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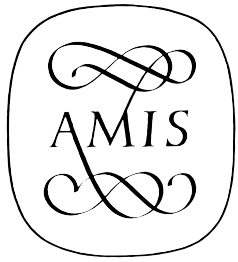

The Bonafinis Spinet: An Early Harpsichord Converted into a Tangent Piano

STEWART POLLENS

ALTHOUGH THE DEVELOPMENT of a keyboard instrument with pivoted hammers and escapement mechanism just prior to 1700 established Bartolomeo Cristofori as the inventor of the piano, there are written references to instruments that may have had striking actions that were developed many years earlier. These include a diagram and description of what is apparently a hinged, leaded, hammer-like mechanism to be used in a keyboard instrument, found in the manuscript of Henri-Arnault of Zwolle, ca. 1440;[1] there is also a letter of 1598 from Hippolito Cricca to the Duke of Modena listing materials needed to construct an "Instrumento Piano e Forte."[2] While Arnault's action is not clearly described and the "Piano e Forte" may in fact denote a harpsichord with contrasting registers, such early references suggest that stringed keyboard instruments with striking mechanisms may have been conceived, though perhaps never built, as early as 250 years before Cristofori's time. One reason these references have received little attention from historians of the piano is that no early instrument possessing a striking mechanism that could corroborate these vague or ambiguous allusions has been known to exist.

A small pentagonal octave spinet harpsichord converted at an early date into a tangent piano may provide evidence, however, of a piano made in the sixteenth or early seventeenth century (fig. 1). While the instrument itself has undergone essentially no alteration other than the removal of the harpsichord jacks and jack-rail cover, the subsequent installation of tangents, and the addition of some small ivory ornaments, the instrument's nameboard with its important inscriptions may in fact be from another instrument.

The spinettino, acquired by the Metropolitan Museum of Art in 1889 as part of the Crosby Brown collection, has a compass of *c/e–a‴* (g♯‴ omitted), forty-one keys, consistent with Italian keyboard instruments of the mid to

1. Paris, Bibliothèque nationale, MS fonds lat. 7295, fol. 128; facsimile ed., *Les Traités d'Henri-Arnault de Zwolle et de divers anonymes* (Kassel: Bärenreiter, 1972).

2. Luigi Francesco Valdrighi, *Musurgiana* (Modena, 1879), 26.

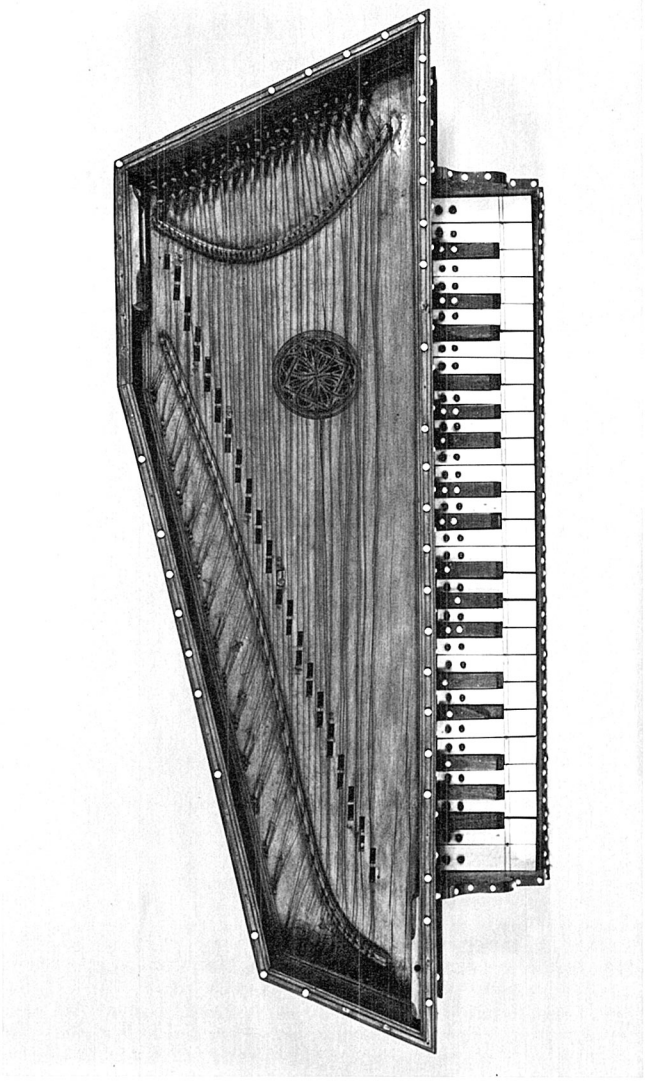

FIGURE 1. The Bonafinis spinet in the Metropolitan Museum of Art, New York, plan view. Photograph by the author.

