THE ROBERT AP HUW MANUSCRIPT

AN EXPLORATION OF ITS POSSIBLE SOLUTIONS

3

TUNING

PETER GREENHILL

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INTRODUCTION

Knowledge of the exact tuning of the *telyn* for each piece in the tablature is an essential prerequisite for reconstructing the music accurately. In so far as the solutions to tuning proposed by interpreters have been tentative, this has been one of the major areas of uncertainty in reconstruction. One possible route at the present time would be to attempt to compare and evaluate the arguments that have been put forward by the many contributors involved concerning those pieces in the text for which tunings have been proposed, in the hope that some reconciliations might be arrived at. The literature on tuning has grown to quite large proportions in recent times, and yet areas of partial agreement are so few that it seems there can only be the remotest prospect of a real consensus being achieved.

What I do believe contributors would agree on at the present time is that the subject of tuning is dogged by a critical shortage of information in the primary sources, and that any interpreter is forced by this shortage into examining a very wide range of possibilities for each of the pieces of information in the early documents. This leads to complex arguments about tunings, tunings which themselves are believed to have been very complex. It might seem that all this complexity is inevitable in view of the apparent shortage of clear evidence.

However, I do not propose here to attempt to further develop or assess the relative merits of the lines of argument that have

already been presented by all the contributors. Instead I shall argue at length for the need to re-examine the information provided by the primary sources, and for the need to place upon them the absolute minimum of interpretive construction. This amounts to a reappraisal of what level of complexity in tuning we should expect the primary sources to be indicating. For - as I hope to demonstrate - we really only have good reason to anticipate a simple tuning scheme. Elaborate interpretive constructions only appear necessary when we are determined that we should anticipate very complex tuning arrangements, and I intend to question the basis upon which our anticipations have been formed. It may be edifying to think that *cerdd dant* was extremely advanced in regard to key, that it was well ahead of its time in terms of development elsewhere, but we need to be on our guard against reading too much into the early sources.

I will present the evidence that the early sources are already sufficient in themselves after all, that the tuning for each piece in the music text is unambiguously indicated, and that there is no obstacle whatsoever relating to tonality which prevents us from reconstructing these pieces of music with confidence. On the basis of the evidence available at the present time I believe the arguments to be presented are conclusive.

Throughout, the term 'tuning' will be used to refer to tuning sets in general, whether they involve the inflecting of notes - as in a change of key - or the reassignment of notes to strings as in *scordatura* tunings. Microtonal tempering adjustments will be treated as a separate issue.

I. THE EARLY LITERATURE RELATING TO TUNING

Firstly, let us examine the early literature on music to see what it does and does not express concerning tuning the *telyn*. The Welsh literature on the technicalities of music is sparse. It divides very simply into two categories: regional and cosmopolitan. The regional literature is couched in terms that are unique to Wales, using terms mainly in the Welsh language but also ones of ultimately Latin origin, and relates primarily to *cerdd dant*. The cosmopolitan literature is couched in terms that are common to Europe as a whole, and the majority of the musical terms used are Latin. They relate directly to plainchant (which of course was practiced in Wales - as 'y cân araf' in contrast to 'cerdd dafod'), but occasionally it appears that a reconciliation was being effected - or at least attempted - between these Latin terms and Welsh terms, some of which are familiar from the regional literature.

Any other division of the literature would need to be speculative and could be misleading (since for example some but probably not all of the cosmopolitan literature originated outside Wales, despite both classes being written in Welsh). These two categories of material are somewhat intermingled in the documents but in general each passage is clearly of the one class or the other.

The cosmopolitan expositions are generally immediately comprehensible because they tend to be based on practices and

indeed on writings that are familiar. The regional expositions are not immediately comprehensible, so the easiest route to understanding the technicalities of *cerdd dant* would be through the cosmopolitan ones in so far as they relate closely and reliably to *cerdd dant* as well as to plainchant. But this is not at all certain. Hence the regional expositions do have to be addressed in tandem with all available sources. It is a complex situation.

What very little literature there is which makes any expressed reference to tuning is mainly of the cosmopolitan category, and it is initially unclear how much of this actually does relate - even secondarily - to *cerdd dant*. For example, Aberystwyth MS Peniarth 147 (1566), p. 197 contrasts the notation of plainsong and pricksong, and then lists the names of the notes in the Guidonian gamut of hexachords, which of course implies the use of both B-flat and B-natural. But a knowledge of plainsong by a Welsh writer does not mean that *cerdd dant* employed both these notes.

Unfortunately, and perhaps tellingly, there appears to be no account of tuning the *telyn* which definitely originates from deep within the *eisteddfod cerdd dant* tradition. We have no exposition on tuning from anyone with the credentials of a Wiliam Penllyn, nor even a record of there having been such an exposition. One possible explanation for this absence could be that it was felt that the tablature was sufficiently clear that the tuning of the *telyn* did not require separate exposition.

Most of what can be gleaned concerning tuning is from

sources which are sufficiently late to be of debatable relevance to the music text in the Robert ap Huw MS. These occur mainly in the context of the names of the *telyn* strings.

STRING-NAMES

We could expect each of the strings of the *telyn* not just to have been denoted by alphabetical symbols and octave marks - as they are in the music text of the MS - but to have borne names as well. Several sources touch on tuning of the *telyn*.

Cardiff Library MS Hafod 24 (John Jones Gellilyfdy 1605-10): 810 describes the lowering by half a note of a string two strings above one named *y cyweirdant* - very possibly the string from which one begins tuning the *telyn* - to form *y gogywair*, which is one of the five principal or warranted *cyweiriau* of *cerdd dant*. Lacking as it does more detail, we cannot be strictly sure of the tuning this passage is indicating, but it must be fairly safe to conclude that it is the diatonic scale of all natural notes apart from the inclusion of B-flat. Since the tablature divides each octave series of letter symbols in such a way that G is the lowest string in the octave, we can well imagine that G was where one began the tuning cycle and that the G-string may have been named *y cyweirdant*. G is of course the most fundamental note in the Guidonian gamut, and just as B - two notes above the G - was the only note that was subject to being flattened in the Hexachordal system, the simplest interpretation of this passage is that it is this flattening of the B-string that is being

referred to. If so, and if the passage is reliable in terms of the *eisteddfod* tradition, then B-flat would have had some significance in *cerdd dant*. This should be borne in mind later, when we come to consider the tablature in detail.

Cardiff Library MS Hafod 3 (by harpist Robert Peilin *c*.1613-*c*.1617) pp. 235-8 refers in passing to the inflection of both B and F strings, in an essay which is primarily about the theory of plainsong and the gamut. Although he was described in 1605 as a *pencerdd* in a flattering poem (by Edwart ap Raff), we cannot at this stage be sure that he had graduated as such because there is a worrying lack of evidence that the institutions of examination had continued well beyond the Caerwys *eisteddfod* of 1567/8. We cannot assume that Peilin himself played the old *cerdd dant* of the *eisteddfod* tradition, but he does employ several *cerdd dant* terms.

Several more points need to be made that bear on Peilin's relationship to the *eisteddfod* tradition.

1) His name appears in Bangor MS Gwyneddon 4, p. 133, on the list of musicians present at Lleweni over Christmas of 1595, in the company of other *gwŷr wrth gerdd*, some of whom are descendants of those at Caerwys 1567/8. But the long list of pieces performed there is of all popular tunes which were very definitely not drawn from the traditional repertory of *cerdd dant*. It is unlikely that both types of music were performed at Lleweni, and so it would seem that these families of musicians had switched in recent decades from the traditional music to accommodate the modern tastes of their patrons. Certainly the

patrons of Tomos ap Richard (who was, in the years following, a musical partner of Peilin), had cosmopolitan tastes.

2) It appears that for much of his career Peilin was part of a band of musicians. The instruments involved included another *telyn*, a *crwth* - probably a *crwth trithant* - and a *pibgorn*. A consort of this sort is never indicated or implied within the *eisteddfod* tradition. Specifically the *crwth trithant* and the *pibgorn* were excluded from the formal proceedings at Caerwys, as if even as early as 1567/8 the tradition was under threat from below, by a popular music or a folk music. It is really unimaginable that the *cerdd dant* repertory - much of its subtle character requires a gentle delivery and keen attention from the audience - could be successfully played on the *telyn* and on a *pibgorn* together. The *pibgorn* is relatively very loud and penetrating, and quite raucous in tone.

3) Several poems refer to Peilin as a 'pencerdd'. Robert ap Huw, Peilin's contemporary, uses the same title in relation to his own repertory. However, one wonders whether the use of 'pencerdd' in these instances was merely a formula for an accomplished musician, and should not be taken in the strict, literal sense of indicating the holder of a formal degree. If, as seems to have been the case, the institutions of formal examination for the degree had ceased, one could imagine that both harpists might have accrued the title by virtue of having performed at the English Court, which fact was certainly taken to confer great prestige upon them both. Robert ap Huw's understanding of traditional *cerdd dant* was poor (demonstrated by

his authorship of the rhythmic signs he added to the music text of the manuscript - see Part 4 of this work, pp. 28-32) and it may well have been that Peilin knew as little or even less about it, despite his 'pencerdd' epithet.

Nevertheless, there appears to be a core element of tradition in Peilin's writing. Uniquely, he supplies convincingly idiosyncratic names for individual harpstrings, and these are very important indeed since they imply the tuning of the *telyn*. Names are provided for seven harpstrings - those lying within each octave - which reveal an obvious alphabetical mnemonic which I bring out by underlinings here, along with translations and correspondences:

gowirdant		= G
a chrassdant	= arid harsh	= A
#ragodant (using the diesis for the b)		= B-natural
ne breiniol gowirdant	= freed	= B-flat
C gywirdant		= C
dylordant	= ? dull	= D
eglurdant	= bright	= E
ffrwythlleddfdant	= fruitful soft	= F
ne breiniol ddyrchafaeldant	= freed raised	= F-sharp

The modifications to the tunings of the B and F strings are of course exactly those that we should expect to find in the mainstream of European practice in the early seventeenth century: the modification of B is familiar from the system of hexachords, and the modification of F from *musica falsa*. But because this treatise is primarily on the theory of the European mainstream,

we have to consider how applicable these 'mainsteam' tunings would have been to the *cerdd dant* tradition in Wales.

Amongst these names there is a core of *cerdd dant* terminology - 'cras' and 'bragod' are two terms which have certainly been drawn from the *cerdd dant* tradition. In fact the whole collection of string names seems to comprise an accretion of different layers, drawn from different systems for naming strings. 'Cras' and 'bragod' relate to *cyweiriau*. 'Gowirdant' and 'C gywirdant' seem to be drawn from a system in which strings were named from their letter-names, suffixed by 'cyweirdant'. 'Dylordant', 'eglurdant' and 'ffrwthleddfdant' have obviously been so named from the outset to establish a mnemonic connection with their letter-names, and they may well be the result of late didactics rather than early practice; they might be the inventions of Peilin.

In contrast, those names which have been forced into the logic of the mnemonic must surely have been drawn from traditional practice. 'gowirdant' is forced, with the artificial mutation from 'cowirdant'; 'a chrassdant' is forced by the addition of the conjunction 'a'; and the natural sign, the diesis, is forced onto 'bragodant'. These names will have been authentic, and they may well have been drawn from the *cerdd dant* tradition. In turn this implies that the modifications to B and F could have also been authentic drawings from the tradition and not merely from the European tradition.

At this point it is important to stress that what is indicated here in regard to tunings is clear and familiar for us

to understand. Note that only two strings may undergo modification, that the sophistication of the tuning here does not extend beyond this, and that the list might have some applicability to the tablature of the Robert ap Huw MS. because of the two points of similarity in vocabulary: 'cras' and 'bragod' - two of the five warranted *cyweiriau* of the *cerdd dant* tradition.

'Cyweirdant' is another term shared with tradition. It is used three times in this passage, in two different ways. In 'gowirdant' (= the G *cyweirdant*) and 'C gywirdant' the word implies an emphasis on the notes G and C, as if these notes were significant or fundamental in gamut formation or scale formation, and Hafod 24 has already indicated G as 'y cyweirdant'. In 'breiniol gowirdant' the word is perhaps used more casually, as a general word for 'string' when considered from the point-of-view of pitch.

These uses are to be contrasted carefully with the use of the same term in other contexts. It is fairly clear that the use in Hafod 24 of 'y cyweirdant' refers to a single string from which one begins tuning, the same concept used later by Gwilym Puw for his 'sette string'.

The closest equivalent to the multiple use of the term here by Peilin is found in Aberystwyth MS Panton 56 (f.4v), where 'cyweirdannau cryfion' are explained as the starting notes for each of the seven individual hexachords. It is of course noteworthy that five of the hexachords begin on either G or C, and so the naming of these two strings by Peilin receives some confirmation here. We will return to Hafod 3 in the next chapter.

Panton 56, an eighteenth-century collation (*c*.1758-85) of mainly earlier material, refers to the inflection of B in a plainsong context, and it also associates the three types of Guidonian hexachords (denoted by corruptions of their Latin names) with some *cerdd dant* terms, thus: 'Begwri' (the context suggests this is from 'B Durum'), 'Beiniol' (from 'B molle') and 'Proprgrawnt' (from 'properground', evidently English for 'proprechant'), with *tro'r tant*, *gogywair* and *bragod gywair* respectively. Each of the three types of hexachord has its own 'cyweirdant', and these can be inferred to be G, F and C respectively, with one set string for each starting-point of the three types of Guidonian hexachord. Thus, if the treatise is correct, of the *cerdd dant* terms here *tro'r tant* would involve B-natural, *gogywair* would involve B-flat and *bragod gywair* would involve neither.

It should be stressed that the original author of this treatise was primarily writing on the theory of plainchant, often unreliably, and not *cerdd dant*. The use of *cerdd dant* terms here rather appears as if he had encountered some Welsh musical terms and was anxious to provide a reconciliation between them and the Latin terms for the hexachords, or to provide some Welsh terms rather than borrowings at least. The reconciliation may have been retrospective, with the author pressing the *cerdd dant* terms into a service they were not designed for. Nevertheless the association drawn here between *gogywair* and B-flat does accord with Hafod 24, despite the fact that Hafod 3 p. 235 associates *y gogywair* with sharpening a string - *dyrchafael y dant* - a term

Peilin uses for the raising of B-flat to B natural. Perhaps it is wise not to give much credence to Peilin's details, since this identification of *dyrchafaeldant* is not supported by his list of harpstrings, where the term 'bragodant' is used for B-natural, and 'breiniol dyrchafaeldant' is reserved for what appears to be F-sharp, not B-natural. Whether it is Jones or Peilin - or indeed neither of them - that is correct about the *gogywair*, it is evident that there was some disagreement then (as there is today) over which was the radical pitch of B and which was the 'modified' pitch. We will see later that the tablature itself was unequivocally decided on this matter.

Not to be confused with any of these conceptions of 'cyweirdant' is the use of the term in chordal, harmonic contexts. The literature on *cerdd dant* generally uses the term in contrast to 'tyniad', and Aberystwyth MS Peniarth 62 (post 1582):18 refers to a set of seven *cyweirdannau* - presumably within each octave - of which three are principal or special, and four (*cynnwys dannau* - contained i.e. damped strings) are weak, in the sense of whether they are to be sustained ('played through until it dies away') or stopped ('measured in whatever way you like') respectively. The three principal *cyweirdannau* here may be those termed *main*, *trebl* and *byrdwn* which made up an individual 'cyweirdant cryf' as described in Peniarth 147 p. 196 and Panton 56 p. 12, but more certainly they may be identified with the components of the triad (when one brings the music text into account).

Evidently the term 'cyweirdant' was used for a whole range

of purposes, but in relation to tuning it seems that out of all the above uses, referring to the G string as 'y cyweirdant' was the most relevant.

Taking stock of what little has been gleaned from these manuscripts concerning tuning, a tuning scale emerges comprised of all natural notes apart from the alternative tuning of B-flat and F-sharp. Indeed it is very conceivable that harp-tuning was no more complex than that required to accommodate modal music and that the scales it produced were no more complex than those of plainsong.

