[] Dendrochronology Program Library Run 77 Program COF 10:40 Tue 15 Mar 2011 Page 1

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[] P R O G R A M C O F E C H A Version 6.06P 27834

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

File of DATED series: 77\_MAN

CONTENTS:

Part 1: Title page, options selected, summary, absent rings by series

Part 2: Histogram of time spans

Part 3: Master series with sample depth and absent rings by year

Part 4: Bar plot of Master Dating Series

Part 5: Correlation by segment of each series with Master

Part 6: Potential problems: low correlation, divergent year-to-year changes, absent rings, outliers

Part 7: Descriptive statistics

RUN CONTROL OPTIONS SELECTED VALUE

1 Cubic smoothing spline 50% wavelength cutoff for filtering

32 years

2 Segments examined are 50 years lagged successively by 25 years

3 Autoregressive model applied A Residuals are used in master dating series and testing

4 Series transformed to logarithms Y Each series log-transformed for master dating series and testing

5 CORRELATION is Pearson (parametric, quantitative)

Critical correlation, 99% confidence level .3281

6 Master dating series saved N

7 Ring measurements listed N

8 Parts printed 1234567

9 Absent rings are omitted from master series and segment correlations (Y)

Time span of Master dating series is 1744 to 2010 267 years

Continuous time span is 1744 to 2010 267 years

Portion with two or more series is 1767 to 2010 244 years

>> 332A 1842 absent in 1 of 15 series, but is not usually narrow: master index is .146

>> 332A 1843 absent in 1 of 15 series, but is not usually narrow: master index is -.300

>> 332A 1845 absent in 1 of 15 series, but is not usually narrow: master index is .148

>> 332A 1870 absent in 2 of 17 series, but is not usually narrow: master index is -.377

>> 332A 1871 absent in 2 of 17 series, but is not usually narrow: master index is .076

>> 332A 1872 absent in 1 of 17 series, but is not usually narrow: master index is .213

>> 334A 1832 absent in 1 of 14 series, but is not usually narrow: master index is -.228

>> 334B 1870 absent in 2 of 17 series, but is not usually narrow: master index is -.377

>> 334B 1871 absent in 2 of 17 series, but is not usually narrow: master index is .076

>> 341B 2009 absent in 3 of 28 series, but is not usually narrow: master index is 1.555

>> 341B 2010 absent in 5 of 28 series, but is not usually narrow: master index is .550

>> 417B 1927 absent in 1 of 25 series, but is not usually narrow: master index is .322

>> 417B 1928 absent in 1 of 25 series, but is not usually narrow: master index is .317

>> 417B 1929 absent in 1 of 25 series, but is not usually narrow: master index is -.131

>> 417B 1931 absent in 1 of 25 series, but is not usually narrow: master index is .262

>> 417B 1932 absent in 1 of 25 series, but is not usually narrow: master index is .873

>> 417B 1933 absent in 1 of 25 series, but is not usually narrow: master index is -.089

>> 417B 1934 absent in 1 of 25 series, but is not usually narrow: master index is 1.234

>> 417B 1938 absent in 1 of 25 series, but is not usually narrow: master index is .257

>> 417B 1939 absent in 1 of 25 series, but is not usually narrow: master index is .307

>> 417B 1941 absent in 1 of 25 series, but is not usually narrow: master index is .764

>> 417B 1942 absent in 1 of 26 series, but is not usually narrow: master index is .031

>> 417B 1944 absent in 2 of 26 series, but is not usually narrow: master index is -.168

>> 417B 1945 absent in 2 of 27 series, but is not usually narrow: master index is .273

>> 417B 1946 absent in 2 of 28 series, but is not usually narrow: master index is .417

>> 417B 1947 absent in 2 of 28 series, but is not usually narrow: master index is .736

>> 417B 1949 absent in 2 of 28 series, but is not usually narrow: master index is .664

>> 417B 1950 absent in 2 of 28 series, but is not usually narrow: master index is .081

>> 417B 1951 absent in 2 of 28 series, but is not usually narrow: master index is .379

>> 417B 1952 absent in 2 of 28 series, but is not usually narrow: master index is .977

>> 417B 1953 absent in 2 of 28 series, but is not usually narrow: master index is .495

>> 417B 1954 absent in 2 of 28 series, but is not usually narrow: master index is .603

>> 417B 1955 absent in 1 of 28 series, but is not usually narrow: master index is 1.563

>> 417B 1957 absent in 1 of 28 series, but is not usually narrow: master index is .751

>> 417B 1958 absent in 1 of 28 series, but is not usually narrow: master index is 1.576

>> 417B 1959 absent in 1 of 28 series, but is not usually narrow: master index is .150

>> 418A 2007 absent in 2 of 28 series, but is not usually narrow: master index is .879

>> 418A 2008 absent in 2 of 28 series, but is not usually narrow: master index is .796

>> 418A 2009 absent in 3 of 28 series, but is not usually narrow: master index is 1.555

>> 418A 2010 absent in 5 of 28 series, but is not usually narrow: master index is .550

>> 418B 2007 absent in 2 of 28 series, but is not usually narrow: master index is .879

>> 418B 2008 absent in 2 of 28 series, but is not usually narrow: master index is .796

>> 418B 2009 absent in 3 of 28 series, but is not usually narrow: master index is 1.555

>> 418B 2010 absent in 5 of 28 series, but is not usually narrow: master index is .550

>> 419A 1944 absent in 2 of 26 series, but is not usually narrow: master index is -.168

>> 419A 1945 absent in 2 of 27 series, but is not usually narrow: master index is .273

>> 419A 1946 absent in 2 of 28 series, but is not usually narrow: master index is .417

>> 419A 1947 absent in 2 of 28 series, but is not usually narrow: master index is .736

>> 419A 1949 absent in 2 of 28 series, but is not usually narrow: master index is .664

>> 419A 1950 absent in 2 of 28 series, but is not usually narrow: master index is .081