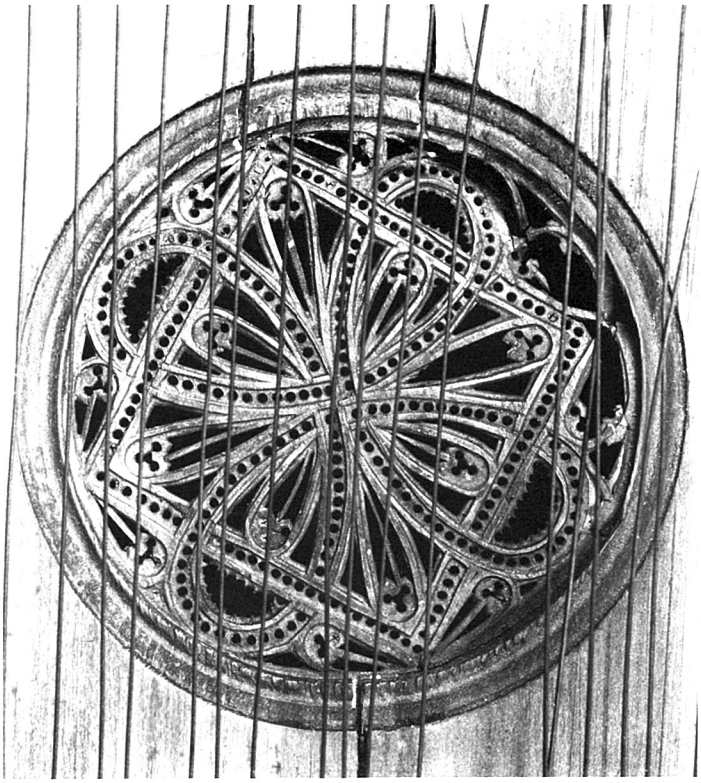

FIGURE 2. Detail of the spinet's soundboard rosette. Photograph by the author.

late sixteenth century. Its small, lightly constructed cypress-wood case is decorated with delicate moldings, natural and blackened bone studs, and an especially fine soundboard rosette of cypress wood backed with parchment (fig. 2). A group of geometric and foliate ivory carvings of various later dates (several of which are presently missing) are glued above the nameboard of the instrument (fig. 3). Soundboard ribbing, corner bracing, and other structural elements are neatly executed, as are the box slide and mortising through the soundboard.

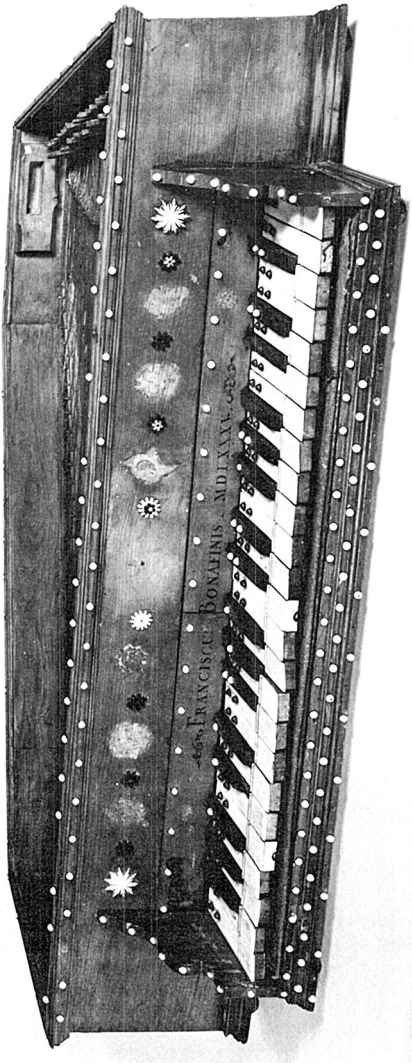

FIGURE 3. Front view of the spinet. Photograph by the author.