We have every reason, then, to take the tunings within Peilin's list of harpstring names at face value. It would seem to indicate that the period to which it relates (which may possibly have been after the demise of the *cerdd dant* tradition) was a stage of evolution at which there was a diatonic tuning which allows for modifications to the B string and the F string and which remained diatonic, with no duplicating of notes. The word used for these inflections is 'breiniol' (not 'cyweiriol', 'tyniadol' or 'lleddf' as some have suggested). This is to say that the scale of the Welsh harp at this time appears to have been in keeping with the rest of what we know of the history of music, that it was not exotic or bizarre.

At this point it is helpful to review the position. We have one source that relates to two inflections, and two that relate to one inflection. This is straightforward enough for us to imagine that the tablature should not present insuperable problems in respect of note-identification. Not insuperable, that

is, were it not for the issue that in the modern, interpretive literature it has generally been considered that the music text contains multiple tunings; that each specific *cywair* comprised a different tuning. This view is challenged at length later, but first a chapter is required on modern interpretations of tuning which have centred on the concept of 'cywair'.

II. MODERN INTERPRETATIONS OF TUNING

In the preceding chapter, we have seen that certain notes or strings have occasionally been associated with various *cyweiriau*. This fact has not, thus far, really complicated the situation regarding tuning in the early literature that we have so far considered. But as we come to the more modern literature it is clear that contributors have felt themselves under pressure to provide a Welsh terminology for the keys emergent in the seventeenth and eighteenth centuries, not just Welsh terms for the ancient hexachords.

As we have seen in the case of the word 'cyweirdant', 'cywair' can be put to a variety of uses. Undoubtedly it and its verb 'cyweirio' have been used from early times to describe the setting of individual strings and the initial tuning of the *telyn*. 'Cywair' presents itself as a suitable candidate and in modern times it has become the word for key, with the retunings they entail, but we need to examine very carefully when this came about.

In 1676 Gwilym Puw used the word in the sense of tuning arrangements or sets. In his notebook, NLW 4710 B, are diagrams of tuning instructions (in English) for three tuning sets, termed 'Y Bragod Gywair', 'Y Gogywair' and 'Y Braidd Gywair', or 'The Ordinarie Sette', 'The Siarpe Sette' and 'The Flat Sette' in English. The instructions commence from a particular 'sette string', the pitch of which is not given but which, if it relates

to earlier practice, may be the G *cyweirdant*. The tunings are hard to implement with certainty because the pitch of the set string is not specified and because at points the tunings appear to be musically improbable, but they are sufficiently different from one another to imply that more than one flat and one sharp are involved. If the set string is G, then B is flat in *y gogywair* which accords with Hafod 24 and Panton 56 but not Hafod 3.

Note that the link here with the *cerdd dant* traditional terms is confined to just the *bragod gywair* and the *gogywair*, so this account does not directly address the *cyweiriau* as they were used in the early tradition, in which there were five warranted *cyweiriau*. In fact it is the English terms which are cohesive here - it is they that are commensurate with one another, not the Welsh ones. This makes one wonder if what Puw was actually attempting to describe was simply the raising of F and the flattening of B, as described in Hafod 3, and the three diatonic keys involved.

Most interestingly here, close parallels to just such a system of three keys are supplied by the set of Irish terms reported by Bunting for the harp in Ireland: 'fuigheall-mor' - great (in the sense of augmented by the sharpening) sound - for the key (D major) derived from the raising of a string; 'fuigheall-beg' - little (in the sense of diminished) sound - for the key (C major) derived from the flattening of a string; and 'uan fuigheall' - single sound - for the tuning (G major) upon which these inflections are made. These terms are semantically

(if not strictly musically) commensurate with Puw's terms. The three English terms used by Gwilym Puw - 'the siarpe sette', 'the flatte sette' and 'the ordinarie sette' - are not translations of the Welsh terms they accompany and are the obvious English counterparts to the Irish terms. If indeed they be so, Puw has misapplied them to his illustration of harp-tuning.

Whatever be the case regarding Puw's tunings, we can compare Bunting's with Peilin's thus: 1) an ordinary or *uan* (single) set, Bunting: G major, Peilin: C major; 2) a flat or *beag* (diminished) set, Bunting: C major, Peilin: F major; 3) a sharp or *mor* (augmented) set, Bunting: D major, Peilin: G major. These are the ways in which the available tunings in each source, Irish and Welsh, would have been organised according to the Irish terms of Bunting and the English terms of Puw.

All three systems - Welsh (as in Hafod 3), Irish (as in Bunting) and English (as inferred from Puw's English names) - indicate the same simple stage in the early development of what was later to become the concept of key. But at this stage the terminology was not that of keys but of inflected notes (and as with the Irish practice described by Bunting there would no doubt have been modal uses of each of these tunings not confined to the Ionian, major mode but including such as the Æolian and the Dorian).

The doubts discussed here concerning the validity of extrapolating back from Puw's tunings to the old *cerdd dant* throw uncertainty again onto the concept that a 'cywair' was a tuning set in the old tradition. Whilst 'cywair' has been used at

various times for a wide variety of purposes in the field of adjusting, correcting and perfecting pitch, in fact really it appears to have been an omnipurpose word within the field of tonality and harmony. But this very flexibility prohibits any initial certainty that its specific use in the context of the well-known group of individually-named and warranted *cyweiriau* (as *bragodgywair*, *isgywair* etc) denoted specific tuning sets (amongst multiple tunings) on the *telyn* within the *cerdd dant eisteddfod* tradition.

Nevertheless, nearly all modern contributors have been convinced that the original *cyweiriau* did involve different tunings for each, and the existence of five principal *cyweiriau* and of the many others we have references to means that a great deal of retuning is supposed to have been normal in this early tradition. Although contributors have often not cited their sources, it is my impression that the majority of contributors have directly or indirectly drawn from Hafod 24 and particularly from Hafod 3 when assigning particular tunings to the warranted *cyweiriau*.

To understand the broad thrust of modern interpretations, it is necessary to consider a further passage in Hafod 3 (pp. 237-8) - in itself a passage very insignificant as regards tuning - following the list of harpstring names discussed before. The manuscript continues, providing the names of seven 'principal' *cyweiriau* which appear to be derived from the names for the strings. The passage does not specify what the concept of 'cywair' which was being developed here actually was, but because

the names follow the string names so closely then the meaning of 'cywair' here certainly includes the musical tone produced by a string. The names are:

G gywair
kras gywair
#ragod gywair (using the natural sign for b)
isgywair
dylod gywair
eglurgywair
ffrwythleddf gywair

It seems that Robert Peilin may have been attempting to force a reconciliation here between the string names and the five warranted *cyweiriau* of the *eisteddfod* tradition, hence the substitution of 'isgywair' for 'C gywir'. We can say this is forced since 'is' and 'ec' (the Welsh word for the letter C) are not very similar at all, and Peilin comments on the substitution, claiming unconvincingly that 'C gywir' is the correct name, that 'isgywair' is mistaken. The name 'isgywair' is of course very well-attested in the early literature.

With the addition of 'isgywair', Peilin may have thought that he had accounted for all the five warranted *cyweiriau*, reading 'G gywir' perhaps as an abbreviation of 'gogywair' and reading 'ffrwythleddf gywair' perhaps as an expansion of 'lleddf gywair'. But notwithstanding the clumsiness of this reconciliation, it is clear that to Peilin at least a 'cywair' was associated with the tone of a particular string. Perhaps the tone also provided a melodic final, in which case a 'cywair' in

this concept would constitute a scalar mode as well as a particular tone. It is likely that this is what Peilin had in mind here, because a note heading the list ('pedair yma fflat ynt d E f g') will refer to a single flat - no doubt the B-flat he describes in other passages - existing within scales which were - presumably - either hexatonic or diatonic modes beginning on these notes.

It remains uncertain to what extent Peilin had a correct understanding of the concept of *cywair* as used in the *eisteddfod* tradition. Nevertheless, what is clear about this passage is that there is no indication whatsoever that a major scale should be erected in turn on each of the seven notes of the octave. Such a modern approach would conflict with the very limited inflecting detailed in the earlier passage on the string names and would be out of keeping with the period. Yet many modern contributors appear to have interpreted this passage in just such a way, with all the retuning that this entails, without presenting any rationale for adopting that interpretation.

It should not be necessary here to reconstruct all the detail of the elaborations that modern writers seem to have projected onto this earlier evidence. I will point out that some of the earlier interpreters in particular (Edward Jones, John Thomas etc) had a tendency to present their scales as if they were privy to a contemporary and commonplace musical tradition which used these terms in these ways. Yet we have no real evidence of such a tradition, and I think that the evidence from amongst the first erstwhile interpreters of the tablature - John

Jones of Jesus College Oxford, William Jones and John Parry Ddall (see Ellis 1973 p. 83, Rees & Harper pp. 59-63) - makes it plain that in the late eighteenth century oral tradition could give no insight into the *cyweiriau*.

Instead we are presented with what are clearly reinterpretations of Peilin's *cyweiriau* as keys, by Edward Jones (p. 29), Owen Pughe, John Thomas (p. 1214), Silvan Evans. The particular key imposed on each of Peilin's *cyweiriau* in turn is:

G gywair: this name dropped in favour of a new term: 'breiniol gywair', in which Peilin's term for inflected strings is applied instead to 'cywair'; with the interpretation: the key of G.

Kras gywair: term retained; reinterpreted as the key of A (G by Thomas), regarded as a sharp key.

#ragod gywair: term normalised as 'bragod gywair'; reinterpreted as the key of B, regarded as a mixed or minor key.

Isgywair: term retained; reinterpreted as the key of C, regarded as a low key.

Dylod gywair: term retained; reinterpreted as the key of D.

Eglurgywair: term retained; reinterpreted as the key of E.

Ffrwythleddf gywair: term contracted to 'lleddf gywair'; reinterpreted as the key of F, regarded as an oblique flat key.

For the *gogywair*, not included in Peilin's list of *cyweiriau*, the tuning instructions in Hafod 24 are drawn on, with Edward Jones identifying (probably arbitrarily) *y cyweirdant* as C to produce a C scale with one flat on E, the later writers following his lead.

In these ways what amounts to a mythology was created by

these early writers, a mythology that has been largely disguised as contemporary tradition for later interpreters, by virtue of the absence of reference to Hafod 3 as a source and by dictionaries presenting the terms as if they were in current usage with these particular meanings. Later interpreters have varied in the extent to which they have fallen prey to this *cywair* mythology: Travis (p. 32) refers to the misinterpretation and misapplication of *cywair* terms in the eighteenth century; Ellis (1973, p. 82) refers to the 'unreliable guesses' of Edward Jones and Iolo Morganwg (who worked with Owen Pughe); Polin (p. 52) considered it possible that Edward Jones derived his opinions from the 'unintelligibility' of Hafod 3. But all modern interpreters seem to have accepted that a change of *cywair* entails a retuning of the *telyn*, apart from Gwynn Williams (1932 p. 34) who considered it possible that the *cyweiriau* were nothing more than modes upon a single fundamental scale (although by 1962 it appears he had changed position).

III. THE TERMINOLOGY OF INFLECTION

It will have been noticed that the early literature supplies a Welsh vocabulary for the inflecting of strings. Although it is a small vocabulary, it appears to be sufficient for the purpose. This fact calls into question the need felt by modern contributors to resort to interpreting the 'cywair' vocabulary as designed for the same purpose. Because the terms involved have been rather passed over in the modern literature, it is essential to investigate them here, particularly in relation to the *cerdd dant* tradition. There are three terms used.

a) 'Dyrchafael y tant' - to raise the string. This is certainly an authentic *cerdd dant* term because it occurs in the repertory lists, in the title of just one piece: cwlwm newydd ar ddyrchafel y tant (see Miles, p. 669, item 127). This implies the existence of a normal tuning, but one that could be departed from - very rarely indeed - to create a composition a special feature of which was the sharpening of a note. Working from Hafod 3 p. 235 (discussed above) this would be the sharpening of B-flat to B-natural, but working from Hafod 3 pp. 236-7 (the string list also discussed above) it might just refer to the raising of F-natural to F-sharp. There are no known associations between this tuning and the pieces in the MS text, so probably the tablature indicates B-flat and/or F-natural throughout.

b) 'Tro tant'. This term is of immediate relevance to the *cerdd dant* tradition and the music text. It occurs in a note to

one piece in the text: Caniad San Silin, and in the title of another: Caniad Tro Tant, as well as in several titles not in the text. As we have seen, the term was used in Panton 56 as the Welsh name for the *B Durum* hexachord, and if that manuscript is correct, it would refer to B-natural.

c) 'Breiniol'. This term is used in the list of harpstrings discussed before to denote the 'freed' status of an inflected string irrespective of whether that be the lowering of B-natural to B-flat or the raising of F-natural to F-sharp.

Actually one wonders - given that we have an apparent set of three terms - with 'dyrchafael y tant' used for the raising of a string, and 'breiniol' used both for the raising of this string and for the lowering of another, if 'tro tant' (turned string) was not the term for the lowering of that other string - that is to say the lowering of the B string to B-flat, the operation described in Hafod 24. This would imply that Panton 56 is incorrect, which is a possibility. Howsoever one wishes to conclude on that, there is certainly no need here to suppose that at the most more than two strings could be inflected.

Further, we already have available in this distinct set of three very descriptive terms all the vocabulary necessary to accommodate the simple tuning system that allows for the inflection of one or two notes at the most. As we have seen, 'dyrchafael' and 'tro tant' were in practical use, not just occurring in theoretical expositions. There is a sufficiency here that causes one to seriously doubt that the individual *cyweiriau* terms were used for the same sort of purpose as the tuning

arrangements that we have been considering here; could the multitude of *cyweiriau* describe something of a higher order of complexity than tuning?

It must be worth pondering at this stage in the development of our ideas if the *cyweiriau* might be more obscure to us than has hitherto been supposed. None of the 'dyrchafaeldant'/'tro tant'/'breiniol' group - let us call it the 'inflection group' of terms - are ever prefixed by 'cywair' in the early literature. And the terms for the *cyweiriau* do not employ the terms for raising, lowering or inflecting strings, which of course would be a very odd fact if the *cyweiriau* did involve retuning.

But notwithstanding this, as we have seen there are instances, two short passages in the later literature, where an equivalence of some sort or another is expressed or implied between parts of the *cyweiriau* group and of the 'dyrchafaeldant'/'tro tant'/'breiniol' group:-

1) Panton 56 f.14r as discussed before: 'a Begwri ai tynha ef megis tro'r tant a Beiniol megis gogywair, proprgrawnt megis bragod gywair'.

2) Note to Caniad San Silin (71.5): 'ar dro tant ne ar is gower mae yn oreu' - on *tro tant* or on *is gywair* it is best.

I personally remain unconvinced of the accuracy of these passages. In particular I think that Panton 56 is very muddled. Although an association of *b-molle* with *gogywair* accords with the reconciliation discussed before of harpstring names with the passage in Hafod 24, why in Panton 56 are the three types of Guidonian hexachords associated with a ragbag of *cerdd dant*

terms, made up out of only two of the five warranted *cyweiriau* together with *tro'r tant* which is a term of a different category from the *cyweiriau*? It seems improbable. Before this passage, the author of Panton 56 has already confounded the types of hexachord with the parts of three-part singing, and as he was not reliable in his understanding of the hexachordal system, it is hard to have much confidence in his reconciliation of that with parts of the *cerdd dant* system.

I do hold that the distinction that has been drawn here between the two groups of terms:- the inflection group and the *cywair* system - is a very important and useful one. It calls into question the reliability of these two passages. My impression is that the *cyweiriau* system was peculiar to *cerdd dant*, very central to *cerdd dant*, and that it was extremely complex; whereas the inflection system is apparently identical with that of the mainstream of music in Europe and may have been adopted at a relatively late date (witness the low incidence of its terms in the Welsh tradition). The earliest reference on the Continent to retuning the harp is that by Martin Agricola in 1529, where the tuning given for a 26-stringed harp is of all natural notes except that the B strings might be tuned to B-flat.

