TREE-RING CHRONOLOGIES OF EASTERN NORTH AMERICA

E. DeWitt and M. Ames, Editors

CONTRIBUTORS

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Acknowledgement is given to the original work of the many collectors and their part in providing the basic information needed for the study and to Donald W. Stevens who developed SIPP1 for archiving chronologies and calculating evaluative statistics. Robert E. Bell, formerly of the University of Oklahoma, Norman, contributed the entire Hawley-Bell collection originally housed at the University of Chicago, Chicago, Illinois.

The collection of 16 of the chronologies, the processing of a larger number of the chronologies, and the assembling of all data presented here were supported in part by the Advanced Research Projects Agency of the United States Department of Defense and was monitored by the Air Force Office of Scientific Research under Grant No. AFOSR 72-2406. Support for the effort was continued through National Science Foundation Office of Climate Dynamics Grant Nos. ATM75-17034 and ATM77-19216.

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I. INTRODUCTION AND CHRONOLOGY STATISTICS

In the past several decades, dendrochronologists have sampled tree rings throughout North America, primarily intending to calibrate tree rings and climate and hence estimate climatic change in the past. Chronologies from western North America have been systematically published as part of the *Laboratory of Tree-Ring Research Chronology Series*, but collection of eastern North American tree-ring samples and publication of the resulting chronologies have been sporadic and, thus far, insufficient to provide adequate spatial coverage for climatic reconstruction. Many of these chronologies are now stored on magnetic tape as part of the Laboratory of Tree-Ring Research Data Base and are available for research use. This paper represents a carefully selected subset of the highest-quality chronologies of all those available from our files for North America east of approximately 100°W longitude (see Fig. 1 and Table I).

Two sources of funding for the collection of 16 of the chronologies and the data processing of a larger number of the chronologies presented in this paper were the Advanced Research Projects Agency and the National Science Foundation, but the efforts of numerous individuals working on their own projects, some of which were not funded, comprise the largest component of this endeavor. The data gathered together here represent the beginning of collaboration among many scientists aimed towards development of a large proxy data base for eastern North America. Thus, sites chosen were those that exhibited the greatest potential for providing climatic information, time depth, and areal coverage.

Some of the final chronologies resulting from these grants were collected to update earlier chronologies from the Hawley-Bell collection of the University of Chicago Tree-Ring Laboratory, Chicago, Illinois, made in the

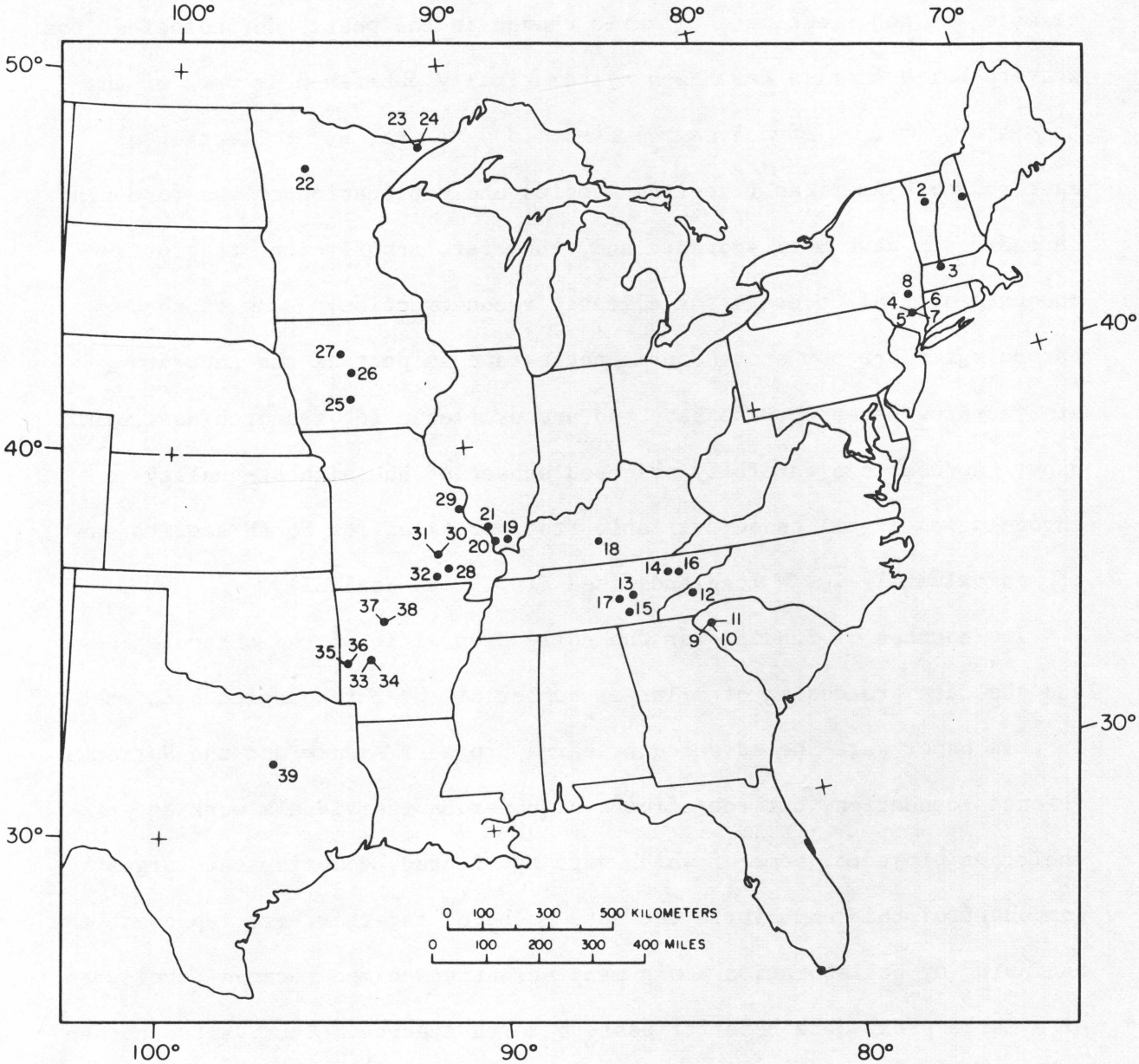

Figure 1. A map of the 39 selected eastern North American tree-ring sites presented in this paper. Site numbers correspond to the sequence numbers in Table I.

TABLE I

Characteristics of the 39 Selected Chronologies Including Site Name, State, Country, Collectors, Identification Number, Species, and Other Characteristics*

```
NANCY BROOK, NEW HAMPSHIRE                    NH   USA   H.C. FRITTS, T.G. SICCAMA
297899 PCRU   1 4407N  7123W  872M  412Y 1561:1972  29C SR: .55 SD: .37 MS: .20
AZ:180 SL:15 NOTES:

CAMEL'S HUMP C+A, VERMONT                     VT   USA   T. G. SICCAMA
559891 PCRU   2 4419N  7254W  991M  337Y 1635:1971  36C SR: .60 SD: .23 MS: .17
AZ:270 SL:30 NOTES: SUMMED

LIVINGSTON, MASSACHUSETTS                     MA   USA   H.C. FRITTS, T.G. SICCAMA
293899 PCRU   3 4238N  7259W  427M  275Y 1697:1971  26C SR: .44 SD: .18 MS: .14
AZ:338 SL:33 NOTES:

SHAWANGUNK MOUNTAINS, NEW YORK                NY   USA   E. R. COOK
367859 QUPR   4 4146N  7410W  275M  284Y 1690:1973  46C SR: .57 SD: .19 MS: .13
AZ:315 SL: 5 NOTES:

SHAWANGUNK MOUNTAINS, NEW YORK                NY   USA   E. R. COOK
368900 PIST   5 4146N  7410W  370M  348Y 1626:1973  32C SR: .52 SD: .24 MS: .19
AZ:225 SL:25 NOTES:

SHAWANGUNK MOUNTAINS, NEW YORK                NY   USA   E. R. COOK
378930 TSCA   6 4146N  7410W  370M  338Y 1636:1973  30C SR: .52 SD: .21 MS: .17
AZ:225 SL:25 NOTES:

SHAWANGUNK MOUNTAINS, NEW YORK                NY   USA   E. R. COOK
420809 PIRI   7 4144N  7415W  335M  352Y 1622:1973  32C SR: .39 SD: .28 MS: .26
AZ:315 SL: 8 NOTES:

GIANT LEDGE, NEW YORK                         NY   USA   T. G. SICCAMA
391899 PCRU   8 4202N  7423W  884M  223Y 1750:1972  20C SR: .42 SD: .16 MS: .13
AZ: 90 SL:10 NOTES:

CLEMSON FOREST, SOUTH CAROLINA                SC   USA   M. K. CLEAVELAND
667849 PIEC   9 3442N  8252W  250M  290Y 1684:1973  48C SR: .66 SD: .26 MS: .17
AZ:117 SL:30 NOTES: TOTAL RING WIDTH; 6 SITES SUMMED; POLYNOMIAL OPTION

CLEMSON FOREST, SOUTH CAROLINA                SC   USA   M. K. CLEAVELAND
668849 PIEC  10 3442N  8252W  250M  290Y 1684:1973  48C SR: .67 SD: .25 MS: .18
AZ:117 SL:30 NOTES: EARLYWOOD WIDTH ONLY; 6 SITES SUMMED; POLYNOMIAL OPTION

CLEMSON FOREST, SOUTH CAROLINA                SC   USA   M. K. CLEAVELAND
669849 PIEC  11 3442N  8252W  250M  291Y 1683:1973  48C SR: .42 SD: .42 MS: .24
AZ:117 SL:30 NOTES: LATEWOOD WIDTH ONLY; 6 SITES SUMMED; POLYNOMIAL OPTION

NEWFOUND GAP, NORTH CAROLINA                  NC   USA   M. AMES, J. HARSHA
418890 PCRU  12 3536N  8326W 1584M  287Y 1686:1972  24C SR: .69 SD: .24 MS: .15
AZ:180 SL:25 NOTES:

FALL CREEK FALLS, TENNESSEE                   TN   USA   C. W. STOCKTON ET AL.
431819 QUAL  13 3541N  8521W  458M  206Y 1767:1972  23C SR: .41 SD: .18 MS: .15
AZ:110 SL: 3 NOTES: UPDATE FOR UNIVERSITY OF CHICAGO WARREN COUNTY SITE
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*The information included in this table is as follows:

Line 1: site name, state, country, and collectors;

Line 2: identification number, species (see Key to Species, p. 6), grid number, latitude, longitude, elevation in meters, total length, beginning date, ending date, number of cores included, serial (auto) correlation, standard deviation, and mean sensitivity;

Line 3: azimuth of exposure in degrees, slope angle in degrees, and additional information.

Table I, cont.

```
NORRIS WATERSHED BOUNDARY, TENNESSEE      TN   USA   C.W. STOCKTON+TENN VALL AUTH
438849 PIEC  14 3612N  8404W  396M  292Y 1681:1972  20C SR: .56 SD: .24 MS: .19
AZ:225 SL:13 NOTES:

SAVAGE GULF HIGH AND LOW, TENNESSEE       TN   USA   C. W. STOCKTON ET AL.
395848 PIEC  15 3527N  8534W  503M  273Y 1700:1972  46C SR: .60 SD: .19 MS: .13
AZ:178 SL: 8 NOTES: SUMMED

STEINER'S WOODS, TENNESSEE                TN   USA   C.W. STOCKTON+TENN VALL AUTH
432819 QUAL  16 3623N  8350W  366M  348Y 1625:1972  14C SR: .34 SD: .21 MS: .19
AZ:999 SL:99 NOTES:

WARREN COUNTY, TENNESSEE                  TN   USA   R. E. BELL
412819 QUAL  17 3538N  8545W  442M  272Y 1669:1940  37C SR: .46 SD: .14 MS: .12
AZ:999 SL:99 NOTES: UNIVERSITY OF CHICAGO COLLECTION

MAMMOTH CAVE, KENTUCKY                    KY   USA   E. ESTES
820810 QUAL  18 3711N  8606W  213M  319Y 1648:1966  20C SR: .66 SD: .21 MS: .14
AZ:270 SL:23 NOTES:

FERNE CLYFFE, ILLINOIS                    IL   USA   C. W. STOCKTON ET AL.
396818 QUAL  19 3732N  8859W  183M  304Y 1669:1972  34C SR: .71 SD: .38 MS: .16
AZ:202 SL:99 NOTES: UPDATE OF ESTES CHRONOLOGY

PINE HILLS-4, ILLINOIS                    IL   USA   E. ESTES
570840 PIEC  20 3732N  8926W  232M  242Y 1724:1965  20C SR: .59 SD: .27 MS: .20
AZ:999 SL:99 NOTES:

PINEY CREEK, ILLINOIS                     IL   USA   E. ESTES
580843 PIEC  21 3754N  8938W  152M  167Y 1806:1972  20C SR: .58 SD: .40 MS: .29
AZ:999 SL:99 NOTES:

ITASCA STATE PARK, MINNESOTA              MN   USA   H. C. FRITTS
430928 PIRE  22 4711N  9514W  457M  300Y 1672:1971  45C SR: .78 SD: .23 MS: .11
AZ:999 SL:99 NOTES: 3 SITES SUMMED

SAGANAGA LAKE, MINNESOTA                  MN   USA   H. C. FRITTS
553927 PIRE  23 4813N  9054W  445M  353Y 1620:1972  42C SR: .48 SD: .25 MS: .21
AZ:999 SL:10 NOTES: 5 SITES SUMMED

SEAGULL LAKE, MINNESOTA                   MN   USA   H. C. FRITTS
577929 PIRE  24 4807N  9055W  445M  347Y 1625:1971  29C SR: .54 SD: .23 MS: .18
AZ:999 SL:99 NOTES: 4 SITES SUMMED

LAKE AHQUABI STATE PARK, IOWA             IA   USA   D. N. DUVICK
463810 QUAL  25 4117N  9335W  275M  261Y 1717:1977  22C SR: .23 SD: .20 MS: .19
AZ:  0 SL:15 NOTES:

LEDGES STATE PARK, IOWA                   IA   USA   D. N. DUVICK, C. MCKINNEY
648819 QUAL  26 4200N  9353W  300M  289Y 1688:1976  47C SR: .42 SD: .24 MS: .20
AZ:999 SL:99 NOTES:

WOODMAN HOLLOW STATE PRESERVE, IOWA       IA   USA   D. N. DUVICK ET AL.
649810 QUAL  27 4225N  9406W  335M  249Y 1729:1977  30C SR: .39 SD: .19 MS: .16
AZ:180 SL:99 NOTES:

CARTER COUNTY, MISSOURI                   MO   USA   D. SENTER
385819 QUAL  28 3655N  9100W  274M  295Y 1642:1936  54C SR: .47 SD: .16 MS: .12
AZ:999 SL:99 NOTES: UNIVERSITY OF CHICAGO COLLECTION

JEFFERSON COUNTY, MISSOURI                MO   USA   R. BELL, F. MAGRE, D. SENTER
381839 JUVI  29 3815N  9025W  150M  193Y 1750:1942  28C SR: .04 SD: .17 MS: .19
AZ:999 SL:99 NOTES: UNIVERSITY OF CHICAGO COLLECTION
```

Table I, cont.

```
SHANNON COUNTY, MISSOURI                    MO    USA    E. JOHNSON, D. SENTER
389819 QUAL  30 3710N  9120W  244M  349Y 1588:1936  36C SR: .52 SD: .19 MS: .14
AZ:999 SL:99 NOTES: UNIVERSITY OF CHICAGO COLLECTION

SHANNON COUNTY, MISSOURI                    MO    USA    C. W. STOCKTON ET AL.
386819 QUAL  31 3716N  9116W  275M  248Y 1725:1972  24C SR: .46 SD: .22 MS: .18
AZ:  0 SL:20 NOTES: UPDATE OF UNIVERSITY OF CHICAGO SHANNON COUNTY SITE

WINONA+MARK TWAIN NAT. FOR., MISSOURI       MO    USA    C. W. STOCKTON ET AL.
387818 QUAL  32 3649N  9119W  256M  193Y 1780:1972  54C SR: .46 SD: .21 MS: .15
AZ:200 SL:18 NOTES: SUMMED

MONTGOMERY COUNTY, ARKANSAS                 AR    USA    R. E. BELL
390849 PIEC  33 3437N  9345W  458M  274Y 1666:1939  39C SR: .26 SD: .20 MS: .20
AZ:180 SL:28 NOTES: UNIVERSITY OF CHICAGO COLLECTION

BIG BRUSHY MOUNTAIN, ARKANSAS               AR    USA    C. W. STOCKTON ET AL.
388849 PIEC  34 3437N  9345W  458M  213Y 1760:1972  41C SR: .46 SD: .26 MS: .22
AZ:270 SL:99 NOTES: UPDATE OF UNIVERSITY OF CHICAGO MONTGOMERY COUNTY SITE

POLK COUNTY, ARKANSAS                       AR    USA    R. E. BELL
311819 QUAL  35 3432N  9415W  381M  263Y 1677:1939  24C SR: .46 SD: .17 MS: .14
AZ:999 SL:99 NOTES: UNIVERSITY OF CHICAGO COLLECTION

BRUSH HEAP MOUNTAIN, ARKANSAS               AR    USA    C. W. STOCKTON ET AL.
354819 QUAL  36 3423N  9355W  550M  253Y 1720:1972  25C SR: .48 SD: .21 MS: .16
AZ:  0 SL:99 NOTES: UPDATE OF UNIVERSITY OF CHICAGO POLK COUNTY SITE

POPE COUNTY, ARKANSAS                       AR    USA    R. E. BELL
383819 QUAL  37 3537N  9312W  457M  298Y 1642:1939  30C SR: .60 SD: .31 MS: .16
AZ:999 SL:99 NOTES: UNIVERSITY OF CHICAGO COLLECTION

RUSSELLVILLE, ARKANSAS                      AR    USA    C. W. STOCKTON ET AL.
384819 QUAL  38 3539N  9304W  564M  260Y 1713:1972  25C SR: .42 SD: .18 MS: .15
AZ:180 SL:99 NOTES: POLYNOMIAL OPTION; UPDATE OF ESTES CHRONOLOGY

