A Dendrochronology Study of Select Timbers from the Hoffman House, Poughkeepsie, New York

William A. Flynt
Architectural Conservator
Historic Deerfield, Inc.
Deerfield, MA

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Introduction

On March 13th, 2013, a selection timbers from the Hoffman house in Poughkeepsie, NY, were sampled by William Flynt for the purposes of conducting a dendrochronology study. The samples were prepped and analyzed at Historic Deerfield by William Flynt, Architectural Conservator.

Background

Dendrochronology, or the study of tree ring growth patterns to date the age of archeological timbers, was initially developed in the 1920's by Andrew E. Douglass using long-lived Ponderosa pines in the Southwest United States. An astronomer by training, Douglass was interested in historical sun spot activity and its relationship to earth's climate. He surmised that by looking at yearly growth ring sequences in long-lived trees growing in an arid environment where moisture is key, he might be able to ascertain yearly variations in climate attributable to sunspot activity. (Baillie, 1982). To push the tree ring database back past the age of living trees, samples were taken from roof poles in Pueblo ruins which turned out to eventually overlap the living tree data. Besides fulfilling his research needs, this work revealed the feasibility of dating archeological structures.

In the 1980's the advent of computer programs to collate the data and compile master chronologies enabled unknown samples to be compared to known masters with a high degree of accuracy. Pioneering work in Eastern Massachusetts focusing on Oak (Krusic and Cook 2001, Miles, Worthington and Grady 2002, 2003, 2005) and in the Connecticut River valley initially concentrating on Pitch pine (Flynt 2004) and expanding into oak, chestnut, hemlock, and white pine has revealed the suitability of using dendrochronology as a mainstream research tool for analyzing and establishing construction timber felling dates in the Northeast, a region heretofore considered too variable climatically to provide reliable results.

To aid with this specific study, dated site and regional master chronologies are available including an Eastern New York State white pine chronology(Griggs), a hemlock chronology encompassing NY, MA, VT (Cook, Baisan, Flynt), several pitch pine chronologies for western MA and eastern NY(Cook, Flynt), and several oak chronologies for eastern NY (Cook, Krusic).
It should be remembered that trees were usually felled in the winter months with frame preparation occurring shortly thereafter, so the earliest a frame could be raised would be in the year following the felling date delineated in a dendrochronology study such as this.

Procedures

In procuring samples suitable for dendrochronology research, the analyst must be on the lookout for timbers, framing, and boards that exhibit several parameters. First, a bark, or waney, edge must be present if one wishes to establish with certainty the last year of

growth. Second, there needs to be a sufficient number of rings in a sample to span several distinctive climactic variations that register as patterns of wide and narrow rings. Ideally, having 100 years of growth is best, but more often than not, samples will range from 60 to 100+ years. While it is feasible to get dates on young samples, spurious results are possible and thus must be reviewed carefully both with longer-lived samples from the same structure as well as with what documentary and stylistic research uncovers. Third, enough samples need to be obtained (10-15 per building episode is usually reasonable) to allow for comparison and the fact that often some will not date for one reason or another. It is also critical that an assessment be made of the building frame to ascertain that the members from which samples are extracted were not reused or inserted at a later date, or, if so, are duly noted. Fourth, all samples must be labeled and entered into a log book that notes the position of each sampled timber within the structure, its species, whether or not it has wane, and any other information pertinent to the sample. In labeling the samples the following code was employed; PH (Poughkeepsie, Hoffman)) with the numbers that follow simply referring to the sequence in which the samples were taken.

Samples were taken using a custom coring bit, chucked into an 18 volt ½" Bosch battery-powered drill that creates a 9/16" hole out of which is obtained a 3/8" core. Core samples were glued into custom wood mounts and sanded using successively finer grit paper (80-600 grit) both on a bench top belt sander and by hand sanding to create a mirror-smooth finish. All samples were then viewed under a Unitron ZST 7.5-45X binocular microscope fitted with cross hairs in one eyepiece to ascertain and mark the number of rings per sample. This was followed by a visual review of all samples from the structures to determine if site-specific growth patterns could be picked out. Each sample was then placed under the microscope on a Velmex Acu-Rite Encoder sliding stage calibrated to read to the nearest micron (.001mm). Measuring begins at the outer, or last year of growth (measure) ring (LYOM), established as 1000, and proceeds to the center of the sample or first year of measure (FYOM). At the junction of each growth ring, the analyst registers the interface electronically which sends the measurement to the computer via a Quick-Chek Digital Readout. In all of the work in this study, the measuring program PJK10v10e was used to compile each structure's raw data files. The program transforms the ring widths into a series of indices that relate each ring's growth to its neighbors, thus standardizing the climate-related influences on a year to year basis (Krusic 2001). Thus trees from a similar location but growing at different rates should exhibit similar indices. With the raw data in hand, using the program COFECHA, samples from each site can be compared with each other to determine if all were cut more or less at the same time or within the span of several years or more. The samples are also compared against one or more dated regional master chronologies of the same species to determine the exact year or years when the samples in question were felled. As strong samples are uncovered, these are added to a fledgling site master and the raw data is again run against the site master to see if additional samples align.
With COFECHA samples are broken down into ring groups of 50 years which are compared to various dated masters. The 50-year groupings in an individual sample are lagged a certain number of years (for this study a lag of 10 years was used for the most part) to provide an overlap of data within the groupings. The results are displayed in a series of ways with Part 8 "Date Adjustment for Best Fit Matches for Counted Unknown

Series" composed of columns with the "best fit" being in column #1, the next "best fit" in column #2 and so on out 10 columns. The "add" number is the number to be added to the last year of growth (1000) to provide the year date of felling, while the "corr" number relates to how well the "add" meshes with the master. A correlation coefficient of .3281 is considered the threshold of significance. High correlation values (preferably over .40) accompanying consistent "add" numbers in the first column usually reveal reliable results. In the example below, consistent "add" numbers with strong correlations appearing in the first column for samples DLBH-07 and 08 reveal each samples true date of felling (1784 and 1782 respectively). Sample DLBH-09 does not show consistently strong correlation with any particular date. Note that the lag used in this example is 10 years.

SERIES	COUNTED SEGMENT	ADD # 1 CORR	ADD # 2 CORR	ADD # 3 CORR	ADD # 4 CORR	ADD # 5 CORR	ADD # 6 CORR	ADD # 7 CORR	ADD # 8 CORR	ADD # 9 CORR	ADD #10 CORR
DLBH-07	937- 986	784 .51	712 .47	729 .37	713 .37	847 .33	846 .31	728 .30	813 .29	800 .29	763 .28
DLBH-07	947- 996	784 .54	712 .45	760 .33	816 .31	729 .31	800 .29	713 .29	671 .29	847 .26	808 .25
DLBH-07	951-1000	784 .41	760 .35	712 .35	661 .31	787 .30	800 .29	774 .29	729 .27	808 .26	832 .25
DLBH-08	929- 978	782 .44	746 .42	793 .33	760 .32	705 .32	840 .31	858 .30	689 .30	824 .28	685 .26
DLBH-08	939- 988	782 .61	746 .37	689 .34	840 .30	725 .29	708 .27	723 .27	806 .27	684 .25	724 .25
DLBH-08	949- 998	782 .69	669 .47	840 .41	722 .32	806 .28	708 .27	700 .26	683 .25	723 .25	720 .24
DLBH-08	951-1000	782 .69	669 .38	840 .38	722 .34	757 .29	700 .28	730 .25	659 .24	838 .23	723 .23
DLBH-09	932- 981	713 .52	785 .35	848 .35	744 .35	729 .32	863 .31	846 .28	849 .26	693 .26	714 .25
DLBH-09	942- 991	846 .38	713 .36	785 .33	848 .33	729 .29	727 .29	790 .29	693 .28	761 .28	705 .27
DLBH-09	951-1000	799 .43	783 .39	731 .30	689 .30	808 .29	767 .27	756 .26	790 .25	814 .24	846 .24

Once samples from a site are firmly dated and grouped into a site species master, Part 2 "Correlations with Master Series of all Segments as Dated and Measured" and Part 3 "Segments Correlating Low, or Higher, at other than Dated Position" of COFECHA can be viewed to see how well each sample correlates with the others in the group and where weak areas within the ring counts are located.

Results (See Figure 1)
Of the 14 samples extracted, seven were pitch pine, one was oak, one appeared to be poplar, three were hemlock, and two were white pine. See Appendix A for sample locations on floorplans.

