772	W-LLC-SM-V	Hogan 1	1649± p-1761 +
1773	W-LLC-SM-V	Hogan 3	1629± p-1782 +
1774	W-LLC-SM-V	Hogan 4	1639± p-1871 + G
1775	W-LLC-SM-W	Hogan 1	1676 nc-1800 +
1780	W-LLC-SM-X	Hogan 3	1724± p-1860 + G
1781	W-LLC-SM-X	Hogan 4	1587± p-1766 inc
974	W-LLC-TS-I	Unit 1	1662± p-1893 inc G
1715	W-LLC-TS-B	Hogan 1	1686± p-1817 inc
1740	W-LLC-TS-D	Hogan 1	1679±nc-1853 inc
1741	W-LLC-TS-D	Hogan 3	1710 nc-1858 G
1734	W-LLC-TS-E	Hogan 1	1533± p-1666 inc
1735	W-LLC-TS-F	Hogan 1	1564± p-1759 +
883	W-LLC-TS-H	Hogan 1	1602 p-1856 inc G
884	W-LLC-TS-H	Hogan 1	1746± p-1856 G
885	W-LLC-TS-H	Hogan 2	1598± p-1743 +
2188	W-LLC-UC-A	Hogan 1	1634± p-1843 + inc G
2191	W-LLC-UC-B	Hogan 1	1585± p-1849 + inc G
2198	W-LLC-UC-D	Hogan 1	1545 p-1834 + inc G
2208	W-LLC-UC-G	Hogan 2	1707 p-1877 + inc G
2209	W-LLC-UC-G	Hogan 3	1687 p-1866 + inc G
2217	W-LLC-UC-H	Hogan 1	1681 p-1856 + inc G
2218	W-LLC-UC-H	Hogan 1	1691± p-1850 + inc G
2221	W-LLC-UC-I	Hogan 4	1714± p-1856 + inc G
2409	W-LLC-UC-II	Hogan 2	1601± p-1888 inc G
2317	W-LLC-UC-W	Hogan 1	1466± p-1842 + inc
2316	W-LLC-UC-X	Hogan 2	1469± p-1839 + inc
2315	W-LLC-UC-X	Sweathouse 1	1766± p-1895 c B
2318	W-LLC-UC-Y	Hogan 1	1570± p-1780 + inc
2320	W-LLC-UC-Z	Hogan 1	1643± p-1887 + inc
2322	W-LLC-UC-Z	Hogan 6	1746± p-1869 + inc G

TABLE 2. (Continued)