OAK PARK, TEXAS                             TX    USA    E. R. COOK, T. P. HARLAN
731860 QUST  39 3158N  9642W  137M  276Y 1699:1974  28C SR: .52 SD: .40 MS: .27
AZ:180 SL: 5 NOTES:
```

Key to Species
For Table I and the Chronologies

Abbreviation	Common Name	Scientific Name
JUVI	eastern red cedar	*Juniperus virginiana*
PCRU	red spruce	*Picea rubens*
PIEC	shortleaf pine	*Pinus echinata*
PIRE	red pine	*Pinus resinosa*
PIRI	pitch pine	*Pinus rigida*
PIST	white pine	*Pinus strobus*
QUAL	white oak	*Quercus alba*
QUPR	chestnut oak	*Quercus prinus*
QUST	post oak	*Quercus stellata*
TSCA	eastern hemlock	*Tsuga canadensis*

1930's. A team of researchers from the Laboratory of Tree-Ring Research, University of Arizona, Tucson, sampled trees as closely as possible to the original site locations where dating had proven successful, and several of the resulting chronologies appear in this paper along with their older counterparts. Such paired chronologies can then be merged as needed in the future, but we recommend that a computer program be used that adjusts the variance of the two series for the overlap period because the matched chronologies do not have the same statistical characteristics (Stevens, 1976b).

The chronologies included in this publication all have the following general characteristics:

1. Each chronology was derived from measured ring widths of a single species sampled from a specific site locality. Most samples include 10 or more trees with two replications from opposite sides of the stem of each tree, making a total of at least 20 radii (cores) for some portion of the derived chronology. Steiner's Woods, Tennessee, was the one exception to this criterion; it contained only seven trees, two cores per tree, because no more trees were available, but we accepted it because of its otherwise high quality. After analysis of the data, we now recommend that, if possible, a sample of 35 to 40 trees be obtained for future eastern North American chronologies.
2. All materials were carefully dated (Stokes and Smiley, 1968), measured, and computer processed to obtain mean standardized ring-width indices (Fritts, 1976).
3. Most chronologies begin in or before the year 1800 and end after 1970. Notable exceptions are the chronologies mentioned earlier from the University of Chicago collection, which end between 1936 and 1942. These are generally not as high in quality as their modern counterparts,

but they are longer. Together with their updates, these chronologies provide temporal and spatial depth for the data set.

In order to select the highest-quality chronologies from all those sampled in eastern North America, the following screening procedures were used. Three statistics of the chronologies were compared, and chronologies with suitable statistics were chosen. The "best" chronologies were assumed to have: a) high mean sensitivity (a statistical measure of relative year-to-year variability), b) low first-order serial correlation (autocorrelation), and c) high standard deviation. It should be noted here that the standards applied to tree rings in the eastern United States are different from those applied to arid-site tree rings in western North America. The more temperate climate and greater stand competition in the East lead to lower tree-growth sensitivity to climate and higher first-order autocorrelation. These characteristics are evaluated further in the next section.

Climatic information, however, may definitely be extracted from eastern tree rings, and, in fact, we hope that this set of chronologies will represent an important first step in assembling an array of proxy information for eastern North America.

Statistical Characteristics of the Chronologies

In order to evaluate and document the characteristics of these new data sets, the statistics of the chronologies (Table I) were examined by stratifying them into different subsets and then obtaining for each stratified subset the mean, median, maximum, and standard deviation for 1) mean sensitivities, 2) first-order serial correlations, and 3) standard deviations. The standard deviations and means were used to calculate the theoretical 50%

limits of the population (± 0.67 standard deviation) and the theoretical 95% limits (± 2 standard deviations) for the three statistics (Stevens, 1976a; Fritts and Shatz, 1975).

Table II includes results from the chronologies stratified into three major tree species, the entire set of 39 chronologies, and also the entire previously published set of 102 western North American chronologies (Drew, 1976; Fritts and Shatz, 1975). The nine shortleaf pine (*Pinus echinata*--PIEC) chronologies in the eastern set had higher average mean sensitivies and standard deviations than the white oak (*Quercus alba*--QUAL) or the red spruce (*Picea rubens*--PCRU) chronologies. Average serial correlations were higher for shortleaf pine and red spruce. While standard deviations and mean sensitivities were low for white oak chronologies, they also exhibited the lowest serial correlations.

It may be noted that there is some variation in the standard deviations of these statistics over the three sets, e.g., the standard deviations of the mean sensitivities of shortleaf pine chronologies are almost double the standard deviations of the other two species and indicate greater variability in this statistic. Thus, the upper and lower 50% and 95% limits of the statistics are not governed merely by the means, but also by the data variations as measured by the standard deviations.

If we define a "good" chronology as one which exhibits the highest mean sensitivity and standard deviation and the lowest serial correlation, it would be difficult to choose catagorically which species is best of these three. However, the three statistics, on the average, appear "best" for shortleaf pine chronologies and "poorest" for red spruce. It is also possible to make value judgments from these data as to what statistics to expect for each of the three species. Hence, a "good" shortleaf pine

TABLE II

Summary of Statistical Characteristics
Of Eastern and Western North American Chronologies

Characteristic	Species			Eastern Total Set[b]	Western Total Set[c]
	QUAL[a]	PIEC[a]	PCRU[a]		
Mean Sensitivity					
Mean	0.157	0.202	0.158	0.175	0.365
Standard Deviation	0.024	0.045	0.028	0.041	0.103
Upper 50% Limit	0.173	0.233	0.177	0.203	0.434
Lower 50% Limit	0.141	0.172	0.139	0.147	0.295
Upper 95% Limit	0.204	0.293	0.213	0.258	0.571
Lower 95% Limit	0.110	0.112	0.103	0.092	0.159
Serial Correlation					
Mean	0.468	0.533	0.540	0.496	0.415
Standard Deviation	0.116	0.131	0.112	0.139	0.104
Upper 50% Limit	0.547	0.622	0.616	0.590	0.485
Lower 50% Limit	0.390	0.445	0.464	0.402	0.345
Upper 95% Limit	0.701	0.796	0.765	0.774	0.623
Lower 95% Limit	0.235	0.270	0.315	0.218	0.206
Standard Deviation					
Mean	0.213	0.277	0.236	0.238	0.380
Standard Deviation	0.059	0.080	0.082	0.071	0.086
Upper 50% Limit	0.252	0.331	0.291	0.285	0.438
Lower 50% Limit	0.173	0.222	0.181	0.190	0.322
Upper 95% Limit	0.330	0.438	0.400	0.379	0.552
Lower 95% Limit	0.095	0.116	0.072	0.096	0.209
Number of Chronologies	16	9	5	39	102

[a]Eastern chronologies stratified by species:
QUAL--*Quercus alba* (white oak)
PIEC--*Pinus echinata* (shortleaf pine)
PCRU--*Picea rubens* (red spruce).
[b]Total set of 39 eastern North American chronologies.
[c]Total set of 102 western North American arid-site chronologies. See Drew (1976) and Fritts and Shatz (1975).

chronology would be expected, on the average, to have a mean sensitivity of 0.202, but half of the time the statistic will be lower than 0.172 or higher than 0.233. Based upon this sample, it would be rare ($P > 0.95$) for a "good" climatic chronology for shortleaf pine to have a mean sensitivity higher than 0.293 or lower than 0.112. Similarly, statements on the expected values for other statistics and species may be deduced from other data in the table, but all of these statements should be considered as tentative inferences to be verified when more chronologies are available from eastern North America.

While statistics of the three species subsets displayed some differences, there are some basic similarities which distinguish them from western sites. In the cases of all three statistics, the western chronologies display generally higher mean sensitivities and standard deviations and lower serial correlations. The western chronologies have an average mean sensitivity of 0.365, while the eastern mean sensitivities average only 0.175. Only 5% may be expected to exceed 0.258, which is a value well below the lower 50% limit of mean sensitivities for the western group (0.295). Indeed, the maximum mean sensitivity of the chronologies presented in this paper is 0.290 (Table I), which is still lower than the 50% lower limit for the western group.

Because of the differing natures of the arid western sites and the more temperate eastern sites, the climatic signal--as indicated by the datability of the tree rings and the mean sensitivity and other statistics of the final chronology--is much more pronounced in western chronologies. Therefore, we thought it necessary to consider redefining sampling standards for eastern work in light of the above evaluation and other evidence (Fritts, 1976).

A recent analysis had been made by Fritts and Cropper (personal communication), in which a sample of 20 of the eastern chronologies included in this paper were studied to ascertain how much climatic information they might contain as compared to western sites. The average percent variance due to the group chronology (Y in Table III) is used as a measure of the climatic signal. It ranges from 17% to 41% with a mean of 28.9 and a standard deviation of 7.93. The percent variance for the group chronology in arid-site conifers is commonly 60% or 31.1% higher. The average standard deviation of the individual core series for the eastern sample was 0.28, which is also markedly lower than the standard deviation of 0.50, characteristic of western chronologies. The core standard deviations in our sample ranged from 0.18 to 0.41 with a standard deviation of 0.06.

These statistics are used to calculate the theoretical percent variance due to nonclimatic factors and the signal-to-noise ratio, both of which vary as a function of the number of trees (n) used in a chronology. Figure 2 shows these relationships calculated for a typical western site with 60% variance accounted for by climate and 40% variance accounted for by nonclimatic factors and for an average of the 20 eastern sites with 29% climatic variance and 71% nonclimatic variance (Table III). The theoretical climatic variance percentages (designated as W for the western sites and as E for the eastern sites) are constant with respect to sample size because all trees are responding to the same macroclimatic signal, and they will all display a common pattern of growth variation due to climate. However, the individual core percent variances due to nonclimatic factors (which can be called the error variances) are different from one tree to the next and are cancelled out when the data from several trees are averaged. Thus, the average percentage declines as a function of some constant k times $1/\sqrt{n}$ where n is

TABLE III

Additional Summary Statistics for Sample of 20 of the 39 Selected Chronologies

Chronology Sequence Number*	Percent Variance Climate (Y)	Mean Standard Deviation of Chronology Cores
1	28	0.30
2	22	0.22
3	17	0.31
8	24	0.27
12	28	0.41
13	25	0.26
14	25	0.31
15	22	0.40
16	22	0.30
19	41	0.27
25	39	0.26
26	40	0.27
27	41	0.24
28	28	0.23
31	36	0.28
32	26	0.29
34	39	0.38
35	25	0.18
36	33	0.22
37	17	0.21
Average	28.9	0.28
Standard Deviation	7.93	0.06

*See Table I.

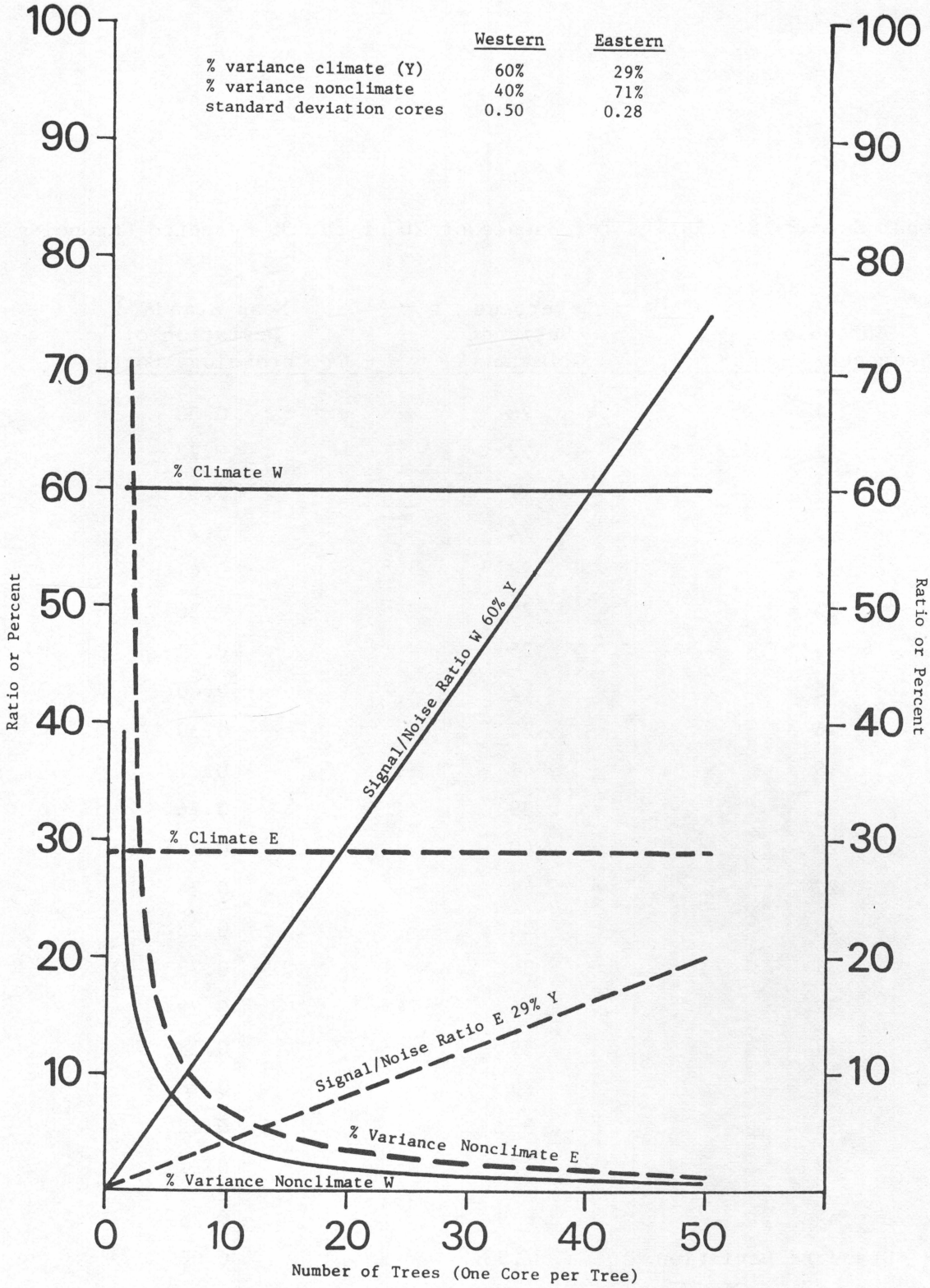

Figure 2. Analysis of percent variance accounted for by climate (Y or signal, represented by solid and dashed horizontal lines), percent variance accounted for by nonclimatic factors (error variance or noise, represented by solid and dashed curves), and signal-to-noise ratio (represented by solid and dashed straight lines with positive slopes) for western (W) and eastern (E) North American tree-ring chronologies. The table at the top of the figure gives average values for percent variance due to climatic and nonclimatic factors and the average standard deviation of the core series for all western arid-site chronologies and for a sample of 20 eastern North American chronologies (see Table III).

the number of trees in the average. The theoretical percentage due to climate is divided by the theoretical percentage due to nonclimatic factors to obtain the signal-to-noise ratio (Fig. 2) shown as solid and dashed straight lines with a positive slope.

For example, a chronology with an average core standard deviation of 0.29 with n such cores and with a nonclimatic variance of 71% would exhibit the following nonclimatic or error variance:

$$\text{error variance} = (0.29)^2 \times \frac{71/n}{100}$$

where the division by 100 converts the percentage measure to its decimal equivalent. It is readily apparent from the figure that the rate of nonclimatic noise declines less rapidly with increasing sample size and is relatively independent of the initial starting variance. The signal-to-noise ratio in the averaged chronology increases as a linear function of the sample size.

The diagram in Figure 2 can be used in the following way. One can see from the figure that, in the arid Southwest, a sample of 10 trees has a signal-to-noise ratio of 15. To obtain the same signal-to-noise ratio with an average eastern chronology (%Y = 29) it would be necessary, in most cases, to sample and merge the results from at least 37 trees. If the samples include only 10 trees, the signal-to-noise ratio is less than 5, and it will be necessary to obtain three times as many chronologies to yield the same amount of climatic information found in a typical western tree-ring chronology. Therefore, it is clear from these data that either sample sizes of 35 to 40 trees per chronology (*one* core per tree) or more chronologies are needed to obtain the same amount of information from eastern dendrochronology as has traditionally been obtained from western dendrochronology. Also, we

tentatively estimate that, if *two* cores per tree are sampled, the number of trees sampled may be reduced somewhat, but in no case more than 25%. Thus, with two cores per tree, the minimum number of trees needed might be from 26 up to 40 depending upon the amount of climatic stress on the site (e.g., if climatic stress is low, the number of trees sampled should approach 40).

Individuals working in eastern North America can calculate their own chronology statistics and use the data from Table III and Figure 2 to evaluate their sampling procedures and to compare their samples to others already obtained. Therefore, it would be helpful if, in addition to the data included in Table I, percent variance due to climate (Fritts, 1976, pp. 282-293), as computed in the analysis of variance subroutine of the INDXA ring-width standardization package available from the Laboratory of Tree-Ring Research, and average standard deviations for the individual core series (a statistic computed in the correlation analysis of INDXA) were included in descriptive summaries of all chronologies published in the future. The Laboratory is now in the process of developing a file which includes these and other data.