>> 419A 1951 absent in 2 of 28 series, but is not usually narrow: master index is .379

>> 419A 1952 absent in 2 of 28 series, but is not usually narrow: master index is .977

>> 419A 1953 absent in 2 of 28 series, but is not usually narrow: master index is .495

>> 419A 1954 absent in 2 of 28 series, but is not usually narrow: master index is .603

>> 419A 2010 absent in 5 of 28 series, but is not usually narrow: master index is .550

>> 419B 2010 absent in 5 of 28 series, but is not usually narrow: master index is .550

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*C\* Number of dated series 28 \*C\*

\*O\* Master series 1744 2010 267 yrs \*O\*

\*F\* Total rings in all series 4416 \*F\*

\*E\* Total dated rings checked 4393 \*E\*

\*C\* Series intercorrelation .550 \*C\*

\*H\* Average mean sensitivity .254 \*H\*

\*A\* Segments, possible problems 8 \*A\*

\*\*\* Mean length of series 157.7 \*\*\*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ABSENT RINGS listed by SERIES: (See Master Dating Series for absent rings listed by year)

332A 12 absent rings: 1829 1841 1842 1843 1844 1845 1868 1869 1870 1871 1872 1873

334A 2 absent rings: 1820 1832

334B 4 absent rings: 1869 1870 1871 1873

341A 1 absent rings: 2004

341B 3 absent rings: 1873 2009 2010

416A 1 absent rings: 1940

417B 34 absent rings: 1917 1927 1928 1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939 1940 1941

1942 1943 1944 1945 1946 1947 1948 1949 1950 1951 1952 1953 1954 1955 1956 1957

1958 1959

418A 6 absent rings: 2005 2006 2007 2008 2009 2010

418B 4 absent rings: 2007 2008 2009 2010

419A 12 absent rings: 1944 1945 1946 1947 1948 1949 1950 1951 1952 1953 1954 2010

419B 1 absent rings: 2010

80 absent rings 1.812%

PART 2: TIME PLOT OF TREE-RING SERIES: 10:40 Tue 15 Mar 2011 Page 2

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1050 1100 1150 1200 1250 1300 1350 1400 1450 1500 1550 1600 1650 1700 1750 1800 1850 1900 1950 2000 2050 Ident Seq Time-span Yrs

: : : : : : : : : : : : : : : : : : : : : -------- --- ---- ---- ----

. . . . . . . . . . . . . . . <=====================> . 332A 1 1793 2010 218

. . . . . . . . . . . . . . . . . <=============> . 332B 2 1875 2010 136

. . . . . . . . . . . . . . . . . <============> . 333A 3 1886 2010 125

. . . . . . . . . . . . . . . . <==================> . 333B 4 1821 2010 190

. . . . . . . . . . . . . . . <====================> . 334A 5 1804 2010 207

. . . . . . . . . . . . . . . . <==================> . 334B 6 1820 2010 191

. . . . . . . . . . . . . . . . . . <======> . 335A 7 1945 2010 66

. . . . . . . . . . . . . . . . . . <========> . 336A 8 1924 2010 87

. . . . . . . . . . . . . . . . . .<=========> . 336B 9 1918 2010 93

. . . . . . . . . . . . . . . . . . <======> . 337A 10 1942 2010 69

. . . . . . . . . . . . . . . . . <==========> . 337B 11 1903 2010 108

. . . . . . . . . . . . . . . . <===============> . 338A 12 1857 2010 154

. . . . . . . . . . . . . . . . . <============> . 338B 13 1881 2010 130

. . . . . . . . . . . . . . . . <=================> . 339A 14 1838 2010 173

. . . . . . . . . . . . . . . . <==================> . 339B 15 1822 2010 189

. . . . . . . . . . . . . . . . . . <========> . 340A 16 1925 2010 86

. . . . . . . . . . . . . . . . . . <======> . 340B 17 1946 2010 65

. . . . . . . . . . . . . . . . <=================> . 341A 18 1830 2010 181

. . . . . . . . . . . . . . . . <==================> . 341B 19 1827 2010 184

. . . . . . . . . . . . . . . . <==================> . 416A 20 1822 2010 189

. . . . . . . . . . . . . . . . <==================> . 416B 21 1823 2010 188

. . . . . . . . . . . . . . . <======================> . 417A 22 1781 2010 230

. . . . . . . . . . . . . . <==========================> . 417B 23 1744 2010 267

. . . . . . . . . . . . . . .<========================> . 418A 24 1767 2010 244

. . . . . . . . . . . . . . . . <===============> . 418B 25 1856 2010 155

. . . . . . . . . . . . . . . <====================> . 419A 26 1803 2010 208

. . . . . . . . . . . . . . . .<===================> . 419B 27 1813 2010 198

. . . . . . . . . . . . . . . . . . <========> . 335B 28 1926 2010 85

: : : : : : : : : : : : : : : : : : : : :

1050 1100 1150 1200 1250 1300 1350 1400 1450 1500 1550 1600 1650 1700 1750 1800 1850 1900 1950 2000 2050

PART 3: Master Dating Series: 10:40 Tue 15 Mar 2011 Page 3

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Year Value No Ab Year Value No Ab Year Value No Ab Year Value No Ab Year Value No Ab Year Value No Ab

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1750 .063 1 1800 .420 4 1850 -.351 15 1900 .808 20 1950 .081 28 2<<