The soundboard mortises for the jacks are numbered in ink at every fifth jack. The numbers 1, 2 and 3, denoting string gauges, are inked between the bridge and hitchpin rail; the numbers ascend as the string diameters decrease, in the manner of the continental wire gauge. These gauge numbers, however, appear somewhat high for a plucked instrument of this scaling.[3] They would in fact be better suited to an instrument with a striking mechanism, and thus might have been added after the instrument was converted into a tangent-action piano.

The keyboard is original, and is also carefully made (by sixteenth-century Italian standards). The levers are of quartered beech mounted on a triple-rail softwood key frame. The natural keys are covered with bone and are neatly scribed, chamferred, and gouged between the two scribed lines (fig. 4). The original key fronts are missing, but two bone arcades (perhaps later additions) survive. Bone and blackened bone studs are mounted on the back of the playing surface of the keys. The levers have been numbered twice in ink; one set of inked numbers is faded, and the levers were presumably renumbered during a restoration (see fig. 4). Old (but presumably not original) wire is present. The present stringing is entirely of brass, as are hitchpins and bridge pins.

The balance-pin mortises consist of drilled holes and unusual flared mortices (fig. 5) that provide clearance when the key is pressed. The key is guided by slips of wood let into the back end of each lever, and by a grooved rack attached to the back rail of the key frame. An overrail, perhaps added when the harpsichord action was removed and the tangents installed, is wired to the grooved rack, limiting key travel. The jack-rail supports are present, but the jack-rail cover is missing; this structure may have been discarded when the original tangent action was fitted. (The cover would have interfered with the damper wires fixed to the older tangents.)

The instrument is presently fitted with a full set of numbered striking tangents (the numbering is not done by the same hand that numbered the key levers, nor does it match the numbering in the inscription dated 1717); the tangents are not the original ones fitted to the instrument, however, as four additional tangents found inside the case (see figs. 6 and 7) are much older than the present complete set. The tangents are rectangular slips with a carved upper platform offset to one side. The offset is needed because the original harpsichord jacks were positioned between the strings,

3. Case dimensions, string lengths, and gauges of existing wires are given in the Appendix.

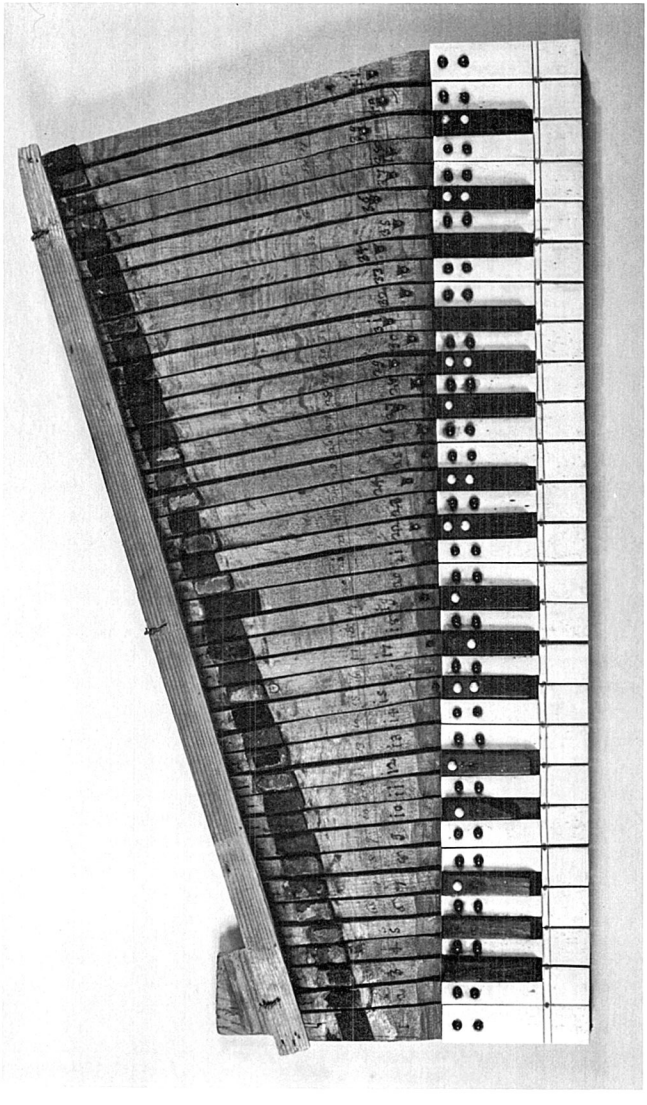

FIGURE 4. Keyboard of the spinet, showing two sets of numbers and overrail. Photograph by the author.