II. THE CHRONOLOGIES by L. G. Drew

The Laboratory of Tree-Ring Research is internationally known for its collections of tree-ring chronologies. These collections began at the turn of the century with the work of A. E. Douglass, founder of the Laboratory. Douglass sampled trees in the southwestern United States and developed many of the theories and techniques still used in dendrochronology today. His work was continued by Edmund Schulman, who worked to expand the geographical range of collected tree-ring sites. Both of these men made substantial and enduring contributions to the science of dendrochronology and to its subfield, dendroclimatology.

Today, the refinement of field criteria for the selection of specimens and of laboratory methods (Schulman, 1956; Stokes and Smiley, 1968; Fritts, 1976) continues. The Laboratory includes a staff of highly skilled dendrochronologists with many years of experience. As these researchers continue their studies, new chronologies are developed. These new chronologies include new species as well as an expansion of the geographical range. Sites are now being more uniformly sampled so that comparisons among sites can be made, and different attributes of growth (such as earlywood only, latewood only, and wood density) are being examined.

A copy of each final chronology and its associated site information and statistics are included in the Laboratory of Tree-Ring Research Data Base. G. Robert Lofgren has developed software for the CYBER 175 computer to retrieve and manipulate chronologies stored on magnetic tapes. His programs accomplish one objective of the Laboratory data processing section--to make final chronologies readily accessible for analysis in research projects. Donald W. Stevens has developed software for the DEC-10 computer (Programs

SIPP1 and SIPP2) to do selective searches on site information of various types and to calculate statistical analyses on site subsets.

In addition to acquisition and cataloging, publication of final chronologies needs to be done periodically so that basic data are available to other researchers. Edmund Schulman began the publication of collections in 1956 with *Dendroclimatic Changes in Semiarid America*. The data processing section of the Laboratory took over this task in 1972 with the publication of six volumes of the "Tree-Ring Chronologies of Western America" as *Series I* of the *Laboratory of Tree-Ring Research Chronology Series*. The chronologies selected for publication were screened for length, mean sensitivity, and serial (auto) correlation.

Chronology Series II includes previously unpublished chronologies from 102 stations in the expanded North American grid, and *Chronology Series III* includes chronologies that have been used for archaeological research.

Site information for the chronologies that follow is tabulated in Table I and repeated at the beginning of each chronology published herein.

NANCY BROOK, NEW HAMPSHIRE NH USA H.C. FRITTS, T.G. SICCAMA
297899 PCRU 1 4407N 7123W 872M 412Y 1561:1972 29C SR: .55 SD: .37 MS: .20
AZ:180 SL:15 NOTES:

TREE RING INDICES

DATE	0	1	2	3	4	5	6	7	8	9
1561		208	238	260	205	189	267	209	230	316
1570	159	192	298	90	156	83	136	97	85	47
1580	130	108	61	50	54	98	160	134	76	47
1590	69	137	54	40	293	84	70	78	115	249
1600	92	79	152	151	141	94	133	83	71	153
1610	64	58	69	44	41	35	40	35	45	78
1620	144	69	79	62	123	72	48	81	54	51
1630	53	59	87	93	146	103	92	85	88	123
1640	96	101	102	180	120	77	62	77	68	130
1650	59	114	90	65	79	40	80	82	105	114
1660	80	76	96	68	126	85	108	138	111	161
1670	100	123	102	118	114	105	133	108	115	109
1680	101	100	85	83	87	113	107	83	57	81
1690	57	62	74	64	64	67	71	61	75	89
1700	99	104	171	136	121	136	122	163	167	117
1710	95	95	134	168	164	141	143	132	109	115
1720	81	93	109	97	109	122	107	102	67	99
1730	93	110	111	87	118	100	89	82	90	90
1740	83	65	69	74	78	86	93	99	76	83
1750	80	72	83	91	101	93	98	86	94	101
1760	98	96	97	89	94	92	98	98	85	96
1770	100	122	108	95	100	111	87	106	93	102
1780	123	100	99	91	94	96	116	109	113	119
1790	115	114	103	114	59	42	51	66	66	65
1800	75	77	67	79	80	79	74	125	94	72
1810	66	56	82	120	132	156	143	176	147	166
1820	106	100	121	118	112	126	120	117	116	131
1830	137	110	92	98	107	100	104	93	92	79
1840	106	95	110	130	103	104	70	65	88	76
1850	85	108	103	115	112	98	105	100	104	116
1860	118	135	100	89	95	87	87	93	79	76
1870	97	69	49	52	65	95	89	104	104	110
1880	117	98	100	110	101	104	114	95	103	109
1890	125	127	139	122	135	95	125	96	104	92
1900	104	85	84	106	118	110	122	97	102	84
1910	96	86	86	106	98	94	100	86	75	90
1920	97	107	95	82	110	101	106	105	114	98
1930	106	132	129	108	103	82	75	83	82	110
1940	100	108	101	96	104	102	95	92	55	92
1950	87	85	95	99	107	131	89	106	123	87
1960	62	91	90	102	100	93	78	99	82	99
1970	107	117	87							

NUMBER OF SAMPLES

DATE	0	1	2	3	4	5	6	7	8	9
1561		1	1	1	1	1	1	1	1	1
1570	1	1	1	1	1	1	1	1	1	1
1580	1	1	1	1	1	1	1	1	1	1
1590	1	1	1	1	1	1	1	1	1	1
1600	1	1	1	1	1	2	2	2	2	2
1610	2	2	2	2	2	2	2	2	2	3
1620	3	3	3	3	3	3	3	3	3	3
1630	3	3	3	3	3	3	3	3	3	3
1640	3	3	3	3	3	3	3	3	3	3
1650	4	4	4	4	4	4	4	4	4	4
1660	4	4	4	4	4	4	4	4	5	5
1670	5	5	5	5	5	5	5	5	5	6
1680	6	6	7	7	7	7	7	7	7	7
1690	7	7	7	7	7	7	7	7	7	7
1700	7	7	7	7	7	8	8	8	10	10
1710	10	10	10	10	10	10	10	10	10	10
1720	10	10	10	10	10	11	12	12	12	13
1730	13	13	13	13	13	13	13	13	13	13
1740	12	12	12	12	12	12	12	12	12	12
1750	13	13	13	14	15	15	15	15	16	16
1760	16	16	16	16	16	16	16	16	16	16
1770	18	19	19	19	19	19	19	19	19	20
1780	20	20	20	21	21	21	21	21	21	21
1790	21	21	21	22	22	22	22	22	22	22
1800	23	23	23	23	23	23	23	23	23	23
1810	23	24	24	25	25	26	27	27	28	28
1820	28	28	28	28	28	28	28	28	28	28
1830	28	28	28	28	28	28	28	28	28	28
1840	28	28	28	28	28	28	28	28	28	28
1850	28	28	28	28	28	28	28	29	29	29
1860	29	29	29	29	29	29	29	29	29	29
1870	29	29	29	29	29	29	29	29	29	29
1880	28	28	28	28	28	28	28	28	28	28
1890	28	28	28	28	28	28	28	28	28	28
1900	28	28	28	28	28	28	28	28	28	28
1910	28	28	28	28	28	28	28	28	28	28
1920	28	28	28	28	28	28	28	28	28	28
1930	28	28	28	28	28	28	28	28	28	28
1940	28	28	28	28	28	28	28	28	28	28
1950	28	28	28	28	28	28	28	28	28	28
1960	28	28	28	28	28	28	28	28	28	28
1970	28	28	7							

SERIAL CORRELATION = .548 STANDARD DEVIATION = .366 MEAN SENSITIVITY = .197 N = 412

CAMEL'S HUMP C+A, VERMONT VT USA T. G. SICCAMA
559891 PCRU 2 4419N 7254W 991M 337Y 1635:1971 36C SR: .60 SD: .23 MS: .17
AZ:270 SL:30 NOTES: SUMMED

	TREE RING INDICES										NUMBER OF SAMPLES									
DATE	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
1635						65	83	75	68	38						1	1	1	1	1
1640	83	125	144	166	170	166	186	186	178	148	1	1	1	1	1	1	1	1	1	1
1650	142	132	133	134	101	53	75	122	127	130	1	1	1	1	1	1	1	1	1	2
1660	105	105	126	128	105	93	81	63	73	77	2	2	2	2	2	2	2	2	2	2
1670	97	96	114	114	102	87	56	35	50	55	2	2	2	2	2	2	2	2	2	2
1680	49	42	49	40	47	54	57	88	77	88	2	2	2	2	2	2	2	4	4	4
1690	83	91	103	91	107	100	112	103	109	112	5	6	6	6	6	6	6	6	6	6
1700	90	100	97	99	81	104	124	117	138	135	6	6	6	6	6	6	7	7	7	7
1710	134	105	113	91	104	121	109	102	94	108	7	7	7	7	7	7	7	7	8	8
1720	67	92	82	112	85	120	86	90	65	108	8	8	8	8	8	8	8	8	9	9
1730	115	118	123	92	121	99	100	89	101	112	9	9	9	9	9	9	9	9	9	9
1740	102	99	93	81	82	99	113	125	92	105	9	9	9	9	9	9	9	9	9	9
1750	110	73	88	75	118	81	110	89	97	104	9	9	9	9	9	9	9	9	9	9
1760	106	102	105	90	129	107	113	89	82	99	9	9	9	9	9	9	9	9	9	9
1770	107	134	127	116	111	115	82	99	79	103	9	9	9	9	11	12	13	13	13	13
1780	147	114	106	84	111	111	140	109	90	78	13	13	14	14	15	15	15	16	16	16
1790	74	89	76	99	77	87	85	122	99	68	16	16	17	17	17	17	17	17	17	18
1800	111	133	92	113	129	117	116	166	116	91	18	19	19	19	19	19	19	19	20	20
1810	107	115	102	103	81	101	87	98	76	85	21	23	26	26	26	27	27	27	27	27
1820	81	77	83	90	82	113	102	116	91	107	27	27	27	27	27	28	29	29	29	29
1830	138	117	99	101	132	95	121	88	90	77	29	29	29	30	30	30	31	31	31	31
1840	115	87	77	89	59	112	122	106	115	92	31	31	32	32	32	32	32	32	33	33
1850	102	94	88	97	100	109	128	118	122	127	33	33	33	33	33	33	33	33	33	33
1860	107	119	120	111	112	85	86	99	77	70	33	33	33	34	34	34	34	34	34	34
1870	94	81	84	69	83	106	63	68	81	104	34	34	34	34	34	34	34	34	34	34
1880	103	88	86	106	97	99	115	109	114	103	34	35	35	35	36	36	36	36	36	36
1890	100	90	112	97	93	78	102	88	93	93	36	36	36	36	36	36	36	36	36	36
1900	116	121	102	117	141	119	131	120	119	81	36	36	36	36	36	36	36	36	36	36
1910	98	78	83	103	116	107	119	82	47	86	36	36	36	36	36	36	36	36	36	36
1920	81	114	102	103	138	95	106	95	110	93	36	36	36	36	36	36	36	36	36	36
1930	113	138	122	105	108	73	77	98	107	120	36	36	36	36	36	36	36	36	36	36
1940	85	123	102	92	92	97	85	103	72	104	36	36	36	36	36	36	36	36	36	36
1950	82	83	103	94	95	147	82	102	126	111	36	36	36	36	36	36	36	36	36	36
1960	83	120	85	121	161	124	95	117	93	91	36	35	35	35	21	21	21	21	21	21
1970	80	98									21	21								

SERIAL CORRELATION = .601 STANDARD DEVIATION = .233 MEAN SENSITIVITY = .172 N = 337

LIVINGSTON, MASSACHUSETTS MA USA H.C. FRITTS, T.G. SICCAMA
293899 PCRU 3 4238N 7259W 427M 275Y 1697:1971 26C SR: .44 SD: .18 MS: .14
AZ:338 SL:33 NOTES:

DATE	TREE RING INDICES 0	1	2	3	4	5	6	7	8	9	NUMBER OF SAMPLES 0	1	2	3	4	5	6	7	8	9
1697								191	185	105								1	1	1
1700	92	91	82	103	130	128	100	150	111	89	1	1	1	1	1	1	1	1	1	1
1710	91	88	95	71	93	92	74	98	73	111	1	1	1	1	1	1	1	1	1	1
1720	118	77	92	80	78	102	84	151	78	75	3	3	3	3	3	3	3	3	3	3
1730	78	97	88	113	125	116	76	100	91	93	3	4	4	4	5	5	5	5	6	6
1740	116	100	102	99	93	90	101	114	66	79	6	6	6	6	6	6	6	6	6	6
1750	92	74	88	115	100	93	142	103	120	120	6	6	7	7	7	7	8	9	9	9
1760	120	106	86	104	111	97	92	67	80	82	9	10	10	11	12	12	12	12	12	13
1770	75	95	119	103	120	100	97	118	104	105	13	13	13	13	13	13	13	13	13	13
1780	107	96	107	90	82	111	142	130	120	134	14	14	14	14	14	14	14	15	15	15
1790	135	108	110	134	109	80	95	104	93	92	15	16	16	16	16	16	16	16	16	16
1800	113	112	114	123	125	111	102	92	97	101	17	17	17	17	17	17	17	17	17	17
1810	101	105	93	96	96	107	104	117	90	84	17	19	19	19	19	19	19	19	20	20
1820	71	81	93	83	85	94	78	84	103	97	20	20	21	21	21	21	21	22	23	24
1830	118	84	85	104	105	114	98	104	99	102	24	24	24	24	24	24	24	24	24	24
1840	97	91	100	68	83	89	91	75	104	88	24	24	24	24	24	24	24	24	24	24
1850	95	126	112	124	97	101	100	95	105	124	24	24	25	25	25	25	25	25	25	25
1860	134	99	97	105	99	101	97	80	78	117	25	25	25	25	25	25	25	25	25	25
1870	144	118	80	79	91	95	75	86	87	98	25	25	25	25	25	25	25	25	25	26
1880	119	99	103	80	83	77	90	75	75	100	26	26	26	26	26	26	26	26	26	26
1890	107	112	114	100	111	85	99	102	103	115	26	26	26	26	26	26	26	26	26	26
1900	134	95	99	114	130	110	108	109	108	98	26	26	26	26	26	26	26	26	26	26
1910	103	70	80	87	73	87	103	91	93	99	26	26	26	26	26	26	26	26	26	26
1920	91	117	12[illegible]	104	116	114	104	119	123	126	26	26	26	26	26	26	26	26	25	25
1930	125	107	117	117	99	109	99	86	104	113	25	24	24	24	24	24	24	24	24	24
1940	95	105	107	83	76	88	97	104	73	93	24	24	24	24	24	24	24	24	24	24
1950	94	90	105	110	108	109	77	108	131	101	24	24	24	24	24	24	24	24	24	24
1960	88	124	104	107	118	107	88	81	86	92	24	24	24	24	24	24	24	24	24	24
1970	78	84									24	24								

SERIAL CORRELATION = .439 STANDARD DEVIATION = .178 MEAN SENSITIVITY = .138 N = 275

SHAWANGUNK MOUNTAINS, NEW YORK NY USA E. R. COOK
367859 QUPR 4 4146N 7410W 275M 284Y 1690:1973 46C SR: .57 SD: .19 MS: .13
AZ:315 SL: 5 NOTES:

DATE	TREE RING INDICES 0	1	2	3	4	5	6	7	8	9	NUMBER OF SAMPLES 0	1	2	3	4	5	6	7	8	9
1690	93	93	96	118	142	129	128	138	98	98	1	1	1	1	1	2	2	2	2	2
1700	70	66	92	83	64	88	96	97	97	93	2	2	2	2	2	2	2	2	2	2
1710	71	117	109	139	101	70	64	68	77	86	2	2	3	3	3	3	3	3	3	3
1720	96	86	74	67	78	94	101	111	111	125	3	3	5	5	5	5	5	6	7	7
1730	119	117	111	104	123	108	95	90	97	87	7	7	7	7	7	7	7	7	7	7
1740	86	78	66	77	73	71	79	94	90	79	8	7	7	7	7	7	7	7	7	7
1750	105	89	121	117	169	166	114	85	90	86	7	7	7	7	7	7	7	8	8	8
1760	89	86	87	93	82	93	113	89	102	85	9	9	9	9	9	11	11	11	11	11
1770	86	85	74	74	96	97	99	130	126	137	11	11	13	13	13	14	14	15	15	15
1780	139	186	157	110	99	95	106	109	129	110	16	16	18	20	20	20	20	21	21	21
1790	123	102	89	96	115	101	99	96	97	76	24	24	24	24	24	24	24	25	25	25
1800	87	105	117	99	105	97	82	100	99	86	26	26	26	26	26	26	27	28	28	28
1810	87	83	107	117	125	129	97	89	87	82	28	28	28	28	28	28	28	28	28	28
1820	84	105	91	80	100	107	77	100	130	109	30	31	32	32	32	33	34	34	34	35
1830	113	101	97	135	121	93	88	97	85	96	36	37	37	37	37	37	37	37	37	37
1840	73	88	96	77	89	72	103	91	98	71	38	38	38	38	38	39	39	40	40	40
1850	82	99	83	98	94	103	94	117	98	112	40	41	41	41	41	43	43	43	44	44
1860	95	83	99	82	82	79	87	98	118	127	45	45	45	45	45	45	45	45	45	45
1870	103	94	85	74	105	84	110	101	122	123	45	45	45	45	45	45	45	46	46	46
1880	116	144	123	124	94	102	91	107	91	159	46	46	46	46	46	46	46	46	46	46
1890	113	86	120	101	91	87	91	89	85	79	46	46	46	46	46	46	46	46	46	46
1900	92	98	122	99	116	98	123	102	101	86	46	46	46	46	46	46	46	46	46	46
1910	82	85	80	86	85	94	110	112	91	102	46	46	46	46	46	46	46	46	46	46
1920	131	101	122	97	106	89	98	105	113	92	46	46	46	46	46	46	46	46	46	46
1930	117	120	128	90	109	120	91	102	111	96	46	46	46	46	46	46	46	46	46	46
1940	95	92	85	95	92	93	108	106	95	83	46	46	46	46	46	46	46	46	46	46
1950	102	107	107	112	102	108	104	98	100	95	46	46	46	46	46	46	46	46	46	46
1960	110	126	94	95	88	72	69	82	90	94	46	46	46	45	45	45	45	45	45	45
1970	94	97	132	114							45	45	45	45						

SERIAL CORRELATION = .567 STANDARD DEVIATION = .186 MEAN SENSITIVITY = .132 N = 284

SHAWANGUNK MOUNTAINS, NEW YORK NY USA E. R. COOK
368900 PIST 5 4146N 7410W 370M 348Y 1626:1973 32C SR: .52 SD: .24 MS: .19
AZ:225 SL:25 NOTES:

DATE	TREE RING INDICES 0	1	2	3	4	5	6	7	8	9	NUMBER OF SAMPLES 0	1	2	3	4	5	6	7	8	9
1626							134	73	102	106							1	2	2	2
1630	88	70	98	133	118	91	77	56	55	67	2	2	2	2	2	2	3	3	3	3
1640	111	109	107	136	135	120	113	83	75	66	3	3	3	3	3	3	3	4	4	4
1650	60	91	178	127	126	106	92	103	116	136	5	5	5	5	5	6	6	6	6	6
1660	150	132	127	99	83	93	115	139	109	110	7	7	7	7	7	7	7	7	7	7
1670	81	94	63	102	88	111	99	116	116	124	9	9	9	9	9	9	9	9	9	9
1680	132	118	126	96	99	76	80	90	71	58	11	11	11	11	11	11	11	11	11	11
1690	97	98	74	70	107	102	113	87	96	91	11	12	12	12	12	12	12	12	12	12
1700	101	92	151	139	54	87	73	76	68	69	12	12	12	13	13	13	13	13	13	13
1710	69	68	82	106	83	92	89	88	132	155	13	13	13	13	13	13	13	13	13	13
1720	157	144	114	111	148	116	131	122	115	117	14	14	14	14	14	15	15	15	15	15
1730	84	84	67	43	106	83	105	134	89	118	17	17	17	18	18	18	18	18	18	18
1740	99	116	121	104	96	114	120	135	91	62	18	18	18	18	18	18	18	18	18	18
1750	102	78	85	67	74	84	105	83	125	116	19	19	19	19	20	20	20	21	21	21
1760	138	117	108	116	82	125	120	90	119	88	21	21	21	21	21	21	23	23	23	23
1770	88	110	65	83	106	90	108	127	122	129	23	23	23	23	23	23	23	23	23	23
1780	105	119	105	70	83	77	106	125	131	114	23	23	23	23	23	23	23	23	23	23
1790	139	112	122	111	96	96	97	62	35	38	25	25	25	25	25	25	25	25	25	25
1800	54	56	75	79	88	76	49	86	88	130	25	25	25	25	25	25	25	25	25	25
1810	93	108	144	129	151	135	124	137	99	115	25	25	25	25	25	25	25	25	25	25
1820	121	119	120	92	105	91	53	92	92	91	25	25	25	25	25	27	27	27	27	27
1830	97	87	91	125	125	119	97	105	92	141	29	29	29	29	29	29	29	29	29	29
1840	95	98	117	102	132	81	124	80	99	69	30	30	30	30	32	32	32	32	32	32
1850	86	92	82	92	88	105	80	94	70	85	32	32	32	32	32	32	32	32	32	32
1860	92	103	117	109	104	129	123	140	107	118	32	32	32	32	32	32	32	32	32	32
1870	98	103	99	70	116	83	100	110	101	96	32	32	32	32	32	32	32	32	32	32
1880	78	92	73	74	51	67	75	67	93	108	32	32	32	32	32	32	32	32	32	32
1890	113	146	167	145	124	112	85	113	87	84	32	32	32	32	32	32	32	32	32	32