1751 -.402 1 1801 2.110 4 1851 .630 15 1901 .224 20 1951 .379 28 2<<

1752 -.275 1 1802 .167 4 1852 -.782 15 1902 .217 20 1952 .977 28 2<<

1753 .221 1 1803 .654 5 1853 .317 15 1903 .633 21 1953 .495 28 2<<

1754 .892 1 1804 .264 6 1854 .071 15 1904 1.901 21 1954 .603 28 2<<

1755 -2.042 1 1805 .786 6 1855 .391 15 1905 1.431 21 1955 1.563 28 1<<

1756 -.054 1 1806 -1.042 6 1856 .613 16 1906 .992 21 1956 -.925 28 1

1757 -2.096 1 1807 2.240 6 1857 .290 17 1907 .559 21 1957 .751 28 1<<

1758 -1.812 1 1808 .469 6 1858 .994 17 1908 .521 21 1958 1.576 28 1<<

1759 -1.009 1 1809 -2.177 6 1859 .803 17 1909 -.524 21 1959 .150 28 1<<

1760 .304 1 1810 -.616 6 1860 1.041 17 1910 .862 21 1960 -.605 28

1761 1.851 1 1811 .490 6 1861 .525 17 1911 -1.892 21 1961 .655 28

1762 .131 1 1812 -.021 6 1862 .920 17 1912 -.089 21 1962 -.542 28

1763 1.210 1 1813 .152 7 1863 .308 17 1913 .669 21 1963 -.216 28

1764 1.621 1 1814 -2.794 7 1864 -.703 17 1914 -.242 21 1964 -.121 28

1765 2.202 1 1815 -.007 7 1865 -.446 17 1915 -.074 21 1965 -.914 28

1766 -.006 1 1816 .577 7 1866 -.715 17 1916 .599 21 1966 -1.119 28

1767 -1.227 2 1817 .745 7 1867 -.260 17 1917 -1.357 21 1 1967 -1.281 28

1768 1.093 2 1818 -1.051 7 1868 -.933 17 1 1918 -1.061 22 1968 -1.401 28

1769 .245 2 1819 -.455 7 1869 -2.285 17 2 1919 -.016 22 1969 -.243 28

1770 -.953 2 1820 -1.718 8 1 1870 -.377 17 2<< 1920 -.165 22 1970 1.053 28

1771 -1.661 2 1821 -.966 9 1871 .076 17 2<< 1921 .549 22 1971 1.496 28

1772 -2.465 2 1822 -.015 11 1872 .213 17 1<< 1922 -.104 22 1972 .519 28

1773 1.636 2 1823 -.006 12 1873 -.720 17 3 1923 -.635 22 1973 .892 28

1774 -.177 2 1824 -.117 12 1874 .209 17 1924 1.782 23 1974 -.779 28

1775 -.413 2 1825 .974 12 1875 .461 18 1925 -1.027 24 1975 -.503 28

1776 -.803 2 1826 .752 12 1876 -.803 18 1926 .648 25 1976 -1.494 28

1777 1.276 2 1827 .627 13 1877 -1.395 18 1927 .322 25 1<< 1977 -1.867 28

1778 1.578 2 1828 -.922 13 1878 -.070 18 1928 .317 25 1<< 1978 .083 28

1779 1.363 2 1829 -1.433 13 1 1879 -.253 18 1929 -.131 25 1<< 1979 .792 28

1780 -1.270 2 1830 .327 14 1880 .590 18 1930 -.414 25 1 1980 1.257 28

1781 -1.016 3 1831 -.951 14 1881 .453 19 1931 .262 25 1<< 1981 .563 28

1782 -.371 3 1832 -.228 14 1<< 1882 .088 19 1932 .873 25 1<< 1982 .825 28

1783 -.930 3 1833 1.068 14 1883 -.263 19 1933 -.089 25 1<< 1983 .487 28

1784 1.105 3 1834 .510 14 1884 .172 19 1934 1.234 25 1<< 1984 .002 28

1785 1.172 3 1835 .700 14 1885 -.314 19 1935 -2.333 25 1 1985 -.029 28

1786 1.282 3 1836 1.335 14 1886 1.224 20 1936 -1.421 25 1 1986 -1.225 28

1787 .719 3 1837 .783 14 1887 -.171 20 1937 -1.447 25 1 1987 .606 28

1788 -.060 3 1838 .047 15 1888 .680 20 1938 .257 25 1<< 1988 .405 28

1789 -.275 3 1839 .059 15 1889 .613 20 1939 .307 25 1<< 1989 .123 28

1790 -2.220 3 1840 .652 15 1890 .591 20 1940 -1.221 25 2 1990 .107 28

1791 -.319 3 1841 -.744 15 1 1891 .061 20 1941 .764 25 1<< 1991 .503 28

1792 -1.659 3 1842 .146 15 1<< 1892 .702 20 1942 .031 26 1<< 1992 .853 28

1793 .541 4 1843 -.300 15 1<< 1893 -1.875 20 1943 -.612 26 1 1993 1.367 28

1744 .056 1 1794 -.614 4 1844 -2.250 15 1 1894 -1.047 20 1944 -.168 26 2<< 1994 .154 28

1745 -1.587 1 1795 -.775 4 1845 .148 15 1<< 1895 -1.006 20 1945 .273 27 2<< 1995 .471 28

1746 1.732 1 1796 .928 4 1846 1.146 15 1896 -.827 20 1946 .417 28 2<< 1996 -1.396 28

1747 -1.824 1 1797 1.465 4 1847 -.361 15 1897 -1.215 20 1947 .736 28 2<< 1997 -.802 28

1748 .929 1 1798 -.460 4 1848 1.068 15 1898 -.406 20 1948 -1.528 28 2 1998 -.637 28

1749 3.761 1 1799 -2.027 4 1849 -.718 15 1899 -.087 20 1949 .664 28 2<< 1999 -.101 28

PART 3: Master Dating Series: 10:40 Tue 15 Mar 2011 Page 4

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Year Value No Ab Year Value No Ab Year Value No Ab Year Value No Ab Year Value No Ab Year Value No Ab

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2000 -1.729 28

2001 .047 28

2002 .823 28

2003 -.310 28

2004 -1.635 28 1

2005 -.902 28 1

2006 -.796 28 1

2007 .879 28 2<<

2008 .796 28 2<<

2009 1.555 28 3<<

2010 .550 28 5<<

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PART 4: Master Bar Plot: 10:40 Tue 15 Mar 2011 Page 5