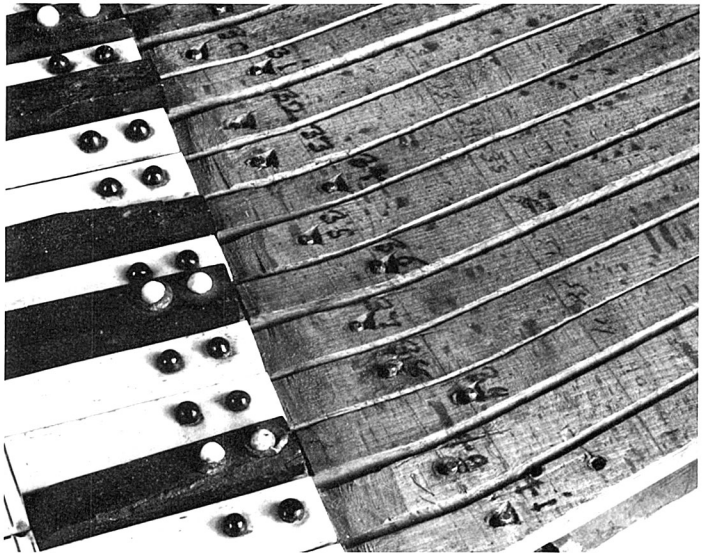

FIGURE 5. Detail of key levers showing flared mortices. The extra holes in the top key were evidently caused by nails used to fix the plank to the key bed prior to marking and sawing. The holes pass through into the key bed. A similar hole is found in the bottom key. Photograph by the author.

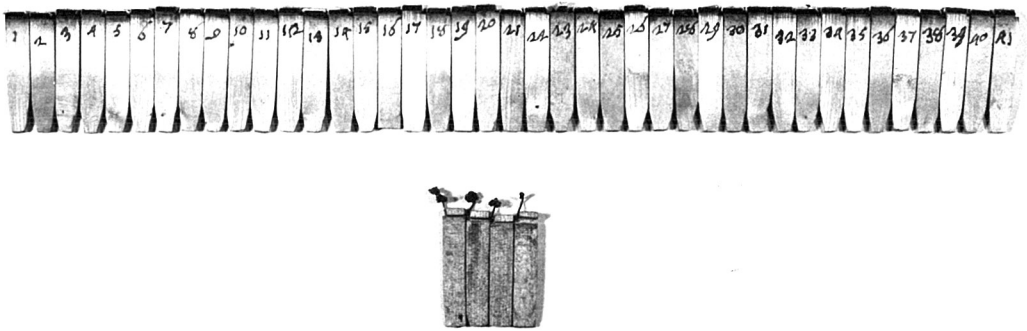

FIGURE 6. Tangents. The top row is the later set, lacking dampers. The bottom four, which are earlier (possibly late sixteenth or early seventeenth century), were recently discovered inside the instrument. Photograph by the author.

FIGURE 7. Detail of one of earlier tangents, with marks that may be remnants of an inscription. Photograph by the author.

while the striking face of the tangent must sit directly under the string. The striking surface is quite long (the average length is about 8 mm) and not truly optimum for producing a clear, penetrating sound. One edge of the striking surface is bevelled to prevent it from striking the neighboring string.

The two generations of tangents differ in several ways. The newer set was never fitted with dampers, and its striking surfaces were lined with thin leather (the leather presently glued to the tops of the tangents appears to be alumated sheep or kid skin). The older tangents show no traces of leather nor any remnants of animal glue along the striking surface. One of the older tangents may bear an inscription, but it is entirely illegible, and what appears to be writing may in fact be just abrasion or dirt. The two sets of tangents are also constructed of different woods: the older ones are of quartered beech, the newer ones of maple. The full set of striking tangents consists for the most part of copies of the four older tangents found stored in the instrument. The lack of dampers suggests that these tangents may have been fitted in the late eighteenth century when small hammered keyboard instruments without dampers became fashionable (particularly in German-speaking countries).