NLC	Group	Specimen	Tree-Ring Laboratory Date, A.D.
2417	W-LLC-UC-PP	Smithy 5	1488± p-1846 inc G
861A	W-LLC-UO-A	Hogan 1	1700± p-1879 +
862A	W-LLC-UO-B	Hogan 1	1767± p-1919 + c
2327	W-LLC-UO-BB	Hogan 1	1631± p-1815 + inc G
863A	W-LLC-UO-C	Hogan 1	1571± p-1835 + G
863AI	W-LLC-UO-C	Hogan 1	1570± p-1833 + G
864A	W-LLC-UO-C	Hogan 1	1687± p-1854 + G
2331	W-LLC-UO-DD	Hogan 3	1698± p-1873 + inc
2328	W-LLC-UO-DD	Fortified Crag 1	1650± p-1790 + inc G
411	W-LLC-UO-E	Hogan 2	1617± p-1744 +
416	W-LLC-UO-F	Hogan 2	1632± p-1779 +
2387	W-LLC-UO-FF	Hogan 1	1560± p-1857 inc
2388	W-LLC-UO-FF	Hogan 1	1630 p-1857 + inc G
423	W-LLC-UO-H	Hogan 2	1655± p-1809 inc
2393	W-LLC-UO-KK	Hogan 6	1591 p-1850 inc G B
2394	W-LLC-UO-LL	Hogan 6	1804± p-1882 inc G
2396	W-LLC-UO-LL	Hogan 7	1608 p-1743 + inc
2398	W-LLC-UO-NN	Hogan 3	1634 p-1894 inc G
946	W-LLC-UO-O	Hogan 1	1619± p-1728 inc
947	W-LLC-UO-O	Hogan 1	1647 p-1817 + G c
951	W-LLC-UO-P	Hogan 2	1473 p-1792 + inc
2400	W-LLC-UO-PP	Lean-to	1710 p-1866 inc
952	W-LLC-UO-Q	Hogan 3	1485± p-1795 inc
953	W-LLC-UO-R	Hogan 1	1384± p-1622 + inc G
954	W-LLC-UO-R	Hogan 1	1498± p-1804 + inc
955	W-LLC-UO-R	Sweathouse	1380± p-1672 +
2407	W-LLC-UO-TT	Hogan 3	1626± p-1877 inc
404	W-LLC-UO-V	Hogan 1	1683± p-1809 +
408	W-LLC-UO-V	Hogan 5	1630± p-1808 +
2224	W-LLC-UO-X	Hogan 3	1529± p-1743 + inc
2265	W-LLC-WE-H	Sweathouse 5	1680 fc-1867 + G
2296	W-LLC-WE-K	Hogan 2	1687 p-1900 + inc
2297	W-LLC-WE-K	Windbreak 3	1820± p-1935 c G B
2298	W-LLC-WE-K	Windbreak 4	1813± p-1939 inc G
2299	W-LLC-WE-K	Windbreak 4	1838 p-1935 inc G
2301	W-LLC-WE-K	Windbreak 5	1725± p-1935 inc G
2302	W-LLC-WE-K	Windbreak 6	1843± p-1935 inc G
2304	W-LLC-WE-M	Hogan 6	1740± p-1921 + inc G
2293	W-LLC-WE-O	House 1	1601± p-1850 + inc

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199	W-CH-LC-A	Hogan 1	1831 p-1921 G
3581	W-CH-UC-I	Room 1	1630 fc-1745 + inc
3582	W-CH-UC-I	Room 1	1615± p-1741 +
3584	W-CH-UC-I	Room 1	1650 p-1758 inc
3586	W-CH-UC-I	Room 1	1608± p-1761 inc
3587	W-CH-UC-I	Room 2	1610 nc-1761 inc
3588	W-CH-UC-I	Room 2	1673 p-1761 inc
3592	W-CH-UC-I	Room 3	1595± p-1752 + inc
3593	W-CH-UC-I	Room 3	1610 nc-1755 + inc
3594	W-CH-UC-I	Room 3	1605 p-1754 + inc G B
3595	W-CH-UC-I	Room 3	1649 p-1752 +
3596	W-CH-UC-I	Room 3	1579 nc-1760 inc
3602	W-CH-UC-I	Room 4	1626± p-1761 inc
3603	W-CH-UC-I	Room 4	1610 nc-1751 inc
3604	W-CH-UC-I	Room 5	1599 p-1757 inc

Explanation of symbols used with dates: p—pith ring; nc—indicates that the pith was gone from the specimen and that the inside dated ring is "near center"; fc—used when the pith is gone from the specimen and the inside dated ring is determined to be quite far out from the pith; ±—center portion is difficult to date and this symbol indicates a ring count only; +—indicates that either the outermost rings are very small and a ring count only could be made to the outside, or that the outermost dated ring is one just preceding what is usually a small, micro or absent ring which may be missing from the specimen; inc—indicates that the outside ring of a specimen is incomplete in growth; c—outermost ring is complete in growth; C—outermost ring is continuous around the circumference of the specimen, implying that the date is close to the cutting date; G—beetle galleries present; B—bark present on the specimen.

TABLE 3. Indices for the Havasu Canyon Area. These were derived from six hogan specimens and four modern specimens.