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Year Rel value Year Rel value Year Rel value Year Rel value Year Rel value Year Rel value Year Rel value Year Rel value

1750-----@ 1800------B 1850---a 1900--------C 1950-----@ 2000g

1751---b 1801----------H 1851-------C 1901------A 1951------B 2001-----@

1752---a 1802-----A 1852--c 1902------A 1952---------D 2002--------C

1753------A 1803--------C 1853------A 1903-------C 1953-------B 2003---a

1754---------D 1804------A 1854-----@ 1904----------H 1954-------B 2004g

1755h 1805--------C 1855------B 1905----------F 1955----------F 2005--d

1756----@ 1806-d 1856-------B 1906---------D 1956--d 2006--c

1757h 1807----------I 1857------A 1907-------B 1957--------C 2007---------D

1758g 1808-------B 1858---------D 1908-------B 1958----------F 2008--------C

1759-d 1809i 1859--------C 1909---b 1959-----A 2009----------F

1760------A 1810--b 1860---------D 1910---------C 1960--b 2010-------B

1761----------G 1811-------B 1861-------B 1911h 1961--------C

1762-----A 1812----@ 1862---------D 1912----@ 1962---b

1763---------E 1813-----A 1863------A 1913--------C 1963----a

1764----------F 1814k 1864--c 1914---a 1964----@

1765----------I 1815----@ 1865---b 1915----@ 1965--d

1766----@ 1816-------B 1866--c 1916-------B 1966-d

1767-e 1817--------C 1867---a 1917-e 1967-e

1768---------D 1818-d 1868--d 1918-d 1968-f

1769------A 1819---b 1869i 1919----@ 1969---a

1770-d 1820g 1870---b 1920----a 1970---------D

1771g 1821-d 1871-----@ 1921-------B 1971----------F

1772j 1822----@ 1872------A 1922----@ 1972-------B

1773----------G 1823----@ 1873--c 1923--c 1973---------D

1774----a 1824----@ 1874------A 1924----------G 1974--c

1775---b 1825---------D 1875-------B 1925-d 1975---b

1776--c 1826--------C 1876--c 1926--------C 1976f

1777---------E 1827-------C 1877-f 1927------A 1977g

1778----------F 1828--d 1878----@ 1928------A 1978-----@

1779----------E 1829-f 1879---a 1929----a 1979--------C

1780-e 1830------A 1880-------B 1930---b 1980---------E

1781-d 1831-d 1881-------B 1931------A 1981-------B

1782---a 1832---a 1882-----@ 1932---------C 1982--------C

1783--d 1833---------D 1883---a 1933----@ 1983-------B

1784---------D 1834-------B 1884-----A 1934---------E 1984-----@

1785---------E 1835--------C 1885---a 1935i 1985----@

1786---------E 1836----------E 1886---------E 1936-f 1986-e

1787--------C 1837--------C 1887----a 1937-f 1987-------B

1788----@ 1838-----@ 1888--------C 1938------A 1988------B

1789---a 1839-----@ 1889-------B 1939------A 1989-----@

1790i 1840--------C 1890-------B 1940-e 1990-----@

1791---a 1841--c 1891-----@ 1941--------C 1991-------B

1792g 1842-----A 1892--------C 1942-----@ 1992--------C

1793-------B 1843---a 1893g 1943--b 1993----------E

1744-----@ 1794--b 1844i 1894-d 1944----a 1994-----A

1745f 1795--c 1845-----A 1895-d 1945------A 1995-------B

1746----------G 1796---------D 1846---------E 1896--c 1946------B 1996-f

1747g 1797----------F 1847---a 1897-e 1947--------C 1997--c

1748---------D 1798---b 1848---------D 1898---b 1948f 1998--c

1749----------O 1799h 1849--c 1899----@ 1949--------C 1999----@

PART 5: CORRELATION OF SERIES BY SEGMENTS: 10:40 Tue 15 Mar 2011 Page 5

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Correlations of 50-year dated segments, lagged 25 years

Flags: A = correlation under .3281 but highest as dated; B = correlation higher at other than dated position

Seq Series Time\_span 1750 1775 1800 1825 1850 1875 1900 1925 1950 1975

1799 1824 1849 1874 1899 1924 1949 1974 1999 2024

--- -------- --------- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ----

1 332A 1793 2010 .44 .44 .50 .18B .40 .79 .77 .48 .43

2 332B 1875 2010 .55 .63 .67 .59 .60

3 333A 1886 2010 .78 .78 .67 .58 .56

4 333B 1821 2010 .39 .47 .41 .54 .67 .73 .59 .55

5 334A 1804 2010 .39 .41 .42 .73 .82 .78 .65 .64

6 334B 1820 2010 .20B .29A .22A .59 .81 .80 .56 .49

7 335A 1945 2010 .43 .41 .35

8 336A 1924 2010 .43 .44 .58 .56

9 336B 1918 2010 .46 .53 .62 .71

10 337A 1942 2010 .50 .63 .60

11 337B 1903 2010 .50 .63 .60 .64

12 338A 1857 2010 .48 .47 .48 .50 .49 .47

13 338B 1881 2010 .66 .55 .35 .38 .46

14 339A 1838 2010 .51 .48 .59 .66 .66 .58 .68

15 339B 1822 2010 .41 .36B .46 .68 .67 .58 .56 .45

16 340A 1925 2010 .47 .64 .63

17 340B 1946 2010 .47 .59 .60

18 341A 1830 2010 .48 .47 .58 .70 .69 .61 .62

19 341B 1827 2010 .70 .62 .53 .65 .72 .66 .73

20 416A 1822 2010 .33 .35 .49 .39 .48 .54 .69 .71

21 416B 1823 2010 .52 .54 .72 .63 .75 .74 .55 .60

22 417A 1781 2010 .80 .84 .67 .63 .66 .70 .71 .46 .49

23 417B 1744 2010 .37 .42 .64 .62 .59 .57 .56 .30B .44 .64

24 418A 1767 2010 .36 .44 .67 .60 .46 .54 .76 .82 .62 .46

25 418B 1856 2010 .75 .84 .80 .78 .73 .69

26 419A 1803 2010 .61 .44 .37 .43 .41 .64 .61 .64

27 419B 1813 2010 .52 .51 .37 .36 .47 .60 .65 .58

28 335B 1926 2010 .60 .17B .14B

Av segment correlation .37 .52 .50 .50 .48 .58 .63 .61 .56 .56

PART 6: POTENTIAL PROBLEMS: 10:40 Tue 15 Mar 2011 Page 6

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For each series with potential problems the following diagnostics may appear:

[A] Correlations with master dating series of flagged 50-year segments of series filtered with 32-year spline,

at every point from ten years earlier (-10) to ten years later (+10) than dated

[B] Effect of those data values which most lower or raise correlation with master series

Symbol following year indicates value in series is greater (>) or lesser (<) than master series value

[C] Year-to-year changes very different from the mean change in other series

[D] Absent rings (zero values)

[E] Values which are statistical outliers from mean for the year

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332A 1793 to 2010 218 years Series 1

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

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1850 1899 -2 -.06 -.13 -.13 -.16 -.18 -.11 -.05 -.01 .20\*-.20 .18|-.05 .07 -.02 .12 .06 -.02 -.07 .16 -.15 .00

[B] Entire series, effect on correlation ( .532) is:

Lower 1809> -.016 1876> -.015 1803< -.013 1806> -.012 1877> -.011 1976> -.009 Higher 1935 .041 1911 .019

1850 to 1899 segment:

Lower 1876> -.097 1877> -.066 1897> -.045 1888< -.027 1856< -.018 1886< -.017 Higher 1852 .057 1893 .054

[D] 12 Absent rings: Year Master N series Absent

1829 -1.433 13 1

1841 -.744 15 1

1842 .146 15 1 >> WARNING: Ring is not usually narrow

1843 -.300 15 1 >> WARNING: Ring is not usually narrow

1844 -2.250 15 1

1845 .148 15 1 >> WARNING: Ring is not usually narrow

1868 -.933 17 1

1869 -2.285 17 2

1870 -.377 17 2 >> WARNING: Ring is not usually narrow

1871 .076 17 2 >> WARNING: Ring is not usually narrow

1872 .213 17 1 >> WARNING: Ring is not usually narrow

1873 -.720 17 3

[E] Outliers 3 3.0 SD above or -4.5 SD below mean for year

1809 +3.3 SD; 1876 +3.2 SD; 1877 +3.7 SD

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332B 1875 to 2010 136 years Series 2

[B] Entire series, effect on correlation ( .606) is:

Lower 1925> -.026 1918< -.014 1897< -.013 1988< -.009 1965> -.009 1896> -.007 Higher 1935 .022 1893 .020

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333A 1886 to 2010 125 years Series 3

[B] Entire series, effect on correlation ( .720) is:

Lower 1962> -.014 1970< -.013 1971< -.008 1899< -.006 1966< -.006 1967> -.005 Higher 1893 .013 1948 .013

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333B 1821 to 2010 190 years Series 4

[B] Entire series, effect on correlation ( .567) is:

Lower 1824< -.014 1982< -.013 1841> -.009 1853< -.008 1908< -.008 1917> -.007 Higher 1935 .026 1893 .019

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334A 1804 to 2010 207 years Series 5

[B] Entire series, effect on correlation ( .566) is:

Lower 1814> -.038 1820< -.020 1872< -.008 1832< -.007 1809> -.005 1896> -.005 Higher 1911 .020 1935 .014

[C] Year-to-year changes diverging by over 4.0 std deviations:

1819 1820 -4.2 SD 1820 1821 5.3 SD

[D] 2 Absent rings: Year Master N series Absent

1820 -1.718 8 1

1832 -.228 14 1 >> WARNING: Ring is not usually narrow

[E] Outliers 4 3.0 SD above or -4.5 SD below mean for year

1814 +4.4 SD; 1820 -7.7 SD; 1856 +3.0 SD; 1999 +3.0 SD

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334B 1820 to 2010 191 years Series 6

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

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1820 1869 3 .07 .12 .06 -.05 .02 -.16 -.19 -.11 -.23 .07 .20|-.19 .19 .21\*-.16 .08 .16 -.08 -.05 .18 -.03

1825 1874 0 .10 .22 -.14 -.02 .04 -.16 -.26 -.06 -.35 .04 .29\*-.23 .10 .23 -.13 .14 .11 -.07 .04 .07 -.04

1850 1899 0 .17 -.04 .02 -.21 .10 -.10 .21 -.06 .13 -.15 .22\*-.33 -.01 -.28 -.01 -.13 .19 -.21 .17 -.12 .21

[B] Entire series, effect on correlation ( .544) is:

Lower 1852> -.017 1822< -.012 1849> -.011 1829< -.010 1893> -.010 1831> -.008 Higher 1935 .032 1911 .026

1820 to 1869 segment:

Lower 1852> -.054 1822< -.036 1849> -.034 1831> -.023 1835< -.023 1820> -.019 Higher 1869 .092 1844 .087

1825 to 1874 segment:

Lower 1852> -.065 1849> -.043 1831> -.031 1868> -.023 1835< -.022 1836< -.018 Higher 1869 .084 1844 .078

1850 to 1899 segment:

Lower 1852> -.083 1876> -.035 1893> -.034 1868> -.027 1870< -.027 1894> -.021 Higher 1869 .126 1873 .025

[D] 4 Absent rings: Year Master N series Absent

1869 -2.285 17 2

1870 -.377 17 2 >> WARNING: Ring is not usually narrow

1871 .076 17 2 >> WARNING: Ring is not usually narrow

1873 -.720 17 3

[E] Outliers 2 3.0 SD above or -4.5 SD below mean for year

1852 +3.3 SD; 1894 +3.0 SD

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335A 1945 to 2010 66 years Series 7