Pitch pine
All the pitch pine came from either the main floor joists or the second floor ceiling joists. In comparing the samples against themselves it was possible to create an undated alignment of the samples that revealed a majority of the timbers were felled within a very short period of time (Chart 1). Sample PH-05 however, appears to have been felled 17 years prior to the others and most likely was stored in some protected area. The samples were next compared to several Massachusetts pitch pine masters, one from the Connecticut River Valley and one from southern Berkshire County (Chart 2). Both reveal suggestions of possible dates that coincide with the age differences revealed in Chart 1 with sample PH-04 showing the strongest alignment, with decent correlation coefficients, to a specific date of 1788. Samples PH-05, PH-07, and PH-08 reveal less strong relationships with specific dates but nonetheless do offer glimpses of realistic dates in relation to PH-04. An email to Edward Cook at the Lamont-Doherty Tree-Ring Laboratory in a search for a geographically closer, dated pitch pine master, resulted in his sending an Albany area pitch pine master his lab compiled over the years. The Hoffman

house samples were compared to this master (Chart 3) revealing a very strong relationship of sample PH-04 to 1788, good strength for PH-05 likely dating to 1771, and suggestions of PH-01 wanting to date to 1786 in its first 69 years of growth, PH-07 likely aligning with 1788, and PH-08 possibly having been felled in 1787. The Hoffman house samples were then assigned actual dates based on the data from these Charts to create a pitch pine site master against which the samples were tested. Chart 4 reveals, not unexpectedly, that the samples align with each other but now with true dates. These dated samples were then inserted into the Albany area pitch pine master and continued to hold up well revealing that they are correctly dated.

Oak

The lone sample of oak, from a first floor ceiling joist, was tested against a variety of regional oak masters (Chart 5). Somewhat surprisingly, the samples appear to want to date to 1711 when compared against most chronologies. Only when compared to the small Hillsdale, NY site master (11 samples) does a later date show up (1748), but even here, it has no clear date relationship to the numerous pitch pine samples within this same portion of the house. It could very well be reused or the results could be spurious. Without additional oak samples it is difficult to ascertain the validity of this result.

White pine

Two of the third floor addition timbers were white pine and when these were compared to the eastern white pine master compiled by Carol Griggs at Cornell University's Tree-Ring Laboratory, the samples aligned convincingly with 1832 (PH-10) and 1834 (PH-11). Chart 6 reveals how well the data aligns. When these samples are assigned dates and added to the eastern New York state white pine master, they mesh well with the other samples.

Hemlock

The three hemlock samples also came from the third floor addition. When compared against the very large regional hemlock master covering portions of three states (NY, MA, VT), the results are conclusive and back up what the white pine revealed. PH-12 and PH-14 align with 1834 while PH-13 aligns with 1831 (Chart 7).

Conclusion

The pitch pine results from the main body of the house point to a period of tree felling during the late summer and into the winter of 1788 in preparation for the house construction, which could have occurred no earlier than 1789. It appears a few pieces of framing were felled prior to this with one coming down two years earlier and the other many years previous, which was likely in storage and still available at the time this house went up. The lone oak sample seemingly wants to date to the early years of the 18th century and could possibly be reused, or the results could be spurious. As noted above, if additional suitable samples of oak could have been located this might have been clarified. It would be worth inspecting this timber more carefully in an attempt to determine if it is reused.

The lone sample of what appears to be poplar could not be analyzed as no dated master chronologies are available for this species.

It would have been helpful to have obtained additional samples from the third floor addition, but thankfully the five samples cored did provide solid dates in the early 1830's. The felling of at least some of the framing for this addition occurred no later than the winter of 1834 suggesting the earliest the roof modifications could have been carried out was during the 1835 construction season.

Acknowledgments
The author would like to thank Eric Gradioa of the architectural firm Mesick, Cohen, Wilson, Baker Architects for supplying documentation concerning the property and help during the day of sampling. Thanks are also in order to Mike Duffy and The Dyson Foundation for being open to the idea of a dendrochronology study as a way to further understand the evolution of the building. Finally, thanks go to Edward Cook, director of Columbia University's Lamont-Doherty Tree-Ring Laboratory for generously supplying the Albany area pitch pine master chronology.

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FIGURE 1

HOFFMAN HOUSE, POUGHKEEPSIE, NY

SAMPLE	AGE	FYOG	LYOG	DATE	WANE	SPECIES	LOCATION
PH-01	98	903	1000	1786	Y	PIRI	1ST JOIST WEST OF EAST SILL
PH-02	58	943	1000	1788	Y	PIRI	2ND JOIST WEST OF EAST SILL
PH-03	52	949	1000	1788	Y	PIRI	3RD JOIST WEST OF EAST SILL
PH-04	82	919	1000	1788	Y	PIRI	4TH JOIST WEST OF EAST SILL
PH-05	68	933	1000	1771	Y	PIRI	6TH JOIST WEST OF EAST SILL
PH-06	98	903	1000	1711	Y	QUAL	SW PARLOR CEILING JOIST ABOVE FIREPLACE
PH-07	57	944	1000	1788	Y	PIRI	2ND FL,S.MID.RM,4TH CEILING JOIST FR.W.WALL
PH-08	83	918	1000	1787*	Y	PIRI	2ND FL,S.MID.RM,5TH CEILING JOIST FR.W.WALL
PH-10	151	850	1000	1832*	Y	PIST	3RD FL,STUD ON S.SIDE OF SE WINDOW
PH-11	89	912	1000	1834	Y	PIST	3RD FL,EAST PLATE
PH-12	138	863	1000	1834	Y	TCSA	3RD FL,NW ROOM,NE CORNERPOST
PH-13	131	870	1000	1831	Y	TCSA	3RD FL,SE ROOM,NW CORNER,N.WALL STUD
PH-14	118	883	1000	1834	Y	TCSA	3RD FL,N.WALL STUD SEVERAL W.OF PH-13

FYOM = FIRST YEAR OF GROWTH (AS MEASURED)
LYOM = LAST YEAR OF GROWTH
PIRI = PITCH PINE
QUAL = OAK
PIST = WHITE PINE
TCSA = HEMLOCK
*= PARTIAL LAST RING AT WANE, NOT MEASURED. TREES FELLED FOLLOWING SPRING/SUMMER (1788,1833)

CHART 1

PART 2: CORRELATIONS WITH MASTER SERIES OF ALL SEGMENTS AS DATED AND MEASURED Tucson-Mendoza-Hamburg-Lamont ProgLib

32-YEAR CUBIC SPLINE FILTER; CORRELATIONS OF 50-YEAR SEGMENTS LAGGED 10 YEARS

FLAGS: __A = CORRELATION UNDER 0.3281; __B = CORRELATION HIGHER AT OTHER POSITION

ØSEQ	SERIES	INTERVAL	900 949	910 959	920 969	930 979	940 989	950 999	960 1009	970 1019	980 1029	990 1039	1000 1049	1010 1059	1020 1069	1030 1079	1040 1089	1050 1099	1060 1109	1070 1119	1080 1129	1090 1139	FLAGS/ TOTAL
1	PH-01	916- 998	=	.27	.29	.40	.33	.34	=	=	=	=											
+				__B	__A																		2/ 5
2	PH-02	943-1000	=	=	=	=	.56	.58	.60	=	=	=											
+																							0/ 3
3	PH-03	950-1000	=	=	=	=	=	.63	.65	=	=	=											
+																							0/ 2
4	PH-04	919-1000	=	.60	.59	.57	.49	.48	.51	=	=	=											
+																							0/ 6
5	PH-05	916- 983	=	.64	.65	.61	.65	=	=	=	=	=											
+																							0/ 4
6	PH-07	944-1000	=	=	=	=	.63	.59	.61	=	=	=											
+																							0/ 3
7	PH-08	917- 999	=	.25	.39	.48	.37	.34	=	=	=	=											
+				__B																			1/ 5

PART 3: SEGMENTS CORRELATING LOW, OR HIGHER AT OTHER THAN DATED POSITION Tucson-Mendoza-Hamburg-Lamont ProgLib