1900	83	88	95	68	116	110	123	114	137	108	32	32	32	32	32	32	32	32	32	32
1910	138	87	93	92	100	106	125	111	90	57	32	32	32	32	32	32	32	32	32	32
1920	113	108	145	93	102	91	93	118	108	117	32	32	32	32	32	32	32	32	32	32
1930	121	124	133	89	101	88	68	90	128	107	32	32	32	32	32	32	32	32	32	32
1940	98	86	89	70	82	89	86	84	85	76	32	32	32	32	32	32	32	32	32	32
1950	101	94	102	97	99	100	100	94	104	95	32	32	32	32	32	32	32	32	32	32
1960	137	117	88	119	74	49	65	96	118	118	32	32	32	32	32	32	32	32	32	32
1970	106	121	134	149							32	32	32	31						

SERIAL CORRELATION = .525 STANDARD DEVIATION = .237 MEAN SENSITIVITY = .185 N = 348

SHAWANGUNK MOUNTAINS, NEW YORK NY USA E. R. COOK
378930 TSCA 6 4146N 7410W 370M 338Y 1636:1973 30C SR: .52 SD: .21 MS: .17
AZ:225 SL:25 NOTES:

DATE	TREE RING INDICES 0	1	2	3	4	5	6	7	8	9	NUMBER OF SAMPLES 0	1	2	3	4	5	6	7	8	9
1636							115	80	57	72							1	1	1	1
1640	82	95	94	135	147	113	81	100	107	84	1	1	1	1	1	1	1	1	1	1
1650	48	53	55	51	50	26	49	39	32	88	1	1	1	1	1	1	1	1	1	1
1660	103	104	90	84	120	116	99	142	127	112	1	2	2	3	3	3	3	3	3	3
1670	102	103	57	144	93	116	80	98	96	115	3	3	3	3	3	3	5	5	5	5
1680	140	114	118	124	126	103	82	77	75	67	6	7	7	7	8	8	8	8	8	8
1690	96	115	105	99	101	126	113	90	101	94	9	9	9	10	10	10	10	10	10	10
1700	89	80	99	113	76	86	127	120	89	89	12	12	12	12	12	12	12	12	13	13
1710	83	87	96	111	104	109	106	111	117	110	13	13	13	13	13	14	14	14	14	15
1720	96	101	98	80	95	94	107	97	101	113	15	15	15	15	15	15	15	15	15	15
1730	122	131	94	89	100	91	94	111	87	113	16	16	16	16	16	16	16	16	16	16
1740	122	110	105	121	123	117	122	136	88	67	17	17	17	17	17	17	17	18	18	18
1750	113	85	108	106	115	98	123	94	90	112	20	20	20	20	20	20	20	20	21	21
1760	105	116	83	108	93	78	86	67	80	90	21	21	21	21	21	21	21	21	21	21
1770	76	103	81	74	104	99	103	102	98	88	21	21	22	22	22	22	22	23	23	23
1780	72	84	94	76	77	69	94	109	117	114	23	23	23	23	23	23	23	23	23	23
1790	99	100	80	74	77	77	78	93	69	78	24	24	25	25	25	25	25	25	25	25
1800	70	86	95	102	80	97	80	88	105	116	25	25	25	25	25	25	25	25	25	25
1810	101	100	120	125	122	144	110	107	115	75	25	25	25	25	25	25	25	25	25	25
1820	84	103	111	91	113	114	67	117	146	129	25	25	25	25	25	25	25	26	26	26
1830	142	134	124	160	173	122	112	134	129	80	28	28	28	29	29	29	29	29	29	29
1840	86	89	119	84	96	82	91	88	96	82	29	30	30	30	30	30	30	30	30	30
1850	84	114	82	82	93	92	86	85	99	87	30	30	30	30	30	30	30	30	30	30
1860	98	89	82	84	89	106	97	104	115	101	30	30	30	30	30	30	30	30	30	30
1870	95	73	72	62	106	85	100	84	113	96	30	30	30	30	30	30	30	30	30	30
1880	95	89	121	111	98	87	88	79	83	121	30	30	30	30	30	30	30	30	30	30
1890	147	135	181	131	98	84	73	115	127	75	30	30	30	30	30	30	30	30	30	30
1900	84	87	142	117	125	108	124	126	109	86	30	30	30	30	30	30	30	30	30	30
1910	100	80	76	92	75	95	124	130	89	96	30	30	30	30	30	30	30	30	30	30
1920	88	81	111	94	93	93	82	98	120	112	30	30	30	30	30	30	30	30	30	30
1930	106	112	95	81	75	105	83	101	128	117	30	30	30	30	30	30	30	30	30	30
1940	86	109	100	111	76	85	124	116	102	74	30	30	30	30	30	30	30	30	30	30
1950	90	130	111	98	100	107	98	104	88	101	30	30	30	30	30	30	30	30	30	30
1960	91	142	81	105	73	44	79	91	109	113	30	30	30	30	30	30	30	30	30	30
1970	108	106	92	143							30	30	30	30						

SERIAL CORRELATION = .517 STANDARD DEVIATION = .214 MEAN SENSITIVITY = .168 N = 338

SHAWANGUNK MOUNTAINS, NEW YORK NY USA E. R. COOK
420809 PIRI 7 4144N 7415W 335M 352Y 1622:1973 32C SR: .39 SD: .28 MS: .26
AZ:315 SL: 8 NOTES:

DATE	TREE RING INDICES 0	1	2	3	4	5	6	7	8	9	NUMBER OF SAMPLES 0	1	2	3	4	5	6	7	8	9
1622			121	121	112	124	70	148	94	71			1	1	1	2	2	2	2	2
1630	99	123	131	109	72	47	31	15	40	102	2	2	2	2	2	2	2	2	2	2
1640	156	123	85	121	105	123	58	116	88	106	2	2	2	2	2	2	2	2	2	2
1650	94	81	139	156	119	39	93	73	146	146	2	2	2	2	2	2	3	3	3	3
1660	159	98	92	63	169	124	127	159	198	72	3	3	3	3	3	3	3	3	3	3
1670	42	65	65	87	44	69	64	80	85	106	3	3	3	3	3	3	3	3	3	3
1680	163	113	120	77	93	78	67	56	77	75	3	3	3	3	3	3	3	3	3	3
1690	122	129	164	128	69	68	39	62	111	111	3	4	4	4	4	4	4	4	4	5
1700	81	108	105	82	50	98	96	118	68	50	7	7	7	7	7	7	7	7	7	7
1710	51	72	68	96	81	73	67	86	85	120	7	7	7	7	7	7	7	7	7	7
1720	161	144	107	89	115	125	158	123	127	134	7	7	7	7	7	7	7	7	7	7
1730	136	133	106	84	125	114	81	92	82	106	7	7	9	9	9	10	10	10	10	10
1740	105	113	143	126	138	106	80	99	105	76	11	11	11	11	11	12	12	12	13	13
1750	106	90	121	128	118	100	113	85	117	79	15	15	15	17	17	17	17	17	17	17
1760	93	80	84	101	79	81	80	76	85	72	17	17	17	17	17	17	17	17	18	18
1770	65	99	82	69	86	112	96	127	101	113	18	18	18	18	18	19	19	19	19	19
1780	67	121	109	112	79	77	103	103	122	101	19	19	19	19	19	19	19	19	19	19
1790	114	99	96	141	80	113	80	103	59	51	19	19	19	21	21	21	22	22	22	22
1800	103	103	107	82	87	99	72	95	106	132	22	22	22	22	22	22	22	22	22	22
1810	79	100	104	106	118	135	78	103	77	73	27	27	27	27	27	29	29	29	29	29
1820	98	107	116	125	130	92	55	103	122	104	29	29	29	29	29	29	29	29	29	29
1830	102	131	125	130	134	116	118	134	102	130	29	29	29	30	30	30	30	30	30	30
1840	99	113	131	78	103	73	141	61	112	68	31	31	31	31	31	31	31	31	31	31
1850	82	71	68	91	57	96	74	87	83	84	32	32	32	32	32	32	32	32	32	32
1860	112	104	93	91	76	115	97	128	99	125	32	32	32	32	32	32	32	32	32	32
1870	118	123	91	57	100	69	84	113	125	106	32	32	32	32	32	32	32	32	32	32
1880	105	117	129	147	101	71	84	85	99	126	32	32	32	32	32	32	32	32	32	32
1890	120	137	142	109	107	82	69	126	142	85	32	32	32	32	32	32	32	32	32	32
1900	107	117	147	57	114	107	102	56	100	70	32	32	32	32	32	32	32	32	32	32
1910	99	58	103	92	79	136	129	118	95	93	32	32	32	32	32	32	32	32	32	32
1920	113	40	41	41	75	92	80	130	117	68	32	32	32	32	32	32	32	32	32	32
1930	103	61	85	102	121	127	127	154	151	134	32	32	32	32	32	32	32	32	32	32
1940	91	95	142	86	102	141	104	114	91	76	32	32	32	32	32	32	32	32	32	32
1950	69	96	67	63	58	103	122	71	138	118	32	32	32	32	32	32	32	32	32	32
1960	156	127	56	83	45	67	57	105	131	170	32	32	32	30	30	30	30	30	30	30
1970	98	100	107	139							30	30	30	27						

SERIAL CORRELATION = .393 STANDARD DEVIATION = .284 MEAN SENSITIVITY = .259 N = 352

GIANT LEDGE, NEW YORK NY USA T. G. SICCAMA
391899 PCRU 8 4202N 7423W 884M 223Y 1750:1972 20C SR: .42 SD: .16 MS: .13
AZ: 90 SL:10 NOTES:

DATE	TREE RING INDICES 0	1	2	3	4	5	6	7	8	9	NUMBER OF SAMPLES 0	1	2	3	4	5	6	7	8	9
1750	124	95	77	80	98	83	100	86	99	121	2	2	2	3	3	3	3	3	3	3
1760	108	89	101	108	88	112	130	106	123	121	3	3	4	4	4	4	4	4	4	4
1770	92	116	110	103	127	111	106	136	97	103	4	4	5	6	6	6	6	6	6	6
1780	91	96	90	102	77	93	105	99	106	112	7	7	7	7	7	7	7	7	7	7
1790	110	102	80	96	93	89	104	106	97	56	7	7	7	7	7	7	7	7	7	7
1800	97	89	83	93	86	60	66	82	76	82	7	7	7	7	7	7	7	7	7	7
1810	89	136	118	112	137	110	88	115	102	98	7	7	9	9	9	10	10	10	10	10
1820	85	77	97	97	83	88	102	128	114	123	10	11	11	11	12	12	12	12	12	12
1830	130	96	99	130	115	120	109	98	98	68	13	13	13	14	14	14	14	14	14	14
1840	92	86	96	96	90	105	93	87	103	80	14	14	14	14	14	14	15	15	15	15
1850	110	118	94	118	89	88	84	90	88	101	15	15	16	16	17	17	18	18	18	18
1860	107	115	127	158	111	119	109	113	94	89	18	18	18	18	18	18	18	18	18	18
1870	111	112	112	97	102	94	83	77	88	89	18	18	18	19	19	20	20	20	20	20
1880	96	94	79	90	95	95	110	103	98	105	20	20	20	20	20	20	20	20	20	20
1890	105	118	114	84	94	75	90	103	113	85	20	20	20	20	20	20	20	20	20	20
1900	85	75	87	80	117	127	146	98	110	84	20	20	20	20	20	20	20	20	20	20
1910	115	93	89	89	97	96	111	109	81	114	20	20	20	20	20	20	20	20	20	20
1920	129	131	141	85	90	93	89	100	101	97	20	20	20	20	20	20	20	20	20	20
1930	108	105	119	123	102	110	78	82	95	101	20	20	20	20	20	20	20	20	20	20
1940	96	123	116	93	92	91	99	111	94	101	20	20	20	20	20	20	20	20	20	20
1950	91	89	102	119	117	103	86	91	109	101	20	20	20	20	20	20	20	20	20	20
1960	81	110	94	116	114	91	84	98	80	81	20	20	20	20	20	20	20	20	20	20
1970	86	92	107								20	20	19							

SERIAL CORRELATION = 0.000 STANDARD DEVIATION = 0.000 MEAN SENSITIVITY = 0.000 N = 0

CLEMSON FOREST, SOUTH CAROLINA SC USA M. K. CLEAVELAND
667849 PIEC 9 3442N 8252W 250M 290Y 1684:1973 48C SR: .66 SD: .26 MS: .17
AZ:117 SL:30 NOTES: TOTAL RING WIDTH; 6 SITES SUMMED; POLYNOMIAL OPTION

	TREE RING INDICES										NUMBER OF SAMPLES									
DATE	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
1684					142	101	110	95	99	52					1	1	1	1	1	1
1690	101	93	105	111	123	101	111	107	76	52	1	1	1	1	1	1	1	1	1	1
1700	100	100	128	131	117	115	137	121	93	85	1	1	1	1	1	1	1	1	1	1
1710	46	64	73	53	39	59	118	97	149	154	1	1	1	1	1	1	1	2	2	2
1720	111	123	115	103	121	116	96	94	104	91	2	2	2	2	2	2	2	2	2	2
1730	81	100	85	97	99	85	108	82	90	101	2	2	2	2	2	2	2	2	2	2
1740	87	111	91	93	151	143	112	95	120	85	2	2	2	2	2	2	2	2	2	2
1750	70	62	71	64	47	62	107	131	49	68	2	2	2	2	2	2	2	2	2	2
1760	106	110	114	104	96	96	98	79	98	125	2	2	2	2	2	2	2	2	2	2
1770	122	103	49	39	26	58	75	87	110	124	2	2	2	2	2	2	2	2	2	2
1780	102	99	73	76	64	59	50	67	102	77	2	2	2	2	2	2	2	2	2	2
1790	98	115	105	101	131	198	221	114	139	140	2	2	2	2	2	2	2	2	2	2
1800	124	120	125	116	132	147	116	131	136	116	2	2	2	2	2	2	2	2	2	2
1810	112	97	75	89	102	89	91	97	60	119	2	2	2	2	2	2	2	2	2	2
1820	156	108	89	82	53	48	51	56	106	138	2	2	2	2	2	2	2	2	2	2
1830	164	221	182	171	156	103	82	70	78	60	2	3	5	6	6	6	6	6	6	6
1840	61	74	83	97	92	98	126	94	79	91	6	7	7	7	7	7	7	7	7	7
1850	82	97	102	120	112	101	97	95	87	97	8	9	9	10	11	11	11	11	12	13
1860	95	121	120	124	106	91	97	96	95	82	13	13	17	17	17	17	17	17	17	17
1870	114	114	112	93	81	121	120	77	108	106	18	18	18	18	18	19	19	19	19	20
1880	95	92	112	102	115	105	123	97	106	108	20	21	21	21	22	22	22	24	24	24
1890	91	72	88	88	76	73	70	87	124	114	25	25	25	25	25	25	25	26	26	26
1900	127	130	100	102	107	90	123	104	97	116	26	27	27	28	29	29	30	30	30	30
1910	83	96	105	83	85	100	112	111	98	101	30	30	31	31	31	33	36	39	39	41
1920	95	78	90	107	93	88	113	100	121	112	42	43	43	43	43	43	45	45	45	45
1930	105	101	117	112	114	92	74	102	99	100	45	45	46	47	48	48	48	48	48	48
1940	105	89	94	100	86	102	92	82	84	99	48	48	48	48	48	48	48	48	48	48
1950	116	100	99	107	94	94	110	129	120	123	48	48	48	48	48	47	47	47	43	43
1960	88	89	79	85	79	83	90	108	114	126	43	43	43	43	43	43	42	41	41	41
1970	116	94	87	88							40	40	40	40						

SERIAL CORRELATION = .651 STANDARD DEVIATION = .261 MEAN SENSITIVITY = .169 N = 290

CLEMSON FOREST, SOUTH CAROLINA SC USA M. K. CLEAVELAND
668849 PIEC 10 3442N 8252W 250M 290Y 1684:1973 48C SR: .67 SD: .25 MS: .18
AZ:117 SL:30 NOTES: EARLYWOOD WIDTH ONLY; 6 SITES SUMMED; POLYNOMIAL OPTION

	TREE RING INDICES										NUMBER OF SAMPLES									
DATE	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
1684					161	113	113	103	96	46					1	1	1	1	1	1
1690	88	85	108	85	126	112	96	116	78	80	1	1	1	1	1	1	1	1	1	1
1700	101	112	127	147	104	147	128	112	83	108	1	1	1	1	1	1	1	1	1	1
1710	56	70	76	61	43	43	103	85	121	127	1	1	1	1	1	1	1	2	2	2
1720	96	120	99	91	113	104	109	91	104	89	2	2	2	2	2	2	2	2	2	2
1730	83	105	81	111	96	99	119	94	107	105	2	2	2	2	2	2	2	2	2	2
1740	92	120	97	95	135	131	115	108	123	111	2	2	2	2	2	2	2	2	2	2
1750	67	82	100	85	50	77	136	159	76	77	2	2	2	2	2	2	2	2	2	2
1760	117	123	108	139	117	126	123	99	120	124	2	2	2	2	2	2	2	2	2	2
1770	103	117	64	54	30	59	82	94	108	116	2	2	2	2	2	2	2	2	2	2
1780	91	90	73	73	72	65	54	67	93	64	2	2	2	2	2	2	2	2	2	2
1790	73	100	89	91	80	145	235	91	115	98	2	2	2	2	2	2	2	2	2	2
1800	99	103	126	115	125	126	105	127	157	121	2	2	2	2	2	2	2	2	2	2
1810	121	91	82	88	107	98	98	96	68	124	2	2	2	2	2	2	2	2	2	2
1820	150	113	87	86	60	47	46	53	85	137	2	2	2	2	2	2	2	2	2	2
1830	132	211	176	184	151	100	74	64	77	51	2	3	5	6	6	6	6	6	6	6
1840	56	73	75	87	79	78	112	79	71	81	6	7	7	7	7	7	7	7	7	7
1850	81	107	103	129	121	111	97	104	84	98	8	9	9	10	11	11	11	11	12	13
1860	99	129	144	149	133	98	109	109	102	94	13	13	17	17	17	17	17	17	17	17
1870	115	119	110	103	91	122	112	78	110	101	18	18	18	18	18	19	19	19	19	20
1880	89	93	111	107	102	106	112	89	101	106	20	21	21	21	22	22	22	24	24	24
1890	89	78	95	81	70	75	63	98	105	113	25	25	25	25	25	25	25	26	26	26
1900	136	137	90	106	119	84	112	107	86	124	26	27	27	28	29	29	30	30	30	30
1910	89	83	100	83	83	94	115	113	104	109	30	30	31	31	31	33	36	39	39	41
1920	100	81	93	109	98	100	107	89	113	113	42	43	43	43	43	43	45	45	45	45
1930	112	119	111	101	104	94	70	95	106	106	45	45	46	47	48	48	48	48	48	48
1940	98	97	97	96	81	100	97	95	83	104	48	48	48	48	48	48	48	48	48	48
1950	118	102	100	115	119	100	110	125	110	121	48	48	48	48	48	47	47	47	44	43
1960	74	77	79	79	80	85	93	107	120	119	43	43	43	43	43	43	42	42	41	41
1970	125	97	95	85							40	40	40	40						

SERIAL CORRELATION = .547 STANDARD DEVIATION = .254 MEAN SENSITIVITY = .176 N = 290

CLEMSON FOREST, SOUTH CAROLINA SC USA M. K. CLEAVELAND
669849 PIEC 11 3442N 8252W 250M 291Y 1683:1973 48C SR: .42 SD: .42 MS: .24
AZ:117 SL:30 NOTES: LATEWOOD WIDTH ONLY; 6 SITES SUMMED; POLYNOMIAL OPTION

	TREE RING INDICES										NUMBER OF SAMPLES									
DATE	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
1683				145	61	52	97	70	115	76				1	1	1	1	1	1	1
1690	161	144	140	219	178	132	200	148	110	32	1	1	1	1	1	1	1	1	1	1
1700	136	116	161	130	145	70	136	112	84	26	1	1	1	1	1	1	1	1	1	1
1710	15	30	36	15	15	55	57	75	200	136	1	1	1	1	1	1	2	2	2	2
1720	95	88	105	94	105	110	60	82	91	84	2	2	2	2	2	2	2	2	2	2
1730	74	83	87	69	100	62	91	59	67	99	2	2	2	2	2	2	2	2	2	2
1740	82	107	84	100	185	153	113	93	119	62	2	2	2	2	2	2	2	2	2	2
1750	75	49	46	47	52	49	92	120	28	70	2	2	2	2	2	2	2	2	2	2
1760	114	112	130	77	82	70	76	64	76	139	2	2	2	2	2	2	2	2	2	2
1770	153	91	38	27	22	60	68	80	119	141	2	2	2	2	2	2	2	2	2	2
1780	121	114	77	85	62	58	50	73	129	100	2	2	2	2	2	2	2	2	2	2
1790	135	152	147	120	256	369	290	194	209	236	2	2	2	2	2	2	2	2	2	2
1800	184	167	141	138	173	222	170	175	144	138	2	2	2	2	2	2	2	2	2	2
1810	127	116	73	97	94	72	79	90	41	94	2	2	2	2	2	2	2	2	2	2
1820	133	78	70	52	26	36	42	37	68	59	2	2	2	2	2	2	2	2	2	2
1830	86	133	123	109	132	92	76	63	61	56	2	4	5	6	6	6	6	6	6	6
1840	54	63	78	91	84	99	114	92	75	92	7	7	7	7	7	7	7	7	7	7
1850	78	89	105	116	111	100	109	107	101	110	8	9	10	10	11	11	11	12	13	13
1860	104	134	105	102	91	92	92	92	92	70	13	16	17	17	17	17	17	17	17	17
1870	112	106	112	80	65	118	125	75	111	116	18	18	18	18	18	19	19	19	20	20
1880	101	86	120	103	130	109	135	105	114	106	21	21	21	22	22	22	23	24	24	25
1890	92	66	80	94	82	68	75	73	139	108	25	25	25	25	25	25	26	26	26	26
1900	114	121	108	95	98	95	135	101	109	108	26	27	28	29	29	29	30	30	30	30
1910	80	113	113	83	89	109	111	110	95	95	30	31	31	31	31	34	36	39	39	41
1920	91	78	90	106	89	77	124	112	130	112	42	43	43	43	43	43	45	45	45	45
1930	98	83	123	123	125	87	77	110	91	94	45	45	46	47	48	48	48	48	48	48
1940	114	79	91	106	92	110	89	71	88	96	48	48	48	48	48	48	48	48	48	48
1950	120	102	104	100	66	89	109	134	133	125	48	48	48	48	48	47	47	47	43	43
1960	104	103	78	91	77	79	86	108	104	135	43	43	43	43	43	43	42	41	41	41
1970	108	97	82	95							40	40	40	40						

SERIAL CORRELATION = .701 STANDARD DEVIATION = .417 MEAN SENSITIVITY = .244 N = 291

NEWFOUND GAP, NORTH CAROLINA NC USA M. AMES, J. HARSHA
418890 PCRU 12 3536N 8326W 1584M 287Y 1686:1972 24C SR: .69 SD: .24 MS: .15
AZ:180 SL:25 NOTES:

	TREE RING INDICES										NUMBER OF SAMPLES									
DATE	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
1686							122	108	109	64							1	1	1	1
1690	57	49	57	104	87	109	120	145	134	123	1	1	1	2	2	2	2	2	2	2
1700	152	143	140	136	161	123	115	117	122	155	2	2	2	2	2	2	2	2	2	2
1710	130	139	95	103	84	86	106	94	73	69	2	2	2	2	2	2	2	2	2	3
1720	65	70	51	72	73	77	97	109	97	113	4	4	4	4	6	6	6	6	6	6
1730	110	115	112	109	124	101	84	84	97	115	6	6	7	8	8	8	8	8	8	8
1740	144	131	153	112	114	121	116	116	100	99	8	8	9	10	11	11	11	11	11	11
1750	110	108	112	78	89	92	84	64	80	93	11	11	11	11	12	12	12	12	12	12
1760	86	93	92	83	84	78	82	64	80	105	12	12	13	13	13	13	13	13	13	13