IV. MULTIPLE TUNINGS

Although the modern literature on the subject of tuning in the old *cerdd dant* tradition gives the appearance that it is an established fact that the *telyn* was retuned in order to play different pieces, the true situation is actually not clearcut. There has been a general assumption that retuning took place, and there has certainly been much argument concerning how this could have been implemented, but arguments have not been advanced to establish that retuning did take place. Yet such reasoning is necessary, because the *prima facie* evidence of the tablature simply lacks indication of retuning.

Indeed the whole subject of *cerdd dant* is so obscure (the majority of its technical terms are not fully understood) that we must take great care to avoid making assumptions where possible, and that the onus is placed strongly upon each contributor to demonstrate and validate any hypothesis he/she may put forward which departs from the *prima facie* evidence of the tablature itself, because the tablature is a very large, detailed, cohesive and potentially coherent sample. I maintain that the tablature itself constitutes the best and largest body of evidence on *cerdd dant* that we have, and that it should generally be given preference over other sources, as a matter of correct method.

Concerning tuning, the overwhelmingly direct fact is that the tablature uses the same alphabetical symbols for each of the sixty-four pieces in the text. Also it can be argued that the

tablature was designed to be intelligible, self-contained and even fluently sight-read. So one would expect that the tablature itself should contain modifications to these alphabetical symbols if they referred to different notes in different parts of the text, and yet there are no such modifications.

Robert ap Huw himself at least did have the means at his disposal to modify the symbols - on p. 109 whilst illustrating *y lleddf gower gwyddel* he twice used a combination of two symbols indicative of B-natural: the *B-quadratum* symbol, that is 'square' b (related to the 'h' of other tablatures and notations, with the diesis symbol '#' below - the symbol for natural. This combination is in clear contrast to the rounded, solitary b of the music text itself - the *B-rotundum* symbol. Every B in the music text itself is a *B-rotundum*, and neither it nor any other letter is modified in any way. The best evidence there could be of retuning is simply not there.

Why is it not there? Had there been an oversight of crippling proportions or is indication of retuning simply unrequired?

It may have been that the author of the text would not have used modifications because it would have been a cumbersome procedure. A verbal direction, naming the tuning, would have sufficed. But in the majority of pieces there is no verbal direction which could relate to retuning. On rare occasions the word 'cywair' is used in different ways, and it is these instances that writers have believed or assumed relate to retuning the *telyn* between pieces; I repeat that it is not that

they have argued this.

Because this has not actually been argued before, I set out the two arguments that can be made.

1) The word was used in the sense of tuning-up stringed instruments such as the *telyn* and *crwth* (e.g. in 'Y 24 Campau'), although it was also used for many purposes, some unconnected to music. Therefore, if the *telyn* was retuned between different pieces, it would have been an appropriate term to use, although as discussed before it is very odd that the 'cywair' terminology does not use the words for sharpening, flattening and inflecting in general. A more appropriate term than 'cywair' would have been the loan-word 'cliff' (from 'clef') which was in currency to judge from Hafod 3 and Panton 56, where it was used to describe the letter name of a note. Also these manuscripts do not use 'cywair' but 'cyfnewid' to describe a shift from one hexachord to another.

It should be added here that it appears that the primary meaning of 'cyweirio' was the initial tuning-up of stringed instruments in general, distinct from the word for stopping strings on fingerboards. Compare two 'Statute' passages relating to the *datgeiniad* (quoted by Robert Griffith p. 40):

'efe a ddyly wybod cyweiriau telyn a chrwth ...'

'efe a ddylai wybod cyweiriau telyn, a **thyniadau** crwth ...'

The first passage must refer to tuning the strings of the *telyn* and the *crwth*. The second, expanded passage must refer to tuning the strings of the *telyn* and stopping the strings of the *crwth* on its (unfretted) fingerboard; i.e. the basic skill

required by the *telyn* was tuning (always difficult), and whereas this could also be said of the *crwth*, actually the greater skill on the *crwth* lay in the stopping, which is the difficult bit here. The word 'tyniad' in the metrical/harmonic sense must have been transferred from the *crwth* or some stopped instrument to the *telyn*, and the double-tonic emphasis will probably have had its origin on a stopped instrument (not the *crwth*) where stoppings alternated with the sounding of open strings in an accompaniment (probably to vocal performance). The particular type of lyre that could give rise to this kind of terminology is discussed in Part 4 of this work, pp. 143-5.

It will be this primary meaning of 'cywair' which will have given rise to the term 'cyweirdant' as used in metrical contexts (i.e. within the *cyweirdant*/*tyniad* system of *mesur*).

2) There are the instances already discussed where the word has been used to describe different tunings for the *telyn*. There are just three of these instances of which I am aware which are from early sources, but none before the seventeenth century:-

i) Robert ap Huw: *lleddf gower gwyddel*, p. 109. Note that this unique instance of notations for inflections is exceptional amongst the nine diagrams of *cyweiriau* on p. 108-9; not even the closely-related version of *lleddf gower gwyddel* on p. 108 uses *B-quadratum* or a natural sign. All the other *cyweiriau* given, together with *lleddf gower gwyddel* on p. 108, use *B-rotundum* throughout and show no modifications to F. Even *lleddf gower gwyddel* p. 109 uses *B-rotundum* in its top row. So far as we can judge the *cywair* system as a whole from those shown on pp. 108-9,

whatever it was that it was based on, it was not based on note-inflections.

The B-natural symbols on p. 109 do not necessarily imply that it was customary to retune when one changed *cywair*, merely that different harpists from different traditions may have used different tunings from one another. The reference to Ireland in the version of *lleddf gower gwyddel* on p. 109 implies that at least some Irish or Hiberno-Norse practice was (or had been) in a different tuning from that (or those) which were the norm in Wales. Note that there is no reason to suppose that either version of *lleddf gower gwyddel* on p. 108 or p. 109 was identical to the *lleddf gower* which was commonplace in Welsh *cerdd dant*.

ii) Hafod 24. As discussed before, this passage draws attention to an association between the *gogywair* and two particular notes: the *cyweirdant* - the set string - and the flattening of the third above. These are almost certainly G and B-flat respectively. This does not mean that each *cywair* used a unique tuning, only that the *gogywair* employed these notes and that a tuning existed (at least conceptually if not in actual practice) which employed a major third here (as in the hexachords). But the implication is that the 'go-' prefix relates to the minor third, and we may, if we choose, further draw out an implication that other *cyweiriau* used different intervals in this or other parts of the scale. Note however that this is not expressed, and that adopting the further implication relies on accepting the authority of Jones's source. The fact is that the passage is anecdotal and not an orderly, systematic attempt to

contrast the *cyweiriau*, unlike the pp. 108-9 diagrams. So strictly speaking, we cannot exclude the possibility that the other *cyweiriau* did not also, along with the *gogywair*, use these two notes.

At this point it may seem pedantic to treat this passage so cautiously, but as will emerge below the view that the *cyweiriau* can be explained by a multiple tunings hypothesis is not really tenable in practice.

iii) Gwilym Puw (1676). He uses the word 'cywair' in the sense of different tunings for the *telyn*. But the apparent link here with the sixteenth-century *eisteddfod* tradition is very weak because of the late date, because he only employs two of the titles of the five warranted *cyweiriau* of the sixteenth-century, and because he includes a third which is entirely unknown to us from the sixteenth-century tradition. As I argue, the performance of the *eisteddfod* tradition may well have ceased shortly after 1584. One can easily conceive that fragments of the terminology of the sixteenth-century *eisteddfod* tradition could have migrated to a quite different musical tradition, one where the harp was used to play dances and popular music of a lighter character as was in currency in Gwilym Puw's time.

Although Gwilym Puw's ancestry relates to the *eisteddfod* tradition, this material would be firmer as evidence if it had been introduced into the record much earlier than 1676. This date is really beyond the tailend of the dates for the introduction of material on the tradition, and most of the material introduced earlier is established to have been copied. If this material was

not a copy, I would consider it as extremely late in origin.

Although none of these sources are conclusive that the *telyn* underwent retuning when a *cywair* was changed (we cannot be sure that Jones and Puw were using 'cywair' in the same sense as it was used in the sixteenth-century tradition) they do provide a basis for a hypothesis that the *telyn* was retuned between pieces to enter different *cyweiriau*. If on adopting and implementing this hypothesis no anomalies transpired, it would have to be taken as conclusive for the purposes of reconstructing the music.

However, such a quagmire of anomalies and contradictions arises that I reject the hypothesis. I set down here the arguments against the use of the word 'cywair' to describe retuning the *telyn*. Note that many of these identify not merely that it is difficult in practice to identify the particular solutions for each *cywair*, but that also it would seem that such solutions could not in theory exist in the realm of retuning.

1. 'CYWAIR' IS RARELY SPECIFIED IN THE MUSIC TEXT

Although some catalogues of pieces for the *telyn* or the *crwth* specify the *cywair* of a particular piece, in the MS text the *cyweiriau* of most pieces is ignored. In only 7 out of 54 (13%) does the name of the *cywair* accompany the piece. In 4 of these cases the designation is an integral part of the title in order to differentiate the piece from another with an otherwise identical title. These are:

Y Caniad Crych ar y Bragodgywair (p. 76)

Caniad Bach ar y Gogywair (44, 46)

Profiad Brido ar Isgywair (64)

Profiad Brido ar Uwchgywair (65)

This leaves only 3 out of 54 (6%) where the author has felt it worthwhile to go out of his way to specify the *cywair*:

Caniad Ystafell (41)

Caniad Cynwrig Bencerdd (50)

Caniad San Silin (71)

Now if the knowledge of the appropriate *cywair* was essential to ascertain the tuning of a piece, this would have been an extraordinary oversight for the author to have made, given the meticulous detail of the text in almost every other respect. If one accepts that the music text was intended to be entirely intelligible, then one is forced to conclude either that the *cywair* is irrelevant to performance on the *telyn*, or that the nature of the tuning(s) is evident either from the tablature or from other sources.

2. 'CYWAIR' IS RARELY SPECIFIED IN OTHER SOURCES

The lists of titles in the Robert ap Huw MS. and in the early sources do not usually specify the *cywair*. Generally the *cywair* is included in the title of a piece only to distinguish the piece from another whose title is otherwise identical, and not as a performance guide. Using these lists - and we have many of them - to discover the *cywair* of the pieces in the text still does not fully succeed. A *cywair* for five more pieces can be gleaned from Aberystwyth MS Gwysaney 28 (*c*. 1560) f. 71, one more from BL MS Add. 15046 (1593) f. 35, and - tenuously - for the 24 *clymau*

cytgerdd also. This leaves 17 pieces (31%) to which *cywair* cannot be ascribed.

The conclusion is that the author could not have omitted the *cyweiriau* in the expectation that this information could be acquired from other sources. The *cywair* must either have been self-evident from the tablature or unimportant in playing from the tablature; it will not have been that the project of entabulation was hopelessly ill-conceived in the first place.

3. CANIAD SAN SILIN

The note to this piece (p. 71): 'ar dro tant ne ar is gower, mae yn oreu'. As mentioned above, I have strong doubts that this note is correct. But if we do accept it as correct, it creates difficulties for the retuning hypothesis. Perhaps these were two different terms for one tuning although it would be hard then to understand why the term 'tro tant' should be considered the better. So if we accept 'tro tant' as a 'cywair' (it is never designated as such) then a choice of *cyweiriau* would be being offered here, and this would lead us into strange territory, for the tablature offers a single version and provides no transposition of the piece. Is it offering the same musical text for two different tunings? If it is to be maintained that 'cywair' involves retuning then the melody of this piece would surely be altered, and the harmonies also. This is a technical possibility, but an improbable one if the tritone is to be avoided. And it does not seem credible that the melody and harmony of an individual piece could be subject to radical

alteration, since all the other pieces present as such highly cohesive and crystallized compositions.

All this is true, of course, only for harps. Stopped instruments such as the *crwth* and the *timpan* are technically capable of realizing a single musical piece in more than just one way. It is to these instruments that the whole language of options and alternatives applies, in respect of fingerings and tunings. The San Silin note ceases to be enigmatic if it is interpreted as information for the *crythor*.

4. PROFIADAU AND FORMULAE

A similar problem occurs with the *profiadau*. Although the beginnings of pieces in this class were played on different *cyweiriau* - *uwch* and *is* - all the *profiadau* run into the same text. This text was of substantial length - it comprised at least the 4 lines of Profiad Chwith Ifan ab y Gof on p. 61 and the 2 lines of Pwnc ar ol pob profiad on p. 56.

Again, is it conceivable that this identical text could have been played using different notes according to the tuning the *telyn* happened to be in for the beginning? Or is it conceivable that the *telyn* would be retuned in the course of a piece, without any specific directions to show exactly when and how?

The exact same problem occurs in other melodic formulae which are common to different pieces. For example, take the phrase in Profiad Brido ar Uwchgywair (65.2.9-14). This is very similar to the phrase which closes (i.e. the *diwedd bach*) every *cainc* and *diwedd* of Gosteg Dafydd Athro, (introduced 15.2); the

phrase used commonly in Y Caniad Crych ar y Bragodgywair (introduced 78.2); also Caniad Marwnad Ifan ab y Gof (introduced 73.1), known from Aberystwyth MS Gwysaney 28 (*c*. 1560) and Aberystwyth MS Peniarth 77 (*c*. 1576) to be *ar y bragod gower*. The last part of this phrase is identical in the treble, and yet these pieces are known to have been composed on a variety of different *cyweiriau*.

These formulae are so common that almost every piece in the text is linked, either directly or indirectly, to almost all the other pieces (see Greenhill (1999) pp. 223-36). It is very unlikely indeed that the same - as it is written - phrase could be played in many different tunings whilst remaining musically successful, especially in respect of harmony.

5. THE EXISTENCE OF OTHER POSSIBILITIES FOR THE TERM

At this point one wonders if the *cyweiriau* might not have meant something other than retuning the *telyn*. I outline here some initial propositions which could relate to the meaning of the word: to correct, to adjust etc. Each of these possibilities would surely need to be considered and debated before it could be claimed that 'cywair' was understood and that it entailed retuning the *telyn*. Many of these possibilities will be developed in later chapters.

a) Tuning sets for the *crwth*. Only one name for a *crwth* tuning set is immediately identifiable as such: 'cywair naturiol'. This is surprising as there are very strong arguments that there would have been a number of tuning sets for the *crwth* (see Part 4, pp. 137-9).

The possibilities are examined in Chapter X on *crwth* tunings.

b) Intervals. Although one poem by Wiliam Llŷn uses numbers to describe these (see Part 4, p. 116), there are no vernacular names for intervals that have come to light, unlike for the harp in Ireland. The existence of vernacular names is suggested in Chapter IX, including 'cras' for the 5th.

c) Particular chords, or types of chord. Again no names are supplied for these. As will be detailed later, the text demonstrates reliance on - significantly - five main triads, and in fact large portions of the treatises on *cyweiriau* could be taken to apply to triadic harmony.

d) Modes. Apart from a borrowing of the Latin names of the hexachords, no names for these are supplied except by the *cyweiriau* of Peilin.

e) Modulations. There are no names for these. The *cyweirdant/tyniad* system itself might properly be described in respect of melody as modulation between two different modes.

f) Particular chord progressions (or types of chordal progression). There are no names for these. The text and the measure system demonstrate that chord changes were heavily structured and took place in a highly organized manner. This possibility will be examined in detail later on in this chapter.

g) Temperaments. This is examined in chapter VIII.

The meanings:- adjustment, correction, perfection - are appropriate candidates for all these possibilities, hence the use of the word 'cywair' cannot be taken on a semantic basis to imply solely and specifically the retuning the *telyn*, when there are

so many other initial possibilities. We have to admit as a possibility, then, the proposition that the *cyweiriau* system might have operated normally within just one single tuning on the *telyn*.