CORRELATIONS OF 50-YEAR SEGMENTS
FROM TEN YEARS EARLIER (-10) TO TEN YEARS LATER (+10) THAN DATED

SERIES	SEGMENT	HIGH	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10
PH-01	916- 965		-.28	-.20	.00	-.09	-.03	-.10	-.02	.03	.24	-.18	.27	.01	-.28	.03	-.32	-.25	.17	-.09	-.04	.28	.02
+		9											__									<__>	
PH-01	920- 969		-.18	-.17	-.07	-.18	-.01	-.01	-.14	-.01	.13	-.13	.29	-.09	-.22	.01	-.35	-.23	.19	-.12	-.14	.17	-.01
+		0											<__>										
PH-08	917- 966		.31	.16	.19	.00	-.02	.00	-.16	-.12	-.21	-.03	.25	.01	.08	.10	-.18	.18	-.03	-.17	-.10	-.13	-.32
+		-10	<__>										__										

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES Tucson-Mendoza-Hamburg-Lamont ProgLib

PH-PP VS PH-PP ALIGNED
50-YEAR SEGMENTS LAGGED 10 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
PH-01	903- 952	-2 .71	38 .29	35 .28	9 .26	27 .22	7 .19	33 .17	39 .16	11 .16	23 .15	37 .15
PH-01	913- 962	-2 .61	-4 .39	35 .32	27 .25	7 .24	9 .24	10 .21	33 .18	26 .17	36 .16	17 .12
PH-01	923- 972	-2 .54	26 .30	10 .28	27 .26	13 .20	4 .19	9 .19	7 .17	-19 .17	11 .14	-4 .11
PH-01	933- 982	-2 .60	-30 .31	4 .27	11 .23	-28 .22	13 .20	10 .20	-8 .19	7 .17	1 .16	-14 .16
PH-01	943- 992	-2 .54	-8 .28	-28 .27	-30 .24	4 .23	-22 .21	1 .20	-36 .18	7 .17	-14 .14	-15 .14
PH-01	951-1000	-2 .55	-8 .27	-36 .24	-28 .20	-49 .19	-15 .18	-37 .16	-30 .14	-38 .14	-17 .13	-22 .11
PH-02	943- 992	0 .71	-3 .29	-31 .27	-13 .20	-29 .19	-6 .19	8 .18	-26 .18	6 .17	-40 .16	-32 .12
PH-02	951-1000	0 .73	-3 .29	-6 .29	-41 .27	-32 .24	-29 .22	-37 .20	-1 .15	-14 .12	-13 .10	-31 .09
PH-03	949- 998	0 .75	-29 .46	-28 .28	-26 .24	-37 .23	-40 .20	-3 .18	-16 .16	-45 .14	-34 .13	-31 .11
PH-03	951-1000	0 .77	-29 .48	-28 .28	-26 .23	-37 .21	-40 .19	-3 .18	-16 .16	-6 .12	-34 .12	-45 .11
PH-04	919- 968	0 .74	29 .34	-16 .30	3 .29	15 .25	-14 .24	2 .20	32 .20	12 .19	31 .15	-13 .13
PH-04	929- 978	0 .70	-25 .30	15 .30	3 .25	6 .22	-10 .17	16 .17	-26 .17	-24 .16	-12 .15	-11 .15
PH-04	939- 988	0 .63	-31 .34	-12 .28	3 .27	6 .26	-26 .20	-18 .18	-29 .14	-6 .14	-24 .13	-37 .13
PH-04	949- 998	0 .63	-41 .34	-47 .27	-12 .23	-26 .19	-37 .18	-9 .16	-29 .16	-39 .15	-31 .15	-6 .15
PH-04	951-1000	0 .65	-41 .30	-47 .27	-12 .26	-26 .21	-29 .20	-6 .20	-9 .17	-24 .16	-32 .15	-37 .15
PH-05	933- 982	-17 .80	9 .35	-30 .20	-6 .17	-25 .14	-32 .14	-20 .13	-18 .13	-3 .13	-15 .12	14 .12
PH-05	943- 992	-17 .78	-20 .31	-33 .23	-4 .20	-25 .16	-28 .16	-32 .13	6 .12	-7 .11	-14 .10	-19 .08
PH-05	951-1000	-17 .79	-20 .27	-48 .27	-4 .26	-25 .19	-44 .18	-43 .14	-35 .12	-33 .11	-14 .10	-46 .09
PH-07	944- 993	0 .74	-12 .23	-28 .21	6 .21	-6 .18	-41 .17	-26 .16	-29 .15	-13 .14	-31 .12	-40 .12
PH-07	951-1000	0 .72	-26 .25	-41 .23	-29 .23	-28 .22	-12 .21	-37 .18	-45 .15	-6 .14	-13 .13	-43 .12
PH-08	918- 967	-1 .54	-11 .23	21 .19	30 .18	14 .16	33 .15	17 .15	15 .13	4 .13	-9 .13	1 .13
PH-08	928- 977	-1 .64	21 .23	17 .21	-9 .16	-14 .14	-18 .13	12 .13	-12 .11	23 .10	1 .10	16 .09
PH-08	938- 987	-1 .59	-32 .35	-36 .23	-30 .16	-28 .15	13 .14	-14 .13	-12 .13	-9 .12	-10 .11	1 .07
PH-08	948- 997	-1 .55	-28 .27	-41 .26	-30 .24	-36 .21	-40 .20	-2 .19	-32 .18	-10 .17	-14 .11	-42 .11
PH-08	951-1000	-1 .53	-49 .27	-28 .25	-30 .25	-41 .22	-2 .19	-36 .19	-32 .17	-10 .16	-40 .16	-43 .11

CHART 2

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES — Tucson-Mendoza-Hamburg-Lamont ProgLib

PH-PP VS CRVM PP MASTER SUMMARY TO 1848
50-YEAR SEGMENTS LAGGED 10 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
PH-01	903- 952	803 .40	643 .38	850 .37	618 .35	848 .34	828 .31	852 .31	761 .30	777 .30	668 .30	723 .29
PH-01	913- 962	604 .44	850 .37	786 .35	643 .34	668 .31	615 .31	881 .30	872 .30	683 .29	761 .29	779 .28
PH-01	923- 972	872 .44	615 .42	789 .37	643 .32	777 .31	604 .29	683 .29	633 .28	635 .26	616 .26	719 .25
PH-01	933- 982	789 .36	615 .34	719 .32	828 .32	635 .31	777 .31	698 .28	633 .26	676 .26	860 .26	795 .25
PH-01	943- 992	601 .38	789 .36	786 .33	598 .30	808 .30	615 .29	691 .29	719 .29	578 .26	676 .26	834 .26
PH-01	951-1000	786 .36	601 .34	808 .32	676 .31	615 .30	598 .29	691 .28	834 .26	789 .25	689 .25	621 .25
PH-02	943- 992	843 .38	687 .35	788 .32	833 .32	812 .27	667 .27	597 .27	628 .27	603 .27	714 .26	824 .25
PH-02	951-1000	687 .47	788 .46	699 .37	603 .36	751 .33	833 .32	812 .31	824 .31	605 .29	606 .29	623 .26
PH-03	949- 998	751 .35	608 .33	753 .32	606 .28	625 .28	589 .27	846 .26	775 .26	712 .26	580 .25	764 .25
PH-03	951-1000	608 .36	751 .35	753 .33	846 .29	606 .28	580 .26	817 .26	764 .25	641 .25	658 .24	712 .24
PH-04	919- 968	608 .33	794 .32	637 .31	595 .30	782 .30	788 .29	819 .28	606 .28	874 .28	854 .26	803 .25
PH-04	929- 978	788 .38	825 .33	794 .31	606 .31	803 .31	741 .30	740 .28	779 .27	730 .26	782 .26	813 .26
PH-04	939- 988	788 .46	825 .45	741 .33	591 .31	859 .28	779 .28	803 .28	631 .26	766 .25	813 .25	849 .24
PH-04	949- 998	788 .49	741 .43	825 .35	833 .33	714 .31	571 .26	756 .26	646 .25	606 .25	568 .24	699 .24
PH-04	951-1000	788 .48	741 .36	756 .33	833 .32	694 .29	646 .29	825 .28	740 .27	839 .27	606 .26	767 .24
PH-05	933- 982	723 .38	591 .37	820 .32	652 .31	797 .31	655 .30	611 .29	865 .28	749 .28	612 .27	592 .27
PH-05	943- 992	771 .37	589 .35	572 .34	749 .34	611 .31	639 .30	591 .29	723 .29	820 .28	652 .28	829 .28
PH-05	951-1000	771 .41	820 .36	589 .35	634 .35	842 .35	829 .33	572 .33	749 .31	723 .30	611 .29	808 .28
PH-07	944- 993	687 .42	611 .34	788 .33	752 .32	609 .31	628 .31	630 .29	751 .28	589 .26	825 .25	659 .25
PH-07	951-1000	687 .36	751 .34	630 .30	846 .29	722 .29	788 .28	776 .27	753 .27	817 .26	659 .26	740 .25
PH-08	918- 967	714 .39	671 .36	636 .34	672 .31	727 .31	659 .29	765 .29	651 .28	679 .28	692 .27	787 .27
PH-08	928- 977	787 .53	824 .34	845 .32	836 .32	740 .31	657 .31	692 .30	739 .30	699 .30	834 .28	621 .28
PH-08	938- 987	787 .46	835 .35	689 .35	765 .34	621 .34	824 .33	657 .32	716 .31	624 .28	729 .27	814 .27
PH-08	948- 997	787 .38	814 .35	765 .34	752 .32	716 .32	826 .30	689 .29	657 .29	621 .28	835 .28	725 .27
PH-08	951-1000	716 .35	814 .35	787 .34	689 .33	566 .31	752 .29	624 .29	765 .28	835 .28	826 .28	639 .27