[B] Entire series, effect on correlation ( .417) is:

Lower 1945< -.081 1986> -.023 2000> -.022 1980< -.018 1974> -.017 1976> -.013 Higher 1948 .094 1955 .018

[C] Year-to-year changes diverging by over 4.0 std deviations:

1996 1997 -4.0 SD

[E] Outliers 2 3.0 SD above or -4.5 SD below mean for year

1986 +3.2 SD; 1997 -5.5 SD

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336A 1924 to 2010 87 years Series 8

[B] Entire series, effect on correlation ( .504) is:

Lower 1962< -.028 1925> -.026 1951< -.017 2003> -.015 1946< -.015 1931< -.011 Higher 2000 .028 1956 .026

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336B 1918 to 2010 93 years Series 9

[B] Entire series, effect on correlation ( .570) is:

Lower 1946< -.041 1948> -.033 1951< -.022 1962< -.017 1940> -.016 1928< -.016 Higher 1935 .082 2000 .021

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337A 1942 to 2010 69 years Series 10

[B] Entire series, effect on correlation ( .523) is:

Lower 1948> -.065 2003< -.032 1979< -.017 2006> -.014 1949< -.007 1960> -.006 Higher 2000 .016 1971 .015

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337B 1903 to 2010 108 years Series 11

[B] Entire series, effect on correlation ( .564) is:

Lower 1921< -.026 1948> -.017 2006> -.016 1924< -.016 1936> -.015 1925> -.011 Higher 1935 .086 1911 .021

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338A 1857 to 2010 154 years Series 12

[B] Entire series, effect on correlation ( .487) is:

Lower 1972< -.027 1934< -.018 1880< -.017 1869> -.016 1961< -.013 1911> -.013 Higher 1893 .030 1935 .026

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1869 +3.3 SD

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338B 1881 to 2010 130 years Series 13

[B] Entire series, effect on correlation ( .454) is:

Lower 1948> -.022 1955< -.021 1934< -.021 1959< -.019 1988< -.014 1940> -.014 Higher 1911 .041 1917 .019

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1917 -4.7 SD

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339A 1838 to 2010 173 years Series 14

[B] Entire series, effect on correlation ( .609) is:

Lower 1874< -.011 1839< -.010 1953< -.009 1935> -.007 1847> -.007 1867> -.006 Higher 1925 .013 1948 .011

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339B 1822 to 2010 189 years Series 15

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

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1825 1874 -3 -.17 .00 .20 -.11 .07 -.11 .03 .37\*-.33 .00 .36|-.05 .11 .11 -.11 .11 -.08 .08 -.10 -.05 -.02

[B] Entire series, effect on correlation ( .490) is:

Lower 2006< -.025 1872< -.015 1832< -.011 1986> -.010 1844> -.010 2000> -.009 Higher 1917 .013 1911 .013

1825 to 1874 segment:

Lower 1872< -.056 1832< -.038 1844> -.035 1860< -.017 1842< -.016 1843> -.014 Higher 1869 .041 1833 .027

[C] Year-to-year changes diverging by over 4.0 std deviations:

2005 2006 -4.0 SD

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

2006 -5.2 SD

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340A 1925 to 2010 86 years Series 16

[B] Entire series, effect on correlation ( .515) is:

Lower 1931< -.123 1925> -.017 1941< -.010 1996> -.010 2006< -.009 1986> -.008 Higher 1935 .020 2000 .015

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1931 -5.5 SD

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340B 1946 to 2010 65 years Series 17

[B] Entire series, effect on correlation ( .523) is:

Lower 1948> -.035 2004> -.030 1949< -.026 1952< -.020 2006< -.014 1977> -.014 Higher 2000 .042 1996 .031

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341A 1830 to 2010 181 years Series 18

[B] Entire series, effect on correlation ( .569) is:

Lower 1844< -.020 1830< -.018 1917> -.010 1831> -.008 2006> -.008 1897> -.007 Higher 1925 .016 1911 .011

[C] Year-to-year changes diverging by over 4.0 std deviations:

1843 1844 -4.4 SD

[D] 1 Absent rings: Year Master N series Absent

2004 -1.635 28 1

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1844 -7.1 SD

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341B 1827 to 2010 184 years Series 19

[B] Entire series, effect on correlation ( .619) is:

Lower 2009< -.021 1873< -.019 1917> -.012 1888< -.007 1990< -.007 1912< -.006 Higher 1948 .014 1844 .012

[D] 3 Absent rings: Year Master N series Absent

1873 -.720 17 3

2009 1.555 28 3 >> WARNING: Ring is not usually narrow

2010 .550 28 5 >> WARNING: Ring is not usually narrow

>> WARNING: Last ring in series is ABSENT

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1873 -4.8 SD

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416A 1822 to 2010 189 years Series 20

[B] Entire series, effect on correlation ( .483) is:

Lower 1829> -.038 1935> -.021 1893> -.016 1918> -.013 1847> -.011 1939< -.009 Higher 1948 .019 1940 .014

[D] 1 Absent rings: Year Master N series Absent

1940 -1.221 25 2

[E] Outliers 3 3.0 SD above or -4.5 SD below mean for year

1829 +5.4 SD; 1918 +3.5 SD; 1940 -5.8 SD

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416B 1823 to 2010 188 years Series 21

[B] Entire series, effect on correlation ( .630) is:

Lower 1831> -.019 1917> -.015 1956> -.015 2004> -.006 1841> -.005 1999< -.005 Higher 1935 .038 1844 .014

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1869 -5.1 SD

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417A 1781 to 2010 230 years Series 22

[B] Entire series, effect on correlation ( .675) is:

Lower 1976> -.009 1918> -.007 1870< -.007 1850< -.007 1977> -.006 1982< -.005 Higher 1911 .013 1814 .013