1770	77	92	106	114	70	57	67	84	78	83	13	13	13	14	14	14	14	14	14	14
1780	86	88	97	105	84	64	71	73	80	85	14	14	14	14	14	14	14	14	14	14
1790	88	97	79	96	98	86	78	78	79	65	14	14	14	14	14	14	14	14	14	14
1800	79	79	79	84	104	106	87	74	90	116	14	14	14	14	14	14	14	14	14	14
1810	119	113	105	108	112	118	136	118	129	107	16	16	16	16	16	16	16	16	16	16
1820	120	94	104	118	113	126	130	118	138	131	16	16	16	16	16	16	17	17	17	17
1830	160	102	119	117	112	122	138	85	107	83	19	19	19	20	20	20	21	21	21	21
1840	75	98	108	125	128	118	98	100	130	128	21	21	21	21	21	21	21	21	21	21
1850	147	130	115	114	111	90	96	87	112	101	21	21	22	22	22	22	22	22	22	22
1860	113	104	111	116	100	109	92	93	87	84	23	23	23	23	23	23	24	24	24	24
1870	74	78	112	104	95	113	137	117	135	112	24	24	24	24	24	24	24	24	24	24
1880	127	87	109	97	111	93	94	102	121	127	24	24	24	24	24	24	24	24	24	24
1890	118	81	92	117	91	75	70	97	73	85	24	24	24	24	24	24	24	24	24	24
1900	98	90	114	109	81	70	58	74	106	93	24	24	24	24	24	24	24	24	24	24
1910	108	83	85	113	89	76	101	132	124	106	24	24	24	24	24	24	24	24	24	24
1920	96	107	71	93	122	104	67	67	88	119	24	24	24	24	24	24	24	24	24	24
1930	95	85	80	81	76	80	72	36	44	83	24	24	24	24	24	24	24	24	24	24
1940	93	129	117	104	90	97	87	111	129	147	24	24	24	24	24	24	24	24	24	24
1950	149	196	146	96	90	56	49	75	110	153	24	24	24	24	24	24	24	24	24	24
1960	133	139	114	124	108	84	88	109	111	81	24	24	24	24	24	24	24	24	24	24
1970	106	96	99								24	24	24							

SERIAL CORRELATION = .688 STANDARD DEVIATION = .236 MEAN SENSITIVITY = .149 N = 287

FALL CREEK FALLS, TENNESSEE TN USA C. W. STOCKTON ET AL.
431819 QUAL 13 3541N 8521W 458M 206Y 1767:1972 23C SR: .41 SD: .18 MS: .15
AZ:110 SL: 3 NOTES: UPDATE FOR UNIVERSITY OF CHICAGO WARREN COUNTY SITE

	TREE RING INDICES										NUMBER OF SAMPLES									
DATE	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
1767								63	95	47								1	1	1
1770	92	116	110	137	171	113	147	85	67	91	1	1	2	2	2	2	2	2	2	2
1780	103	70	74	106	106	103	130	110	116	106	2	2	2	2	2	2	2	4	4	4
1790	113	114	122	139	102	99	73	102	89	56	4	4	4	4	4	5	5	6	6	6
1800	80	72	103	103	87	86	84	84	61	67	6	7	7	7	7	7	7	7	7	7
1810	82	81	85	84	132	74	86	93	89	81	9	9	12	12	13	13	14	14	16	16
1820	110	70	92	118	145	122	117	108	110	104	17	17	17	17	17	17	18	18	18	18
1830	109	102	122	127	111	124	113	106	78	65	18	18	18	20	20	20	20	21	21	21
1840	111	92	118	108	116	103	116	122	103	149	21	21	21	21	21	21	21	21	21	21
1850	99	100	98	76	94	82	90	96	86	97	21	21	21	21	21	21	21	21	21	21
1860	103	79	94	90	84	101	80	96	80	98	21	22	22	22	22	22	22	22	22	22
1870	94	100	80	91	84	112	119	95	100	74	22	23	23	23	23	23	23	23	23	23
1880	93	96	107	114	95	94	110	99	103	129	23	23	23	23	23	23	23	23	23	23
1890	108	102	122	119	113	109	121	111	88	105	23	23	23	23	23	23	23	23	23	23
1900	101	91	83	107	94	104	114	114	97	120	23	23	23	23	23	23	23	23	23	23
1910	118	77	109	85	77	110	100	108	94	84	23	23	23	23	23	23	23	23	23	23
1920	91	90	104	113	102	70	70	86	93	95	23	23	23	23	23	23	23	23	23	23
1930	87	73	80	80	93	106	77	82	102	99	23	23	23	23	23	23	23	23	23	23
1940	97	116	110	111	94	108	103	106	116	110	23	23	23	23	23	23	23	23	23	23
1950	122	131	103	100	84	104	96	90	119	97	23	23	23	23	23	23	23	23	23	23
1960	93	88	79	85	103	110	108	110	104	98	22	22	22	22	22	22	22	22	22	22
1970	110	118	103								22	22	22							

SERIAL CORRELATION = .408 STANDARD DEVIATION = .178 MEAN SENSITIVITY = .151 N = 206

NORRIS WATERSHED BOUNDARY, TENNESSEE TN USA C.W. STOCKTON+TENN VALL AUTH
438849 PIEC 14 3612N 8404W 396M 292Y 1681:1972 20C SR: .56 SD: .24 MS: .19
AZ:225 SL:13 NOTES:

	TREE RING INDICES										NUMBER OF SAMPLES									
DATE	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
1681		96	87	52	39	17	40	70	129	173		1	1	1	2	2	2	2	2	2
1690	151	139	138	110	107	89	70	74	103	114	2	2	2	2	2	3	3	3	3	3
1700	51	43	28	57	76	96	118	116	121	88	3	3	3	3	3	3	3	3	4	6
1710	73	138	125	122	68	93	108	125	139	145	6	6	6	6	6	6	6	6	8	10
1720	112	98	111	147	110	127	118	119	134	132	10	10	10	10	10	10	10	11	12	12
1730	113	101	104	115	100	99	67	89	111	139	12	12	12	12	12	12	12	12	12	12
1740	159	122	110	90	95	110	138	83	64	46	12	12	12	12	12	12	12	12	12	12
1750	69	102	68	55	13	35	53	89	83	97	12	12	12	12	12	12	12	12	12	12
1760	76	75	69	103	97	86	114	108	91	73	12	12	12	12	12	12	12	12	12	12
1770	101	145	76	69	68	124	151	150	130	121	12	12	12	12	12	13	13	13	14	14
1780	87	126	111	111	97	86	95	124	103	80	14	14	14	14	14	14	14	14	14	14
1790	74	84	105	140	138	121	113	83	90	99	14	14	14	15	15	15	16	16	16	16
1800	94	105	103	101	110	104	88	79	125	92	16	17	18	18	18	18	18	18	18	18
1810	86	71	88	90	100	124	121	138	124	104	18	18	18	18	18	19	19	19	19	19
1820	105	101	95	84	77	91	81	108	101	111	19	19	19	19	19	19	19	19	19	19
1830	101	99	87	74	86	90	91	92	84	79	19	19	19	19	19	20	20	20	20	20
1840	94	111	123	119	119	112	91	102	93	84	20	20	20	20	20	20	20	20	20	20
1850	86	106	74	80	96	116	92	109	93	120	20	20	20	20	20	20	20	20	20	20
1860	120	128	113	111	105	79	66	75	103	94	20	20	20	20	20	20	20	20	20	20
1870	116	95	88	66	84	113	106	128	119	76	20	20	20	20	20	20	20	20	20	20
1880	96	70	123	94	95	92	118	97	94	133	20	20	20	20	20	20	20	20	20	20
1890	127	80	82	98	95	98	120	138	123	77	20	20	20	20	20	20	20	20	20	20
1900	77	96	77	96	101	123	114	107	90	116	20	20	20	20	20	20	20	20	20	20
1910	114	78	91	84	82	109	116	99	93	92	20	20	20	20	20	20	20	20	20	20
1920	91	74	90	118	119	93	79	83	123	147	20	20	20	20	20	20	20	20	20	20
1930	89	83	83	155	111	113	62	111	108	96	20	20	20	20	20	20	20	20	20	20
1940	104	80	130	122	103	107	93	98	87	86	19	19	19	19	19	19	19	19	19	19
1950	134	143	117	110	121	132	119	97	91	88	19	19	19	19	19	19	19	19	19	19
1960	109	89	108	112	71	86	49	80	98	108	18	18	18	18	18	18	18	18	18	18
1970	130	133	72								18	17	17							

SERIAL CORRELATION = .561 STANDARD DEVIATION = .244 MEAN SENSITIVITY = .192 N = 292

SAVAGE GULF HIGH AND LOW, TENNESSEE TN USA C. W. STOCKTON ET AL.
395848 PIEC 15 3527N 8534W 503M 273Y 1700:1972 46C SR: .60 SD: .19 MS: .13
AZ:178 SL: 8 NOTES: SUMMED

DATE	TREE RING INDICES 0	1	2	3	4	5	6	7	8	9	NUMBER OF SAMPLES 0	1	2	3	4	5	6	7	8	9
1700	98	105	89	63	126	163	127	116	95	95	2	3	3	3	3	3	3	4	4	4
1710	82	86	102	89	95	90	89	102	120	101	5	5	5	5	6	6	6	7	7	7
1720	97	101	98	97	134	125	112	97	98	106	7	7	7	8	8	8	8	8	8	8
1730	115	109	111	100	106	80	78	92	103	132	8	8	8	8	11	12	12	13	13	13
1740	129	116	109	99	100	111	101	96	82	84	13	14	14	14	14	14	14	14	14	14
1750	68	69	66	82	82	71	71	91	99	95	14	14	14	14	14	14	15	15	16	16
1760	103	107	102	85	93	96	98	106	106	106	16	16	16	16	16	16	16	16	16	16
1770	96	109	76	69	65	95	114	115	96	117	16	16	16	16	16	16	16	16	16	16
1780	116	134	135	138	137	116	104	111	112	102	16	16	16	16	16	16	16	16	17	17
1790	111	92	92	111	130	143	133	98	94	74	17	17	17	17	17	17	17	18	19	19
1800	68	68	85	79	83	71	65	65	76	92	20	21	21	21	21	22	22	22	22	23
1810	92	84	95	91	104	130	129	129	125	143	24	24	24	24	25	25	26	27	28	30
1820	111	116	104	75	88	84	75	77	93	96	32	34	34	35	35	35	35	36	36	36
1830	90	78	84	80	110	122	115	106	111	114	36	36	36	36	36	36	36	37	38	38
1840	120	107	113	93	115	128	123	110	95	84	39	40	41	41	41	41	41	42	45	45
1850	95	104	85	103	91	115	80	98	102	126	45	45	45	45	45	45	45	45	45	45
1860	102	116	107	115	116	95	60	85	76	85	46	46	46	46	46	46	46	46	46	46
1870	115	102	98	91	93	96	98	113	123	83	46	46	46	46	46	46	46	46	46	46
1880	116	85	128	104	108	77	81	85	99	88	46	46	46	46	46	46	46	46	46	46
1890	95	79	93	99	98	83	90	118	134	95	46	46	46	46	46	46	46	46	46	46
1900	108	105	86	102	108	112	115	121	131	157	46	46	46	46	46	46	46	46	46	46
1910	116	109	105	90	84	89	118	101	96	96	46	46	46	46	46	46	46	46	46	46
1920	89	72	93	106	76	62	83	98	112	108	46	46	46	46	46	46	46	46	46	46
1930	82	77	84	129	99	114	71	104	131	128	46	46	46	46	46	46	46	46	46	46
1940	114	88	115	109	110	111	103	94	89	99	46	46	46	46	46	46	46	46	46	46
1950	100	85	95	127	108	117	134	136	131	119	46	46	46	46	46	46	46	46	46	46
1960	92	106	86	65	84	74	73	80	79	98	46	46	46	46	46	46	46	46	46	46
1970	121	101	114								46	46	46							

SERIAL CORRELATION = .596 STANDARD DEVIATION = .185 MEAN SENSITIVITY = .129 N = 273

STEINER'S WOODS, TENNESSEE TN USA C.W. STOCKTON+TENN VALL AUTH
432819 QUAL 16 3623N 8350W 366M 348Y 1625:1972 14C SR: .34 SD: .21 MS: .19
AZ:999 SL:99 NOTES:

DATE	TREE RING INDICES 0	1	2	3	4	5	6	7	8	9	NUMBER OF SAMPLES 0	1	2	3	4	5	6	7	8	9
1625						132	69	111	95	45						1	1	1	1	1
1630	72	46	83	71	53	69	96	88	73	80	1	1	2	2	2	2	2	2	2	2
1640	90	88	91	80	89	76	67	82	112	133	2	2	2	2	2	2	2	2	2	2
1650	100	140	123	95	57	53	64	77	69	115	2	2	2	2	2	2	2	2	2	3
1660	115	92	114	112	137	85	77	83	67	88	3	3	3	3	3	3	3	3	3	3
1670	71	100	65	117	88	131	89	134	119	74	3	3	3	3	3	3	3	3	3	3
1680	125	50	90	115	116	65	60	55	48	66	3	3	3	4	4	4	4	4	4	4
1690	69	81	95	73	131	84	90	97	82	88	4	4	4	4	4	4	5	5	5	5
1700	87	113	118	91	133	129	129	165	80	115	5	5	6	6	6	6	7	7	7	7
1710	137	160	152	76	117	84	143	130	86	121	7	8	8	8	8	8	8	8	8	9
1720	96	117	110	87	71	72	79	80	80	107	9	9	9	9	9	9	9	9	9	9
1730	104	102	109	140	108	70	84	70	83	114	9	9	9	10	10	10	10	10	10	10
1740	97	126	130	92	88	142	68	74	64	88	10	10	10	10	10	10	10	10	10	10
1750	77	81	69	76	103	69	95	114	106	113	10	10	10	10	10	10	10	10	11	12
1760	115	144	85	109	100	92	83	101	104	110	12	12	12	12	12	12	13	13	13	13
1770	112	128	93	96	58	79	110	86	85	88	13	13	13	13	13	13	13	13	13	13
1780	120	113	126	92	69	74	97	106	98	75	13	13	13	13	13	13	13	13	13	13
1790	66	78	89	113	99	95	110	91	101	99	13	13	13	13	13	13	13	13	13	13
1800	119	127	101	97	85	118	104	98	116	137	13	13	13	13	13	13	13	13	13	13
1810	146	111	105	90	118	113	100	118	146	79	13	13	13	13	13	13	13	13	13	13
1820	120	93	112	133	109	91	91	99	84	103	13	13	13	13	13	13	13	13	13	13
1830	91	88	75	76	80	89	100	92	94	65	14	14	14	14	14	14	14	14	14	14
1840	122	87	107	127	90	107	104	94	96	118	14	14	14	14	14	14	14	14	14	14
1850	88	76	108	79	109	103	83	99	82	82	14	14	14	14	14	14	14	14	14	14
1860	95	83	83	78	77	77	80	84	100	111	14	14	14	14	14	14	14	14	14	14
1870	113	93	84	111	84	108	116	96	113	86	14	14	14	14	14	14	14	14	14	14
1880	95	135	143	131	143	112	120	110	114	126	14	14	14	14	14	14	14	14	14	14
1890	126	116	147	123	97	97	92	107	87	90	14	14	14	14	14	14	14	14	14	14
1900	81	112	111	129	106	100	92	102	85	107	14	14	14	14	14	14	14	14	14	14
1910	114	71	101	97	88	127	114	101	87	102	14	14	14	14	14	14	14	14	14	14
1920	101	86	98	97	95	77	92	84	112	97	14	14	14	14	14	14	14	14	14	14
1930	77	82	99	83	100	127	79	113	123	91	14	14	14	14	14	14	14	14	14	14
1940	96	91	90	95	76	139	111	101	82	94	14	14	14	14	14	14	14	14	14	14
1950	108	103	87	111	98	99	104	97	103	91	14	14	14	14	14	14	14	14	14	14
1960	114	109	98	113	94	105	92	103	110	88	14	14	14	14	14	14	14	14	14	14
1970	87	103	92								14	14	14							

SERIAL CORRELATION = .343 STANDARD DEVIATION = .209 MEAN SENSITIVITY = .190 N = 348

WARREN COUNTY, TENNESSEE TN USA R. E. BELL
412819 QUAL 17 3538N 8545W 442M 272Y 1669:1940 37C SR: .46 SD: .14 MS: .12
AZ:999 SL:99 NOTES: UNIVERSITY OF CHICAGO COLLECTION

	TREE RING INDICES										NUMBER OF SAMPLES									
DATE	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
1669										58										2
1670	83	114	115	134	130	118	99	99	89	89	2	2	2	2	2	2	2	2	2	2
1680	124	66	94	79	105	72	92	115	104	98	2	2	2	2	2	2	2	2	2	2
1690	91	102	99	88	112	102	125	110	110	98	2	2	2	4	6	6	6	6	6	6
1700	117	117	92	65	108	110	104	123	99	108	6	8	8	8	8	11	11	12	12	12
1710	133	138	118	118	115	97	101	87	66	84	14	14	14	16	17	17	17	17	17	17
1720	88	86	83	88	80	77	103	84	109	112	19	19	19	19	21	21	21	21	24	24
1730	82	98	90	110	106	94	95	104	100	133	25	25	26	27	27	27	27	27	28	28
1740	113	109	105	91	99	120	103	94	79	94	28	28	29	30	30	30	30	30	30	31
1750	94	91	102	90	114	83	85	94	99	92	32	32	32	32	34	34	35	35	35	35
1760	103	105	87	85	78	75	76	72	99	94	35	35	35	35	35	35	35	35	35	35
1770	90	97	76	78	67	81	114	94	99	123	35	35	35	35	35	35	35	35	35	35
1780	123	107	119	110	91	103	127	130	117	115	36	36	36	36	36	36	37	37	37	37
1790	117	113	108	126	122	112	118	126	112	86	37	37	37	37	37	37	37	37	37	37
1800	121	95	135	118	108	122	110	112	100	103	37	37	37	37	37	37	37	37	37	37
1810	106	97	102	100	127	108	103	118	113	105	37	37	37	37	37	37	37	37	37	37
1820	117	90	96	104	105	94	94	102	108	101	37	37	37	37	37	37	37	37	37	37
1830	100	89	108	97	86	99	93	82	77	68	37	37	37	37	37	37	37	37	37	37
1840	92	82	88	88	85	93	97	97	88	101	37	37	37	37	37	37	37	37	37	37
1850	89	86	88	78	94	86	97	108	95	90	37	37	37	37	37	37	37	37	37	37
1860	101	84	94	92	93	98	86	95	84	93	37	37	37	37	37	37	37	37	37	37
1870	87	93	79	88	84	98	103	95	99	83	37	37	37	37	37	37	37	37	37	37
1880	95	101	109	109	107	98	112	96	98	117	37	37	37	37	37	37	37	37	37	37
1890	108	103	122	114	98	107	108	108	94	103	37	37	37	37	37	37	37	37	37	37
1900	100	92	93	106	102	101	107	108	105	122	37	37	37	37	37	37	37	37	37	37
1910	114	80	111	94	81	110	119	115	99	90	37	37	37	37	37	37	37	37	37	37
1920	101	95	109	110	102	73	89	104	109	110	37	37	37	37	37	37	37	37	37	37
1930	97	82	97	93	105	110	88	93	122	115	37	37	37	37	37	37	37	37	37	37
1940	113										37									

SERIAL CORRELATION = .459 STANDARD DEVIATION = .143 MEAN SENSITIVITY = .117 N = 272

MAMMOTH CAVE, KENTUCKY KY USA E. ESTES
820810 QUAL 18 3711N 8606W 213M 319Y 1648:1966 20C SR: .66 SD: .21 MS: .14
AZ:270 SL:23 NOTES:

	TREE RING INDICES										NUMBER OF SAMPLES									
DATE	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
1648									115	92									1	1
1650	94	97	87	61	43	31	69	59	87	107	1	1	1	1	1	1	1	1	1	1
1660	110	123	143	87	66	51	59	61	89	69	1	1	1	1	1	1	1	1	1	1
1670	87	79	105	105	118	143	159	156	97	138	1	1	1	1	1	1	1	1	1	1
1680	74	79	113	110	103	98	85	85	74	78	1	1	1	1	1	1	1	1	1	2
1690	87	94	64	69	84	78	86	76	73	82	2	2	2	2	2	2	2	2	2	2
1700	93	114	108	128	142	158	178	157	125	101	2	3	3	3	3	3	4	4	4	4
1710	133	145	135	125	125	115	115	128	128	120	4	4	4	4	4	5	5	5	5	5
1720	119	106	79	96	79	102	100	87	91	107	5	5	5	5	5	5	5	5	5	5
1730	87	75	74	90	86	79	69	81	113	104	6	6	6	6	6	6	6	6	6	6
1740	127	118	106	78	94	93	79	110	91	81	6	6	6	6	6	6	6	6	7	7
1750	111	112	93	110	109	88	91	112	147	138	8	8	8	8	8	8	8	9	9	10
1760	111	130	102	125	112	124	102	98	125	104	10	10	10	10	10	10	10	10	10	10
1770	102	116	80	88	68	82	100	106	103	86	10	10	10	10	10	10	10	10	10	10
1780	86	92	96	91	69	66	79	70	84	90	10	10	10	10	10	10	10	10	10	11
1790	80	87	82	108	112	107	142	134	115	109	11	11	11	11	11	11	11	11	11	11
1800	115	120	118	132	118	108	94	107	98	95	11	11	11	12	12	12	12	12	12	12
1810	96	95	87	95	101	85	77	81	87	91	12	12	12	12	12	12	12	12	12	12
1820	81	76	92	105	130	109	104	125	134	103	13	13	13	13	14	16	16	16	16	18
1830	121	112	91	64	75	85	95	125	117	92	18	18	18	18	18	18	18	18	18	18
1840	110	92	101	105	123	130	130	118	125	115	18	18	18	18	18	18	18	18	18	18
1850	110	96	103	92	117	94	93	96	87	81	19	19	19	19	19	19	19	19	19	19
1860	93	78	91	94	84	81	86	88	77	88	19	19	19	20	20	20	20	20	20	20
1870	80	87	97	89	68	103	102	95	95	73	20	20	20	20	20	20	20	20	20	20
1880	73	99	104	116	104	93	101	95	77	104	20	20	20	20	20	20	20	20	20	20
1890	93	98	99	95	99	75	79	90	67	81	20	20	20	20	20	20	20	20	20	20
1900	79	79	87	103	99	83	98	114	122	122	20	20	20	20	20	20	20	20	20	20
1910	115	82	112	99	70	121	108	103	73	77	20	20	20	20	20	20	20	20	20	20
1920	78	78	106	106	127	97	98	114	139	103	20	20	20	20	20	20	20	20	20	20
1930	87	79	91	93	106	135	88	113	144	129	20	20	20	20	20	20	20	20	20	20
1940	110	98	93	96	83	104	125	125	113	116	20	20	20	20	20	20	20	20	20	20
1950	145	148	105	104	88	102	88	98	108	112	20	20	20	20	20	20	20	20	20	20
1960	119	136	104	71	79	104	120				20	20	20	20	20	20	19			

SERIAL CORRELATION = .659 STANDARD DEVIATION = .212 MEAN SENSITIVITY = .142 N = 319

FERNE CLYFFE, ILLINOIS IL USA C. W. STOCKTON ET AL.