The dampers found on the four older tangents consist of a small piece of leather suspended above the striking surface of the tangent by a piece of brass wire. The wire is crimped around the leather damper and is curved in such a way that the height and position of the damper can be easily

djusted. When the key is at rest, the tangent hangs from the string by the damper (fig. 8). Only three of the leather dampers are present, and they are quite old and deteriorated. The leather is extremely soft and fine in texture and appears to have been either oil dressed or tanned. It is interesting to note that one of the very few dated harpsichords of the sixteenth century that possess remnants of the original dampers, the 1581 double virginal by Hans Ruckers (Metropolitan Museum of Art), appears to have been fitted with dampers of similarly folded leather.

When the spinet was converted from plucking to striking action, the jack-rail cover was apparently removed to provide clearance for the dampers. In order to limit key dip, an overrail was wired above the backrail of the key frame. The brass wire used to attach the overrail is of the same gauge as the wire used in the dampers of the four older tangents. Both the damper wires and the overrail wire also have similar draw marks (presumably made by a worn draw plate).

The nameboard is inscribed in ink: *FRANCISCUS BONAFINIS MDLXXXV* (fig. 9). On the verso (fig. 10), left side, also in ink, is written: *Factum anno 1587.* In the center another hand has written, in a darker ink:

> Post spacium centum triginta duo añorum Restauratum à me N: N: anno 1717. (After a period of one hundred and thirty-two years restored by me N:N: in the year 1717.)

The right side of the back of the nameboard has been scraped clean and no inscription is visible under normal light. Because it appeared that the area had been scraped to obliterate an inscription, that section of the nameboard was examined and photographed using several types of illumination. Two devices for viewing in infra-red light[4] were used, as well as photography in infra-red light and infra-red luminescence photography; photography in ultra-violet light and visual examination and photography with both long and short-wave ultra-violet fluorescence were also used.

Traces of an inscription could be read by visual examination using long-wavelength ultra-violet light, and were enhanced by high-contrast photography of fluorescence excited by long-wavelength ultra-violet light. Attempts were made to further enhance sections of the inscription by computer imaging techniques. Results reported by Dr. Joseph Biegel of the Photo-Optics Department of the ITEK Corporation (Lexington,

4. These devices are the VWR Infra-red Viewer and Hamamatsu Infra-Red Viewing System. I would like to thank Maryanne Ainesworth of the Painting Conservation Laboratory for her assistance with the infra-red examination.

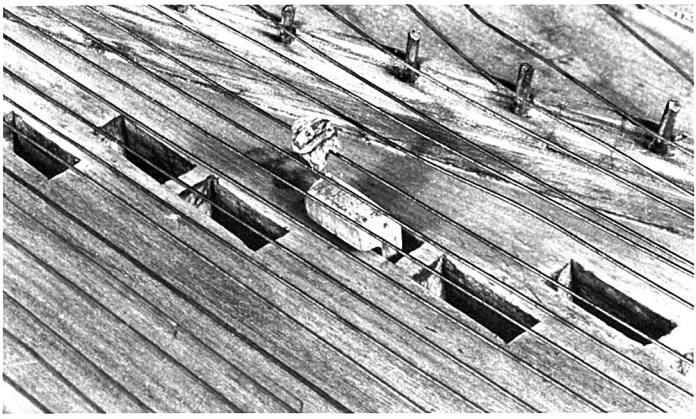

FIGURE 8. Detail of tangent positioned in guide. Photograph by the author.

Mass.) indicate that the word "Martello" was clearly visible on the computer monitor, and that in fact it appeared to be written over another inscription that was illegible and very faded.

Only a small part of the inscription was made clear enough through ultra-violet fluorescence that an interpretation could be attempted (see figs. 11, 12a, and 12b). My reading of this fragmentary and very unclear inscription is as follows (second line): "R Colla A Martello ____/ ____:: F ____ ano 1632." Another reading of the second line of the inscription is "Rifatto A Martello."[5] This would suggest that a striking mechanism, denoted by the word *martello* (hammer), had been installed or possibly repaired by that date. While the term "colla" could refer to a glued repair, the striking tangents (both old and newer sets) are carved from solid stock and are not glued together, as their shape might suggest. One of the older tangents has a small wooden pin projecting from the bottom surface that is conceivably glued into the tangent, but no glue can be observed even with the assistance of an ultra-violet lamp. (The purpose of the pin, presumably, is to increase the effective length of the tangent, thereby "regulating" the tangent's action.)