A.D.	0	1	2	3	4	5	6	7	8	9
1620.....	.....	.....	.....	.....	.....	.....	.....	102	88	106
1630.....	113	112	75	98	106	150	120	112	98	101
1640.....	128	123	120	112	118	143	92	106	90	112
1650.....	91	104	101	75	52	104	147	131	82	81
1660.....	118	107	119	116	94	82	95	80	56	69
1670.....	42	60	110	97	125	85	85	103	108	93
1680.....	145	152	135	154	103	82	74	125	124	125
1690.....	127	123	158	118	108	139	115	105	112	115
1700.....	90	108	85	51	71	124	116	67	83	103
1710.....	130	99	136	135	105	93	91	98	146	116
1720.....	154	91	57	117	78	100	127	91	99	68
1730.....	94	112	141	107	114	46	100	74	130	34
1740.....	68	108	51	128	103	165	156	124	65	145
1750.....	71	73	64	57	70	82	93	89	113	103
1760.....	109	82	110	78	128	78	89	72	79	78
1770.....	72	110	83	56	71	103	94	118	71	99
1780.....	104	111	89	134	176	77	98	135	71	96
1790.....	73	113	101	104	59	98	80	64	70	85
1800.....	62	55	87	64	98	47	61	62	44	73
1810.....	46	87	80	24	55	52	108	74	84	90
1820.....	20	64	35	77	96	107	113	102	136	89
1830.....	102	126	89	137	125	126	99	126	143	168
1840.....	144	128	117	151	176	107	119	48	142	161
1850.....	156	106	139	129	135	118	81	43	110	66
1860.....	75	77	132	69	91	108	144	144	169	110
1870.....	79	51	41	49	114	96	77	94	65	28
1880.....	42	43	61	70	102	114	110	88	110	121
1890.....	169	129	137	108	74	134	75	124	122	14
1900.....	41	69	33	107	22	139	174	220	193	157
1910.....	155	159	124	86	124	117	157	139	98	121
1920.....	132	70	91	104	98	109	122	114	106	44
1930.....	112	69	102	82	86	120	68	121	123	66
1940.....	133	143	134	121	122	102	84	46	79	118
1950.....	68	16	144	148	102	121	37	.....	.....	.....

TABLE 4. Indices for Navajo Mountain area. These were derived from four hogan specimens and three modern specimens.

A.D.	0	1	2	3	4	5	6	7	8	9
1590.....	.....	.....	.....	.....	.....	.....	104	107	108	106
1600.....	24	78	132	174	166	124	125	70	92	96
1610.....	87	64	60	40	88	110	132	88	97	97
1620.....	133	134	114	36	57	79	29	87	50	72
1630.....	62	83	43	71	83	110	68	57	56	109
1640.....	131	113	101	100	120	84	101	121	42	87
1650.....	96	125	99	108	15	120	104	114	60	100
1660.....	115	155	106	102	97	68	107	74	58	51
1670.....	30	97	99	115	131	98	95	107	88	68
1680.....	130	121	92	107	76	01	88	147	126	133
1690.....	81	96	152	116	68	97	75	102	104	100
1700.....	90	150	80	43	102	108	104	71	82	112
1710.....	131	109	120	133	146	116	126	107	122	126
1720.....	169	149	74	140	106	143	151	126	67	68
1730.....	82	103	133	70	106	33	121	79	105	90
1740.....	61	126	96	155	110	130	152	124	37	138
1750.....	101	124	74	49	136	74	91	79	143	142
1760.....	150	122	103	87	153	62	140	148	130	77
1770.....	90	130	79	14	94	81	92	122	65	91
1780.....	68	97	138	142	176	102	118	148	83	74
1790.....	40	98	110	134	89	130	87	86	118	104
1800.....	103	69	94	78	101	102	53	117	62	103
1810.....	77	122	115	46	107	105	134	94	70	61
1820.....	58	111	18	54	70	92	147	71	143	70
1830.....	178	138	106	145	114	125	94	123	123	134
1840.....	146	126	73	124	132	40	132	19	123	132
1850.....	131	77	168	97	110	109	99	57	96	80
1860.....	73	08	113	76	34	109	99	96	142	104