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES — Tucson-Mendoza-Hamburg-Lamont ProgLib

PH PP VS SOUTHERN BERKSHIRE COUNTY PP MASTER
50-YEAR SEGMENTS LAGGED 10 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
PH-01	903- 952	811 .43	848 .37	735 .33	766 .30	778 .29	763 .28	753 .27	777 .27	708 .27	823 .26	792 .26
PH-01	913- 962	792 .37	766 .35	811 .35	846 .34	848 .30	706 .30	683 .27	733 .27	779 .26	735 .26	750 .25
PH-01	923- 972	811 .37	731 .33	683 .32	764 .31	706 .31	766 .29	792 .29	846 .29	810 .28	809 .27	744 .27
PH-01	933- 982	676 .34	664 .33	731 .33	682 .32	797 .32	850 .30	706 .29	725 .28	848 .26	656 .26	766 .25
PH-01	943- 992	797 .36	731 .35	676 .33	764 .31	664 .30	682 .27	706 .26	760 .26	716 .25	738 .24	820 .22
PH-01	951-1000	764 .34	797 .32	691 .30	820 .30	676 .30	810 .29	749 .27	716 .27	703 .27	731 .26	682 .25
PH-02	943- 992	726 .39	671 .37	819 .34	837 .28	714 .26	771 .25	757 .24	780 .24	798 .24	705 .22	843 .21
PH-02	951-1000	726 .38	751 .37	671 .34	817 .32	714 .31	782 .31	819 .26	705 .26	739 .25	771 .23	699 .22
PH-03	949- 998	785 .39	811 .38	726 .32	671 .28	757 .28	705 .28	801 .27	822 .27	740 .26	759 .26	823 .25
PH-03	951-1000	811 .39	785 .35	671 .30	726 .30	705 .29	740 .28	822 .27	759 .27	823 .26	757 .25	739 .25
PH-04	919- 968	755 .39	769 .34	840 .33	803 .31	788 .31	686 .30	851 .29	721 .28	678 .27	757 .26	825 .25
PH-04	929- 978	686 .45	788 .44	660 .42	840 .32	728 .30	730 .29	661 .28	727 .26	813 .26	755 .25	720 .24
PH-04	939- 988	788 .44	825 .42	686 .39	742 .32	799 .31	696 .31	660 .31	708 .29	847 .29	772 .24	730 .24
PH-04	949- 998	772 .38	788 .38	686 .37	799 .34	825 .32	741 .25	751 .25	687 .23	705 .23	714 .22	801 .21
PH-04	951-1000	788 .42	686 .40	772 .33	705 .27	681 .22	663 .22	825 .22	751 .21	811 .21	646 .21	728 .21
PH-05	933- 982	735 .42	677 .36	680 .36	781 .34	723 .31	795 .31	695 .30	768 .29	816 .28	703 .26	736 .25
PH-05	943- 992	735 .39	768 .38	701 .35	784 .35	781 .32	654 .30	723 .29	680 .29	737 .28	658 .27	806 .26
PH-05	951-1000	701 .50	784 .43	768 .39	735 .38	737 .35	654 .32	771 .30	723 .29	653 .27	803 .27	658 .23
PH-07	944- 993	788 .40	672 .33	823 .30	740 .29	680 .29	726 .27	801 .25	753 .24	727 .23	699 .23	784 .22
PH-07	951-1000	672 .31	788 .31	692 .31	823 .30	680 .29	753 .28	654 .26	837 .24	740 .24	801 .24	726 .23
PH-08	918- 967	771 .35	850 .34	782 .32	864 .30	802 .30	787 .30	714 .29	739 .29	727 .27	784 .27	772 .27
PH-08	928- 977	787 .52	666 .46	739 .40	800 .37	773 .34	850 .31	714 .26	858 .26	726 .25	770 .24	692 .23
PH-08	938- 987	787 .48	739 .36	716 .35	800 .34	770 .32	818 .29	773 .28	706 .27	799 .27	666 .26	797 .26
PH-08	948- 997	644 .39	770 .38	799 .35	810 .34	752 .33	739 .31	643 .31	800 .30	670 .28	666 .27	818 .27
PH-08	951-1000	810 .35	770 .35	716 .32	644 .31	666 .29	799 .28	752 .27	739 .27	643 .27	800 .26	773 .26

CHART 3

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES Tucson-Mendoza-Hamburg-Lamont ProgLib

PH-PP VS ALBANY AREA PITCH PINE MASTER (LDEO)
50-YEAR SEGMENTS LAGGED 10 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
PH-01	903- 952	786 .51	615 .46	836 .41	668 .34	751 .34	723 .34	659 .33	776 .33	763 .28	811 .28	826 .28
PH-01	913- 962	786 .49	615 .48	678 .33	643 .30	617 .29	668 .28	723 .27	613 .27	659 .27	751 .26	616 .26
PH-01	923- 972	786 .44	676 .38	617 .36	615 .34	587 .31	678 .30	568 .30	792 .29	777 .29	789 .28	751 .28
PH-01	933- 982	676 .42	786 .33	777 .33	789 .32	587 .31	792 .31	617 .31	719 .30	810 .30	704 .27	661 .24
PH-01	943- 992	760 .41	553 .36	676 .35	554 .31	617 .30	789 .29	771 .28	792 .28	777 .27	786 .26	587 .26
PH-01	951-1000	553 .44	760 .44	676 .32	587 .31	789 .29	554 .28	617 .27	661 .27	663 .26	624 .26	689 .26
PH-02	943- 992	576 .56	577 .38	539 .38	785 .35	649 .35	650 .33	712 .31	669 .31	788 .29	747 .27	691 .27
PH-02	951-1000	576 .63	539 .44	650 .41	577 .40	747 .38	782 .37	699 .35	712 .32	649 .31	788 .30	785 .30
PH-03	949- 998	759 .45	712 .38	751 .34	580 .34	607 .33	788 .29	686 .28	650 .28	539 .27	577 .27	672 .26
PH-03	951-1000	759 .47	607 .36	751 .34	580 .34	712 .33	650 .30	686 .29	788 .27	711 .26	577 .26	785 .25
PH-04	919- 968	788 .54	592 .49	608 .42	741 .41	609 .35	757 .33	700 .32	691 .31	782 .30	753 .30	690 .29
PH-04	929- 978	788 .66	592 .39	741 .37	714 .32	608 .32	568 .32	606 .32	660 .31	690 .31	791 .30	700 .29
PH-04	939- 988	788 .65	741 .44	675 .36	610 .34	613 .33	623 .32	791 .29	620 .29	592 .29	773 .29	799 .27
PH-04	949- 998	788 .61	741 .52	764 .38	714 .36	747 .35	782 .35	613 .31	791 .31	675 .30	551 .30	610 .29
PH-04	951-1000	788 .52	741 .47	782 .37	747 .32	791 .32	764 .31	714 .31	613 .28	676 .28	610 .27	651 .26
PH-05	933- 982	723 .49	771 .44	695 .37	722 .37	591 .36	573 .35	697 .32	559 .29	782 .29	794 .27	674 .27
PH-05	943- 992	771 .48	768 .39	695 .37	723 .33	722 .33	589 .33	784 .33	765 .32	781 .32	591 .31	674 .29
PH-05	951-1000	771 .46	768 .39	722 .39	674 .37	784 .35	765 .32	591 .32	723 .32	695 .31	551 .27	559 .26
PH-07	944- 993	712 .45	788 .40	539 .39	650 .37	700 .35	564 .32	782 .31	578 .31	687 .30	726 .27	785 .27
PH-07	951-1000	650 .47	539 .44	788 .41	712 .35	580 .33	613 .30	700 .30	578 .30	564 .29	687 .29	672 .29
PH-08	918- 967	798 .47	623 .38	739 .32	818 .31	783 .29	705 .27	756 .27	605 .27	661 .26	633 .26	772 .25
PH-08	928- 977	787 .40	739 .38	699 .35	707 .34	798 .31	597 .30	662 .27	640 .26	629 .26	690 .26	559 .25
PH-08	938- 987	787 .49	729 .40	739 .36	738 .34	707 .33	619 .32	752 .31	650 .31	629 .29	621 .27	640 .26
PH-08	948- 997	621 .38	739 .36	787 .36	729 .33	752 .32	789 .31	619 .28	707 .28	685 .28	576 .28	725 .27
PH-08	951-1000	621 .36	729 .34	787 .34	739 .33	752 .29	789 .28	707 .28	619 .28	689 .27	630 .26	758 .26