396818 QUAL 19 3732N 8859W 183M 304Y 1669:1972 34C SR: .71 SD: .38 MS: .16
AZ:202 SL:99 NOTES: UPDATE OF ESTES CHRONOLOGY

DATE	TREE RING INDICES 0	1	2	3	4	5	6	7	8	9	NUMBER OF SAMPLES 0	1	2	3	4	5	6	7	8	9
1669										363										1
1670	510	191	196	146	167	195	140	142	144	130	1	1	1	1	1	2	2	3	3	4
1680	164	128	136	160	146	132	131	111	124	91	6	6	6	6	6	6	6	6	6	6
1690	77	78	75	79	110	88	69	71	83	92	7	7	7	7	7	7	7	7	7	7
1700	114	117	108	100	102	106	96	101	78	86	8	8	8	9	9	10	10	10	10	10
1710	94	115	103	94	87	78	90	81	79	81	10	10	11	11	12	13	13	13	13	13
1720	73	68	70	66	67	73	87	96	78	108	13	13	13	13	13	13	13	13	13	13
1730	95	75	72	64	78	63	48	71	86	98	13	13	13	13	13	13	13	13	13	13
1740	128	112	102	86	75	84	65	80	85	80	14	14	14	14	14	14	14	14	14	14
1750	80	69	75	64	52	58	74	85	132	164	14	14	14	14	14	14	14	14	15	15
1760	150	140	94	97	109	118	115	105	126	124	15	15	15	15	15	15	15	15	15	15
1770	108	117	109	95	69	110	138	95	163	172	16	16	16	16	16	16	16	16	16	16
1780	192	201	192	178	159	129	136	151	134	135	16	16	18	18	18	18	18	18	18	18
1790	131	162	116	99	105	136	132	143	124	97	18	18	18	18	18	18	18	18	18	19
1800	107	106	139	98	102	111	88	106	106	115	19	19	19	19	19	19	19	19	19	19
1810	91	95	105	100	95	81	76	90	96	110	19	19	19	19	19	19	19	19	19	19
1820	91	91	95	95	81	74	64	103	89	76	19	19	19	19	19	19	19	20	21	21
1830	94	97	86	86	51	61	79	88	81	69	21	21	21	21	21	21	21	21	21	21
1840	94	76	94	84	99	100	103	85	91	76	22	22	22	22	22	22	22	22	22	23
1850	69	72	84	79	97	85	97	83	87	73	23	23	23	24	24	24	24	24	24	25
1860	86	82	92	99	82	93	106	88	100	114	27	28	28	29	29	29	30	30	30	31
1870	94	87	85	97	65	101	117	96	87	85	31	32	33	33	33	33	33	33	33	33
1880	99	94	125	119	114	92	86	78	97	122	33	33	33	33	33	33	33	33	34	34
1890	89	115	134	102	84	115	98	105	115	112	34	34	34	34	34	34	34	34	34	34
1900	105	74	99	117	115	102	107	128	103	103	34	34	34	34	34	34	34	34	34	34
1910	129	77	133	86	77	143	118	101	77	117	34	34	34	34	34	34	34	34	34	34
1920	97	84	101	111	138	98	79	120	131	123	34	34	34	34	34	34	34	34	34	34
1930	90	94	98	93	73	124	73	113	131	101	34	34	34	34	34	34	34	34	34	34
1940	94	80	117	99	80	112	110	108	105	114	34	34	34	34	34	34	34	34	34	34
1950	106	115	81	80	83	122	87	118	106	93	34	34	34	34	34	34	34	34	34	34
1960	96	99	87	90	83	94	92	97	115	100	34	34	34	34	34	34	34	16	16	16
1970	104	95	80								16	16	16							

SERIAL CORRELATION = .708 STANDARD DEVIATION = .384 MEAN SENSITIVITY = .157 N = 304

PINE HILLS-4, ILLINOIS IL USA E. ESTES
570840 PIEC 20 3732N 8926W 232M 242Y 1724:1965 20C SR: .59 SD: .27 MS: .20
AZ:999 SL:99 NOTES:

DATE	TREE RING INDICES 0	1	2	3	4	5	6	7	8	9	NUMBER OF SAMPLES 0	1	2	3	4	5	6	7	8	9
1724					97	37	58	121	83	121					1	1	1	2	2	3
1730	159	83	108	153	101	82	100	139	108	148	4	4	4	5	5	5	5	6	6	6
1740	127	104	119	134	121	104	75	96	81	72	6	6	7	7	7	7	7	7	7	7
1750	69	84	71	78	70	66	60	85	71	66	7	7	7	7	7	7	9	9	10	10
1760	67	98	90	90	94	98	93	86	65	75	10	10	10	10	10	10	10	10	10	10
1770	95	123	90	65	61	71	77	89	82	87	10	10	10	10	10	10	10	10	10	10
1780	49	56	57	86	60	60	58	75	86	58	10	10	10	10	10	10	10	10	10	10
1790	78	84	70	81	102	80	89	81	83	67	10	10	10	10	10	10	10	10	10	10
1800	61	83	94	81	96	100	121	104	108	103	10	10	10	10	10	10	10	10	10	10
1810	112	112	127	126	157	172	115	94	85	127	10	10	10	10	10	10	10	10	10	10
1820	103	123	122	107	134	112	94	111	136	116	10	10	10	10	10	11	11	11	11	12
1830	125	122	110	93	114	117	138	149	99	125	12	12	12	12	12	14	15	15	15	15
1840	134	116	140	114	148	167	116	105	123	154	16	17	17	17	18	20	20	20	20	20
1850	114	136	131	113	96	95	58	70	90	124	20	20	20	20	20	20	20	20	20	20
1860	124	130	147	130	94	109	91	106	125	118	20	20	20	20	20	20	20	20	20	20
1870	155	129	110	106	100	128	140	128	136	106	20	20	20	20	20	20	20	20	20	20
1880	150	86	129	111	124	90	87	71	86	116	20	20	20	20	20	20	20	20	20	20
1890	109	131	135	108	103	69	90	111	146	80	20	20	20	20	20	20	20	20	20	20
1900	84	82	73	55	60	58	80	109	134	172	20	20	20	20	20	20	20	20	20	20
1910	134	123	79	68	55	70	83	138	95	104	20	20	20	20	20	20	20	20	20	20
1920	77	76	94	90	100	73	86	131	110	157	20	20	20	20	20	20	20	20	20	20
1930	67	68	77	76	63	96	48	61	100	92	20	20	20	20	20	20	20	20	20	20
1940	65	61	81	48	58	93	104	106	120	86	20	20	20	20	20	20	20	20	20	20
1950	111	93	77	79	109	80	85	111	128	117	20	20	20	20	20	20	20	20	20	20
1960	86	108	91	70	60	69					20	20	20	20	18	14				

SERIAL CORRELATION = .589 STANDARD DEVIATION = .273 MEAN SENSITIVITY = .200 N = 242

PINEY CREEK, ILLINOIS IL USA E. ESTES
580843 PIEC 21 3754N 8938W 152M 167Y 1806:1972 20C SR: .58 SD: .40 MS: .29
AZ:999 SL:99 NOTES:

DATE	TREE RING INDICES 0	1	2	3	4	5	6	7	8	9	NUMBER OF SAMPLES 0	1	2	3	4	5	6	7	8	9
1806							161	37	67	69							1	1	1	1
1810	40	91	204	163	179	143	89	109	101	75	1	1	1	1	2	2	2	2	3	4
1820	73	45	40	38	67	82	105	132	137	105	5	5	5	5	6	7	7	10	11	12
1830	126	98	73	72	93	115	109	97	70	88	12	14	15	15	15	15	15	17	17	17
1840	118	102	128	67	103	113	78	96	110	139	17	17	17	17	17	17	17	17	17	17
1850	118	108	91	108	86	84	47	78	115	164	18	18	19	19	19	19	19	19	19	19
1860	128	145	163	129	84	121	85	85	87	112	19	19	20	20	20	20	20	20	20	20
1870	89	82	64	57	71	87	130	85	124	95	20	20	20	20	20	20	20	20	20	20
1880	177	56	122	157	167	77	89	84	86	117	20	20	20	20	20	20	20	20	20	20
1890	138	139	84	84	76	67	60	75	99	38	20	20	20	20	20	20	20	20	20	20
1900	57	32	50	48	124	113	117	189	219	213	20	20	20	20	20	20	20	20	20	20
1910	187	124	83	83	52	75	89	128	61	61	20	20	20	20	20	20	20	20	20	20
1920	70	138	105	99	115	100	131	180	179	182	20	20	20	20	20	20	20	20	20	20
1930	66	63	68	61	46	87	35	40	80	89	20	20	20	20	20	20	20	20	20	20
1940	65	24	45	66	93	75	117	138	153	100	20	20	20	20	20	20	20	20	20	20
1950	118	161	106	106	41	90	114	127	166	136	20	20	20	20	20	20	20	20	20	20
1960	143	173	129	104	79	84	86	89	105	122	20	20	20	20	20	20	20	20	20	20
1970	103	64	51								20	20	20							

SERIAL CORRELATION = .583 STANDARD DEVIATION = .395 MEAN SENSITIVITY = .287 N = 167

ITASCA STATE PARK, MINNESOTA MN USA H. C. FRITTS
430928 PIRE 22 4711N 9514W 457M 300Y 1672:1971 45C SR: .78 SD: .23 MS: .11
AZ:999 SL:99 NOTES: 3 SITES SUMMED

DATE	TREE RING INDICES 0	1	2	3	4	5	6	7	8	9	NUMBER OF SAMPLES 0	1	2	3	4	5	6	7	8	9
1672			116	124	120	139	112	93	114	90			1	1	1	1	1	1	1	1
1680	95	86	94	88	83	81	80	62	56	56	1	2	2	2	2	2	2	2	2	2
1690	60	48	41	48	64	77	70	68	63	72	2	2	2	2	2	2	2	2	2	2
1700	85	83	89	114	114	107	110	111	82	48	2	2	2	2	2	2	2	2	2	2
1710	45	103	152	178	190	158	191	127	106	131	2	2	2	2	2	2	2	2	2	2
1720	110	85	114	136	134	130	173	147	134	137	2	2	2	2	2	2	2	3	5	5
1730	138	125	116	128	104	63	61	73	91	99	5	6	6	6	6	6	7	7	7	8
1740	101	99	98	97	107	99	118	125	114	115	9	9	9	9	10	11	11	11	11	11
1750	114	97	99	96	105	99	93	83	87	98	11	12	13	13	13	13	13	13	13	13
1760	99	112	108	107	118	105	81	92	82	73	13	13	14	15	16	16	16	16	16	16
1770	61	80	76	73	76	87	88	102	124	119	16	17	19	19	19	19	20	20	20	20
1780	104	119	116	128	128	128	123	122	108	100	20	20	20	21	21	22	22	22	23	23
1790	90	86	92	97	98	81	105	96	80	84	23	23	23	23	23	23	23	23	23	23
1800	64	79	94	110	95	90	88	96	88	78	23	23	23	23	24	24	25	25	25	25
1810	81	84	91	91	80	84	85	72	75	81	25	25	25	25	25	25	25	25	25	25
1820	93	87	117	104	101	96	96	107	131	137	26	26	26	26	26	26	27	30	31	33
1830	138	134	129	151	150	112	95	93	91	101	38	39	39	40	41	42	42	43	44	44
1840	89	85	92	92	90	88	93	88	96	98	44	44	44	44	44	44	44	44	44	44
1850	84	83	101	104	100	107	120	113	107	99	44	44	44	44	44	45	45	45	45	45
1860	111	113	102	58	77	84	88	92	92	93	45	45	45	45	45	45	45	45	45	45
1870	115	109	132	116	132	127	116	123	131	93	45	45	45	45	45	45	45	45	45	45
1880	90	97	94	85	81	94	85	104	94	111	45	45	45	45	45	45	45	45	45	45
1890	98	97	96	87	97	111	119	120	112	109	45	45	45	45	45	45	45	45	45	45
1900	109	88	105	112	114	126	128	104	92	88	45	45	45	45	45	45	45	45	45	45
1910	73	71	89	104	102	119	125	103	115	110	45	45	45	45	45	45	45	45	45	45
1920	98	100	99	81	69	83	78	85	95	95	45	45	45	45	45	45	45	45	45	45
1930	99	102	98	84	82	99	72	61	70	62	45	45	45	45	45	45	45	45	45	45
1940	69	78	102	72	79	115	124	120	113	111	45	45	45	45	45	45	45	45	45	45
1950	94	108	138	116	105	129	99	97	100	135	45	45	45	45	45	45	45	45	45	45
1960	124	114	100	103	94	118	119	111	102	102	45	45	45	45	45	45	45	45	45	45
1970	82	97									45	45								

SERIAL CORRELATION = .784 STANDARD DEVIATION = .227 MEAN SENSITIVITY = .111 N = 300

SAGANAGA LAKE, MINNESOTA MN USA H. C. FRITTS
553927 PIRE 23 4813N 9054W 445M 353Y 1620:1972 42C SR: .48 SD: .25 MS: .21
AZ:999 SL:10 NOTES: 5 SITES SUMMED

DATE	TREE RING INDICES 0	1	2	3	4	5	6	7	8	9	NUMBER OF SAMPLES 0	1	2	3	4	5	6	7	8	9
1620	102	61	141	117	92	152	95	129	138	204	1	1	1	1	1	1	1	1	1	2
1630	139	106	135	149	189	144	110	128	126	70	2	2	2	3	5	5	5	5	5	5
1640	95	86	122	115	90	93	152	144	89	113	5	5	5	5	5	5	5	5	5	5
1650	95	106	74	90	102	87	67	63	51	70	5	5	5	5	5	5	5	5	5	5
1660	55	55	53	62	62	43	54	52	67	77	5	5	5	5	5	5	5	5	5	5
1670	79	103	59	97	77	74	87	54	73	111	5	6	7	7	7	7	7	9	9	9
1680	86	94	77	114	97	109	100	115	77	83	9	10	10	10	10	10	10	12	12	12
1690	69	70	86	100	124	127	106	96	115	91	13	13	13	13	13	13	13	14	15	17
1700	113	108	115	137	127	130	110	132	119	103	17	18	18	18	20	22	23	23	23	24
1710	107	122	99	118	107	115	118	82	93	92	24	24	24	24	24	25	25	26	26	26
1720	116	83	95	118	85	92	90	86	97	112	26	27	27	29	29	29	29	29	29	30
1730	110	102	111	104	116	95	47	95	99	47	30	31	31	32	33	33	34	34	34	34
1740	94	71	50	66	79	96	126	133	149	128	34	34	34	34	34	34	34	34	34	34
1750	124	101	118	100	101	78	106	81	82	90	34	35	35	35	35	35	35	35	35	35
1760	61	70	108	95	82	117	94	123	98	101	35	35	35	35	35	35	35	35	35	35
1770	101	90	104	89	95	95	61	102	131	130	36	37	37	37	37	37	37	37	37	37
1780	81	115	103	114	113	91	80	127	113	109	39	39	40	40	40	40	40	40	40	40
1790	94	86	89	107	79	84	90	78	79	95	40	40	40	40	40	40	40	40	40	40
1800	96	117	145	121	40	103	79	81	81	76	40	40	41	41	41	41	41	41	41	41
1810	88	98	91	109	134	139	120	122	95	142	42	42	42	42	42	42	42	42	42	42
1820	137	87	147	111	102	127	125	137	163	101	42	42	42	42	42	42	42	42	42	42
1830	128	114	132	130	166	105	124	96	108	90	42	42	42	42	42	42	42	42	42	42
1840	73	105	121	114	119	106	81	121	138	121	42	42	42	42	42	42	42	42	42	42
1850	117	111	91	57	111	70	108	100	109	121	42	42	42	42	42	42	42	42	42	42
1860	87	111	68	62	44	76	54	84	81	74	42	42	42	42	42	42	42	42	42	42
1870	82	60	99	105	70	63	98	119	100	83	42	42	42	42	42	42	42	42	42	42
1880	95	99	62	75	78	101	69	97	103	91	42	42	42	42	42	42	42	42	42	42
1890	79	80	96	74	82	136	136	118	141	145	42	42	42	42	42	42	42	42	42	42
1900	99	145	115	91	121	145	104	103	138	84	42	42	42	42	42	42	42	42	42	42
1910	35	80	95	84	80	115	109	113	113	89	42	42	42	42	42	42	42	42	42	42
1920	113	70	90	77	59	107	114	107	116	95	42	42	42	42	42	42	42	42	42	42
1930	120	77	87	102	79	103	77	71	98	92	42	42	42	42	42	42	42	42	42	42
1940	82	78	97	84	106	104	100	111	71	99	42	42	42	42	42	42	42	42	42	42
1950	117	113	108	121	94	87	102	98	76	71	42	42	42	42	42	42	42	42	42	42
1960	83	71	110	103	110	139	104	120	136	119	42	42	42	42	42	42	42	42	42	40
1970	95	100	111								40	40	28							

SERIAL CORRELATION = .482 STANDARD DEVIATION = .248 MEAN SENSITIVITY = .207 N = 119

SEAGULL LAKE, MINNESOTA MN USA H. C. FRITTS
577929 PIRE 24 4807N 9055W 445M 347Y 1625:1971 29C SR: .54 SD: .23 MS: .18
AZ:999 SL:99 NOTES: 4 SITES SUMMED

DATE	TREE RING INDICES 0	1	2	3	4	5	6	7	8	9	NUMBER OF SAMPLES 0	1	2	3	4	5	6	7	8	9
1625						128	100	104	115	93						1	2	4	4	4
1630	94	102	90	98	96	132	118	134	110	85	4	4	4	4	4	5	5	5	7	7
1640	105	92	115	114	118	102	88	112	92	92	7	7	7	7	7	7	7	7	7	7
1650	111	111	108	116	117	100	101	87	84	109	7	7	7	7	7	7	7	7	7	7
1660	94	75	66	86	81	69	78	63	71	108	7	7	7	7	7	7	7	7	7	7
1670	120	108	88	82	80	97	99	83	81	107	7	7	7	7	7	7	7	7	7	7
1680	102	104	71	70	69	101	112	132	107	107	7	8	8	8	9	10	10	10	10	10
1690	107	82	71	85	122	149	135	105	120	113	10	10	10	10	10	10	12	12	12	12
1700	124	112	117	147	145	150	145	139	129	127	12	12	12	12	12	13	13	14	14	14
1710	139	140	128	119	120	131	139	97	83	100	15	15	15	15	16	17	17	17	17	17
1720	108	99	106	119	87	98	107	117	100	122	18	18	18	18	19	19	20	20	20	20
1730	117	111	111	109	108	100	64	86	90	46	20	20	21	21	21	21	21	21	21	21
1740	84	59	46	57	62	76	102	102	123	107	22	23	23	23	24	24	24	24	24	24
1750	90	86	99	91	79	75	106	86	89	85	26	26	26	26	26	26	26	26	26	26
1760	67	63	106	76	88	91	92	124	84	91	26	26	26	26	26	26	26	26	26	26
1770	84	73	100	80	75	85	58	76	114	105	26	26	26	26	26	26	26	26	26	26
1780	62	84	78	92	106	87	66	92	76	97	26	26	26	26	26	26	26	26	26	26
1790	85	67	78	94	85	74	92	96	80	96	28	28	28	28	28	28	28	28	28	29
1800	92	130	156	146	65	118	125	106	99	107	29	29	29	29	29	29	29	29	29	29
1810	110	97	74	105	128	107	87	89	66	99	29	29	29	29	29	29	29	29	29	29
1820	88	51	108	99	103	102	95	108	132	83	29	29	29	29	29	29	29	29	29	29
1830	100	99	104	107	152	142	135	120	136	109	29	29	29	29	29	29	29	29	29	29
1840	94	126	141	113	131	131	97	130	160	140	29	29	29	29	29	29	29	29	29	29
1850	155	145	114	94	141	98	130	126	141	136	29	29	29	29	29	29	29	29	29	29
1860	120	128	66	92	67	99	69	101	84	88	29	29	29	29	29	29	29	29	29	29
1870	110	68	108	137	105	58	100	117	105	84	29	29	29	29	29	29	29	29	29	29
1880	81	87	83	64	75	81	53	100	107	99	29	29	29	29	29	29	29	29	29	29
1890	95	105	95	57	69	115	92	87	123	140	29	29	29	29	29	29	29	29	29	29
1900	114	136	142	107	113	158	125	97	123	80	29	29	29	29	29	29	29	29	29	29
1910	36	65	73	83	82	111	121	140	133	90	29	29	29	29	29	29	29	29	29	29
1920	128	86	107	72	73	113	131	104	139	96	29	29	29	29	29	29	29	29	29	29
1930	111	102	102	99	70	93	68	69	91	65	29	29	29	29	29	29	29	29	29	29
1940	73	74	99	75	112	115	96	114	77	101	29	29	29	29	29	29	29	29	29	29
1950	100	102	120	134	103	118	109	91	84	80	29	28	28	28	28	28	28	28	28	28
1960	80	65	104	107	83	123	101	115	113	116	28	28	28	28	28	28	28	28	28	28
1970	95	99									28	27								

SERIAL CORRELATION = .542 STANDARD DEVIATION = .230 MEAN SENSITIVITY = .182 N = 347

LAKE AHQUABI STATE PARK, IOWA IA USA D. N. DUVICK
463810 QUAL 25 4117N 9335W 275M 261Y 1717:1977 22C SR: .23 SD: .20 MS: .19
AZ: 0 SL:15 NOTES:

DATE	TREE RING INDICES 0	1	2	3	4	5	6	7	8	9	NUMBER OF SAMPLES 0	1	2	3	4	5	6	7	8	9
1717								158	65	140								1	1	1
1720	118	95	114	125	110	160	109	112	90	84	1	1	1	2	2	2	2	2	3	3
1730	84	76	126	105	92	98	69	78	110	103	3	3	3	3	3	4	4	5	5	5
1740	108	117	97	89	84	141	105	90	63	105	5	5	5	5	5	5	5	5	5	5
1750	103	108	73	72	104	74	85	76	69	90	6	6	6	6	6	6	6	6	6	6
1760	98	129	117	136	119	78	127	103	103	108	6	6	8	8	9	9	9	9	11	12
1770	97	111	71	82	135	142	110	132	112	145	12	12	12	12	12	12	12	12	12	12
1780	92	137	107	96	116	106	92	103	92	81	12	12	12	12	12	13	13	14	14	14
1790	56	71	98	109	113	113	75	86	70	68	14	14	14	14	14	14	14	14	14	14
1800	55	108	155	103	120	125	114	120	104	86	14	14	14	14	14	14	14	14	14	14
1810	124	130	100	100	118	109	73	105	71	98	14	14	14	14	14	14	14	14	14	14
1820	91	73	103	98	124	129	100	99	120	81	14	14	14	14	14	14	15	15	15	15
1830	125	96	107	133	116	103	84	95	75	71	16	16	17	17	17	17	17	17	17	17
1840	85	98	96	89	96	80	76	81	68	87	17	17	17	17	17	17	17	18	18	18
1850	86	116	105	108	108	63	89	89	117	121	18	19	19	19	19	19	19	19	19	19
1860	68	98	108	99	94	103	109	105	89	117	19	19	19	20	20	20	20	20	20	20
1870	93	103	119	103	74	111	109	113	109	116	20	20	20	20	20	20	20	20	20	20
1880	106	138	128	126	136	131	96	80	119	121	21	21	21	21	21	21	21	21	21	21
1890	74	100	109	82	59	71	87	99	85	103	21	21	21	21	21	21	21	21	21	21
1900	72	86	139	133	101	107	98	121	103	122	21	22	22	22	22	22	22	22	22	22
1910	68	63	101	101	55	111	106	86	80	102	22	22	22	22	22	22	22	22	22	22
1920	102	93	98	105	115	87	99	113	136	100	22	22	22	22	22	22	22	22	22	22
1930	102	81	129	89	64	125	107	92	93	71	22	22	22	22	22	22	22	22	22	22