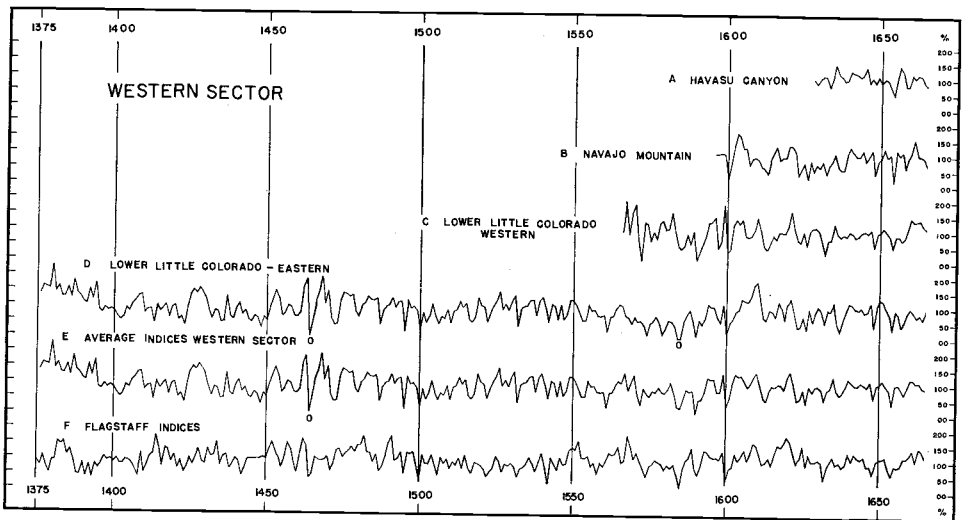


FIG. 2. Standardized indices for the Western Sector. The Flagstaff indices (Douglass 1947) are given for comparison. Locally absent rings are indicated by zeros.

TABLE 4. (Continued)

A.D.	0	1	2	3	4	5	6	7	8	9
1870.....	51	95	111	60	102	80	87	148	119	67
1880.....	67	40	35	22	101	99	93	61	90	111
1890.....	138	110	150	120	84	94	27	113	101	00
1900.....	46	69	07	93	06	122	124	137	115	131
1910.....	151	147	145	118	152	125	108	131	86	118
1920.....	134	55	133	146	131	139	140	147	136	120
1930.....	105	96	91	54	109	94	86	128	105	97
1940.....	84	151	119	45	100	72	11	51	103	113
1950.....	69	06	127	100	91	.....	.....	.....	.....	.....

TABLE 5. Indices for the western half of the Lower Little Colorado area. These were derived from six hogan specimens and three modern specimens.

A.D.	0	1	2	3	4	5	6	7	8	9
1560.....	.....	.....	.....	.....	.....	.....	99	198	89	161
1570.....	189	74	06	131	129	69	100	75	129	137
1580.....	106	109	163	103	53	43	53	93	61	102
1590.....	07	35	59	87	131	133	149	47	70	189
1600.....	34	43	123	142	128	142	89	84	88	108
1610.....	148	104	55	43	66	92	78	102	100	98
1620.....	122	170	114	76	68	103	57	106	117	116
1630.....	106	66	28	76	77	130	98	87	95	88
1640.....	105	99	85	93	102	107	99	111	53	100
1650.....	106	117	103	91	50	89	91	74	86	116
1660.....	150	137	140	144	123	115	85	60	54	86
1670.....	23	71	94	114	122	61	51	104	100	82
1680.....	105	107	99	106	56	60	60	90	111	129
1690.....	138	143	162	166	119	140	127	105	121	135
1700.....	70	112	93	46	74	107	79	89	67	100
1710.....	100	103	117	90	82	72	68	114	142	129
1720.....	157	127	77	95	67	96	132	110	83	68
1730.....	85	88	144	59	85	51	100	52	96	50
1740.....	83	123	47	151	114	164	173	163	53	159
1750.....	88	103	52	70	97	107	133	141	112	116
1760.....	107	80	91	48	155	95	140	109	108	88