5. This opinion was voiced by Dr. Luigi Ferdinando Tagliavini, who examined the instrument in 1986.

FIGURE 9. Nameboard, obverse side, showing central joint. Photograph by the author.

FIGURE 10. Nameboard, verso. The lighter, scraped section is at the right. Photograph by the author.

FIGURE 11. Detail of the right side of the nameboard, verso. Photograph by the author using ultra-violet fluorescence.

FIGURES 12a and 12b. Detail of the right side of the nameboard, verso, slightly enlarged, with two different degrees of contrast enhancement. Photographs by the author.

A disturbing aspect of the nameboard is the central lap joint. It is unlikely that a maker would construct a nameboard with a central joint, but a reasonable explanation for this may be that the batten forming the nameboard was made for a larger instrument and later cut down to fit this spinet. The inscription relating to the instrument's restoration in 1717 runs fluently across the joint, and thus would appear to have been added after the batten was cut down and rejoined. Because the join occurs between the names "Franciscus" and "Bonafinis," there is no way of knowing whether it predates that inscription. Extensions of the serifs of the letter "B" in "Bonafinis" apparently cross the joint, but these extensions could have been added after the joint was made in an effort to disguise it. The sawing and rejoining of the nameboard may have been done to reduce the length of a pre-existing nameboard (perhaps made for an instrument in 1585) in order to use it in this smaller instrument constructed two years later—hence the seemingly contradictory inscription "Factum anno 1587" found on the back. The board may have been shortened in the center and rejoined in this complex way in an attempt to preserve the inked decorations at either end, and perhaps to retain the maker's name. Nevertheless, the inked arabesques have been cut through slightly at both the ends and along the bottom edge, evidence that the board was trimmed at those points as well. The batten is held in place by two carved wooden pins (of which only one survives) which pass through pierced studs projecting down from the front wall of the case. While there has been no redrilling of either nameboard or studs or apparent movement of the studs, thus supporting the speculation that the nameboard may be the original one fitted to *this* instrument, traces of the obliterated inscription appear to run through one of the holes, lending further support to the idea that the nameboard was originally made for another instrument.

Was Franciscus Bonafinis the maker of this instrument? Arriving at a decision as to whether or not the maker's name "Franciscus Bonafinis" was inscribed prior to the creation of the central joint is complicated by the nature of the joint used. Since the lap joint might have been made to remove even a short section of material, and since the front transverse saw cut is made just before the "B" in BONAFINIS, the maker's name may have been present prior to the rejoining (as stated above, the presence of the serif extensions is inconclusive). There is the possibility that Bonafinis made both this instrument and the (presumably larger) instrument from which the nameboard came. The presence of two dates only two years apart on the nameboard suggests that some important alteration may have occurred shortly after the instrument was made (1587 may refer to the

date the tangent action was fitted); or perhaps an older nameboard was adapted to fit a newly made instrument. The only other known instrument by the maker Bonafinis is a virginal dated 1560 at Ingatestone Hall, Essex.[6]

The inscription relating to the 1717 restoration, certainly added after the nameboard was rejoined, oddly contradicts the neighboring inscription, "Factum anno 1587"; for it refers to the earlier date in Roman numerals found on the other side. The sixteenth-century dates are found on opposite sides of the same half of the joined nameboard, ruling out the possibility that half of one nameboard made in 1585 and half of one made in 1587 were joined together. At the joint, the grain patterns of the left and right pieces do not appear to match. But little meaning can be ascribed to this point, as the nameboard is slab sawn, and the grain meanders so that the removal of a short section might destroy the continuity of grain lines (fig. 13). Both the calligraphy and overall appearance of the front and back inscriptions appear similar in age; but it is difficult to compare hands, for the front inscription is in formal capitals marked out by scribe lines, while the verso is in freer script. Aside from the scraped section of the back of the nameboard (which is consequently lighter in color), the wood, color, and patination of the nameboard appear to match the rest of the case of the instrument. The batten has been reglued at the joint several times, and at present the fit is poor and very obvious. Both animal-hide glue and traces of shellac are present (the latter evidently used as an adhesive, as no traces of this material are found elsewhere on the instrument).