CHART 4

PART 2: CORRELATIONS WITH MASTER SERIES OF ALL SEGMENTS AS DATED AND MEASURED Tucson-Mendoza-Hamburg-Lamont ProgLib

32-YEAR CUBIC SPLINE FILTER; CORRELATIONS OF 50-YEAR SEGMENTS LAGGED 10 YEARS

FLAGS: __A = CORRELATION UNDER 0.3281; __B = CORRELATION HIGHER AT OTHER POSITION

0SEQ	SERIES	INTERVAL	1680 1729	1690 1739	1700 1749	1710 1759	1720 1769	1730 1779	1740 1789	1750 1799	1760 1809	1770 1819	1780 1829	1790 1839	1800 1849	1810 1859	1820 1869	1830 1879	1840 1889	1850 1899	1860 1909	1870 1919	FLAGS/ TOTAL
1	PH-01	1704-1786	=	=	.26	.31	.40	.33	.34	=	=	=											2/ 5
+					__B	__A																	
2	PH-02	1731-1788	=	=	=	=	=	.57	.60	=	=	=											0/ 2
+																							
3	PH-03	1737-1788	=	=	=	=	=	.62	.65	=	=	=											0/ 2
+																							
4	PH-04	1707-1788	=	=	.59	.54	.56	.48	.51	=	=	=											0/ 5
+																							
5	PH-05	1704-1771	=	=	.64	.66	.63	.66	=	=	=	=											0/ 4
+																							
6	PH-07	1732-1788	=	=	=	=	=	.63	.61	=	=	=											0/ 2
+																							
7	PH-08	1705-1787	=	=	.25	.44	.42	.36	.34	=	=	=											1/ 5
+					__B																		

PART 3: SEGMENTS CORRELATING LOW, OR HIGHER AT OTHER THAN DATED POSITION Tucson-Mendoza-Hamburg-Lamont ProgLib

CORRELATIONS OF 50-YEAR SEGMENTS
FROM TEN YEARS EARLIER (-10) TO TEN YEARS LATER (+10) THAN DATED

SERIES	SEGMENT	HIGH	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10
PH-01	1704-1753		-.28	-.20	.01	-.09	-.03	-.10	-.02	.03	.24	-.18	.26	.01	-.28	.03	-.32	-.26	.17	-.10	-.04	.28	.02
+		9											___									<___>	
PH-01	1710-1759		-.18	-.14	-.05	-.17	.14	.06	-.18	.03	.05	-.12	.31	-.11	-.23	.04	-.33	-.20	.21	-.11	-.16	.19	.00
+		0											<___>										
PH-08	1705-1754		.31	.16	.20	.00	-.02	.00	-.16	-.12	-.21	-.03	.25	.00	.08	.10	-.19	.18	-.03	-.17	-.10	-.13	-.32
+		-10	<___>										___										

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES Tucson-Mendoza-Hamburg-Lamont ProgLib

PH-PP VS PH-PP SITE MASTER
50-YEAR SEGMENTS LAGGED 10 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
PH-01	903- 952	786 .71	826 .29	823 .28	797 .26	815 .22	795 .20	821 .17	799 .16	827 .15	811 .15	798 .15
PH-01	913- 962	786 .61	784 .38	823 .32	795 .25	815 .25	797 .24	798 .21	821 .18	814 .17	824 .16	805 .12
PH-01	923- 972	786 .54	814 .30	798 .29	815 .26	801 .20	792 .19	797 .19	769 .17	795 .17	799 .14	784 .11
PH-01	933- 982	786 .60	758 .31	792 .27	799 .23	760 .22	801 .20	798 .20	780 .19	795 .17	789 .17	774 .16
PH-01	943- 992	786 .54	780 .28	760 .27	792 .24	758 .24	766 .21	789 .20	752 .18	795 .17	774 .14	773 .14
PH-01	951-1000	786 .55	780 .27	752 .25	760 .19	739 .18	773 .18	751 .16	758 .14	750 .14	771 .13	766 .11
PH-02	943- 992	788 .72	785 .30	757 .27	759 .20	775 .20	782 .19	796 .18	762 .17	794 .17	748 .16	756 .12
PH-02	951-1000	788 .73	785 .29	782 .29	747 .27	756 .24	759 .22	751 .20	787 .15	774 .12	775 .10	757 .10
PH-03	949- 998	788 .75	759 .46	760 .28	762 .24	751 .23	748 .19	785 .18	772 .17	743 .15	754 .13	757 .11
PH-03	951-1000	788 .77	759 .48	760 .28	762 .23	751 .21	748 .19	785 .18	772 .16	782 .13	754 .12	743 .12
PH-04	919- 968	788 .74	817 .34	772 .30	791 .29	803 .24	774 .24	790 .20	820 .20	800 .20	819 .15	775 .14
PH-04	929- 978	788 .69	763 .30	803 .30	791 .25	794 .22	762 .17	778 .17	804 .17	764 .15	777 .15	776 .14
PH-04	939- 988	788 .63	757 .34	776 .28	791 .27	794 .26	762 .20	770 .18	759 .15	782 .14	764 .13	751 .13
PH-04	949- 998	788 .62	747 .33	741 .27	776 .23	762 .20	751 .18	759 .17	779 .16	757 .15	749 .15	782 .15
PH-04	951-1000	788 .65	747 .30	741 .26	776 .26	762 .21	759 .21	782 .19	779 .17	764 .16	756 .15	751 .15
PH-05	933- 982	771 .81	797 .36	758 .19	782 .17	763 .15	756 .14	768 .14	770 .13	773 .12	785 .12	802 .11
PH-05	943- 992	771 .78	768 .32	755 .23	784 .20	763 .17	760 .16	756 .12	794 .12	781 .11	774 .11	769 .07
PH-05	951-1000	771 .79	768 .28	740 .28	784 .26	763 .20	744 .19	745 .14	753 .12	755 .11	774 .10	742 .09
PH-07	944- 993	788 .74	776 .22	760 .22	794 .21	782 .18	747 .17	762 .16	759 .15	775 .13	757 .12	748 .12
PH-07	951-1000	788 .72	762 .25	759 .23	747 .23	760 .22	776 .20	751 .18	743 .16	782 .13	775 .13	745 .12
PH-08	918- 967	787 .54	777 .23	809 .19	818 .18	802 .16	805 .15	821 .15	779 .13	792 .13	803 .13	789 .12
PH-08	928- 977	787 .64	809 .22	805 .22	779 .16	770 .14	800 .14	774 .14	776 .11	811 .10	789 .09	804 .09
PH-08	938- 987	787 .59	756 .34	752 .23	758 .16	760 .15	801 .14	774 .13	779 .13	776 .12	778 .11	789 .07
PH-08	948- 997	787 .55	760 .28	747 .26	758 .24	752 .20	748 .19	786 .19	756 .18	778 .17	774 .11	746 .11
PH-08	951-1000	787 .53	739 .27	760 .26	758 .25	747 .21	786 .19	752 .18	756 .16	778 .16	748 .15	779 .11

CHART 5

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES Tucson-Mendoza-Hamburg-Lamont ProgLib