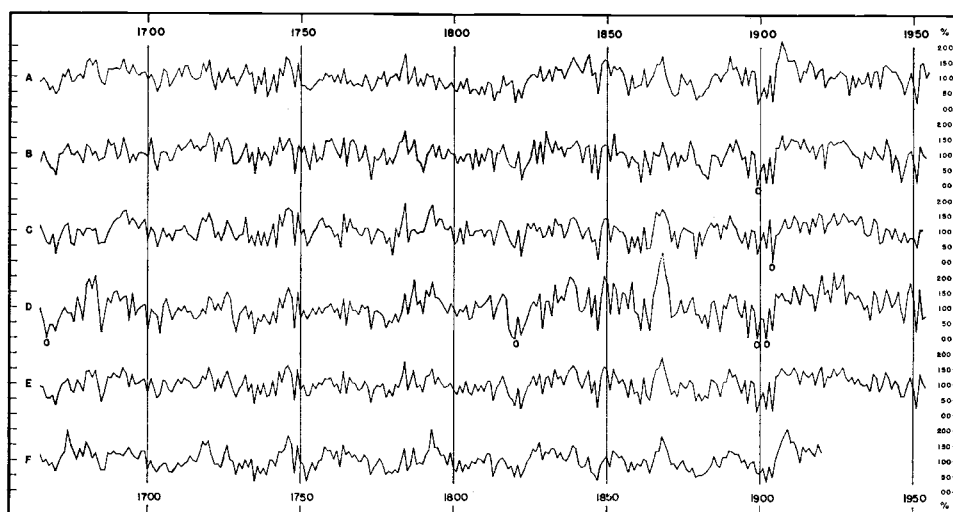


FIG. 2. (Continued)

TABLE 5. (Continued)

A.D.	0	1	2	3	4	5	6	7	8	9
1770.....	84	109	109	58	84	108	100	96	59	78
1780.....	20	111	80	134	190	65	102	107	92	98
1790.....	99	135	166	185	116	140	140	108	106	117
1800.....	58	69	111	58	134	88	86	102	103	108
1810.....	78	104	105	54	99	136	130	102	76	57
1820.....	45	107	20	79	127	109	129	101	115	79
1830.....	89	120	84	143	122	124	78	103	141	147
1840.....	136	106	72	100	113	67	74	09	112	142
1850.....	144	63	120	114	100	99	82	29	84	48
1860.....	82	34	116	43	47	103	164	151	172	158
1870.....	128	66	102	43	97	113	106	102	96	11
1880.....	98	63	88	111	129	114	126	74	123	108
1890.....	152	127	112	79	61	98	42	104	102	25
1900.....	66	98	45	140	00	85	94	113	141	109
1910.....	116	150	136	97	132	129	91	144	113	159
1920.....	153	95	128	135	159	121	135	159	149	131
1930.....	138	120	140	150	95	85	90	143	130	60
1940.....	67	111	106	72	112	77	66	97	63	79
1950.....	73	43	104	104	.....	.....	.....	.....	.....	.....

TABLE 6. Indices for the eastern half of the Lower Little Colorado area. These were derived from six hogan specimens and three modern specimens.