6. THE CRWTH

The pieces in the Robert ap Huw MS. must on the whole have been playable, in some form, on the *crwth* (I except those pieces that modulate between modes: the *profiadau* and Caniad Marwnad Ifan ap y Gof). Although the music text is arranged for the harp, most pieces apparently must have been playable on the *crwth* because repertory sources so rarely and so scantily differentiate pieces as for one or the other instrument, and they mix within lists the compositions of both *telynorion* and *crythorion*. Now in order to play these pieces the *crythor* must have used *scordatura* devices, to make full use of the two unstopped strings of the thumb at least (see Part 4, pp. 134-142).

There is no vocabulary that we are aware of for these tuning sets, unless it be 'cywair'. If the five warranted *cyweiriau* did relate to the *crwth* in this way, then a *telynior* would not need to know the *cywair* for each piece, and this would explain the strangely casual approach to specifying the *cyweiriau*. It could also account for some of the discrepancies over which *cywair* certain pieces are recorded as being on, since a single piece might be realizable on the *crwth* using different tuning sets.

The use of 'cywair' for *crwth* tuning seems quite likely as the musical system and its vocabulary appear to have been evolved on an instrument or a pair of instruments of few strings, not on a harp with many open strings (see Part 4, pp. 16-7, 140-1, 143-5).

It must be significant that the sixteenth-century material relating to *cywair* is never presented exclusively in the context of the *telyn*. It is often in the context of what relates at least partially to both instruments, such as the catalogues of pieces. But the fullest exposition we have, from the early treatises, is in the specific context of the *crwth* alone, not the *telyn*. Indeed the treatises are occupied by more material on the *crwth* than on the *telyn*, and this has led me to believe that the *crwth* had been more central to the idiom than the *telyn*, perhaps at an early period.

Thus we have (Peniarth 147 pp. 199-200; Peniarth 62 etc): 'Dywetter bellach am y cowiriau... Pump cywair y sydd... Un bys y grythor sydd yn cadw tri chowir...' etc. This passage is certainly about notes, and is probably about *scordatura*, and is possibly about scales also, but is certainly not about *telyn* tunings.

7. THE EARLY TREATISES ON CERDD DANT

These include obscure expositions on *cywair* which, like the example above, appear to occur in the context of the *crwth*, and are hard to reconcile with an understanding of the word as retuning the *telyn*. For instance, Peniarth 147, p. 200: 'From the

five main *cyweiriau* you can make as many *cyweiriau* as you want'! How can you, from five tunings, make as many as you want? 'Each of the *cyweiriau* are mixed the one with the other'. How can you mix different tunings together? How can the number of tunings be unlimited? 'It is through instruction that the various fillings-up (*llanw*) can be classified' - at least here is an acknowledgement from the author of the difficulty of communicating such complexities. 'Llanw' here is probably used in the sense of an interval; if so it does not accord well with the tuning interpretation of 'cywair'. These passages do make some sense if you take 'cywair' as related to chords, chordal harmony and progression.

The point here is that the bulk of these expositions are obscure, and further that little or no light has been shed on them by the much tested hypothesis of retuning. I suspect that if the true meanings of 'cywair', 'cyweirdant' and 'tyniad' were uncovered, these expositions would become almost wholly comprehensible. This has not happened as yet in the literature.

8. SUBSEQUENT PRACTICE

Often the retuning hypothesis has been understood to involve the use of different keys on the *telyn*. The use of five fundamental tunings from which one could make an unlimited number of tunings is far in excess of the use of keys in medieval music in so far as this is understood, particularly for a diatonic instrument. All the indications are that the 'cywair' system was ancient, dating back at least to the twelfth century, and it is only

later, as the modes gave way to keys, that the number of tunings in Wales must have multiplied. From all that we know, it was in a different place (the Continent), under different circumstances (the influence of fully-chromatic keyboard instruments), at a different time (the sixteenth and seventeenth centuries), on a different instrument (the large Renaissance harp) and for a different music (Baroque) that the harp and harping practices were adapted for inflections. Could it have been the traditional, modally-based music of Wales that was really at the forefront of this development?

Indeed as late as 1676 Gwilym Puw only supplies one basic tuning and two others for the harp in Wales. In Ireland, Bunting (relating to practice in 1792) gives one basic tuning, one alternative and a third that was rarely used. This is the quantity that we would expect in the seventeenth and eighteenth centuries, but for earlier times we would be entitled to expect the same or less since modality rather than key is understood to have generally played a greater part in tonality. Yet on the retuning hypothesis it would appear that in Wales the number of tunings would have declined as the transition was made from the old *cerdd dant* to popular music. Meanwhile of course in the rest of Europe the number would have been increasing as the old modal system gave way to keys. There seems to be something very wrong here.

More specifically, as we have seen, the sources quote the Guidonian system of hexachords and attempt reconciliations between it and the secular *cerdd dant* tradition. Now it is

thought that in practice the Guidonian system was in fact diatonic, but as quoted in the early literature it is hexatonic, and it includes only one inflection - B-flat, implying that it was sufficient to occasionally retune just one string in each octave. But as we have seen, the only inflection that is specified in the MS is B-natural on p. 109, implying the use otherwise of B-flat. This is within the old hexachordal system.

9. THE MULTIPLICITY OF 'CYWAIR' TERMS

Any interpretation of 'cywair' as retuning the *telyn* has to explain the large number of *cyweiriau*. If retuning the *telyn* was indeed involved, then the tradition had not merely allowed some proliferation of tunings to develop, but it had embarked upon a veritable jamboree of retuning.

There are many 'cywair' terms in addition to the five 'warranted' *cyweiriau*: 'bragod gywair', 'cras gywair', 'gogywair', 'lleddf gywair' and 'is gywair'. From p. 108-9 are added: 'cywair Ithel', 'cywair gwyddelig dieithr', 'lleddf gywair gwyddel', 'cywair chwith'/'cywair dieithr', 'cywair ynghywair Edward', 'cywair yr Athro Fedd' and 'cywair ynghywair y wrach'. In addition again there are references in titles of pieces to 'uwch gywair', 'yr anghywair', 'cywair y gwyddel', 'cywair uchel', 'cywair cywair' (probably resulting from a copyist's eyeskip), 'lleddf gywair Brido', 'cywair dau hanner' and 'cywair Seisyllt'. These terms total twenty, and they do not include the following from Hafod 3: 'G gywair', 'dylod gywair', 'eglurgywair' and 'ffrwythleddf gywair', nor 'braidd gywair' from Puw, yet it

is always possible that some of these later terms were drawn from the old *cerdd dant* tradition.

None of the early sources from which these terms were drawn purports to be a definitive list, so we may surmise that there may have been even more 'cywair' terms, of which there is no record. In view of the small number of harp tunings used subsequent to the decline of the *cerdd dant* tradition, is it really credible that the tradition had evolved some twenty different tunings for this small, diatonic instrument?

10. THE DIAGRAMS ON PP. 108-9

It has been necessary for those writers who have adopted the retuning hypothesis to interpret these diagrams as retunings of the *telyn*, with - as I shall demonstrate - considerable difficulty.

The suggestion here has been that the left-hand columns of letters denote strings of the *telyn*, whereas the right-hand columns of letters denote not strings but notes to which the strings of the left-hand column are tuned. This interpretation of the alphabetical symbols of the right-hand columns as notes is unprompted as there is no indication of them as such, and these writers have been happy to preclude, up until now, the letters of the text itself and the left-hand columns indicating anything other than strings.

In the absence of any explanation from Robert ap Huw as to how the diagrams are constructed and what it is that they signify about the *cyweiriau*, the above supposition can be argued on just

one basis: the indication of B-natural in the context of *lleddf gywair gwyddel* on p. 109 discussed above. Thus it appears that possibly in the octave marked '|' the A string is 'tuned' to B-natural, as is the B string above it.

There is an ambiguity here however, as on the preceding page the same *cywair* is given with these A and B strings unchanged, and with the F string above 'tuned' to G. It could be unwise to base an explanation of an entire system on one unique, ambiguous instance. All that can be said with certainty here is that the author wished to draw attention to some relationship between two strings or two notes and B-natural. It is not necessary that the left-hand columns do signify strings as opposed to notes, particularly when in this instance an alphabetical symbol in the right column does appear to be referring to a note.

Thus it cannot be argued that the diagrams must refer to retuning the *telyn* on the basis that there is no other possible explanation. I can argue that there is at least one alternative possible explanation, and perhaps there are others I have not thought of. The following proposition has a lot of merit.

It is actually very viable that these complex diagrams indicate the missing lynchpin of their music theory. What we, and the tradition, appear to lack is any codification of the actual note-relationships between *cyweirdant* and *tyniad*, yet we should expect that these would be defined and analyzed, since they underpin and define the entire musical system, and they extend to a complexity beyond that of the double-tonic.

The *telynior* would naturally have thought of each finger of

the lower hand as a distinct 'voice', moving from a *cyweirdant* position to a *tyniad* one that corresponded, and then back again. From the text we know there were many different sets of patterns to these shifts of finger and note, and if no means of articulating the principles had been developed then teaching, particularly of composition, would have been very difficult indeed. It would be difficult to articulate the patterns as for each 'voice' there are three different options used: no shift, a shift up or down to adjacent strings, and a shift up or down two strings. A table would be required for each pattern, showing which of these three options is used by each 'voice'.

These are precisely the options indicated in pp. 108-9. The relationships between the columns in the diagrams involve a) no change, or b) a change to adjacent notes either up or down, or c) a change to two notes up or down. These are precisely the same as the movements of the fingers on the *telyn* as they move from a *cyweirdant* chord to a *tyniad* chord. So it could very well be that the diagrams indicate the relationship between *cyweirdant* and *tyniad*: - chordal progression.

We are familiar with *cyweirdant*/*tyniad* metrical relationships, these are the measures. The diagrams could show harmonic relationships between them - the system whereby a *cyweirdant* chord is transposed to become a *tyniad* chord. This would be a system of transformation or modulation between notes, not between strings and notes. Thus the left columns could show *cyweirdant* notes and the right columns the corresponding *tyniad* notes. One selects a chord at will from the left column to form a

cyweirdant chord, but then, having done so, one has to play a specified *tyniad* counterpart, determined by the particular *cywair*. This is to say that when composing in any particular *cywair* one can choose notes freely from the left column to form a *cyweirdant* chord, but having done so the right column then simply dictates the counterpart *tyniad* chord.

So, restating this in slightly different terms, we could interpret the tables as: both left and right columns simply indicate notes, thereby showing the harmonic relationship, the chordal progression.

Working on this basis, we must expect that the chords selected from the first column in each *cywair*, although various, would tend to have prevalent ones amongst them, and that there would thereby be a strong association between particular tuning sets for the *crwth* and particular *cyweiriau*. It may well be, then, that when we look at early material on *cyweiriau*, we should not expect details of tuning (harp-strings) and scale to emerge but details of chordal progressions.

Note here that certainly nowhere else is the actual harmonic relationship of *cyweirdant*/*tyniad* analyzed or defined, and yet it is this relationship which underpins the entire musical system and defines it as a genus.

I have not argued here that this is the definitive explanation, only that it is a possible one. If the diagrams included the other warranted *cyweiriau* in addition to the *cras gywair* the whole proposition could be simply tested against parts of the text. As it is the fact is that we cannot be certain what

the diagrams indicate. The situation is further complicated by the addition of a linear or metrical dimension to the *cyweiriau* on p. 112 where they are described as *clymau* and even a measure is actually ascribed to one of them. But this does suggest the horizontal, linear dimension in which chordal progression occurs, and not the vertical dimension of harmony that tunings directly relate to. The *cyweiriau* must have been more complex in concept than *scordatura*.

The existence of a viable explanation of the diagrams, as advanced here, throws the onus onto the proponent of the retuning hypothesis to actually demonstrate that the diagrams do relate to retuning the *telyn*. And rather alarmingly no writer has explained why the retuning interpretation has to be applied to the diagrams; no arguments have been put forward as to why this is necessary. The matter has always been approached as if it were self-evident, but as we have been seeing it is not self-evident, nor is it the only possible explanation.

In fact there are several strong arguments against such a hypothesis, which largely arise from the practical difficulties of applying it:

i) Intonation. The compass involved would be large. For example the hypothesis would require the a| string turned down to ff in *cywair yr Athro Fedd* but up to b| in *cywair ithel*. I suggest this is quite impractical - the string would tend to go out of tune, in my experience of gut and metal strings, and I expect the same of horsehair. Note that without such extremes harps are already notoriously difficult to tune, because

sharpening a string slightly always tends to flatten the adjacent strings, and *vice versa*. A light portable early harp would have a flexible string-band which would tend to accentuate these difficulties.

ii) Tone. Given that such a string must be capable of bearing the tension of b| without any risk of breaking, what would be its tone quality when tuned to ff? My experience of all types of string is that this is unacceptably poor.

iii) Purpose. What would be the purpose of such tuning sets? In some cases one ends up with the same diatonic scale one (presumably) began with, but sounding on different strings! My experience of this is that it is deadly to one's sense of note position, which is already fragile on the harp by the very nature of the instrument.

Any suggestion that such a tuning was a flippant or satirical comment (Ellis (1977) p. 79) or lay outside the canon (Ellis (1991) p. 33) has to be doubted because of the technical and formal nature of the context.

In the case of other supposed 'tuning sets' one ends up with hexatonic or pentatonic tunings, but the music text already contains pieces and sections of pieces that are hexatonic or pentatonic (in their selection of alphabetical symbols) in ratios that are interestingly similar to early traditional folk music from the British Isles.

A possible explanation here, suggested by Osian Ellis, is the production of enhanced tone from echoing or ringing strings in unison. But the parallel here with tunings of the Irish harp

is weak. In Bunting's tuning for the 30-stringed harp there is only one such pair (3%). There is an example here (*lleddf gywair gwyddel*) p. 109) of seven pairs (28%), and others where duplication is not the pattern. Indeed the very design of the small diatonic harp with its constraints on string lengths does not lend itself to dedicated sympathetic strings in the way long instruments with fingerboards do. If one has relatively few strings one does not want to demote some of them to the status of sympathetic strings, else the melodic and harmonic possibilities become reduced.

iv) Idiosyncracy. These supposed 'tuning sets' would produce results quite unlike any other known concept of retuning. Would the technique of the early *telyn* have been so unique?

These arguments are conclusive. I should stress that I have experimented with these proposed tuning sets in practice extensively, not just considered them abstractedly on the page, and I think that any reader who did the same would concur. It is only through experiencing the difficulties of implementing the p. 108 diagrams as tuning sets in practice that the full weight of these arguments is experienced. Certainly the diagrams cannot be used in support of the retuning hypothesis.

CONCLUSIONS ON MULTIPLE TUNINGS

For the reasons outlined above, it is necessary to reject the hypothesis that 'cywair' was used to denote retuning of the *telyn*. The true meaning or meanings of 'cywair' will be other than this. My own view is that they describe the

cyweirdant/*tyniad* relationships, which are themselves closely bound up with the tunings and fingerings of the *crwth*. As such they would not have immediate bearing on the task at hand - the discovery of the notes produced by the tablature symbols.

Indeed it ought to be sufficient for present purposes to accept the issue as obscure or unresolved. For I have - over the years of studying and playing the tablature - evolved a deep respect for its consistency, its cohesiveness, and its detail. Of course we have problems in grasping both the conventions of the musical tradition and the conventions of the notation, but it would be deeply puzzling if the text was seriously inadequate as a means of communicating music scores to those who were familiar with the conventions of the music (but not with the conventions of the tablature). It ought to be the case that we have some confidence that the document as a whole should contain the necessary information on the notes used by the pieces - if it did not provide this then the entabulation would assuredly have been a musically purposeless exercise!

At this point we are entitled to approach the document afresh, unencumbered by false expectations about tuning. In the absence of any directions for retuning, save for the one enigmatic reference to the use of *tro tant* as an alternative (p. 71) discussed before, the possibility that the *telyn* was not retuned between pieces - that it remained invariably in one tuning - must be the first to present itself.