PH-OAK VS HUDSON VALLEY OAK MASTER SUMMARY
50-YEAR SEGMENTS LAGGED 20 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
PH-06	903- 952	583 .44	700 .43	711 .42	637 .35	975 .34	999 .34	765 .32	806 .32	682 .31	990 .30	835 .29
PH-06	923- 972	1014 .43	711 .42	990 .40	921 .37	824 .36	1011 .34	765 .34	999 .31	583 .30	975 .30	617 .30
PH-06	943- 992	711 .64	748 .41	990 .38	906 .37	594 .33	513 .33	975 .32	945 .32	769 .29	685 .29	821 .29
PH-06	951-1000	711 .66	831 .38	898 .35	797 .31	931 .30	513 .29	547 .29	961 .27	880 .27	646 .27	539 .26

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES Tucson-Mendoza-Hamburg-Lamont ProgLib

PH-O VS NEW PALTZ OAK MASTER SUMMARY
50-YEAR SEGMENTS LAGGED 20 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
PH-06	903- 952	711 .47	583 .44	700 .39	600 .32	806 .31	824 .29	684 .29	564 .29	637 .28	835 .28	737 .28
PH-06	923- 972	711 .45	599 .32	836 .32	583 .31	824 .31	700 .30	564 .29	765 .29	638 .28	617 .28	682 .26
PH-06	943- 992	711 .63	685 .34	748 .33	821 .33	623 .32	513 .30	660 .30	542 .30	769 .29	614 .28	594 .27
PH-06	951-1000	711 .62	623 .30	539 .29	599 .29	797 .28	685 .28	513 .28	763 .27	590 .25	570 .24	547 .24

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES Tucson-Mendoza-Hamburg-Lamont ProgLib

PH-O VS SOUTHERN BERKSHIRE COUNTY OAK MASTER
50-YEAR SEGMENTS LAGGED 20 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
PH-06	903- 952	824 .49	711 .45	737 .41	752 .38	813 .35	866 .29	736 .26	821 .26	833 .25	848 .25	835 .25
PH-06	923- 972	711 .41	813 .38	824 .37	752 .37	683 .36	737 .35	866 .33	848 .26	846 .25	753 .25	736 .24
PH-06	943- 992	711 .35	842 .32	824 .31	816 .30	748 .30	677 .29	737 .27	738 .25	809 .25	772 .25	686 .24
PH-06	951-1000	657 .39	735 .37	711 .37	813 .36	699 .31	824 .30	816 .30	783 .28	772 .27	748 .26	804 .24

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES Tucson-Mendoza-Hamburg-Lamont ProgLib

PH-O VS HILLSDALE, NY OAK MASTER
50-YEAR SEGMENTS LAGGED 10 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
PH-06	903- 952	835 .47	824 .31	789 .30	765 .27	790 .27	833 .26	773 .25	832 .24	811 .22	814 .22	808 .18
PH-06	913- 962	835 .39	789 .34	773 .30	765 .26	833 .24	771 .23	824 .22	753 .21	795 .20	811 .19	832 .19
PH-06	923- 972	748 .42	765 .32	773 .29	753 .29	783 .28	824 .26	789 .26	811 .21	813 .20	763 .18	786 .18
PH-06	933- 982	748 .41	768 .39	753 .32	811 .29	789 .26	747 .25	813 .24	783 .22	773 .20	809 .20	765 .19
PH-06	943- 992	748 .53	783 .29	735 .27	773 .25	732 .24	724 .24	772 .24	781 .18	768 .17	736 .16	792 .15
PH-06	951-1000	748 .38	783 .24	753 .23	772 .23	736 .22	773 .21	763 .20	781 .20	715 .19	735 .17	724 .17

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES Tucson-Mendoza-Hamburg-Lamont ProgLib

PH-OAK VS CONNECTICUT RIVER VALLEY OAK MASTER
50-YEAR SEGMENTS LAGGED 20 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
PH-06	903- 952	835 .40	711 .40	833 .39	848 .33	832 .31	824 .30	880 .28	753 .26	857 .25	737 .24	795 .23
PH-06	923- 972	711 .48	833 .39	871 .36	848 .35	692 .35	835 .35	714 .29	857 .29	824 .28	716 .27	810 .27
PH-06	943- 992	711 .41	725 .30	747 .29	833 .29	781 .27	675 .27	819 .27	748 .26	692 .25	759 .25	699 .25
PH-06	951-1000	711 .41	761 .32	734 .32	783 .30	779 .27	672 .27	748 .26	699 .26	818 .26	833 .25	725 .24

CHART 6

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES Tucson-Mendoza-Hamburg-Lamont ProgLib

PH-WHITE PINE VS EASTERN NY WHITE PINE MASTER
50-YEAR SEGMENTS LAGGED 10 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
PH-10	850- 899	794 .50	758 .44	832 .44	718 .41	707 .39	736 .37	906 .32	907 .28	936 .26	873 .26	737 .26
PH-10	860- 909	907 .50	832 .44	685 .40	718 .38	809 .34	736 .33	919 .33	794 .33	873 .30	759 .30	758 .30
PH-10	870- 919	832 .57	809 .39	907 .37	794 .35	785 .34	718 .33	685 .33	736 .32	817 .30	713 .28	931 .28
PH-10	880- 929	832 .58	718 .37	907 .35	667 .33	817 .31	866 .30	736 .29	793 .29	885 .26	904 .26	798 .25
PH-10	890- 939	832 .60	798 .37	866 .36	880 .32	785 .31	817 .28	768 .27	811 .27	700 .26	847 .26	907 .26
PH-10	900- 949	832 .59	880 .35	646 .32	878 .31	768 .31	866 .30	808 .30	796 .29	643 .29	753 .28	798 .28
PH-10	910- 959	832 .54	768 .43	676 .35	753 .33	798 .30	646 .28	645 .28	866 .27	700 .27	738 .27	779 .26
PH-10	920- 969	832 .55	779 .31	811 .31	878 .30	768 .29	647 .28	764 .27	855 .27	783 .26	858 .26	834 .26
PH-10	930- 979	832 .42	647 .33	665 .31	779 .30	783 .29	764 .28	862 .27	843 .25	833 .25	781 .25	768 .24
PH-10	940- 989	832 .38	647 .33	851 .30	776 .30	718 .30	779 .30	862 .30	745 .29	644 .28	811 .27	857 .26
PH-10	950- 999	593 .39	779 .37	718 .35	758 .35	811 .33	625 .33	832 .32	598 .30	737 .29	776 .28	781 .28
PH-10	951-1000	758 .41	593 .40	737 .34	718 .34	625 .32	832 .31	779 .31	811 .31	851 .31	781 .30	644 .29
PH-11	912- 961	834 .46	755 .41	656 .40	770 .39	822 .38	788 .35	869 .33	651 .28	675 .28	823 .26	743 .26
PH-11	922- 971	834 .54	770 .41	656 .37	804 .34	857 .34	686 .34	747 .30	823 .29	728 .29	623 .29	705 .28
PH-11	932- 981	834 .53	804 .33	668 .33	778 .31	857 .30	686 .30	616 .29	656 .29	747 .27	864 .27	725 .25
PH-11	942- 991	834 .39	747 .39	656 .33	666 .33	668 .32	833 .29	783 .27	739 .27	778 .26	754 .26	845 .26
PH-11	951-1000	834 .34	694 .33	720 .33	656 .33	783 .32	754 .32	747 .31	804 .30	630 .27	597 .26	833 .26

CHART 7

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES Tucson-Mendoza-Hamburg-Lamont ProgLib

PH HEMLOCK VS COOK/BAISAN/FLYNTHEMLOCK MASTER
50-YEAR SEGMENTS LAGGED 25 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
PH-12	863- 912	834 .65	693 .40	756 .35	638 .34	825 .33	658 .32	916 .32	858 .31	943 .31	628 .30	620 .30
PH-12	888- 937	834 .70	584 .45	716 .41	630 .39	829 .36	746 .36	855 .35	579 .34	957 .34	635 .33	971 .33
PH-12	913- 962	834 .77	804 .44	725 .43	734 .37	575 .36	658 .35	1003 .34	557 .31	980 .31	962 .30	776 .30
PH-12	938- 987	834 .70	913 .39	992 .32	879 .30	832 .30	778 .30	600 .29	1000 .28	948 .28	911 .27	632 .26
PH-12	951-1000	834 .68	952 .39	992 .39	913 .39	613 .37	511 .37	600 .36	974 .36	555 .35	909 .33	702 .30
PH-13	870- 919	831 .57	639 .46	610 .41	690 .37	963 .35	699 .34	911 .33	752 .30	742 .30	1038 .29	940 .28
PH-13	895- 944	831 .54	965 .39	661 .35	713 .34	1038 .32	581 .31	802 .30	655 .29	840 .29	1054 .27	629 .26
PH-13	920- 969	831 .53	569 .41	629 .36	700 .35	798 .31	973 .29	969 .29	802 .29	713 .29	731 .28	722 .27
PH-13	945- 994	831 .65	569 .47	775 .45	805 .42	912 .35	609 .34	722 .34	696 .33	969 .31	876 .30	700 .30
PH-13	951-1000	831 .66	949 .41	508 .41	775 .40	696 .37	569 .35	608 .33	805 .33	549 .31	748 .31	996 .31
PH-14	883- 932	834 .64	751 .40	579 .37	1041 .37	619 .34	720 .32	820 .31	855 .30	699 .30	1029 .30	694 .30
PH-14	908- 957	834 .72	575 .46	734 .37	604 .36	633 .32	908 .31	1041 .30	649 .30	720 .29	668 .29	766 .28
PH-14	933- 982	834 .73	725 .47	766 .41	879 .38	575 .37	626 .36	913 .35	600 .32	647 .30	911 .29	915 .29
PH-14	951-1000	834 .61	511 .52	879 .42	725 .42	647 .39	693 .38	575 .35	992 .34	626 .31	1002 .31	600 .31