1940	66	97	107	101	95	110	99	109	73	113	22	22	22	22	22	22	22	22	22	22
1950	99	120	110	114	93	92	65	93	95	105	22	22	22	22	22	22	22	22	22	22
1960	113	112	114	97	122	109	109	104	84	124	22	22	22	22	22	22	22	22	22	22
1970	94	94	91	108	117	103	98	72			22	22	22	22	22	22	22	22		

SERIAL CORRELATION = .235 STANDARD DEVIATION = .199 MEAN SENSITIVITY = .192 N = 261

LEDGES STATE PARK, IOWA IA USA D. N. DUVICK, C. MCKINNEY
648819 QUAL 26 4200N 9353W 300M 289Y 1688:1976 47C SR: .42 SD: .24 MS: .20
AZ:999 SL:99 NOTES:

DATE	TREE RING INDICES 0	1	2	3	4	5	6	7	8	9	NUMBER OF SAMPLES 0	1	2	3	4	5	6	7	8	9
1688									167	68									1	1
1690	67	51	71	105	191	128	102	50	68	107	1	1	1	1	1	1	1	1	1	1
1700	94	122	75	86	68	90	184	166	78	104	1	1	1	1	1	2	2	2	2	2
1710	88	133	115	121	103	121	97	122	96	111	3	3	3	3	3	3	3	3	3	3
1720	71	57	106	142	91	90	158	139	135	107	4	5	5	7	8	8	8	8	8	8
1730	111	111	139	114	83	94	60	67	93	86	8	8	8	9	9	9	9	9	9	9
1740	73	85	70	59	77	133	153	152	125	111	9	9	9	9	9	9	9	9	9	9
1750	129	105	95	97	116	99	79	83	84	105	9	9	9	9	9	10	10	10	10	10
1760	71	122	137	99	128	111	161	124	92	105	10	10	10	10	10	11	11	11	11	11
1770	91	55	61	58	93	113	88	116	98	107	11	11	11	11	11	11	11	11	11	11
1780	79	115	87	79	75	79	87	80	77	79	11	11	11	11	11	12	12	12	12	12
1790	91	60	86	90	87	92	81	97	66	72	12	12	12	12	12	12	12	12	12	12
1800	46	82	132	87	102	95	129	99	91	77	13	13	13	13	13	13	13	13	13	13
1810	82	98	82	94	131	114	81	84	90	76	13	13	14	14	15	15	15	15	15	15
1820	64	68	72	66	95	96	115	125	157	114	15	15	15	15	15	15	15	17	17	18
1830	134	139	133	158	143	138	116	124	103	90	18	18	19	19	19	21	22	24	24	24
1840	126	127	90	111	116	92	87	99	78	104	24	24	24	25	25	25	25	26	26	26
1850	109	113	88	107	110	99	89	81	103	104	27	27	27	28	30	30	30	30	30	30
1860	84	79	100	86	88	77	95	97	92	131	31	31	32	32	32	33	33	34	34	34
1870	93	99	122	95	72	103	102	122	111	108	34	34	35	35	35	35	35	35	36	36
1880	94	119	123	109	113	123	86	72	92	99	38	39	40	41	41	41	41	41	41	42
1890	79	85	106	89	58	63	110	107	100	81	44	45	45	45	47	47	47	47	47	47
1900	70	81	119	123	119	113	125	124	130	125	47	47	47	47	47	47	47	47	47	47
1910	84	86	125	91	81	125	111	101	83	100	47	47	47	47	47	47	47	47	47	47
1920	114	105	111	102	112	77	68	109	125	89	47	47	47	47	47	47	47	47	47	47
1930	95	64	112	89	60	118	98	95	110	89	47	47	47	47	47	47	47	47	47	47
1940	71	125	123	114	121	125	99	116	77	93	47	47	47	47	47	47	47	47	47	47
1950	94	119	106	105	89	98	66	95	96	95	47	47	47	47	47	47	47	47	47	47
1960	92	107	112	74	110	104	103	90	92	114	47	47	47	47	47	47	47	47	47	47
1970	86	87	88	112	117	113	100				47	47	47	47	47	47	47			

SERIAL CORRELATION = .417 STANDARD DEVIATION = .235 MEAN SENSITIVITY = .196 N = 289

WOODMAN HOLLOW STATE PRESERVE, IOWA IA USA D. N. DUVICK ET AL.
649810 QUAL 27 4225N 9406W 335M 249Y 1729:1977 30C SR: .39 SD: .19 MS: .16
AZ:180 SL:99 NOTES:

DATE	TREE RING INDICES 0	1	2	3	4	5	6	7	8	9	NUMBER OF SAMPLES 0	1	2	3	4	5	6	7	8	9
1729										79										1
1730	77	117	184	106	62	88	96	105	119	131	1	1	1	1	1	1	1	2	2	3
1740	72	96	82	59	78	103	113	87	74	93	3	3	4	4	4	4	4	4	4	4
1750	99	82	76	75	104	133	116	96	104	158	7	8	8	8	8	8	8	8	8	8
1760	113	162	152	107	103	96	99	124	95	121	8	8	9	10	10	12	13	14	14	15
1770	106	83	65	59	114	123	101	117	93	132	16	17	17	17	17	18	18	18	18	18
1780	110	113	102	79	92	87	112	87	93	89	18	18	18	18	19	20	20	20	20	20
1790	93	82	120	150	115	121	97	106	81	78	20	21	23	24	25	25	26	26	26	26
1800	86	105	115	79	93	103	113	115	93	86	27	27	27	27	27	29	29	29	29	29
1810	113	130	98	109	121	120	91	109	99	76	29	29	29	29	30	30	30	30	30	30
1820	87	82	103	77	82	94	92	86	96	63	30	30	30	30	30	30	30	30	30	30
1830	84	93	102	114	115	106	91	102	83	82	30	30	30	30	30	30	30	30	30	30
1840	90	106	92	97	106	104	81	86	80	92	30	30	30	30	30	30	30	30	30	30
1850	88	99	75	88	85	78	75	88	97	96	30	30	30	30	30	30	30	30	30	30
1860	93	106	108	76	92	83	101	106	108	106	30	30	30	30	30	30	30	30	30	30
1870	82	88	113	93	80	101	94	120	146	139	30	30	30	30	30	30	30	30	30	30
1880	115	132	138	117	121	147	102	92	126	128	30	30	30	30	30	30	30	30	30	30
1890	108	118	146	109	71	89	109	124	121	91	30	30	30	30	30	30	30	30	30	30
1900	83	84	116	125	125	114	101	111	106	118	30	30	30	30	30	30	30	30	30	30
1910	79	90	110	91	90	107	115	111	88	98	30	30	30	30	30	30	30	30	30	30
1920	100	114	93	95	113	84	73	98	116	94	30	30	30	30	30	30	30	30	30	30
1930	97	62	117	98	73	117	89	105	102	88	30	30	30	30	30	30	30	30	30	30
1940	77	106	107	103	113	126	96	102	78	91	30	30	30	30	30	30	30	30	30	30
1950	98	105	98	104	98	85	71	96	95	86	30	30	30	30	30	30	30	30	30	30
1960	85	97	104	89	101	108	103	94	77	110	30	30	30	30	30	30	30	30	30	30
1970	89	84	104	122	116	112	105	79			30	30	30	30	30	26	26	26		

SERIAL CORRELATION = .387 STANDARD DEVIATION = .187 MEAN SENSITIVITY = .162 N = 249

CARTER COUNTY, MISSOURI MO USA D. SENTER
385819 QUAL 28 3655N 9100W 274M 295Y 1642:1936 54C SR: .47 SD: .16 MS: .12
AZ:999 SL:99 NOTES: UNIVERSITY OF CHICAGO COLLECTION

DATE	TREE RING INDICES 0	1	2	3	4	5	6	7	8	9	NUMBER OF SAMPLES 0	1	2	3	4	5	6	7	8	9
1642			127	126	139	117	101	147	138	148			1	4	4	4	4	4	4	4
1650	107	188	126	117	82	103	79	72	70	85	4	4	4	4	4	4	4	4	4	4
1660	85	89	76	87	72	83	101	95	89	99	6	6	6	6	6	6	6	6	6	6
1670	69	86	71	91	83	107	95	107	79	102	6	6	6	6	6	6	6	6	6	6
1680	93	69	76	108	99	74	70	68	80	92	6	6	6	6	6	6	6	7	7	7
1690	119	95	97	74	96	114	101	77	88	109	7	7	7	7	7	7	7	7	7	7
1700	120	130	119	112	92	75	100	101	85	93	7	7	8	9	9	9	9	9	10	10
1710	105	103	92	95	120	101	103	98	98	99	10	10	10	10	11	12	12	12	12	13
1720	91	95	101	106	82	80	85	106	77	118	13	13	15	16	16	16	16	16	16	16
1730	92	91	118	130	99	97	80	90	87	121	16	16	16	16	16	16	16	16	18	18
1740	151	100	104	100	110	120	110	128	109	102	21	21	21	21	21	21	23	24	26	26
1750	100	95	91	87	94	79	82	84	102	119	27	28	30	30	30	30	30	31	31	32
1760	115	113	92	84	97	100	90	81	118	125	32	32	32	32	33	33	35	36	37	38
1770	118	104	85	79	78	80	88	81	89	88	38	38	38	38	39	39	41	42	42	42
1780	80	81	85	107	73	88	91	107	111	98	42	42	42	42	43	44	44	44	44	45
1790	97	129	105	102	107	105	115	116	115	92	46	46	46	47	47	47	47	47	48	48
1800	108	93	137	105	105	126	106	112	108	101	48	48	48	48	48	48	48	48	49	50
1810	108	117	111	86	94	99	94	109	101	110	50	50	51	53	53	53	53	53	53	53
1820	102	95	102	98	99	107	98	120	110	93	53	53	54	54	54	54	54	54	54	54
1830	121	114	111	111	100	93	101	99	85	87	54	54	54	54	54	54	54	54	54	54
1840	103	90	93	96	107	100	92	83	85	97	54	54	54	54	54	54	54	54	54	54
1850	92	85	88	81	98	86	92	90	100	92	54	54	54	54	54	54	54	54	54	54
1860	98	100	100	103	96	103	102	96	90	78	54	54	54	54	54	54	54	54	54	54
1870	72	79	87	92	85	111	124	106	121	96	54	54	54	54	54	54	54	54	54	54
1880	109	101	133	141	115	98	95	97	94	111	54	54	54	54	54	54	54	54	54	54
1890	95	103	121	113	99	94	97	107	106	104	54	54	54	54	54	54	54	54	54	54
1900	92	79	89	104	100	90	95	98	100	104	54	54	54	54	54	54	54	54	54	54
1910	109	87	113	88	83	126	116	111	88	104	54	54	54	54	54	54	54	54	54	54
1920	96	99	100	107	116	89	87	105	111	108	54	54	54	54	54	54	54	54	54	52
1930	92	94	94	92	88	108	85				51	51	51	51	51	51	51			

SERIAL CORRELATION = .469 STANDARD DEVIATION = .159 MEAN SENSITIVITY = .120 N = 295

JEFFERSON COUNTY, MISSOURI MO USA R. BELL, F. MAGRE, D. SENTER
381839 JUVI 29 3815N 9025W 150M 193Y 1750:1942 28C SR: .04 SD: .17 MS: .19
AZ:999 SL:99 NOTES: UNIVERSITY OF CHICAGO COLLECTION

	TREE RING INDICES										NUMBER OF SAMPLES									
DATE	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
1750	114	85	103	112	126	85	118	111	93	111	1	1	1	1	1	1	1	2	2	2
1760	104	120	92	122	93	94	116	94	115	109	2	2	2	2	2	2	3	3	3	3
1770	98	98	83	77	85	93	106	114	108	116	3	4	4	4	4	6	7	7	7	7
1780	78	125	101	154	81	109	106	80	94	82	8	8	8	8	9	9	9	10	10	10
1790	88	96	92	96	115	109	105	120	113	73	10	10	11	11	12	12	12	12	12	12
1800	94	93	110	94	104	112	96	102	109	74	12	12	12	12	12	12	12	13	13	14
1810	105	95	103	104	104	76	81	75	77	104	14	14	14	14	14	14	14	14	15	15
1820	78	84	95	78	103	116	110	142	111	83	15	15	15	15	15	15	15	15	15	15
1830	117	105	87	118	101	99	83	107	93	106	16	16	16	16	16	16	16	16	16	16
1840	113	99	128	76	113	96	85	110	111	106	16	16	16	16	17	17	17	17	18	18
1850	84	109	100	95	97	86	63	109	127	108	20	20	21	21	21	22	22	22	22	22
1860	112	107	103	131	85	98	88	88	85	110	22	22	22	22	22	22	22	22	22	22
1870	90	87	70	78	78	115	126	119	134	74	23	24	24	24	24	25	26	27	27	27
1880	90	61	130	113	121	102	99	87	105	130	27	27	27	27	27	27	27	27	27	27
1890	89	126	104	103	103	81	97	114	97	78	27	27	27	27	27	27	27	27	27	27
1900	99	82	67	126	136	122	100	111	115	122	27	27	27	27	27	27	27	27	28	28
1910	126	73	93	90	58	89	94	110	82	101	28	28	28	28	28	28	28	28	28	28
1920	94	93	94	106	139	94	79	114	114	114	28	28	28	28	28	28	28	28	28	28
1930	67	95	70	101	79	130	80	129	117	91	28	27	27	27	27	27	27	26	26	25
1940	113	83	118								25	24	18							

SERIAL CORRELATION = .044 STANDARD DEVIATION = .171 MEAN SENSITIVITY = .189 N = 193

SHANNON COUNTY, MISSOURI MO USA E. JOHNSON, D. SENTER
389819 QUAL 30 3710N 9120W 244M 349Y 1588:1936 36C SR: .52 SD: .19 MS: .14
AZ:999 SL:99 NOTES: UNIVERSITY OF CHICAGO COLLECTION

	TREE RING INDICES										NUMBER OF SAMPLES									
DATE	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
1588									134	93									2	2
1590	101	84	120	171	128	134	140	39	39	60	2	2	2	2	3	3	3	3	4	4
1600	48	73	54	72	77	82	98	105	61	73	4	4	4	4	4	4	4	4	4	4
1610	78	85	102	106	99	121	102	118	125	163	4	4	4	4	4	4	4	4	4	4
1620	167	160	129	158	113	153	166	105	97	90	4	4	4	4	4	4	4	4	4	4
1630	95	85	91	81	94	75	98	104	93	103	4	4	5	5	5	5	5	6	6	6
1640	98	113	82	73	73	80	94	116	112	140	6	6	6	6	6	6	6	6	6	6
1650	93	113	109	123	125	125	84	92	130	102	6	6	6	6	6	6	6	6	6	6
1660	90	89	85	86	73	83	84	74	86	103	6	6	6	6	6	6	6	7	7	7
1670	72	107	118	126	121	146	112	105	96	96	8	8	9	9	9	10	11	11	11	11
1680	108	86	103	92	106	100	95	93	106	125	12	12	12	12	12	12	13	13	13	13
1690	130	103	123	97	140	137	104	90	100	103	13	13	13	13	14	14	15	16	16	18
1700	78	101	113	102	107	99	125	130	81	117	20	20	20	20	21	21	22	22	22	22
1710	102	134	101	114	122	127	118	95	92	118	22	23	23	27	27	27	27	28	28	30
1720	91	92	93	96	60	61	60	90	68	98	31	31	31	31	32	33	33	33	33	33
1730	77	81	107	106	92	91	64	96	92	112	33	34	34	34	34	34	34	34	34	34
1740	125	121	107	95	110	112	85	115	92	88	34	34	34	34	34	34	34	34	34	34
1750	99	88	86	82	92	98	83	96	94	116	34	34	34	34	34	34	34	34	34	34
1760	84	103	77	99	97	97	92	79	128	118	34	34	34	34	34	34	34	34	34	34
1770	125	98	99	83	58	95	110	108	121	108	34	34	34	34	35	35	35	35	35	35
1780	105	110	98	121	96	96	95	114	124	76	35	35	35	35	35	35	36	36	36	36
1790	89	113	90	114	119	118	117	129	134	101	36	36	36	36	36	36	36	36	36	36
1800	117	94	128	91	118	110	112	107	104	102	36	36	36	36	36	36	36	36	36	36
1810	119	124	96	89	91	78	78	86	81	105	36	36	36	36	36	36	36	36	36	36
1820	93	77	92	93	120	116	113	95	105	101	36	36	36	36	36	36	36	36	36	36
1830	120	121	106	105	91	98	88	93	82	93	36	36	36	36	36	36	36	36	36	36
1840	89	76	101	86	103	95	101	95	97	101	36	36	36	36	36	36	36	36	36	36
1850	90	90	93	86	113	95	88	78	80	81	36	36	36	36	36	36	36	36	36	36
1860	90	104	89	97	94	97	105	89	90	90	36	36	36	36	36	36	36	36	36	36
1870	77	84	100	91	88	107	123	101	124	107	36	36	36	36	36	36	36	36	36	36
1880	111	102	129	128	102	101	104	96	101	123	36	36	36	36	36	36	36	36	36	36
1890	94	93	118	103	99	93	111	127	120	99	36	36	36	36	36	36	36	36	36	36
1900	85	84	94	101	108	98	101	97	109	108	36	36	36	36	36	36	36	36	36	36
1910	109	85	115	89	90	114	105	97	93	102	36	36	36	36	36	36	36	36	36	36
1920	98	104	111	113	114	90	88	106	120	104	36	36	36	36	36	36	36	36	36	36
1930	95	85	85	94	88	109	97				36	36	36	36	36	36	34			

SERIAL CORRELATION = .518 STANDARD DEVIATION = .192 MEAN SENSITIVITY = .141 N = 349

SHANNON COUNTY, MISSOURI MO USA C. W. STOCKTON ET AL.
386819 QUAL 31 3716N 9116W 275M 248Y 1725:1972 24C SR: .46 SD: .22 MS: .18
AZ: 0 SL:20 NOTES: UPDATE OF UNIVERSITY OF CHICAGO SHANNON COUNTY SITE

	TREE RING INDICES										NUMBER OF SAMPLES									
DATE	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
1725						178	116	86	67	68						2	2	2	2	3
1730	88	73	94	97	96	59	48	78	99	123	4	4	4	5	6	6	6	7	8	9
1740	112	86	84	84	103	41	47	77	89	91	9	9	10	10	11	11	11	11	11	11
1750	92	43	59	64	77	103	98	105	119	167	11	11	11	11	11	12	13	13	13	14
1760	100	111	92	132	118	118	133	121	171	159	15	15	15	15	15	16	16	16	16	16
1770	165	131	116	111	48	114	136	101	148	116	16	16	16	16	16	16	16	16	16	16
1780	138	89	106	139	106	109	113	135	144	90	16	16	16	18	18	18	18	18	18	18
1790	90	117	95	106	114	128	114	126	103	81	18	18	18	18	18	18	18	19	20	20
1800	90	61	107	89	95	99	106	108	74	87	20	21	21	21	21	21	21	21	21	22
1810	106	91	86	56	79	70	62	106	83	94	23	23	23	23	23	23	23	23	23	23
1820	94	91	90	95	107	100	95	115	101	83	23	23	23	23	23	23	23	23	23	23
1830	124	115	117	108	101	95	105	122	86	84	23	23	23	23	23	23	23	23	23	23
1840	96	73	94	73	93	83	80	70	76	70	23	23	23	23	23	23	23	23	23	23
1850	84	62	68	67	78	69	99	86	72	76	23	23	23	23	23	23	23	23	23	23
1860	91	86	101	101	95	107	111	95	82	92	23	23	23	24	24	24	24	24	24	24
1870	68	91	101	86	81	113	131	109	148	109	24	24	24	24	24	24	24	24	24	24
1880	121	87	130	133	79	100	117	103	105	143	24	24	24	24	24	24	24	24	24	24
1890	107	122	126	118	109	105	112	130	114	94	24	24	24	24	24	24	24	24	24	24
1900	87	78	91	82	114	113	110	89	113	115	24	24	24	24	24	24	24	24	24	24
1910	137	79	130	92	84	132	126	111	87	105	24	24	24	24	24	24	24	24	24	24
1920	108	93	113	120	134	93	95	85	136	116	24	24	24	24	24	24	24	24	24	24
1930	97	101	84	85	81	108	84	93	102	94	24	24	24	24	24	24	24	24	24	24
1940	88	79	94	75	71	111	93	104	117	104	24	24	24	24	24	24	24	24	24	24
1950	97	123	79	79	73	105	89	128	106	94	24	24	24	24	24	24	24	24	24	24
1960	105	89	122	74	96	94	102	97	93	97	24	24	24	24	24	24	24	24	24	24
1970	93	105	130								24	24	24							

SERIAL CORRELATION = .458 STANDARD DEVIATION = .225 MEAN SENSITIVITY = .182 N = 248

WINONA+MARK TWAIN NAT. FOR., MISSOURI MO USA C. W. STOCKTON ET AL.
387818 QUAL 32 3649N 9119W 256M 193Y 1780:1972 54C SR: .46 SD: .21 MS: .15
AZ:200 SL:18 NOTES: SUMMED

	TREE RING INDICES										NUMBER OF SAMPLES									
DATE	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
1780	191	218	126	164	95	105	75	140	103	81	1	1	1	2	2	2	2	3	3	5
1790	94	68	81	100	80	91	46	118	117	100	6	6	8	8	9	9	9	9	9	10
1800	124	85	133	121	131	134	123	137	140	126	10	12	13	14	14	14	14	14	14	16
1810	118	110	118	97	99	94	79	103	93	101	17	17	17	18	19	19	19	19	20	20
1820	92	89	94	106	82	102	89	87	95	76	21	22	23	23	23	24	24	25	25	25
1830	98	89	90	93	86	94	107	106	94	92	25	25	26	26	27	27	27	27	28	28
1840	107	88	84	80	95	94	86	91	85	102	29	29	29	29	30	30	31	31	31	31
1850	78	91	90	87	101	77	98	81	88	91	32	32	32	32	33	33	36	36	36	37
1860	97	97	103	95	79	85	96	79	78	86	37	37	37	37	37	37	37	37	38	39
1870	90	106	132	106	94	115	154	137	154	106	41	41	41	44	45	47	48	49	49	49
1880	95	92	125	138	87	96	92	98	97	110	49	49	50	50	50	50	51	53	53	53
1890	86	95	121	106	93	105	89	114	105	104	53	53	53	53	54	54	54	54	54	54
1900	101	86	99	125	111	101	104	107	122	124	54	54	54	54	54	54	54	54	54	54
1910	143	78	119	81	75	116	102	101	72	85	54	54	54	54	54	54	54	54	54	54
1920	89	82	90	98	111	78	92	111	127	113	54	54	54	54	54	54	54	54	54	54
1930	91	82	76	76	72	99	77	105	105	96	54	54	54	54	54	54	54	54	54	54
1940	83	94	95	88	82	124	122	113	127	121	54	54	54	54	54	54	54	54	54	54
1950	120	134	89	80	90	121	98	112	105	90	54	54	54	54	54	54	54	54	54	54
1960	101	89	98	100	108	104	91	106	86	96	54	54	54	54	54	54	54	34	34	34
1970	100	106	85								34	34	34							

SERIAL CORRELATION = .461 STANDARD DEVIATION = .209 MEAN SENSITIVITY = .152 N = 193

MONTGOMERY COUNTY, ARKANSAS AR USA R. E. BELL