Accordingly, it is necessary to discover if a single tuning exists which can accommodate the <u>whole</u> text in a way which could

conceivably have been musically successful at the time.

Preoccupied with what now begins to look as if it has been a wild-goose chase - the search for different tunings which can accommodate parts of the text - contributors have not attempted to discover one tuning which can accommodate it all, although Polin ((1982) p. 2) added a footnote suggesting that this would be difficult, and Dart (p. 55) commented - without explanation - that in respect of tuning most of the manuscript makes musical nonsense if it is transcribed literally. Yet I shall demonstrate in the next two chapters that Dart was mistaken in his impression. A literal reading does produce music which makes sense after all - music which is perfectly straightforward in tonality.

V. TUNING THE TELYN

REVIEW OF THE EVIDENCE FROM THE TEXT

The text contains 25 alphabetical symbols:-

cc dd ff g1 a1 b1 c1 d1 e1 f1 g a b c d e f g· a· b· c· d· e· f· g·

This is, incidentally, a different number from those that contributors have generally discovered, but I assure the reader these are all present, without ambiguity (see Part 4: TECHNIQUE, p. 129).

The marks added to the alphabetical symbols are clearly octave marks, and they are not entirely unique - the horizontal bars and the dots occur in the same positions in the allegedly-antique tablature cited in Wulf's *Handbuch* (this was noticed by Whittaker (1974A) p. 26). Most contributors have been agreed that they enable the symbol pairings to be arranged in ascending sequence as above. The question then arises: are these solely the strings of the *telyn*, or are they both strings and notes?

It has generally been assumed by previous writers that the symbols stand for strings only and not notes *per se*, and that more information extraneous to the tablature is required on the tuning of a particular piece entabulated before it can be played. They have believed that most strings were retuned to different notes according to the piece to be played. I have explained above why there is no need to hypothesize such a complication, and if

one does not do so, then it will be that these symbols stand for both strings and specific notes. There is nothing radical in such a proposition as of course it was more common in tablatures in general to use alphabetical symbols to represent notes rather than strings.

Note also that study of the catalogues of pieces reveals that the repertory in general from which these pieces were drawn was played apparently on the *crwth* as well as the *telyn*, and most probably upon the *timpan* also. Although the text is in form for the *telyn* (the pieces are shown in harp arrangements), we have to view most of the pieces in the text as realizable in essence on the *crwth* and *timpan*, and of course the important common factor in performances on the three different instruments (as solo alternatives to one another) would be the notes, not the string-arrangements and the fingering.

What can the symbols tell us about the scale? The symbols are arranged in seven-note, apparently diatonic octaves, with G as the lowest note within each octave (which is unusual amongst tablatures). A diatonic scale is what one might expect of instrumental music from late-medieval Europe. No doubt greater divisions of the scale were used in practice in much vocal music and perhaps on instruments with fingerboards, and generally in Southern Europe, but scales of seven or less notes in the octave are commonplace in the record, especially in Northern Europe. Small harps do not lend themselves to greater divisions of the scale of course.

In connection with this, it is worth restating that Gerald

de Barri in describing the music produced by these very stringed instruments does not appear to have been struck by anything odd in its tonality. Rimmer (p. 28) observes:

> Whatever music Giraldus heard in Ireland, it did not sound to him barbarous and peculiar; he described it specifically as better executed and more agreeable than that generally heard in England. Whatever its musical idiom was, it seems to have been not far removed from that of Western Christendom.

In the absence, at this point, of any evidence to the contrary, it seems on the face of it that the scale was composed of the natural notes known by the names of the alphabetical symbols used. However, the rounded b used throughout the text is in contrast to the square b used for B-natural on p. 109 (as already discussed). Although both types of B are looped in Robert ap Huw's cursive script, the distinction between the two is deliberately exaggerated graphically, and emphasized by the addition of the diesis on p. 109. Because no other signs for sharpening or flattening notes are given in the text (and such signs had been devised before the sixteenth century) it can be deduced here that the scale was of all natural notes with the exception of B-flat.

Such a scale is well within the realms of possibility; this we know from every area of the study of early music in Europe. Gerald de Barri mentioned *b-molle* for example. For plainchant,

notation accommodated only the inflection B-flat/B-natural, all other notes remaining natural (despite the probable use of F-sharp and E-flat in practice). We should remind ourselves here that B-flat, although modern terminology can confuse one into thinking that it is the departure or the exception from the rudimentary scale, was never considered as secondary to B-natural. It is thought (Reese p. 160) that B-flat may have been '... not merely a faintly undesirable substitute for b-natural, as the theorists too often imply, but its peer; and the (plainchant) melodies themselves, with their frequent use of b-flat, bear out the theory'. As was customary, Peilin describes B-natural as sharp.

The adoption here of the scale which the tablature literally offers is of course necessary method whilst there remains no evidence that another scale was intended. This does not entirely rule out the possibility that F-sharp or E-flat may have been used on occasion, and that this tablature, like other early notations, simply did not stretch to indicating this. But it is also possible to approach the problem by analyzing the chords in the text, if one is prepared to apply certain principles of harmony (such as an aversion to the tritone) to this field. It is of course not necessarily correct to do so as we cannot be sure precisely which aesthetics the composers of the music in the text subscribed to. Writers have differed widely on this point, ranging from Glyn (p. 130): '... these measures are nothing else than the simple repetitions of two chords, tonic and dominant ...' to Whittaker ((1974B) p. 51) who accepted as a

possibility the extensive use of the tritone and concluded: ''Cyweirdant' harmonies are always treated as consonant, even if, within our own terms of reference, they may appear to be highly dissonant. 'Tyniad' harmonies, on the other hand, are treated as mild dissonances ...'.

Actual analysis of the harmonies of the text reveals a huge number of internal rules and tendencies, from which one can deduce universalities, such as that the music is sophisticated and complex; but when one specifically tries to unpack the harmonic language into modern terms one is hampered by the very multitude of these internal rules. A more effective approach is to formulate some harmonic rules that one might expect to find, and then analyze the text to see if indeed they are there to be found. There should be some validity in this approach because there is literary evidence to suggest that harmonic taste within *cerdd dant* largely corresponded to that of contemporaneous European art-music in the classification of concordant and discordant intervals (see the poem by Wiliam Llŷn quoted by Ellis (1991) p. 32, and Panton 56 pp. 33-5 quotes the nine consonant intervals of plainsong with a note that they refer to both 'tant' and 'lleferydd': string and voice). However the text commonly admits what appear to be simple and compound 2nds, even in *cyweirdant* positions, so the harmony was not entirely what we consider as conventional.

Avoidance of the tritone is an obvious choice of a potential rule, and perhaps less secure is avoidance of the semitone as a constituent of chords. It is important to define 'chord' here

rigorously because:

1) Letters placed vertically over one another may not have been played simultaneously. It is clear that usually, in the upper part, they were not played simultaneously, but there are strong arguments that they were played simultaneously in the lower part (Part 4, pp. 116-9, 142). Therefore it is best, initially, to restrict the analysis to the lower part.

2) It is clear that the notes were often damped, for reasons of harmony. This was commonplace in the upper part, and it may have been done, rather sparingly, in the lower part also. Nevertheless, for the sake of simplicity, I assume for the current purpose that the lower part was not damped.

AVOIDANCE OF THE TRITONE

In order to detect this it is necessary that one of the following pairs of symbols be avoided in the text: G-C, A-D, B-E, C-F, D-G, E-A, F-B; and indeed only one is avoided: B-E. Therefore, if the composers felt it was necessary to avoid the tritone, then the tritone must lie between B and E, which is to say the notes here must be B-flat and E-natural. (If they were B-natural and E-sharp then the A would have to be sharp and so on.) This is of course exactly the scale the tablature indicates, and this finding confirms that tuning. As the finding is unlikely to be due to chance, there is a strong likelihood that the composers and performers did feel it was necessary to avoid the tritone.

Bringing the upper part into account and discounting those situations where I understand the upper-part note was played

before or after the notes of the lower part, one finds examples of B and E together, but extremely rarely; and in most cases the formula was altered on its subsequent appearances, presumably because it was felt to be inaccurate or unsatisfactory harmonically.

All the other pairs of symbols are commonly found in the lower part, and with about equal frequency, apart from E-A which is not very common. E should be considered to be a weak note in many pieces, and it is the only note upon which drones are never established in any piece in the text. In hexatonic pieces either E or B symbols are not used for plain notes, and in the largely pentatonic Caniad Tro Tant E is not used as a plain note. No doubt this was because the apparent tritone between B and E strings would further restrict a pentatonic or hexatonic piece, unless the piece was so formed by dropping the B or the E. The absence of a note, and presumably a string, for E in the bass (and for the B below that) would be connected to this. So it seems that in the choice between dropping B and E, it was E that was more likely to be dropped. From this it follows that in general a structural reliance on the pair B-F would be preferred to E-A, and this may explain the infrequency of the pair E-A.

In view of the evenness of the frequency of the other pairs, the total absence in the lower part of B-E is really striking.

AVOIDANCE OF THE SEMITONE AS AN INTERVAL

In order to identify the presence of this principle it is necessary that two of the following pairs of adjacent symbols is

avoided in chords: G-A, A-B, B-C, C-D, D-E, E-F, F-G. Now G-A, C-D and F-G are commonly used. Never used are A-B, B-C, D-E and E-F; and therefore it is likely that two of these four pairs involve semitonal intervals. Among the possible options here of course are the two involved in the literal reading of the tablature: the combination A-natural to B-flat and the combination E-natural to F-natural. Although this part of the analysis does not in itself enable one to narrow down the options to a single scale, it does support the identification of B-E as the tritone and the use of the natural scale with B-flat.

Bringing the treble into account we find G-A is common, but also, rather unambiguously, E-F in a repeated figure in cainc x and cainc xiii of Yr Osteg Fawr. This is rather disconcerting, but I must emphasize that it is possible, because it is in the treble, that the two notes were not struck simultaneously. My personal conclusion is that this is a deliberate and humorous use of a semitonal discord in a light-hearted piece.

VI. MODALITY

When the tablature letters are read literally, what sort of music emerges? How credible is the music in terms of tonality and harmony? It is very interesting here to look into the modalities that emerge within the music text. We cannot be sure that the concept of contrasting different modalities with one another between pieces formed part of the tradition's theory, especially as the characteristic alternation between *cyweirdant* and *tyniad* upon which the music is based suggests that 'modulation' between pairs of modes within passages would have been the best basis for their theory of tonality.

But in respect of actual practice, if we exclude the *tyniad* components of the text for the moment we can assign modes to the melodic lines of the upper parts of the pieces by referring to the final plain notes of sections and of passages which end in a *cyweirdant*. The result here is that most pieces in the text happen to have been composed in a clearly-defined mode, with a minority of pieces exhibiting one or a few shifts in modality as they progress. This is to say that mode was important - it really grasps the ear here despite the predominance of the *cyweirdant*/*tyniad* modulation, largely because melodic finals are often supported by their root chords. So it may indeed be correct to interpret Robert Peilin's list of *cyweiriau* (discussed before) as intended - albeit not necessarily correctly - to relate to scalar modes.

The modes used provide us with some means of judging the credibility of the literal reading of the tablature. If the Locrian mode emerged here as common (or, perhaps, at all) it would be doubtful that the literal reading could be correct. The indicator of the Locrian mode here would be E, and in fact no passages in the text use E as a modal final. As mentioned before, in many pieces E is a weak note or is not used as a plain note at all, and it is never used as a drone. Harmonically, E is commonly used in conjunction with C and G to form what undoubtedly is the major triad C-E-G, and also (very rarely) E is used in conjunction with A and C to form the minor triad A-C-E. Both the other available major triads: F-A-C and B-flat-D-F are commonplace. The other minor triads are less commonplace: G-B-flat-D and D-F-A (which is rare). This is to say that two factors reduce the frequency of a triad: the presence of E and the presence of minor thirds. No triad raised on E occurs, of course.

The harmony used is generally composed of chords raised on the above roots by various inversions, but quite frequently closer harmony occurs, where A, B-flat or D are added to C-G, and G to B-flat-D-F. Less frequently G or C are added to any chord. None of these 'mixed' chords involves an interval of less than a tone on the literal reading.

This sort of use of harmony is quite intelligible, and it combines with melodic lines to create a strong impression of modality in most of the text. The frequency with which particular modes are used is unsurprising. The most common final is C, followed by G, indicating the Mixolydian and Dorian modes

respectively. The Ionian and Æolian modes are much less common but they are present. In the broader European context there is nothing strange in this which could cause us to call into question the adoption of this literal scale. Indeed these findings are reassuring. In tonality the reconstructed music is entirely credible.

Concerning scales, the adoption of the literal reading entails reading the majority of pieces as diatonic, but with a considerable number of pieces as on gapped scales, either pentatonic or hexatonic ones. Drones are fairly commonplace but by no means predominate. Again there is nothing here that lies outside or even close to the margins of what one would expect from the European context.

It should be emphasized at this point that this analysis of modality has only become possible through the progress that has been made in this work, on several fronts, the most important of which are summarized here:

1) The discovery that the B symbols used throughout the music text are specific; that they are *B-rotundum* in contrast to *B-quadratum*.

2) The identification of the abbreviated symbols in abbreviated examples of *y plethiad byr* (Part 4: TECHNIQUE, pp. 76-8; Greenhill (1999), p. 219), which is especially prevalent in closing formulas - such as Close I A (Greenhill (1999), p. 232) - which of course contribute greatly to an understanding of modality.

3) The definition of the sequential order in which the

segments of text should be read and of the endings of the constituent *ceinciau* and *diweddau* of sections (Part 5: METRE, appendix p. 1) so that modal finals can be located.

It will perhaps have been without the aid of some or all of these advances that Thurston Dart and Polin were discouraged from a literal reading.