APPENDIX A

All plans on the following pages courtesy of Mesick Cohen Wilson Baker Architects

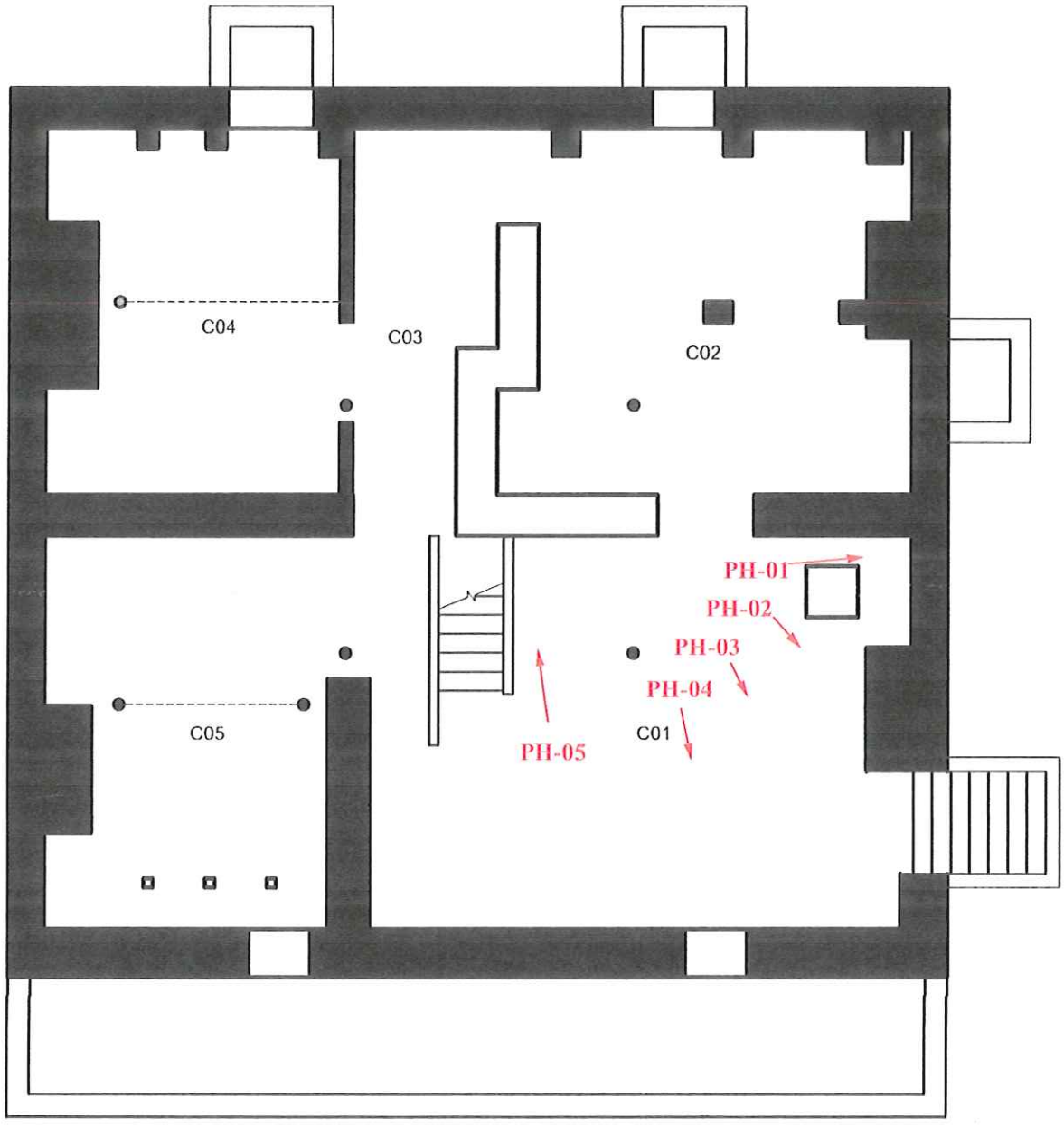

Fig. 23 - Hoffman house. Existing cellar plan.

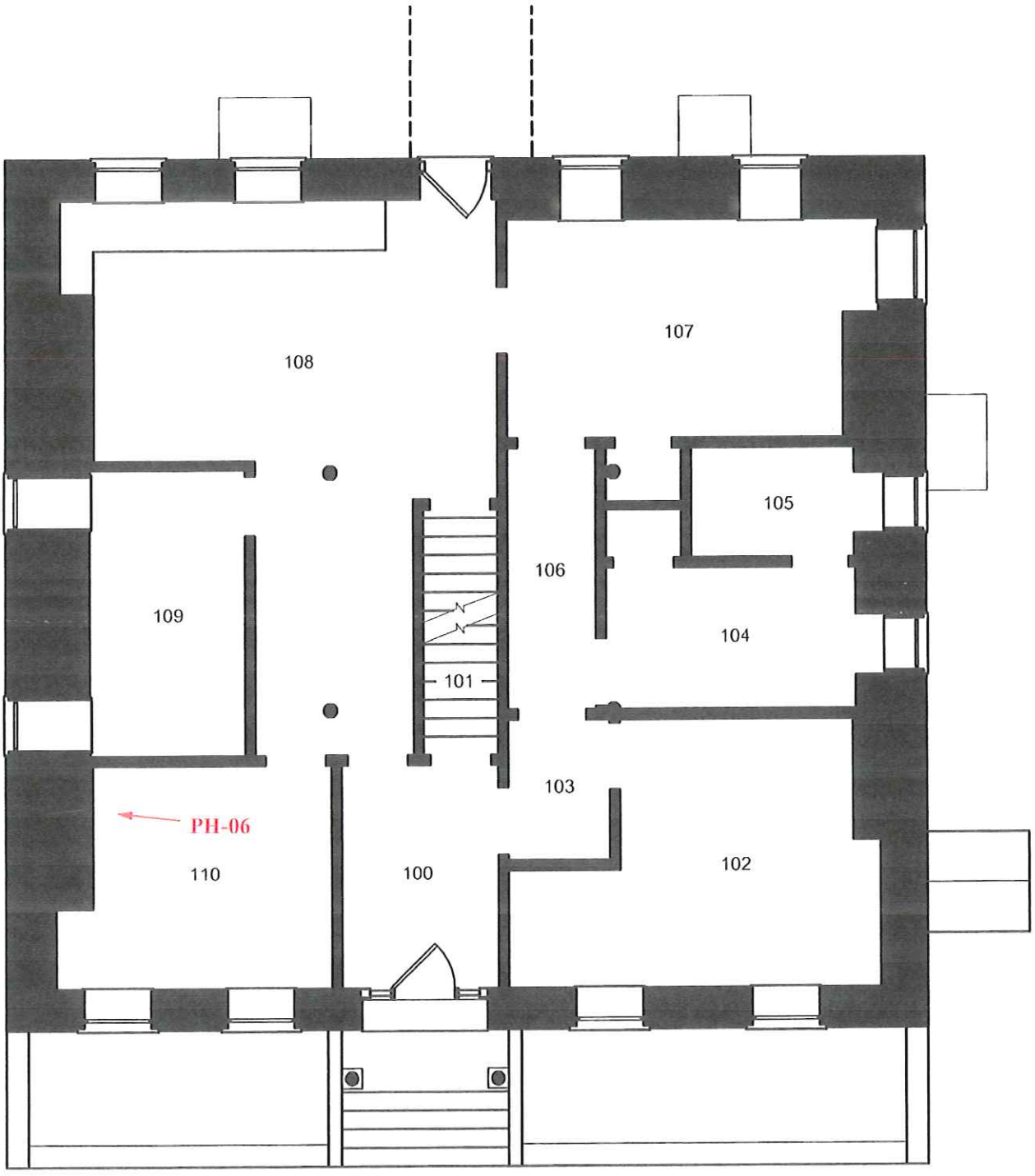

Fig. 26 - Hoffman house. Existing first floor plan.