A.D.	0	1	2	3	4	5	6	7	8	9
1370.....	.....	.....	.....	.....	.....	.....	135	159	155	153
1380.....	226	141	160	126	125	155	119	179	135	126
1390.....	108	102	149	115	168	82	73	90	80	86
1400.....	78	60	48	59	90	78	103	112	128	133
1410.....	72	84	86	39	100	78	88	100	57	93
1420.....	98	50	60	32	92	131	150	139	157	142
1430.....	123	82	54	84	79	44	47	130	65	54
1440.....	90	107	70	82	53	46	68	59	27	64
1450.....	52	92	122	149	124	65	78	103	96	66
1460.....	65	78	163	188	00	54	114	144	196	107
1470.....	154	62	38	42	118	144	140	131	136	81
1480.....	66	102	110	133	122	120	124	39	86	100

TABLE 6. (Continued)

A.D.	0	1	2	3	4	5	6	7	8	9
1490.....	104	127	95	114	117	14	122	94	100	86
1500.....	21	81	46	66	108	68	44	68	60	92
1510.....	44	86	92	119	96	112	58	49	66	131
1520.....	105	99	50	83	106	120	150	90	110	88
1530.....	118	138	36	96	102	104	122	124	72	122
1540.....	134	96	51	110	104	58	109	60	78	125
1550.....	123	109	82	57	59	110	91	93	74	73
1560.....	75	23	71	74	99	112	107	75	69	49
1570.....	72	56	58	45	11	50	58	75	53	12
1580.....	35	60	57	41	01	00	57	77	95	59
1590.....	07	63	45	68	115	105	105	73	54	114
1600.....	18	54	66	92	97	131	126	121	139	177
1610.....	189	129	71	62	97	92	75	125	106	64
1620.....	119	132	85	39	43	76	33	101	58	88
1630.....	109	92	53	98	92	123	51	26	64	96
1640.....	123	116	103	99	108	89	93	121	37	108
1650.....	135	128	103	83	33	100	83	42	62	88
1660.....	105	92	74	84	69	97	56	00	41	43
1670.....	21	58	82	97	80	80	48	134	101	54
1680.....	170	190	159	201	117	19	78	129	112	147
1690.....	152	118	132	136	55	145	72	94	103	109
1700.....	20	94	80	73	14	104	128	91	59	81
1710.....	98	87	103	84	88	65	62	74	95	79
1720.....	135	124	88	114	90	132	149	130	54	19
1730.....	79	89	105	61	90	13	66	52	77	58
1740.....	44	88	48	131	97	138	163	135	32	151
1750.....	66	93	62	78	99	78	101	81	100	102
1760.....	113	84	98	62	128	42	122	91	91	78
1770.....	111	96	106	27	86	90	83	73	34	59
1780.....	52	80	52	83	149	79	127	190	113	125
1790.....	81	160	137	185	135	132	119	101	82	115
1800.....	100	71	97	88	109	61	69	123	104	105
1810.....	116	126	142	63	104	126	146	134	33	06
1820.....	00	72	11	42	70	106	122	106	147	32
1830.....	124	124	75	177	116	140	126	172	203	193
1840.....	168	93	89	108	169	69	141	27	131	206
1850.....	181	79	183	162	79	151	145	97	187	92
1860.....	81	27	133	76	26	136	181	238	280	208
1870.....	173	70	76	90	128	86	87	121	138	78
1880.....	81	49	81	33	115	125	74	24	114	99
1890.....	148	133	143	90	70	125	06	114	94	00
1900.....	64	66	00	100	27	148	134	150	127	127
1910.....	114	172	143	111	176	157	142	144	90	150
1920.....	208	144	160	116	218	163	175	210	110	154
1930.....	144	129	142	121	95	109	62	156	138	83
1940.....	102	163	134	101	118	154	88	53	144	182
1950.....	127	21	161	66	72	.....	.....	.....	.....	.....

TABLE 7. Western Sector indices. Average of areal indices from the Havasu Canyon area, Navajo Mountain area, and the eastern and western divisions of the Lower Little Colorado area. The period of 1376 to 1566 is represented by only one group—the eastern half.