Here is a summary of the modalities of the individual pieces as they strike the ear, with the short and damped notes of the fingering movements not contributing to the impression of scale. As adopted generally in this work, lower-case Roman numerals refer to sections of a piece, and Arabic numerals refer to specific addresses: page no., line no. and column no.

gosteg dafydd athro	C; hexatonic - no E; G drone
gosteg yr halen	C; diatonic; C drone
yr osteg fawr	C; diatonic; C drone
gosteg lwyteg	C; probably diatonic but no B in 1st section; C drone
klymau kytgerdd	C; diatonic, no drones
kaniad y gwyn bibydd	C (despite the piece ending on A); diatonic; G and C drones
kaniad ystafell	G; diatonic (i-x), pentatonic - no E or B (40.5.9-41.1.22), diatonic thereafter; D and G drones in xii
kaniad kydwgan	F; diatonic; C drone
kaniad bach ar y go gower	C; diatonic; G and C drones in xii

kaniad kynwrig benkerdd	F; diatonic but no B in xii; C drone, with F drone also in xii
kaniad llywelyn ap ifan ...	G (i-vi), C (vii-xii), G (xiii-xvi); hexatonic - no E (i-xii), diatonic (xiii-xvi); F drone (parts of i-iv)
kaniad suwsana	G (i-iv), C (v-vi); diatonic with weak E (i-iv), hexatonic (v-vi) - no E; F and G drones (parts of i-ii)
pwngk ar ol pob profiad	G; hexatonic - no E; B-flat and G drones (56.1.1-56.1.16)
profiad kyffredin	C; hexatonic - no E; no drones
y ddigan y droell	F; hexatonic - no E; no drones
kaingk ruffydd ab adda ...	G; hexatonic - no E; no drones
kaingk dafydd broffwyd	C; pentatonic - no A or B; G drone
profiad yr eos brido	C (57.5-58.3.17), D (58.3.18- 58.4.3), C thereafter; hexatonic - no E; no drones
profiad yr eos	D (58.5-59.6.15), C thereafter; quadritonic - no B, C or F (58.5.1-58.6.8), diatonic (58.5.1-59.1.19), hexatonic - no C (59.2.1-59.3.5), diatonic (59.3.6-59.6.15), hexatonic - no E (59.6.16 onwards); no drones

profiad chwith ifan ab go	C (60.1-61.1.7), D (61.1.8-12), C thereafter; diatonic (60.1.- 60.4), pentatonic - no B or E (60.5.1-60.5.8), diatonic (60.5.9-60.6.13), hexatonic - no E (60.6.14-61.4.15); C drone (60.1.13-60.2.18 & 60.3.13-60.5.8)
profiad fforchog ifan ...	C; hexatonic - no E; no drones
profiad y botwm	C (62.4.9-63.3.2), D (63.3.3-7), C thereafter; hexatonic - no E; no drones
profiad y brido ar is gower	C (63.4.1-64.2.8), D (64.2.9-64.3.13), C thereafter; hexatonic - no E (63.4.1-6), hexatonic - no B (63.4.7-64.2.8), diatonic (64.2.9-64.3.13), hexatonic - no E (64.3.14 onwards); F drone (63.4.1-63.4.6), C drone (63.4.7-64.2.8)
profiad brido ar uwch gower	D (64.4-65.2.5), C thereafter; hexatonic - no E (64.4-5), diatonic (64.6.1-65.2.19), hexatonic - no E (65.3.1 onwards); no drones

kaniad y wefl	C; diatonic; G drone (xii)
kaniad tro tant	D (i-xii), B-flat (xiii); pentatonic - no E (*ceinciau*) and weak G (*diwedd*); F and B-flat drones (xiii)
kaniad san silin	G; diatonic; no drones
kaniad marwnad ifan y go	G (i-v), C (vi-xvii); diatonic; G and C drones (xvii)
y kaniad krych ...	C (i-vii), D (80.5.5-81.1.3), C (81.1.4-xii); diatonic (i-vi), hexatonic - no E (vii), quadritonic - no B,C or E (80.5.5-81.1.3), hexatonic - no E (81.1.4-81.5), diatonic (x-xii); D drone (80.2.1-80.3.5), A drone (80.5.5-81.1.3)
kaniad hun wenllian	G (i-ii), C (iii-xii); diatonic; no drones
kaniad pibau morfydd	G (i), C (ii-xv); diatonic; no drones
kaniad llywelyn dylynior	C; diatonic; G drone (xv)

VII. PITCH

It seems probable that when it was originally conceived to notate the music (or at least to associate the notes with the letter system), the tradition was confronted with a decision as to which letters to use to describe the notes. As we have seen from Hafod 3, the notes within the octave had their own vernacular names arising from the Welsh terms for individual strings, and these were fairly distinct from the letter system. If rational factors prevailed at the time, the tradition must have chosen the notational scale with B-flat over that with B-natural because the F hexachords more nearly approximated the pitch (in absolute terms) of the *telyn* and the *crwth* than the G hexachords. This is to say the F strings on the *telyn* must have been closer to F notes in plainchant than to G notes. I can see no other reason why it should have been preferred. This narrows down the pitch involved somewhat, but it could still have been that the pitch of the *telyn* was two or three tones away from the actual mean pitch of the plainsong of the time (whenever that time was exactly).

Notwithstanding the circumstances in which the strings of the *telyn* were first associated with the letter-names of the notes, it will be the safest option to consider that *telyn* pitch in the tablature related closely to the pitches of stringed instruments in the sixteenth century, that is to say in a range somewhat below concert pitch.

The octave levels can be specified by reference to early

surviving harps of 29/30 strings from Ireland and Scotland. The augmentation of these from harps of 25 strings is suggested by representations of small harps (which predate the extant harps) which appear to lack a projecting block. It appears probable that the design of 25-stringed harps was augmented to 29/30 by adding strings in the bass, not in the top register. Taking into account the dimensions of the extant early harps (and crowds) and discounting the bottom dimensions, it is necessary that middle c is

represented in the text by the symbol c|, and not by the symbol $\bar{c}$ as transcribed by Polin amongst others; that is to say she has transcribed the music, as she admitted was possible (p. 184), an octave too low. The tessitura encompasses C of the bass clef (second space) to the G an octave above the treble stave, i.e. *c* to *g'''* (somewhat higher than Agricola's 26 strings: *F* to *c'''* and Glarean's 24: *F* to *a'''* on the Continent). This results in the pieces in the manuscript being pitched at a level that is very acceptable for solo performance, and definitely not so low as to suggest that the pieces were designed merely for the accompaniment of vocal delivery.

It is important to emphasize here that it is probable that absolute pitch was actually of rough significance, since in the Irish tradition of early stringed instruments absolute pitch was an important component of expression in composition.

VIII. THE METHOD OF TUNING

Diatonically-strung harps lend themselves to tuning in any number of straightforward sequences of 4ths, 5ths and 8ves from a particular individual set string, as indeed was described by Gwilym Puw for the Ordinary Set and by Edward Bunting in Ireland.

For practical purposes it is not necessary to identify a particular string in the text that was used for the purpose of a set string, although it appears from Hafod 3 that *y cyweirdant* in the sense of a set string (as described in Hafod 24) was one of the G strings, and this matches the octave division of the tablature. From Gwilym Puw it can be inferred that the first octave to be tuned would be the lowest complete one, commencing from an initial set string at the top of that octave. Translated onto a 25-stringed *telyn* this implies that the initial set string would have been that denoted by the symbol $\bar{g}$ in the tablature. However, C is the modality of most pieces in the manuscript text, and Hafod 3 also associates *cyweirdant* with that note, by the name 'C cyweirdant'. So it is more probable that a C string was the set string. Tuning probably began from the one denoted by the symbol $\bar{c}$ in the tablature. From C the tuning cycle comprises the ascending chain of 5ths C-G-D-A-E and the descending chain of 5ths C-F-B(flat).

It is necessary here to correct what appears to have been a misinterpretation in the modern literature of the Hafod 24 passage concerning the locating of *y cyweirdant*. The passage

begins: 'Pa fan bynnag y bo y Kowirdant yn y delyn...' (wherever the *cyweirdant* is on the harp). Now we know that the total number of strings on individual harps in Wales was not standard but tended to vary. Thus the choice as to where to locate the *cyweirdant* - the set string from which one begins the tuning cycle - would often have been different from one harp to another, and the passage is obviously written with this in mind:- Jones (or his source) could not attempt to define *y cyweirdant* in relationship to the top or bottom strings of all harps, and it will have been this that led him to qualify his statement about where it is located. Thus it is that this passage cannot be taken as evidence that the tuning cycle could be commenced from different strings on the same harp, that the scale was transposable and could be raised from any starting note. A *telynior* would have customarily tuned from a single initial string.

One more very important point needs to be made in respect of the method of tuning. We should not take it for granted that the *cerdd dant* harpists simply followed the sort of tuning sequence described by Bunting, for to do so would be to assume that they used Pythagorean intonation. We might be entitled to assume this if it had been that *cerdd dant* was the product of a harp-based musical culture, but it seems most probable that the *cerdd dant* tradition would not have been forged on the harp, and if scales on a divisive principle rather than the cyclic principle of Pythagorean tuning had been evolved on the *crwth* and *timpan* they may have been used on the harp as well. So initially we cannot be

sure about what sort of diatonic scale it is that is implied by the string symbols in the tablature.

In fact initially, we cannot even be sure that they used any particular intonation as a universal prescription. For all we know at this point it may have been that they used different intonations for different pieces. We have already excluded the possibility of retuning between pieces in the manuscript in any gross way - by as much as two tones in *scordatura* or as little as a semitone in inflected notes - because the music does not require it, none of the evidence points to it and the harp does not easily lend itself to this sort of treatment, without sharping levers or pedals. But none of these arguments extends to small changes in intonation. If the musical style of different compositions would be enhanced by it, would this highly-discerning and specialized professional élite have been prepared to delicately reset their tuning of the *telyn* by the microtones needed to adjust intonation from one piece to another? For if this was the case, then the methods of tuning would be complex indeed. Even implementing a mean-tone temperament involves more than tuning in 4ths, 5ths and 8ves, it involves testing and checking 3rds at least as well.

We need to examine carefully the whole, neglected issue of intonation before drawing any conclusions on tuning method. Those readers who are unconcerned with this level of detail can pass over the next, lengthly chapter, where a wide range of possible intonations is examined. Let it suffice here to add that the tuning sequences that a range of intonations would require would

be very numerous, as the musicians would have needed a sequence for passing directly from each intonation to every other intonation.

IX. INTONATION

We turn now to the question of intonation. The tuning of the harp by 5ths is described by the continental writer Glareanus in 1547 and also by Bunting, but - even if these sources did have some indirect relationship to practice in the *cerdd dant* tradition - neither of them mention if their tunings were by pure 5ths, by tempered 5ths or by a mixture of pure and tempered 5ths. Nor has any of the evidence of *cerdd dant* ever been interpreted as directly indicating anything about intonation, and contributors appear to have been in the dark as to whether a single intonation or a variety of intonations was employed. Nevertheless, the problem cannot be ignored else - in the strictest sense - the music has to remain unretrieved, and unless some conclusions can be reached on intonation the music must be declared irretrievable. The problem simply has to be addressed, and at the very least I hope to introduce the topic here.

I believe that the problem of intonation is best approached by examining the requirements of each individual composition and not by attempting to decide on a particular generic solution. At least this approach is on a firm footing, based as it is on the contents of the tablature, and it should ensure that the best is done for the musical realization of the compositions lying there. I propose here to establish the desirability (on stylistic grounds) and technical feasibility of a particular collection of intonations, before moving on to the evidence that this

collection was codified.

Firstly, let us consider the indications concerning tempered versus untempered intonation. It will emerge that there are very strong indications that tempering would have been employed, and that there is no historical evidence that precludes it.

If pure 5ths were exclusively employed in tuning, the resulting untempered scale (expressed in cents) would be:

C	D	E	F	G	A	B	C
0	204	408	498	702	906	996	1200

In its favour, this Pythagorean-type scale is very simple to tune and possesses several pure intervals. In addition to its pure 3/2 5ths and 4/3 4ths, the scale's tones are all pure 9/8 major tones. It is necessary here to immediately point out that if Pythagorean intonation had been used in *cerdd dant*, these pure major tones would have had much greater impact than they could in any other early music because several intervals of a single tone were used as vertical sonorities in the manuscript; fairly commonplace chords include F-G, G-A and C-D. Thus in *cerdd dant* the purity of major tones would have been exploited harmonically, not just melodically, if Pythagorean intonation was used.

However, Pythagorean intonation does not yield pure major or pure minor 3rds, and whereas it is not possible to positively exclude Pythagorean intonation, the music is characteristically so strongly dominated by triadic harmony that it is acoustically very limited by an intonation that has no pure 3rds. For more than anything it is this triadic harmony which creates

the astoundingly precocious appearance that the music presents to us, and in practice the music gains resonance greatly from any intonation that admits pure 3rds. This is for a number of reasons. Not only is the harmony based on triadic consonance, but the music is based primarily and very strongly on its harmony rather than its melody in the first place. The richly-harmonic timbre of the harp is especially conducive to harmonic music and to temperament, with the harp's multitude of open strings where the note produced by every string plucked is supported by sympathetic resonance from other harmonically-related strings. This is of course particularly pronounced in the case of the wooden harp with metal strings (less so for the leathern harp with horsehair strings) and in the case of single-rank diatonically-tuned harps in general (with no chromatic strings to interfere with the harmonicity of sympathetic resonance). So the early *cerdd dant* musicians, before and beyond any other instrumentalists, ought to have been particularly highly motivated to temper some or all of their 5ths.

Furthermore, they would not have needed to await the development of thought on this amongst continental writers, since from fifteenth- and sixteenth-century accounts of the tuning of keyboard instruments it appears that tempering was practiced by musicians before theorists in their writings began to experiment with a variety of intonations and to record them.

I am very grateful to my fellow *cerdd dant* harpist, Paul Dooley, for the important observation that this music is not best served by Pythagorean intonation (personal communication).

IRREGULAR TEMPERAMENTS

Pure 3rds can be achieved in two ways, either by lightly tempering all 5ths in some form of mean-tone temperament or by irregular tempering, leaving some 5ths pure whilst heavily tempering one or more others. Such heavily tempered 5ths as irregular temperaments require tend to be unusable as consonant intervals, so any irregular temperament would preclude the use of at least one 5th or another in a single composition, but indeed a considerable number of pieces in the manuscript do not use one or more particular 5ths. For these pieces, then, the opportunity for using irregular temperaments did exist. Interestingly here, the absent 5ths are not wholly a by-product of all of these pieces having been composed on gapped scales; in several cases the pieces are heptatonic, so here one wonders if particular 5ths were avoided in order to make use of particular temperaments. This would suggest that just intonation was indeed a goal pursued by the composers, at least occasionally.

If this was so, then the variety of 5ths absent from these pieces would indicate that the tradition used a variety of irregular temperaments. This is an interesting proposition. We are presented with a complex problem in trying to deduce the precise nature of the temperaments that this would require, but it can be done by matching the requirements of just intonation that each piece makes with what various temperings make

available.

The circumstance that a considerable number of pieces in the manuscript have one or more 5ths absent makes it possible to achieve pure major 3rds (and some pure 10/9 minor 2nds) whilst retaining intervals of a pure 5th for such 5ths as the piece employs. This type of temperament is irregular in the sense that 5ths that are to be used in chords are left pure but those that are not are rendered unusable by being heavily tempered, by a syntonic comma of 21.5 cents. The most useful temperaments that happen to be available preclude only one or two particular 5ths, leaving five or four of the six diatonic triads pure and available to the composer.

These temperaments are set out as follows; $^{-}$ indicating a flattening by a comma, $^{+}$ indicating a sharpening by a comma.

1. $D^{-}\ A^{-}\ E^{-}$ precludes G-D
2. $A^{-}\ E^{-}\ B^{+}\ F^{+}$ precludes D-A, F-C
3. $E^{-}\ B^{+}\ F^{+}$ precludes F-C, A-E
4. $D^{-}\ A^{-}\ E^{-}\ B^{+}$ precludes G-D, B-F
5. $A^{-}\ E^{-}\ B^{+}$ precludes D-A, B-F
6. $G^{-}\ D^{-}\ A^{-}\ E^{-}$ precludes C-G

The scales produced by each set of temperings are:

	C	D	E	F	G	A	B	C
1.	0	182	386	498	702	884	996	1200
2.	0	204	386	520	702	884	1018	1200
3.	0	204	386	520	702	906	1018	1200
4.	0	182	386	498	702	884	1018	1200
5.	0	204	386	498	702	884	1018	1200
6.	0	182	386	498	681	884	996	1200

Scale 1 is the 4th inversion of the justly-intoned scale, on a tuning given by Ptolemy (2nd century AD). Scale 2 is the same - when transposed down from C to A - as that which is thought to be the basis of the Highland bagpipe scale. Scale 3 is on a tuning given by Didymus (1st century BC). Scale 5 is to be found amongst old Arabian lute tunings (Safi al-Din).

The pieces in the manuscript which can make use of these temperaments are:-

Temperaments

Gosteg Dafydd Athro	3
Gosteg yr Halen	1
Yr Osteg Fawr	1
Gosteg Llwyteg	1
Clymau Cytgerdd	1
Caniad Cadwgan	1 or 4
Caniad Bach ar y Gogywair	2
Cainc Ruffudd ab Adda ap Dafydd	1
Cainc Dafydd Broffwyd	5
Profiad Fforchog	3
Caniad Tro Tant	1 or 6
Caniad San Silin	2 or 3

This list leaves a residue of pieces that do happen to lack some particular 5th without a temperament available. Several pieces have an absent 5th A-E, but lack the other absent 5ths that would enable them to be accommodated by any of the above temperaments (taking into account that the Pwnc ar ôl pob Profiad - played after and presumably immediately after every *profiad* - contains G-D such that none of the *profiadau* could be entirely accommodated by temperament 1 or 4 without changing the tuning). These are:

Caniad Cynwrig Bencerdd
Caniad Suwsana
Profiad Cyffredin
Profiad yr Eos Brido
Profiad Chwith Ifan ap y Gof

Profiad y Botwm
Profiad Brido ar Isgywair
Profiad Brido ar Uwchgywair
Caniad y Wefl

whereas Profiad yr Eos does have A-E but has no F-C and so cannot be well-served by temperament 3.