The spinet is most certainly from the mid to late sixteenth century.[7] The inscriptions on the nameboard also appear to be genuine, although the batten itself may have been made originally for a larger instrument. Judging from the verso inscription it seems possible that another, earlier instrument may have been fitted with tangents in, or prior to, 1632. There is no way of knowing when the batten may have been transferred to this instrument, but the instrument's own set of tangents could easily date from that same period. The inscription concerning the fitting or restoration of the striking tangents in the original instrument may have been scraped off at that time, but more likely in 1717 during its later restoration. (It is ironic

6. Donald Boalch, *Makers of the Harpsichord and Clavichord 1440–1840*, 2d ed. (London: Oxford University Press, 1974), 17, "Bonafinis," and 11, "Benismis"; and F. G. Emmison, "A Virginal by (?) Franciscus Bonafinis, 1560, at Ingatestone Hall," *Galpin Society Journal* 17 (1964): 109–10.

7. This statement is based upon the instrument's compass and appearance. It is the opinion of Dr. John Henry van der Meer, who saw the instrument in 1986, that it is mid sixteenth century.

FIGURE 13. Detail of the nameboard joint photographed in raking light to reveal grain lines. Photograph by the author.

that the date 1717 is given by Christoph Gottlieb Schröter for his invention of a tangent action.[8])

Although there is little to cause doubt that the spinet is a sixteenth-century instrument, the date of its conversion into a tangent piano is uncertain.[9] The four older tangents found in the instrument may very well date from the late sixteenth or early seventeenth century, for the wood (in terms of type, grain and growth structure, method of sawing, and patina) is in fact quite similar to that used in making the key levers. While the inscription on the back of the nameboard may provide information about this or a previous instrument's conversion, it has been obliterated to such an extent that a number of sophisticated techniques have thus far failed to decipher it. One might speculate that the nameboard and its inscription concerning the hammer(s) came from another instrument; but it is unlikely that the older tangents were originally made for another instrument, as they appear to fit this box slide perfectly, and the offset striking surfaces coincide with the cramped string band of this small instrument.

Whether Franciscus Bonafinis made this instrument, or another instrument from which the nameboard came, is a matter of speculation. In either case, he may not have been the individual who converted the little spinettino into a tangent piano. Further examination of the nameboard inscription may shed more light on this matter, but at this point one can only say that this instrument is an extremely early tangent piano, and that in fact it may be the earliest piano known.

The Metropolitan Museum of Art, New York

8. Lorenz Christoph Mizler, *Neu-eröffnete musikalische Bibliothek* (Leipzig, 1739–54), vol. 3, pt. 3, p. 474ff. A model of this action was reported in 1738 to have been submitted to the Dresden court in an unsuccessful attempt to win funds for its construction.

9. Edwin Ripin's unpublished article "The Bonafinis Spinet: On Route to the Piano" discusses this instrument's conversion into a tangent piano. He assigns the date of the conversion to 1717 (the date of the visible inscription on the back of the nameboard; but he was not aware of the obliterated inscription visible under long-wave ultra-violet light, and he does not mention the four older tangents with the leather dampers.

Appendix

The Bonafinis Spinet: Dimensions, String Lengths and Wire

Dimensions

Overall width: 76.6 cm
Overall depth (excluding studs): 31.5 cm
Case height (excluding studs): 14.5 cm
Case-wall thickness: 3.5–4.5 mm

Octave span *f*–*f*‴: 45.2 cm
Length of natural key plate: 7.9 cm
Length of accidental: 5.2 cm
Soundboard rose diameter: 6.8 cm

String Lengths

String	Length	Original Plucking Point
c/*e*	62.2 cm	5.8 cm
f	61.3 cm	7.2 cm
c′	53.1 cm	11.2 cm
f′	44.7 cm	11.3 cm
c″	31.4 cm	7.2 cm
f″	23.4 cm	6.1 cm
c‴	15.3 cm	5.0 cm
f‴	11.0 cm	6.2 cm (from long bridge; 5.0 cm from short bridge)
a‴	8.6 cm	6.0 cm (from long bridge; 2.6 cm from short bridge)

Wire

Gauge Markings
(Written in ink on soundboard between bridge and hitchpin

Key No.	Note	Gauge No.
1	*c*/*e*	1(?)
9	*c*′	2
24	*d*♯″	3

Present Wire (brass throughout)

Key No.	Note	Diameter
1–8	*c*/*e*–*b*	.488–.49 mm
9–22	*c*′–*c*♯″	.442 mm
23–34	*d*″–*c*♯‴	.402 mm
35–40	*d*‴–*g*‴	.398–.394 mm
41	*a*‴	.374 mm