A.D.	0	1	2	3	4	5	6	7	8	9
1370.....	.....	.....	.....	.....	.....	.....	135	159	155	153
1380.....	226	141	160	126	125	155	119	179	135	126
1390.....	108	102	149	115	168	82	73	90	80	86
1400.....	78	60	48	59	90	78	103	112	128	133
1410.....	72	84	86	39	100	78	88	100	57	93
1420.....	98	50	60	32	92	131	150	139	157	142
1430.....	123	82	54	84	79	44	47	130	65	54
1440.....	90	107	70	82	53	46	68	59	27	64
1450.....	52	92	122	149	124	65	78	103	96	66
1460.....	65	78	163	188	00	54	114	144	196	107
1470.....	154	62	38	42	118	144	140	131	136	81

TABLE 7. (Continued)

A.D.	0	1	2	3	4	5	6	7	8	9
1480.....	66	102	110	133	122	120	124	39	86	100
1490.....	104	127	95	114	117	14	122	94	100	86
1500.....	21	81	46	66	108	68	44	68	60	92
1510.....	44	86	92	119	96	112	58	49	66	131
1520.....	105	99	50	83	106	120	150	90	110	88
1530.....	118	138	36	96	102	104	122	124	72	122
1540.....	134	96	51	110	104	58	109	60	78	125
1550.....	123	109	82	57	59	110	91	93	74	73
1560.....	75	23	71	74	99	112	103	136	79	105
1570.....	131	65	32	88	70	60	79	75	91	75
1580.....	71	85	110	72	27	22	55	85	78	80
1590.....	07	49	52	78	123	119	119	76	77	136
1600.....	25	58	107	136	130	132	113	92	106	127
1610.....	141	99	62	48	84	98	95	105	101	86
1620.....	125	145	104	50	56	86	40	99	78	96
1630.....	98	88	50	86	90	128	84	70	78	98
1640.....	122	113	102	101	112	106	96	115	56	102
1650.....	107	118	102	89	38	103	106	90	72	96
1660.....	122	123	110	112	96	90	86	54	52	62
1670.....	29	72	96	106	115	81	70	112	99	74
1680.....	138	143	121	142	88	40	75	123	118	134
1690.....	125	120	151	134	88	130	97	102	110	115
1700.....	68	116	85	53	65	111	107	80	73	99
1710.....	115	100	119	111	105	87	87	98	126	113
1720.....	154	123	74	117	85	118	140	114	76	56
1730.....	85	98	131	74	99	36	97	64	102	58
1740.....	64	111	61	141	106	149	161	137	47	148
1750.....	82	98	63	64	101	85	104	98	117	116
1760.....	120	92	101	69	141	69	123	105	102	80
1770.....	89	111	94	39	84	96	92	102	57	82
1780.....	61	99	90	123	173	81	111	145	90	98
1790.....	73	126	129	152	100	125	106	90	94	105
1800.....	81	66	97	72	111	75	67	101	78	97
1810.....	79	110	111	47	91	105	130	101	66	54
1820.....	31	89	21	63	91	104	130	95	135	68
1830.....	123	127	89	151	119	129	99	131	152	161
1840.....	149	113	88	121	148	71	116	26	127	160
1850.....	153	81	152	126	106	119	102	57	119	72
1860.....	78	36	124	66	50	114	147	157	191	145
1870.....	108	70	83	61	110	94	89	116	105	46
1880.....	72	49	66	59	118	113	101	62	109	110
1890.....	152	125	136	99	72	113	38	114	105	10
1900.....	54	76	21	110	14	124	132	155	144	131
1910.....	134	157	137	103	146	132	125	140	97	137
1920.....	158	91	128	125	152	133	143	158	125	112
1930.....	125	104	119	102	96	102	77	137	124	76
1940.....	97	142	123	85	113	101	62	62	97	123
1950.....	84	22	134	105	88	121	37

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