Accordingly, these ten pieces appear to require either Pythagorean intonation after all, or a mean-tone temperament.

MEAN-TONE TEMPERAMENTS

The pieces listed above that cannot be satisfactorily accommodated by any irregular temperament share that characteristic with a larger group of pieces that each employ all of the six diatonic 5ths. Certainly, then, both groups must have been played either in the untempered intonation or in a temperament which tempers each and every 5th by sufficiently small quantities that they remain tolerable, not too sour to the ear. In practice this would almost certainly involve equal quantities for each 5th, that is to say, in some form of mean-tone temperament. Equal temperament, incidentally, is a highly unlikely contender, as in its early years it was probably confined to fingerboard instruments.

The most likely candidates amongst mean-tone temperaments are 1/4-comma and 1/3-comma mean-tone temperaments, in which each 5th is set small by, respectively, a quarter or a third of the value of the syntonic comma of 21.5 cents. Both are not really difficult to tune, because they produce pure 3rds - pure major

3rds in the case of 1/4-comma mean-tone and pure minor 3rds in the case of 1/3-comma mean-tone. The gain in resonance of exactly pure 3rds here outweighs the loss of exactly pure 5ths because the size of the adjustment is less as a ratio of the 5th than of the 3rd. That both the 1/4- and 1/3-comma adjustments left the 5ths tolerable is shown by the widespread use of these temperaments in Renaissance keyboard music, although the smaller 1/4-comma adjustment is thought to have been by far the more common of the two.

Compared with Pythagorean intonation, 1/4-comma mean-tone has the effect of accentuating the sonority of major triads relative to that of minor triads, and this arrangement does suit the way in which *cerdd dant* was organised harmonically. From the music text we can see that it was the composers' general custom to place major triads in metrical positions that were *cyweirdant*, whereas they would place either major or minor triads in *tyniad* positions. So where the major-minor patterning is used, 1/4-comma mean-tone brings out the contrast between *cyweirdant* and *tyniad*, suiting the way in which *cyweirdant* carries a sense of repose and *tyniad* one of transition. 1/3-comma mean-tone reduces this contrast. The likelihood is, then, that of the two, 1/4-comma mean-tone would be preferred in general.

1/4-comma mean-tone temperament creates this scale:

C	D	E	F	G	A	B	C
0	193	386	503	697	890	1007	1200

The pieces in the manuscript that have no absent 5ths, and

are better served by this temperament than by using pure 5ths are:

Caniad y Gwyn Bibydd
Caniad Ystafell
Caniad Llywelyn ab Ifan ap y Gof
Y Ddigan y Droell
Caniad Marwnad Ifan ap y Gof
Y Caniad Crych ar y Bragodgywair
Caniad Hun Wenllian
Caniad Pibau Morfydd
Caniad Llywelyn Delynior

Some parts of pieces in the manuscript do not follow the usual major-major or major-minor patterns between *cyweirdant* and *tyniad*. Minor-major patterning seems, albeit not entirely clearly, to be contained in part of Caniad Ystafell (38.5.1-39.3.10), of Caniad Marwnad Ifan ap y Gof (71.6.1-72.5.7), of Profiad Brido ar Uwchgywair (64.6.1-65.2.5) and of Caniad Hun Wenllian (87.6.1-88.1.12). This implies that pieces may have existed outside of the music text that were composed entirely in this rather contradictory format. If so the contrast in them between *cyweirdant* and *tyniad* would probably be better served by 1/3-comma mean-tone than by 1/4-comma mean-tone.

There are parts of pieces that are predominantly minor in both *cyweirdant* and *tyniad* positions: Caniad Ystafell vii-xii and Y Caniad Crych ar y Bragodgywair (80.2.1-3.10, 80.5.5-81.1.3). If there existed pieces entirely in this minor format then their general sonority would be best enhanced by 1/3-comma mean-tone.

Indeed some case can be made out on stylistic grounds for setting Caniad Ystafell in 1/3-comma mean-tone.

1/3-comma mean-tone temperament creates this scale:

C	D	E	F	G	A	B	C
0	190	379	505	695	884	1010	1200

THE CYWEIRIAU REVISITED

It would be rash to presume that such a complex variety of intonations as has been advanced here would have been effected in an *ad hoc*, uncodified manner, whilst there still remains a terminology in *cerdd dant* that is unaccounted for. Could it simply be that the *cyweiriau* refer to different intonations? The whole topic of the *cyweiriau* is very abstruse, and in some ways we can almost afford to pass it by until that extra, small piece of information is acquired that will make the whole topic transparent, or until some part of the information we do have is revealed to be faulty. However, *if* intonation is what the *cyweiriau* refer to then some alterations to the intonations of a few pieces would need to be made. The practical import is that Caniad San Silin would be played in untempered intonation instead of temperaments 2 or 3, and the options for three pieces can be narrowed down to just one: Profiad Brido ar Isgywair would be played in untempered intonation, Profiad Brido ar Uwchgywair would be played in 1/3-comma mean-tone, and Caniad Cadwgan would be played in temperament 1.

Because of these minor practical implications, and whilst

there is a possibility that there is historical evidence that implies the use of a variety of intonations (in addition to the musical evidence we have been considering), it is necessary to examine the technical feasibility of the proposition that the *cyweiriau* refer to intonations.

The examination that follows is complex, but the opening point is a very simple one. It is remarkably impressive that the above list of nine pieces in the manuscript that have no absent 5ths includes as many as seven of the pieces that we are informed are played on the *bragodgywair*:

Caniad y Gwyn Bibydd
Caniad Ystafell
Caniad Marwnad Ifan ap y Gof
Y Caniad Crych ar y Bragodgywair
Caniad Hun Wenllian
Caniad Pibau Morfydd
Caniad Llywelyn Delynior

Was the *bragodgywair* actually an intonation? After all, it is the use of all six diatonic 5ths that marks this group as one that relates to intonation. So it is worth examining the significance of all these seven pieces being incapable of irregular temperaments. The only other piece in the manuscript known to be played on the *bragodgywair* is Caniad Cynwrig Bencerdd, but that piece also, despite it having an absent 5th A-E, is already on the list of pieces with absent 5ths that are unable to be accommodated by any irregular temperament other than Pythagorean or mean-tone. Thus it is that all eight pieces known

as being on the *bragodgywair* share this intonational characteristic.

Of the other pieces with this characteristic, eight are unspecified in relation to *cywair*. It is highly probable that two of these, Caniad Llywelyn ab Ifan ap y Gof and Caniad Suwsana, should be identified with the titles Caniad Marwnad Llywelyn ab Ifan ap y Gof and Caniad Marwnad Suwsana; the same contraction appears to have occurred in the manuscript in respect of Caniad Marwnad Cynwrig Bencerdd (see Part 5, pp. 69-70). If so then they should be played on the *bragodgywair* ascribed to them by Gwysaney 28 fo.71 and other manuscripts (see Miles pp. 620-3).

If this exhausted the *cywair* ascriptions in the lists we could infer that the remaining six pieces too should be played on the *bragodgywair*, but there remain two pieces that were played on other *cyweiriau*: Profiad Brido ar Isgywair and Profiad Brido ar Uwchgywair. That these *cyweiriau* were not mere subdivisions of the *bragodgywair* can be inferred from the fact that the *isgywair* was, like the *bragodgywair* itself, one of the five warranted *cyweiriau*. Yet *isgywair* and *uwchgywair*, the existence of which is not referred to anywhere except as part of the latter title, do seem to form a pair of contrasting terms in this pair of titles. Clearly some one thing or another was relatively high in Profiad Brido ar Uwchgywair, as 'uwch' means 'above', which was relatively low in Profiad Brido ar Isgywair, as 'is' means 'below'. To judge from the music texts of the pieces, the variable involved in the contrast was not pitch in any manifestation that is obvious there, so perhaps it related to the

more subtle realm of intonation.

The only type of intonational scenario that can satisfy the criteria required by this contrast whilst also involving the *bragodgywair* has to be one in which the *bragodgywair* constitutes some kind of a mean in some frame of reference that relates to pitch levels, where the frame of reference admits the *bragodgywair* being flanked on both sides - above by the *uwchgywair* and below by the *isgywair*. Intonation can supply an answer, as at least the intonations available to be allotted here do happen to be three in number. Moreover, they do relate to pitch levels, in that Pythagorean intonation has its 5ths pitched wider than 1/4-comma mean-tone and 1/3-comma mean-tone has its 5ths pitched narrower than 1/4-comma mean-tone. This is to say that when tuning an ascending 5th, with Pythagorean intonation the string being tuned is set higher than it would be with 1/4-comma mean-tone, whereas with 1/3-comma mean-tone it is set lower than with 1/4-comma mean-tone. This might imply that the *uwchgywair* equates with Pythagorean intonation, that the very commonly-used *bragodgywair* equates with 1/4-comma mean-tone, and that the *isgywair* equates with 1/3-comma mean-tone.

However, these identifications of intonation are not really suitable for Profiad y Brido ar Isgywair and Profiad y Brido ar Uwchgywair, since the former is in major-major *cyweirdant-tyniad* format whereas the latter appears at least in part (64.6.1-65.2.5) to be in minor-major format. Predominantly minor tonality, as discussed before, is better suited by 1/3-comma mean-tone than by Pythagorean intonation. But if the *cerdd dant*

harpists reckoned their strings not by counting upwards but in the way more familiar to us of counting downwards, as was done in Gwilym Puw's diagram of tuning, then the tempering of descending 5ths involves the *raising* of strings. Thus the *uwchgywair* would equate with the appropriately minor intonation of 1/3-comma mean-tone after all, whilst the *isgywair* would equate with the untempered intonation. This is a satisfactory technical possibility, even though conceiving of tuning in descending 5ths entails adopting a set string higher in the chain of 5ths than the C proposed above.

Moving on now to the remaining pieces for which *cyweiriau* are specified, all these lie amongst the pieces for which pure major 3rds can be supplied by irregular temperaments. These are:

	Temperaments	Cywair
Clymau Cytgerdd	1	cras gywair
Caniad Cadwgan	1 or 4	cras gywair
Caniad Bach ar y Gogywair	2	gogywair
Caniad Tro Tant	1 or 6	(tro tant)
Caniad San Silin	2 or 3	(tro tant) or isgywair

From this list, the Clymau Cytgerdd and Caniad Cadwgan identify temperament 1 as the *cras gywair*. Caniad Bach ar y Gogywair identifies temperament 2, the basis of the Highland bagpipe scale, as the *gogywair*. Significantly, the piece is unique in contrasting the 2nds F-G and G-A, which happen to be balanced - both are minor tones - only in this particular temperament. The remaining one of the five warranted *cyweiriau* - the *lleddf gywair*

- we should expect to be represented here, the principal candidate being temperament 3, used by two pieces: Gosteg Dafydd Athro and Profiad Fforchog Ifan ap y Gof.

Caniad Tro Tant and Caniad San Silin remain problematic. As written in the music text, they do not share a common tonality or even modality, and yet the note to the latter (already introduced at p. 25) makes it clear that it could share the characteristic of *tro tant* with the former. If it is the case that *tro tant* refers to B-flat (as suggested p. 24) it would be easy to understand why Caniad Tro Tant was so named, since - uniquely in the manuscript - it has B-flat tonality (and B-flat modality in its last section). Caniad San Silin has different tonality and modality, so presumably the import of the note to the piece is that whereas Caniad San Silin is capable of being set on B-flat, the version given is set on G and it is this version to which the preferred treatment *isgywair* should be applied.

This recommendation of *isgywair* for Caniad San Silin appears to be at odds with the identification arrived at above of *isgywair* as untempered Pythagorean intonation, but actually just because a piece such as Caniad San Silin does not require untempered intonation does not mean that it cannot or should not be played in untempered intonation. Certainly Profiad y Brido ar Isgywair cannot be played in temperaments 2 or 3 because it employs all six 5ths, so *isgywair* cannot be identified as either of these. It is just possible that Caniad San Silin, which appears to contain archaic features (particularly its narrow compass), was deliberately set in what was probably viewed (then

as now) as an archaic intonation. Hence it may not have been that the advantages offered for this piece by temperaments 2 and 3 were simply overlooked.

TERMINOLOGY

Whether or not we have enough information to have arrived at correct identifications of particular intonations for the *cyweiriau*, on the information we have it does appear, from the above demonstrations, that the general proposition that *cyweiriau* comprised intonations is at least technically feasible. This interpretation is in sympathy with the term 'cywair' itself and is supported by several terms used in connection with *cyweiriau*. 'Cywair' has general meanings: adjustment, order, agreement, proper state or condition, trim, reparation, restoration, which are very appropriate in music for temperament as well as for tuning, key and pitch.

Furthermore, four of the five warranted *cyweiriau* possessed strings termed 'tannau lleddfon' (Peniarth 147, p. 200, Peniarth 62, p. 18). Now because *cras gywair* has no *tannau lleddfon* named after it in these sources, 'lleddf' obviously carries senses of contrast with 'cras' here. These are that whereas 'cras' is hard, harsh, parched, dry, acrid, 'lleddf' is soft, calm, tender, placid (as well as being oblique, inclined, askew). There are two possibilities concerning the *tannau lleddfon*. Most probably the term referred to the middle pair of crwth strings, but it might have been a term for tempered harp strings, for the act of

tempering is commonly viewed as a softening of intervals. If this was the case, then the strong implication here would be that *cras gywair* was viewed as untempered, whereas the other *cyweiriau* (especially the *lleddf gywair*), with their *tannau lleddfon*, were tempered.

It may have been, then, that *cras gywair* was the same as what we consider untempered intonation - Pythagorean intonation - and that the two pieces we have that are known to be on *cras gywair* did not avail themselves of the opportunity of pure major 3rds afforded to them by temperament 1. The alternative solution is that temperament 1 with its tempered D^{-} A^{-} E^{-} was considered as the basic tuning, with all other intonations considered as departures from this. It is not obvious why this would be so (unless this tuning was the most ancient - it is one version of the 'tense' diatonic tuning of Ancient Greek music), but it would leave temperament 3 - the most likely contender for the *lleddf gywair* - with the greatest number of altered strings: A B^{+} D F^{+}, which would account for why the *lleddf gywair* was so-named from *tannau lleddfon*.

On this reckoning, the naming of the *gogywair* could be accounted for on the basis that temperament 2 with its A^{-} E^{-} B^{+} F^{+} has three altered strings: B^{+} D F^{+}, one less than the *lleddf gywair* might have had. 'Go' means 'rather', 'somewhat', implying that it required only moderate adjustment, less adjustment than the *lleddf gywair* must have had. But this is becoming very speculative.

'Bragod' is a term that also relates to taste. It refers to

bragget, the beverage produced by sweetening bitter ale with mead, and so it seems that 'bragod' was used here as a metaphor for bitter-sweet harmony. This is apt enough for mean-tone intonation, particularly for 1/4-comma mean-tone, with its slightly sour 5ths blended in triads with sweetly-pure major 3rds. I should emphasise here that the triadic *cerdd dant* harmony brings out the distinctive flavour of 1/4-comma mean-tone very strongly indeed. It produces an attractive, rather irresistible blend of flavours.

THEORY

Finally, the proposition that *cywair* equates with intonation would explain some more otherwise enigmatic facts supplied by the early literature (Peniarth 147, pp. 199-200, Peniarth 62, p. 18).

That the *cyweiriau* show the various *lleisiau* - sounds - (as they quarrel one against the other or as they are separated the one from the other) may indicate that intonation affects intervals.

That from the five principle *cyweiriau* you can make as many as you want of *cyweiriau* may indicate how temperings generate multiple intonations.