390849 PIEC 33 3437N 9345W 458M 274Y 1666:1939 39C SR: .26 SD: .20 MS: .20
AZ:180 SL:28 NOTES: UNIVERSITY OF CHICAGO COLLECTION

TREE RING INDICES

DATE	0	1	2	3	4	5	6	7	8	9
1666							116	78	71	95
1670	48	74	21	115	94	136	109	125	112	74
1680	88	78	99	107	100	64	79	71	99	97
1690	117	68	93	97	120	156	91	89	105	118
1700	108	120	84	106	113	126	132	69	57	104
1710	94	105	116	76	112	122	127	103	117	94
1720	99	80	94	105	93	89	91	75	92	112
1730	93	90	114	95	85	73	58	76	82	126
1740	92	91	77	117	115	103	89	77	88	114
1750	103	104	75	97	102	145	101	145	115	99
1760	81	128	89	87	116	101	121	77	85	88
1770	107	133	69	86	103	89	127	115	118	126
1780	96	128	90	120	85	98	82	99	65	62
1790	79	89	80	113	113	126	100	114	96	77
1800	75	73	91	86	125	118	95	90	133	103
1810	99	100	107	130	115	144	105	127	89	120
1820	103	103	91	100	66	83	100	109	116	137
1830	144	102	106	89	78	94	89	74	71	98
1840	83	86	104	58	111	108	120	115	111	114
1850	109	98	118	103	106	98	82	108	115	144
1860	73	95	70	95	88	93	118	107	70	72
1870	104	95	105	113	86	89	87	96	126	85
1880	85	70	117	100	82	71	56	68	70	107
1890	97	88	130	137	87	100	70	87	120	82
1900	102	101	101	90	103	94	111	114	153	119
1910	122	128	117	118	126	135	90	133	95	126
1920	95	85	92	131	124	80	93	119	113	119
1930	104	101	89	100	74	103	93	116	85	88

NUMBER OF SAMPLES

DATE	0	1	2	3	4	5	6	7	8	9
1666							1	1	1	1
1670	1	1	1	1	1	2	2	2	2	2
1680	2	2	2	2	2	2	2	3	3	3
1690	3	3	3	3	3	3	3	3	4	4
1700	4	5	5	5	5	5	5	5	5	6
1710	7	7	7	8	8	9	10	10	10	10
1720	10	10	10	10	10	10	10	10	10	11
1730	12	12	12	12	12	12	12	12	12	12
1740	12	13	13	13	13	13	13	13	13	13
1750	14	14	14	14	14	14	14	14	14	14
1760	15	17	17	17	17	17	18	18	18	18
1770	18	19	20	21	22	22	22	23	24	25
1780	25	30	30	30	30	31	32	32	32	32
1790	32	33	34	34	34	34	34	34	34	34
1800	34	34	34	34	34	34	34	34	34	35
1810	35	36	36	36	36	36	36	36	37	37
1820	37	37	37	37	37	37	37	37	37	37
1830	37	37	37	37	37	37	37	38	38	39
1840	39	39	39	39	39	39	39	39	39	39
1850	39	39	39	39	39	39	39	39	39	39
1860	39	39	39	39	39	39	39	39	39	39
1870	39	39	39	39	39	39	39	39	39	39
1880	39	39	39	39	39	39	39	39	39	39
1890	39	39	39	39	39	39	39	39	39	39
1900	39	39	39	39	39	39	39	39	38	38
1910	38	38	38	38	38	38	38	38	38	38
1920	38	38	38	38	38	38	38	38	38	38
1930	38	38	38	38	38	38	38	38	38	38

SERIAL CORRELATION = .261 STANDARD DEVIATION = .202 MEAN SENSITIVITY = .200 N = 274

BIG BRUSHY MOUNTAIN, ARKANSAS AR USA C. W. STOCKION ET AL.
388849 PIEC 34 3437N 9345W 458M 213Y 1760:1972 41C SR: .46 SD: .26 MS: .22
AZ:270 SL:99 NOTES: UPDATE OF UNIVERSITY OF CHICAGO MONTGOMERY COUNTY SITE

TREE RING INDICES

DATE	0	1	2	3	4	5	6	7	8	9
1760	28	129	93	111	109	95	92	53	86	63
1770	118	97	67	92	130	91	131	135	136	165
1780	121	141	76	121	67	81	69	118	75	61
1790	80	106	105	141	152	120	98	136	101	82
1800	61	47	101	112	143	112	42	60	93	81
1810	94	109	104	128	114	114	112	135	91	91
1820	78	74	78	72	58	68	84	116	113	131
1830	131	89	112	135	97	135	96	74	63	60
1840	74	64	77	54	127	134	156	155	170	147
1850	95	88	98	84	102	113	88	116	119	138
1860	92	89	90	98	80	83	106	115	70	83
1870	106	91	106	98	73	66	61	92	148	119
1880	104	74	131	87	80	77	49	69	86	115
1890	114	106	127	131	113	99	71	103	112	83
1900	131	125	111	125	116	114	138	143	149	130
1910	102	107	103	90	118	116	81	127	57	79
1920	69	78	95	128	94	72	64	90	89	105
1930	69	72	60	77	73	74	94	127	77	93
1940	108	130	152	87	121	146	110	101	85	96
1950	131	96	95	74	65	97	70	112	126	132
1960	116	143	113	82	67	85	88	111	108	92
1970	123	119	80							

NUMBER OF SAMPLES

DATE	0	1	2	3	4	5	6	7	8	9
1760	1	2	2	2	2	2	2	3	4	4
1770	4	4	4	5	5	5	5	5	5	7
1780	7	7	7	7	7	7	7	7	7	7
1790	7	7	8	9	10	10	10	10	10	10
1800	10	10	10	10	10	10	10	10	10	10
1810	10	11	11	11	11	11	11	11	11	11
1820	11	11	11	11	11	11	11	11	11	11
1830	11	11	11	11	11	12	12	13	13	13
1840	13	13	13	13	13	14	14	14	14	14
1850	14	14	14	16	16	16	18	18	18	18
1860	18	18	20	20	20	24	24	26	29	29
1870	29	29	29	32	35	35	35	35	35	38
1880	38	38	38	38	38	38	38	38	39	39
1890	39	39	39	39	39	41	41	41	41	41
1900	41	41	41	41	41	41	41	41	41	41
1910	41	41	41	41	41	41	41	41	41	41
1920	41	41	41	41	41	41	41	41	41	41
1930	41	41	41	41	41	41	41	41	41	41
1940	41	41	41	41	41	41	41	41	41	41
1950	41	41	41	41	41	41	41	41	41	41
1960	41	40	40	40	40	40	40	40	40	40
1970	40	40	39							

SERIAL CORRELATION = .455 STANDARD DEVIATION = .264 MEAN SENSITIVITY = .225 N = 213

POLK COUNTY, ARKANSAS AR USA R. E. BELL
311819 QUAL 35 3432N 9415W 381M 263Y 1677:1939 24C SR: .46 SD: .17 MS: .14
AZ:999 SL:99 NOTES: UNIVERSITY OF CHICAGO COLLECTION

	TREE RING INDICES										NUMBER OF SAMPLES									
DATE	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
1677								163	141	121								2	2	2
1680	87	99	107	85	67	57	84	93	67	89	2	2	2	2	2	2	2	2	4	4
1690	88	75	104	125	117	123	99	119	97	90	4	4	4	4	4	4	4	4	6	6
1700	97	103	116	99	90	88	93	99	92	84	6	6	6	6	6	6	6	6	6	6
1710	83	96	120	119	107	101	86	93	129	112	6	6	6	6	6	6	6	6	8	8
1720	142	115	123	102	101	94	73	83	87	97	8	10	10	10	10	10	10	10	10	10
1730	113	116	128	134	118	114	93	107	100	114	10	10	10	10	10	12	12	12	12	14
1740	133	121	107	107	111	85	80	88	77	89	14	16	16	16	16	16	16	16	16	16
1750	78	84	65	93	113	101	89	76	99	118	16	16	16	16	16	16	16	16	16	16
1760	101	102	82	97	105	99	79	74	96	111	16	16	16	16	16	16	16	16	16	16
1770	106	94	64	101	134	131	133	117	99	96	16	16	16	16	16	16	18	20	20	20
1780	109	151	112	127	99	96	94	127	115	113	20	20	20	20	20	22	22	22	22	22
1790	115	98	85	114	102	106	96	99	88	78	22	22	22	22	22	22	22	22	22	22
1800	94	63	109	99	104	106	99	88	101	94	22	22	22	22	22	22	22	22	22	22
1810	106	114	64	96	89	93	95	133	94	102	22	22	22	22	22	22	22	22	22	22
1820	80	82	76	84	60	71	81	85	79	92	22	22	22	22	22	22	24	24	24	24
1830	92	91	114	128	98	111	146	139	109	112	24	24	24	24	24	24	24	24	24	24
1840	118	92	118	125	113	111	113	114	70	90	24	24	24	24	24	24	24	24	24	24
1850	106	92	104	103	102	78	85	115	103	90	24	24	24	24	24	24	24	24	24	24
1860	88	96	85	85	91	93	104	104	81	100	24	24	24	24	24	24	24	24	24	24
1870	110	103	118	122	81	96	126	99	120	91	24	24	24	24	24	24	24	24	24	24
1880	111	100	104	108	97	97	81	97	99	103	24	24	24	24	24	24	24	24	24	24
1890	104	99	111	112	80	115	83	92	102	101	24	24	24	24	24	24	24	24	24	24
1900	89	87	108	106	106	100	101	90	102	94	24	24	24	24	24	24	24	24	24	24
1910	85	91	104	90	88	115	97	95	85	104	24	24	24	24	24	24	24	24	24	24
1920	98	105	114	111	108	91	93	107	115	123	24	24	24	24	24	24	24	24	24	24
1930	104	100	95	88	88	116	96	98	107	95	24	24	24	24	24	24	24	24	24	24

SERIAL CORRELATION = .461 STANDARD DEVIATION = .165 MEAN SENSITIVITY = .135 N = 263

BRUSH HEAP MOUNTAIN, ARKANSAS AR USA C. W. STOCKTON ET AL.
354819 QUAL 36 3423N 9355W 550M 253Y 1720:1972 25C SR: .48 SD: .21 MS: .16
AZ: 0 SL:99 NOTES: UPDATE OF UNIVERSITY OF CHICAGO POLK COUNTY SITE

	TREE RING INDICES										NUMBER OF SAMPLES									
DATE	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
1720	138	102	65	109	107	77	92	91	80	137	1	1	1	1	1	1	1	1	1	1
1730	141	137	74	141	77	66	50	54	82	123	1	1	1	1	1	1	1	1	1	1
1740	231	192	122	110	151	106	97	114	110	114	1	1	1	1	1	1	2	2	3	3
1750	105	122	102	98	96	78	90	63	106	94	5	5	5	5	5	5	6	6	6	6
1760	85	90	74	108	108	106	91	67	75	107	6	6	6	6	6	6	6	6	6	7
1770	113	115	68	83	100	95	117	129	99	57	7	7	7	7	7	7	7	7	7	7
1780	80	128	120	120	92	99	64	78	106	93	7	7	7	8	8	8	8	9	11	11
1790	109	99	89	111	130	116	125	116	96	87	11	12	12	12	13	14	14	14	14	14
1800	91	57	97	110	108	122	100	87	89	99	14	14	14	14	15	15	16	16	16	16
1810	111	139	96	111	108	89	82	99	108	97	16	16	16	16	16	16	16	16	16	16
1820	74	67	70	74	46	49	64	85	81	86	16	16	16	16	17	17	17	17	18	18
1830	129	117	112	138	135	107	129	139	110	105	18	18	18	18	18	18	18	18	18	18
1840	114	103	112	120	118	116	113	127	106	123	18	17	17	17	17	17	18	18	18	18
1850	116	94	80	108	100	73	86	111	117	94	18	18	18	18	20	20	20	21	21	21
1860	96	77	74	69	82	84	105	98	96	107	22	22	22	22	22	23	23	23	23	23
1870	96	105	97	133	84	92	131	114	120	90	24	24	24	24	24	24	24	24	24	24
1880	109	95	123	121	99	90	80	85	97	110	25	25	25	25	25	25	25	25	25	25
1890	133	117	107	111	98	106	82	82	86	89	25	25	25	25	25	25	25	25	25	25
1900	79	83	89	107	108	92	89	103	98	92	25	25	25	25	25	25	25	25	25	25
1910	84	80	102	99	88	117	99	99	92	102	25	25	25	25	25	25	25	25	25	25
1920	110	97	112	122	110	81	80	98	99	116	25	25	25	25	25	25	25	25	25	25
1930	92	89	94	87	89	124	96	104	113	95	25	25	25	25	25	25	25	25	25	25
1940	106	96	111	104	91	136	119	100	99	103	25	25	25	25	25	25	25	25	25	25
1950	123	114	95	83	86	92	86	99	104	102	25	25	25	24	24	24	24	24	24	24
1960	105	104	97	84	78	107	84	118	129	122	24	24	24	24	24	24	24	24	24	24
1970	98	92	84								24	23	23							

SERIAL CORRELATION = .482 STANDARD DEVIATION = .213 MEAN SENSITIVITY = .159 N = 253

POPE COUNTY, ARKANSAS AR USA R. E. BELL
383819 QUAL 37 3537N 9312W 457M 298Y 1642:1939 30C SR: .60 SD: .31 MS: .16
AZ:999 SL:99 NOTES: UNIVERSITY OF CHICAGO COLLECTION

	TREE RING INDICES										NUMBER OF SAMPLES									
DATE	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
1642			121	88	92	149	203	154	174	111			1	1	1	1	1	1	1	1
1650	87	117	71	40	41	41	33	262	271	320	1	1	1	1	1	1	1	1	1	1
1660	129	61	142	132	108	78	64	122	148	73	1	1	2	2	2	2	2	2	2	2
1670	74	96	106	120	178	181	179	178	102	84	2	2	2	2	2	2	3	3	3	4
1680	106	104	131	113	99	76	88	101	81	56	4	4	5	5	5	6	6	6	6	6
1690	69	81	69	60	91	87	82	90	103	123	6	6	6	6	7	8	8	8	8	8
1700	107	89	78	64	93	94	77	70	67	92	9	9	9	9	10	10	10	11	11	11
1710	86	109	96	75	86	74	116	80	69	84	11	11	11	11	12	12	13	13	13	13
1720	77	54	47	75	90	81	91	87	137	236	15	15	15	15	15	15	15	16	16	16
1730	169	157	147	199	152	116	85	72	69	95	17	17	17	17	17	17	17	17	17	17
1740	114	106	102	91	96	95	91	101	90	99	19	19	19	19	19	19	19	19	19	19
1750	102	124	106	92	97	105	111	81	103	103	20	22	22	22	22	22	22	22	22	22
1760	93	95	78	88	107	95	81	66	71	81	26	26	27	28	28	28	28	28	28	28
1770	100	87	73	109	98	116	93	122	105	105	29	29	29	29	29	29	29	29	29	29
1780	113	140	117	127	105	105	118	145	116	116	30	30	30	30	30	30	30	30	30	30
1790	144	112	95	99	106	113	122	117	98	88	30	30	30	30	30	30	30	30	30	30
1800	88	81	111	109	103	107	79	95	100	95	30	30	30	30	30	30	30	30	30	30
1810	112	117	96	105	100	97	95	111	104	92	30	30	30	30	30	30	30	30	30	30
1820	88	84	87	96	87	90	87	101	96	91	30	30	30	30	30	30	30	30	30	30
1830	100	91	102	114	83	85	100	93	91	71	30	30	30	30	30	30	30	30	30	30
1840	90	80	93	110	101	117	114	105	96	119	30	30	30	30	30	30	30	30	30	30
1850	102	76	89	99	101	73	76	84	113	88	30	30	30	30	30	30	30	30	30	30
1860	101	88	81	92	92	93	104	115	99	102	30	30	30	30	30	30	30	30	30	30
1870	92	110	98	110	85	84	109	106	119	91	30	30	30	30	30	30	30	30	30	30
1880	99	93	113	125	112	96	88	97	94	101	30	30	30	30	30	30	30	30	30	30
1890	126	103	102	114	92	98	93	92	104	109	30	30	30	30	30	30	30	30	30	30
1900	98	94	106	122	112	115	111	98	114	115	30	30	30	30	30	30	30	30	30	30
1910	109	83	110	91	96	117	103	106	96	108	30	30	30	30	30	30	30	30	30	30
1920	100	94	90	109	110	91	90	113	110	121	30	30	30	30	30	30	30	30	30	30
1930	98	106	106	95	89	110	86	87	100	86	30	30	30	30	30	30	30	30	30	29

SERIAL CORRELATION = .599 STANDARD DEVIATION = .307 MEAN SENSITIVITY = .159 N = 298

RUSSELLVILLE, ARKANSAS AR USA C. W. STOCKTON ET AL.
384819 QUAL 38 3539N 9304W 564M 260Y 1713:1972 25C SR: .42 SD: .18 MS: .15
AZ:180 SL:99 NOTES: POLYNOMIAL OPTION; UPDATE OF ESTES CHRONOLOGY

	TREE RING INDICES										NUMBER OF SAMPLES									
DATE	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
1713				71	126	82	79	116	116	100				1	1	1	1	1	1	1
1720	110	117	135	118	84	91	109	54	53	69	1	1	1	1	1	1	1	1	1	1
1730	82	148	111	96	88	91	66	89	116	168	1	1	1	1	1	1	1	1	1	1
1740	145	112	124	155	127	98	110	124	125	107	1	1	1	1	1	2	2	2	3	5
1750	133	124	77	72	76	75	87	69	93	104	5	5	5	5	5	5	6	6	6	6
1760	94	108	86	123	105	115	90	55	93	103	7	8	8	8	8	8	8	8	8	8
1770	106	108	69	111	94	110	115	107	83	109	8	8	8	8	10	10	10	11	11	12
1780	107	135	109	120	97	90	98	130	127	112	12	12	13	13	13	13	13	13	13	13
1790	132	115	86	105	95	109	130	131	105	78	13	13	14	14	14	14	14	14	14	14
1800	73	67	95	80	95	129	122	92	85	95	14	15	15	15	15	17	17	17	17	17
1810	114	114	83	79	93	89	85	84	107	89	18	18	18	18	18	18	18	18	18	18
1820	87	93	101	113	86	98	115	99	109	96	18	18	18	18	18	18	18	19	19	19
1830	110	87	101	111	99	106	122	125	96	83	20	20	20	20	20	20	20	20	21	21
1840	110	85	118	118	134	128	120	109	109	103	22	22	22	22	22	22	22	22	22	22
1850	90	95	100	100	107	89	102	124	122	95	22	22	22	22	22	22	22	22	22	22
1860	102	102	83	81	85	88	100	111	83	112	22	22	22	22	22	22	22	22	22	22
1870	121	108	103	99	76	79	104	96	103	83	22	22	22	22	23	23	23	23	23	23
1880	92	96	108	110	88	81	84	97	98	107	23	23	23	23	23	23	24	24	24	24
1890	111	112	123	121	96	101	74	75	78	92	24	24	24	24	25	25	25	25	25	25
1900	72	78	81	99	106	115	125	108	108	125	25	25	25	25	25	25	25	25	25	25
1910	112	76	100	81	81	116	104	107	87	95	25	25	25	25	25	25	25	25	25	25
1920	120	97	106	131	139	75	83	114	117	115	25	25	25	25	25	25	25	25	25	25
1930	95	109	100	86	87	129	96	118	131	96	25	25	25	25	25	25	25	25	25	25
1940	97	85	95	92	85	122	125	112	107	115	25	25	25	25	25	25	25	25	25	25
1950	110	118	89	80	79	100	87	95	92	106	25	25	25	25	25	25	25	25	25	25
1960	90	91	93	95	96	109	98	103	97	87	25	25	25	25	25	25	25	25	25	25
1970	91	96	80								25	25	25							

SERIAL CORRELATION = .418 STANDARD DEVIATION = .179 MEAN SENSITIVITY = .148 N = 260

OAK PARK, TEXAS TX USA E. R. COOK, T. P. HARLAN
731860 QUST 39 3158N 9642W 137M 276Y 1699:1974 28C SR: .52 SD: .40 MS: .27
AZ:180 SL: 5 NOTES:

	TREE RING INDICES										NUMBER OF SAMPLES									
DATE	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
1699										27										1
1700	58	58	94	75	73	33	112	79	74	54	2	2	2	2	2	2	2	2	2	2
1710	76	45	100	103	48	43	84	82	120	176	2	2	2	2	2	2	2	2	2	2
1720	168	130	73	84	68	49	127	99	40	49	2	2	2	2	2	2	2	2	2	2
1730	43	99	113	69	65	247	95	102	134	239	2	2	2	2	2	2	2	2	2	2
1740	310	207	232	153	270	205	241	167	131	124	2	2	2	2	2	3	3	3	3	3
1750	86	142	63	133	74	76	141	221	163	145	3	3	3	3	3	3	3	3	3	3
1760	154	132	132	121	109	116	115	107	68	87	5	5	5	5	6	6	6	6	6	7
1770	107	126	70	106	121	78	78	76	88	82	8	8	8	8	8	8	8	8	8	8
1780	70	104	119	94	94	94	56	74	87	34	8	8	9	9	9	9	9	9	9	9
1790	32	138	156	191	159	127	126	127	117	104	10	10	10	10	10	10	10	10	10	11
1800	107	57	83	83	93	53	67	96	78	110	13	13	13	13	13	14	14	14	15	15
1810	88	114	97	92	81	130	113	112	89	127	16	16	16	16	16	16	16	16	16	16
1820	77	79	69	78	69	74	62	72	79	76	17	17	17	17	17	17	17	17	17	17
1830	97	109	125	147	122	94	181	93	109	96	18	18	18	18	18	18	18	18	18	18
1840	114	91	67	140	79	121	103	74	69	123	19	19	19	19	19	19	19	19	19	19
1850	97	119	111	111	100	64	97	62	99	82	19	19	19	19	19	19	19	19	19	19
1860	80	82	90	100	90	107	97	126	91	136	20	20	20	20	20	20	20	20	20	20
1870	112	122	110	107	102	102	106	137	108	73	25	25	25	25	25	25	25	26	26	27
1880	88	81	135	148	160	117	60	44	139	138	27	27	27	27	27	27	27	27	27	27
1890	160	100	101	112	75	66	76	90	64	52	27	27	28	28	28	28	28	28	28	28
1900	107	67	53	175	100	122	126	100	147	77	28	28	28	28	28	28	28	28	28	28
1910	89	84	95	61	110	109	120	59	54	139	28	28	28	28	28	28	28	28	28	28
1920	91	155	142	81	139	51	135	131	141	129	28	28	28	28	28	28	28	28	28	28
1930	116	118	126	80	76	92	70	109	121	89	28	28	28	28	28	28	28	28	28	28
1940	66	101	119	131	130	152	158	118	98	76	28	28	28	28	28	28	28	28	28	28
1950	99	67	79	62	76	67	60	63	81	90	28	28	28	28	28	28	28	28	28	28
1960	93	104	95	60	58	106	114	95	94	115	28	28	28	28	28	28	28	28	28	28
1970	141	103	106	133	101						28	28	28	28	11					

SERIAL CORRELATION = .519 STANDARD DEVIATION = .400 MEAN SENSITIVITY = .275 N = 276

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