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1918 +3.1 SD

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417B 1744 to 2010 267 years Series 23

[\*] Early part of series cannot be checked from 1744 to 1766 -- not matched by another series

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

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1925 1974 -6 -.06 .17 .17 .12 .40\* .12 -.64 .14 .20 -.48 .30| .23 .23 .34 .12 -.29 -.49 -.51 -.40 -.06 .34

[B] Entire series, effect on correlation ( .433) is:

Lower 1780> -.068 1960> -.016 1935> -.011 1771> -.010 1948> -.006 1768< -.006 Higher 1893 .015 1911 .011

1925 to 1974 segment:

Lower 1960> -.085 1958< -.025 1927< -.024 1940> -.022 1948> -.021 1955< -.017 Higher 1925 .040 1974 .035

[C] Year-to-year changes diverging by over 4.0 std deviations:

1779 1780 4.2 SD 1959 1960 4.3 SD

[D] 34 Absent rings: Year Master N series Absent

1917 -1.357 21 1

1927 .322 25 1 >> WARNING: Ring is not usually narrow

1928 .317 25 1 >> WARNING: Ring is not usually narrow

1929 -.131 25 1 >> WARNING: Ring is not usually narrow

1930 -.414 25 1

1931 .262 25 1 >> WARNING: Ring is not usually narrow

1932 .873 25 1 >> WARNING: Ring is not usually narrow

1933 -.089 25 1 >> WARNING: Ring is not usually narrow

1934 1.234 25 1 >> WARNING: Ring is not usually narrow

1935 -2.333 25 1

1936 -1.421 25 1

1937 -1.447 25 1

1938 .257 25 1 >> WARNING: Ring is not usually narrow

1939 .307 25 1 >> WARNING: Ring is not usually narrow

1940 -1.221 25 2

1941 .764 25 1 >> WARNING: Ring is not usually narrow

1942 .031 26 1 >> WARNING: Ring is not usually narrow

1943 -.612 26 1

1944 -.168 26 2 >> WARNING: Ring is not usually narrow

1945 .273 27 2 >> WARNING: Ring is not usually narrow

1946 .417 28 2 >> WARNING: Ring is not usually narrow

1947 .736 28 2 >> WARNING: Ring is not usually narrow

1948 -1.528 28 2

1949 .664 28 2 >> WARNING: Ring is not usually narrow

1950 .081 28 2 >> WARNING: Ring is not usually narrow

1951 .379 28 2 >> WARNING: Ring is not usually narrow

1952 .977 28 2 >> WARNING: Ring is not usually narrow

1953 .495 28 2 >> WARNING: Ring is not usually narrow

1954 .603 28 2 >> WARNING: Ring is not usually narrow

1955 1.563 28 1 >> WARNING: Ring is not usually narrow

1956 -.925 28 1

1957 .751 28 1 >> WARNING: Ring is not usually narrow

1958 1.576 28 1 >> WARNING: Ring is not usually narrow

1959 .150 28 1 >> WARNING: Ring is not usually narrow

[E] Outliers 2 3.0 SD above or -4.5 SD below mean for year

1780 +5.4 SD; 1960 +4.8 SD

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418A 1767 to 2010 244 years Series 24

[B] Entire series, effect on correlation ( .530) is:

Lower 1780< -.051 2004> -.011 1767> -.009 1771< -.007 1770> -.007 1826< -.006 Higher 1935 .034 1814 .009

[D] 6 Absent rings: Year Master N series Absent

2005 -.902 28 1

2006 -.796 28 1

2007 .879 28 2 >> WARNING: Ring is not usually narrow

2008 .796 28 2 >> WARNING: Ring is not usually narrow

2009 1.555 28 3 >> WARNING: Ring is not usually narrow

2010 .550 28 5 >> WARNING: Ring is not usually narrow

>> WARNING: Last ring in series is ABSENT

[E] Outliers 5 3.0 SD above or -4.5 SD below mean for year

1768 +4.0 SD; 1780 -5.4 SD; 1860 +3.3 SD; 1880 +3.0 SD; 2004 +3.1 SD

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418B 1856 to 2010 155 years Series 25

[B] Entire series, effect on correlation ( .707) is:

Lower 2007< -.036 2006> -.015 1985< -.012 1856< -.009 2003> -.006 1956> -.006 Higher 1911 .013 1935 .011

[C] Year-to-year changes diverging by over 4.0 std deviations:

2006 2007 -4.1 SD

[D] 4 Absent rings: Year Master N series Absent

2007 .879 28 2 >> WARNING: Ring is not usually narrow

2008 .796 28 2 >> WARNING: Ring is not usually narrow

2009 1.555 28 3 >> WARNING: Ring is not usually narrow

2010 .550 28 5 >> WARNING: Ring is not usually narrow

>> WARNING: Last ring in series is ABSENT

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

2006 +3.1 SD

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419A 1803 to 2010 208 years Series 26

[B] Entire series, effect on correlation ( .499) is:

Lower 1911> -.034 1940> -.013 1935> -.011 1844> -.006 1887> -.006 1985< -.005 Higher 1814 .017 1809 .014

[D] 12 Absent rings: Year Master N series Absent

1944 -.168 26 2 >> WARNING: Ring is not usually narrow

1945 .273 27 2 >> WARNING: Ring is not usually narrow

1946 .417 28 2 >> WARNING: Ring is not usually narrow

1947 .736 28 2 >> WARNING: Ring is not usually narrow

1948 -1.528 28 2

1949 .664 28 2 >> WARNING: Ring is not usually narrow

1950 .081 28 2 >> WARNING: Ring is not usually narrow

1951 .379 28 2 >> WARNING: Ring is not usually narrow

1952 .977 28 2 >> WARNING: Ring is not usually narrow

1953 .495 28 2 >> WARNING: Ring is not usually narrow

1954 .603 28 2 >> WARNING: Ring is not usually narrow

2010 .550 28 5 >> WARNING: Ring is not usually narrow

>> WARNING: Last ring in series is ABSENT

[E] Outliers 3 3.0 SD above or -4.5 SD below mean for year

1814 -5.5 SD; 1911 +4.0 SD; 1918 -5.5 SD

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419B 1813 to 2010 198 years Series 27