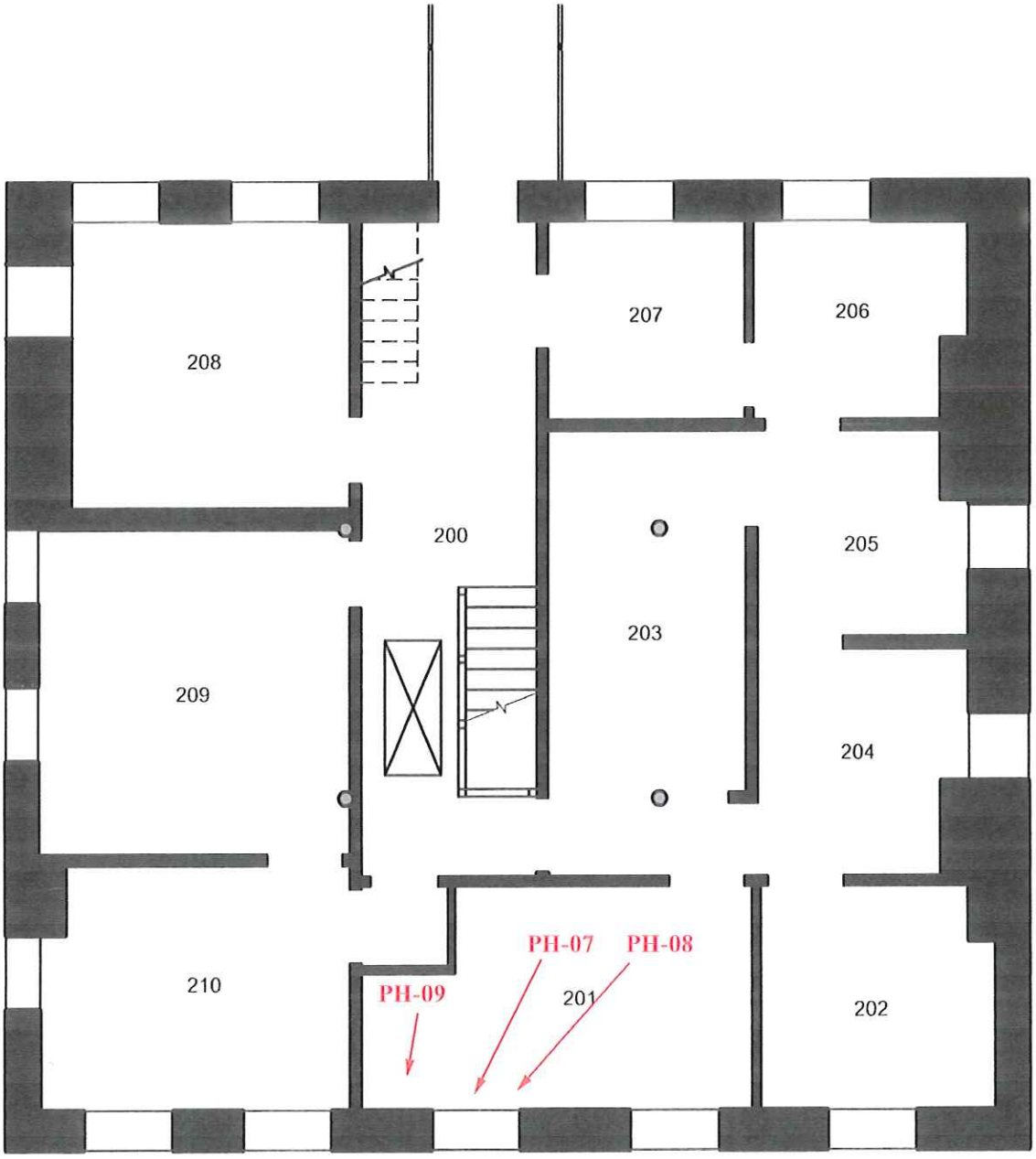

Fig. 36 - Hoffman house. Existing second floor plan.

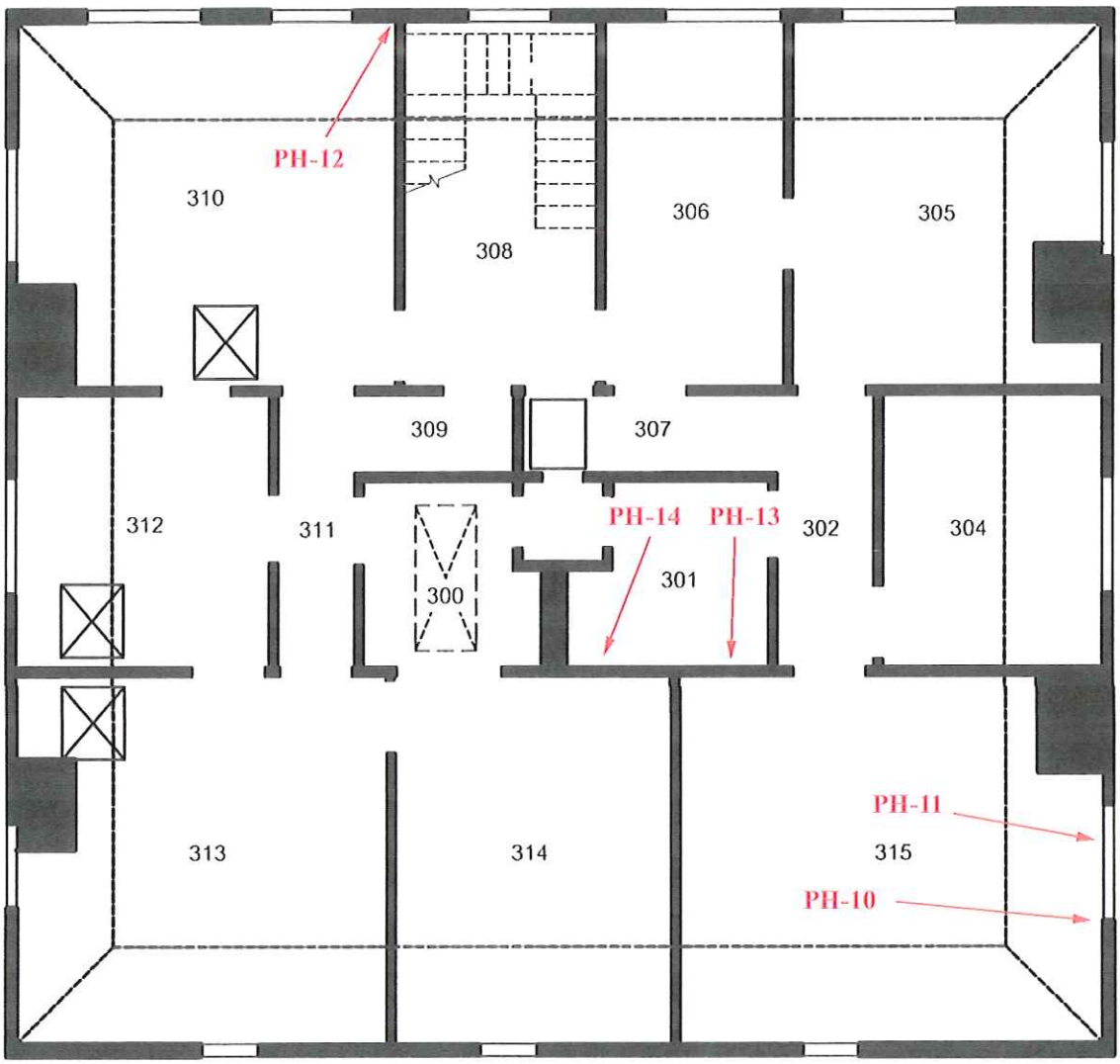

Fig. 39 - Hoffman house. Existing half-story plan.