[B] Entire series, effect on correlation ( .512) is:

Lower 1911> -.026 1881< -.014 1948> -.010 2010< -.008 1862< -.008 1858< -.008 Higher 1893 .009 1996 .009

[D] 1 Absent rings: Year Master N series Absent

2010 .550 28 5 >> WARNING: Ring is not usually narrow

>> WARNING: Last ring in series is ABSENT

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1911 +3.8 SD

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335B 1926 to 2010 85 years Series 28

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

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1950 1999 -3 -.37 -.01 -.20 -.10 -.02 .03 .04 .41\*-.02 .07 .17|-.13 -.22 .18 .01 .11 .21 .32 .01 -.06 -.30

1961 2010 -3 -.24 -.08 -.22 .07 .08 -.02 -.10 .41\* .15 -.04 .14| - - - - - - - - - -

[B] Entire series, effect on correlation ( .437) is:

Lower 1996> -.035 1993< -.022 1974> -.020 2004> -.018 1976> -.017 1933< -.017 Higher 1935 .149 1948 .022

1950 to 1999 segment:

Lower 1996> -.064 1993< -.045 1974> -.037 1971< -.032 1976> -.028 1981< -.016 Higher 1977 .040 1987 .031

1961 to 2010 segment:

Lower 1996> -.061 1993< -.040 1974> -.036 1976> -.028 1971< -.027 2004> -.027 Higher 2009 .058 1987 .036

[E] Outliers 2 3.0 SD above or -4.5 SD below mean for year

1976 +3.1 SD; 1996 +3.7 SD

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PART 7: DESCRIPTIVE STATISTICS: 10:40 Tue 15 Mar 2011 Page 7

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Corr //-------- Unfiltered --------\\ //---- Filtered -----\\

No. No. No. with Mean Max Std Auto Mean Max Std Auto AR

Seq Series Interval Years Segmt Flags Master msmt msmt dev corr sens value dev corr ()

--- -------- --------- ----- ----- ----- ------ ----- ----- ----- ----- ----- ----- ----- ----- --

1 332A 1793 2010 218 9 1 .532 .86 3.80 .897 .940 .318 2.59 .362 -.016 1

2 332B 1875 2010 136 5 0 .606 1.47 3.78 .925 .866 .265 2.67 .498 .024 1

3 333A 1886 2010 125 5 0 .720 1.51 2.99 .479 .681 .214 2.56 .420 -.036 1

4 333B 1821 2010 190 8 0 .567 1.00 2.12 .514 .864 .207 2.59 .442 -.033 1

5 334A 1804 2010 207 8 0 .566 1.03 2.92 .604 .898 .247 2.58 .291 -.070 1

6 334B 1820 2010 191 8 3 .544 1.01 3.52 .731 .909 .268 2.60 .441 -.042 2

7 335A 1945 2010 66 3 0 .417 2.44 5.04 1.049 .859 .245 2.42 .424 -.051 2

8 336A 1924 2010 87 4 0 .504 2.56 5.11 1.337 .887 .181 2.58 .436 -.008 1

9 336B 1918 2010 93 4 0 .570 2.17 4.71 1.152 .909 .203 2.42 .487 -.078 1

10 337A 1942 2010 69 3 0 .523 2.38 5.07 1.096 .864 .194 2.60 .458 .013 3

11 337B 1903 2010 108 4 0 .564 1.91 5.19 1.058 .815 .287 2.66 .375 -.055 1

12 338A 1857 2010 154 6 0 .487 1.40 4.31 1.051 .902 .263 2.80 .501 .006 1

13 338B 1881 2010 130 5 0 .454 1.73 5.34 1.363 .934 .242 2.79 .449 -.100 1

14 339A 1838 2010 173 7 0 .609 .98 2.65 .487 .677 .293 2.74 .511 -.027 1

15 339B 1822 2010 189 8 1 .490 1.23 3.07 .657 .768 .291 2.74 .388 .009 1

16 340A 1925 2010 86 3 0 .515 1.30 3.12 .522 .692 .215 2.62 .413 -.033 1

17 340B 1946 2010 65 3 0 .523 1.53 4.20 .698 .688 .231 2.67 .499 -.030 1

18 341A 1830 2010 181 7 0 .569 .82 2.29 .433 .786 .301 2.54 .277 -.039 1

19 341B 1827 2010 184 7 0 .619 .84 3.63 .540 .882 .291 2.80 .384 -.009 1

20 416A 1822 2010 189 8 0 .483 .69 2.63 .432 .815 .302 3.03 .441 .044 1

21 416B 1823 2010 188 8 0 .630 .79 3.08 .458 .828 .268 2.52 .374 -.062 1

22 417A 1781 2010 230 9 0 .675 .82 1.72 .338 .783 .223 2.73 .441 .009 1

23 417B 1744 2010 267 10 1 .433 .69 2.57 .529 .893 .240 2.84 .338 -.048 1

24 418A 1767 2010 244 10 0 .530 .78 2.79 .609 .904 .253 2.82 .370 -.053 1

25 418B 1856 2010 155 6 0 .707 .84 2.23 .487 .798 .271 2.69 .404 -.047 1

26 419A 1803 2010 208 8 0 .499 .87 2.99 .534 .775 .241 2.55 .328 .002 1

27 419B 1813 2010 198 8 0 .512 .79 1.75 .307 .776 .213 2.53 .359 .000 3

28 335B 1926 2010 85 3 2 .437 2.73 5.46 1.218 .902 .175 2.59 .411 -.054 3

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Total or mean: 4416 177 8 .550 1.14 5.46 .663 .836 .254 3.03 .401 -.026

- = [ COFECHA 77 COF ] = -