That all the *cyweiriau* are mixed the one with the other, and it is through instruction that the *llanw* - the fillings-up - between the *cyweiriau* can be classified may indicate how various intonations have complex impacts on chordal intervals.

That there is part of every *cywair* in the *bragodgywair*, that every finger of the crythor keeps in it, and that the

bragodgywair is the principal *cywair* may indicate that a mean-tone temperament has the flexibility to accommodate all six 5ths.

That 'isgywair ar y bragod dannau' was censured at an early eisteddfod (according to a tale related in a note to J D Rhys's Grammar of 1592) may indicate that the niceties of intonation concern what is and is not acceptable to the ear, that an unfamiliar intonation is difficult to accept.

Not everything concerned with *cywair* is immediately reconciled by the development here of the proposition that *cywair* equates with intonation. Why with Robert Peilin's naming of the harpstrings (see p. 8 above) the A string should be termed *crasdant* and the B string when natural should be termed *bragodant*? Certainly the harmony of the pieces we possess on the *bragodgywair* precludes the use of B natural, so probably Peilin's naming is erroneous. How exactly is it that, as Peniarth 147 p. 199 informs us, the forefinger of the *crythor* keeps *gogywair* and *bragodgywair* and the middle finger *isgywair*, *cras gywair* and *lleddf gywair*? Obviously intonation determines the positioning of the fingers on the crwth, but it is not exactly clear how intervals produced by these fingers define the various intonational scales involved.
Why should there be references to *yr hen fragod gywair* - the old *bragodgywair* - (Peniarth 62, p. 8 and see Miles p. 635) when one would not expect 1/4-comma mean-tone to be viewed as especially ancient?

Until some more headway is made with these problems of theory, the proposition that *cywair* denoted intonation is best

viewed as no more than a hypothesis. Nevertheless, in the light of all the arguments developed here, it has to be conceded that at this time the *cywair* system appears more convincing as a codification of intonation than it ever did in the former interpretation - as a codification of *scordatura*. But howsoever one may choose to conclude on the matter of *cywair* and whether or not one adopts the particular temperaments it implies for the four pieces concerned, it remains the case that the intonations that have been isolated here serve the manuscript repertory much better than any one single intonation could.

SUMMARY

The following summary of the most probable intonation for each composition in the music text also includes the possible alternatives for those four pieces where the harmony implies a solution somewhat different from that derived from the '*cywair*=intonation' hypothesis. The six irregular temperaments concerned are labelled:

1. $D^{-}\ A^{-}\ E^{-}$
2. $A^{-}\ E^{-}\ B^{+}\ F^{+}$
3. $E^{-}\ B^{+}\ F^{+}$
4. $D^{-}\ A^{-}\ E^{-}\ B^{+}$
5. $A^{-}\ E^{-}\ B^{+}$
6. $G^{-}\ D^{-}\ A^{-}\ E^{-}$

Composition	Temperaments
Gosteg Dafydd Athro	3
Gosteg yr Halen	1
Yr Osteg Fawr	1
Gosteg Llwyteg	1
Y Clymau Cytgerdd	1
Caniad y Gwyn Bibydd	1/4-comma mean-tone
Caniad Ystafell	1/4-comma mean-tone
Caniad Cadwgan	1 (or possibly 4)
Caniad Bach ar y Gogywair	2
Caniad Cynwrig Bencerdd	1/4-comma mean-tone
Caniad Llywelyn ab Ifan ap y Gof	1/4-comma mean-tone
Caniad Suwsana	1/4-comma mean-tone
Profiad Cyffredin	1/4-comma mean-tone
Y Ddigan y Droell	1/4-comma mean-tone
Cainc Ruffudd ab Adda ap Dafydd	1
Cainc Dafydd Broffwyd	5
Profiad yr Eos Brido	1/4-comma mean-tone
Profiad yr Eos	1/4-comma mean-tone
Profiad Chwith Ifan ap y Gof	1/4-comma mean-tone
Profiad Fforchog Ifan ap y Gof	3
Profiad y Botwm	1/4-comma mean-tone
Profiad Brido ar Isgywair	untempered (or possibly 1/4- comma mean-tone)
Profiad Brido ar Uwchgywair	1/3-comma mean-tone (or possibly 1/4-comma mean-tone)
Caniad y Wefl	1/4-comma mean-tone
Caniad Tro Tant	1 or 6
Caniad San Silin	untempered (or possibly 2 or 3)

Caniad Marwnad Ifan ap y Gof	1/4-comma mean-tone
Y Caniad Crych ar y Bragodgywair	1/4-comma mean-tone
Caniad Hun Wenllian	1/4-comma mean-tone
Caniad Pibau Morfydd	1/4-comma mean-tone
Caniad Llywelyn Delynior	1/4-comma mean-tone

X. CRWTH TUNINGS

As the music text consists of *telyn* arrangements, the great problems that performance technique on the *crwth* presents do not directly affect reconstruction of the music. Nevertheless, *crwth* tunings do bear indirectly on the principles of reconstruction, because 'cywair' is expressly related not only to *crwth* fingering but to *crwth* tuning as well. It therefore becomes important to examine *crwth* tuning in so far as the interpretation of 'cywair' depends upon it. I hope that this exploration of *crwth* tuning and its terminology, whilst it falls short of solving all the unknown features of the instrument, is sufficient for the present purpose of reappraising to which instrument the 'cywair' terms most properly and primarily belong.

At the outset it needs to be stated that the music text reveals that the *crwth* must have been handled with a technique which was essentially entirely different in its approach to the stopped strings from the standard approaches used for organum fiddling and for monodic playing of the violin and all other instruments with violin-type tuning. Consequently, the *crwth* would have required a different approach to its tuning, an approach which is indeed supplied by one source. The details of the deduced 'alternate-stopping' *crwth* technique in the *cerdd dant* tradition are addressed in Part 4, pp. 134-41.

Two tunings for the *crwth* have been handed down, that of Edward Jones and Daines Barrington, and that of William Bingley.

That of Jones and Barrington apparently derives from a passage in British Library Add. MS 15020:91, of which there is a copy: Aberystwyth MS 168:6. The passage is as follows:

> Y modd i Gyweirio Crwth
>
> Yn gyntaf codwch y crasdant (Iaf) cyfuwch ag y gellir heb ei dorri, yno codwch y cowirdant (5ed) bumb not yn is; a chodwch y 6ed wyth not yn is na'r cowirdant, ag yna gellir ei alw yn fyrdwn neu'n fas iddaw
>
> Cyweiriwch yr ail tant (2d) wyth not yn is na'r cyntaf ag fe fydd ynteu yn fyrdwn i'r cyntaf a chyweiriwch y trydydd tant (3ed) bump not yn is na'r cywirdant yno codwch y llwfrdant (4dd) wyth not yn uwch ag felly fe fydd y (3dd) yn fyrdwn i'r 4d ar crwth yn ei Gowair naturiol.

The directions are clear. They result in a tuning:

String 1: Y crasdant - the set string
String 2: ai Fyrdwn - 8ve below *y crasdant*
String 3: Byrdon y Llwfrdant - 8ve below *y llwfrdant*
String 4: y Llwfrdant - 2nd below *y crasdant*
String 5: y Cywirdant - 5th below *y crasdant*
String 6: ai Fyrdon - 8ve below *y cyweirdant*

The strings are paired in three courses, each course containing two strings one of which is doubled at the 8ve below by its *byrdwn*. The outer pair of stopped strings are set a 5th above the outboard pair and the inner pair of stopped strings are set a 4th above the outboard pair. Jones supplies the pitches: *g-g'-c''-c'-d'-d''*.

The second tuning is provided by William Bingley, who interviewed a *crwth*-player in Caernarfon in 1801, in which the relationships are different. The inner pair of stopped strings are a 5th above the outboard pair, not a 4th, and the outer pair of stopped strings are a 9th above the outboard pair. Also it is string 4 not string 3 that serves as the bourdon in the inner pair. Bingley supplies the pitches: *a-a'-e'-e''-b'-b''*, although perhaps neither these nor Jones's should be taken literally. For comparison with Jones's pitches, we could consider Bingley's as: *g-g'-d'-d''-a'-a''*.

The similarities between these two tunings suggest that they are authentic in their intervals. Yet, almost certainly, they could not have been alternative scordatura for a single *crwth*, because the range of retuning involved would probably be impracticable. To change from the 'natural' tuning to the Bingley tuning the outboard strings would have to be lowered by a 5th, if the outer pair of stopped strings could not be raised at all. The two tunings probably come from different traditions.

Nevertheless the reference to 'ei Gowair naturiol' clearly implies the existence of other tuning sets, so it will probably have been that the *cywair naturiol* came from a tradition that used other *cyweiriau*. It is frustrating that the source uses the loan-word 'naturiol' and not a Welsh proper name, for surely this tuning must have had such a name. If 'bragod gywair' had been used, for instance, then the hypothesis that the five warranted *cyweiriau* relate to *crwth*-tuning would be proved. As it is, we

are left to speculate what the Welsh names for this and the other *cyweiriau* of the *crwth* actually were, but we do at least possess the information discussed before that relates the five warranted *cyweiriau* to the fingering of the *crwth*, not the *telyn*. So we need to consider whether the implied existence of alternative tunings to the *cywair naturiol* is a practical notion.

In terms of practical applicability to *cerdd dant*, the *cywair naturiol* is very much more appropriate than the Bingley tuning. The crucial difference between the two here is that the former has the two stopped courses set at a 2nd apart and the latter a 5th apart. The setting a 2nd apart is convenient - indeed virtually essential - for accommodating the double-tonic which dominates the upper-part of the music text, in that the fingering of a phrase stopped on the one course can then be replicated on the other course to produce the phrase shifted by a tone. Meanwhile, in this alternate-stopping technique first one course then the other is left open to sound the appropriate accompaniment, the two courses exchanging rôles, alternating in the measures. It is this double-tonic patterning which is characteristic of the melody in the text. Also the melodic phrases are generally small in compass, they rely heavily on adjacent notes, and they are stiffly formulaic. This deliberate, restricted mobility is part and parcel of the fingering technique on the *telyn*, and on the *crwth* it may arise out of fingering a phrase on just one course rather than on several strings (as on the violin for example).

Bingley's tuning - at a 5th apart - would be more

appropriate for music of the tonic-dominant variety, so it may derive from outside the *cerdd dant* tradition, very possibly having been influenced (by 1801) by the tuning of the violin. Alternatively, it may have been designed for the standard fiddle technique where each finger is held flat across the fingerboard to stop both of the stopped courses of strings simultaneously, thereby producing parallel organum at the 5th.

What, then, may have been the alternative tunings to the *cywair naturiol*? The first point to be made is that the double-tonic does not underlie the whole of the upper part of the text, and some use could therefore be made of tunings that have the stopped courses set at intervals other than a 2nd. Other intervals occur in the *cyweirdant*/*tyniad* phrasing, particularly phrases that are repeated without shifting (contrast 81.2.10-81.3 with 81.4.11-81.5). Here the two stopped courses might be better set in unison than at a 2nd. It might be worth noting, in connection with departures from the root, 4th and 5th of the *cywair naturiol*, that Scottish traditional violinists used *scordatura*, including one that employed root, major 3rd and 5th (discussed by Collinson, p. 227).

Secondly, benefit could be obtained from resetting the relationship between the stopped courses and the outboard course. Although it is not certain that the outboard course did provide a drone (either by being continuously bowed or by being repeatedly plucked *pizzicato* by the thumb), if it did then the dedication of these strings to a drone of a single pitch would radically restrict the ability to play these pieces on the *crwth*. As we

have seen, the text uses several different notes as drones, and so it would be helpful to retune the outboard course to provide these.

There again, the outboard course might not always have provided a drone. If these strings were plucked by the thumb, the spacing between them is such that it would be easy to pluck them individually. Plucking of these strings is not very convincing acoustically. If they were continuously bowed, the thumb might still have had a damping rôle or some harmonic muting rôle, or even a stopping rôle (using the back of the nail), and any of these techniques might access the outboard strings individually. In any of these circumstances it would be useful on occasion to reset the interval between the outboard strings to intervals other than the 8ve.

A third possible location for retuning is suggested if one reads the 'cywair naturiol' description as applying not to the tuning set in general but only to the setting of the inner stopped course, such that the 8ve setting between these strings was only one of a number of options.

With inadequate information on *crwth* technique, and with no extant *crwth* arrangements at all, it would be an arduous task to discover by experiment precisely which techniques and which tunings could produce the optimum contribution from the instrument here. Furthermore, even if some progress were made, it is unlikely that the names for the alternative tunings would become apparent. In the meantime an understanding of the early passages on fingering the *crwth* remains elusive. Even the string-names

used there do not precisely match those used in the tuning-scheme.

What does seem clear is that in order to realize the basics of the harmony used in these pieces, a variety of tunings similar to and including the *cywair naturiol* scheme would have to be employed. The arguments for this are set out in Part 4, pp. 134-41. The doubling of the melody at a 5th that Bingley's tuning would most conveniently produce would definitely not be the most effective way of organizing the stopped courses.

Would these alternative tunings have been termed 'cyweiriau'? In addition to the inference from the 'cywair naturiol' tuning, it is possible to make out an argument from the naming of the *crwth* strings. The terms for the stopped courses: 'crasdant' and 'llwfrdant' are very interesting. The senses in which the words: 'cras' and 'llwfr' are used in general suggest a sense of contrast between them, such that a sense of boldness from the meanings of 'cras' contrasts with a timidity of 'llwfr' (literally 'cowardly'), and so it would seem that these strings were so named from their sound - the intervals of a 5th and a 4th respectively with the outboard course - and not from their positioning on the instrument. It seems likely, then, that all intervals would have been known by terms as well as by numbers; terms such as 'cras'. 'Cras' is of course one of the main 'cywair' terms, and so I suggest that the other 'cywair' terms might refer to other intervals that arise as significant from tunings of the *crwth*. On this line of thought it is odd that there is no 'llwfr gywair' ever mentioned, but then perhaps

'llwfr' is a mistaking of 'lleddf'.

I believe the *cywair naturiol*, in enabling the melody line to be supported by a double-tonic accompaniment, must have occupied a central place throughout the *cerdd dant* tradition. I expect that the *timpan* and any plucked precursors of the *crwth* would have needed to have been organized on the same principles. The possibility discussed before that the terms: 'cyweirdant' and 'tyniad' originally meant the sounding of open and stopped strings respectively, implies the use of end-stopped instruments of accompaniment as opposed to virtuosic solo instruments with a full-length fingerboard. This is to say the double-tonic alternation of harmony in *cerdd dant* may predate the development of solo stringed instruments and be extremely ancient. Even the structuring of the *cywair naturiol*, reliant on the 4th - 5th chordal accompaniment produced between the outboard course and the courses over the fingerboard, appears to be what Giraldus Cambrensis was referring to in the twelfth century ('whether the strings strike together a 4th or a 5th'). The *crwth*, operating as the bridge between the accompaniment lyres upon which the harmonic system supposedly evolved and the music we have arranged for the *telyn*, is the key to understanding the basis of the music's harmony.

XI. CONCLUSION

In summary, what is offered here is a simple solution to the extremely vexed issue of tonality. This has been arrived at by placing great credence on the early sources, especially the tablature itself, to which is attributed a simple efficacy. A critical approach has been adopted towards the elaborate constructions which have been built upon these early sources. The result is that transcription of the whole text in respect of tonality is enabled, for the first time. Prior to this the absence of identifications of the *cyweiriau* of many of the pieces in the music text has limited (strictly speaking) the scope of transcription. This interpretation simplifies transcription tremendously. On adopting it, the transcriber no longer needs to apply different hypotheses and methods to different parts of the text in general nor use an *ad hoc* approach to those pieces for which no *cywair* is specified. In being this simple and direct, the literal approach provides an interpretive approach with a certain methodological 'bedrock' to it, which could never be matched by any 'cywair' interpretation whilst the *cyweiriau* of all pieces remains unknown. Hitherto it has been supposed that recovery of all the music is an impossibility because of this sticking-point, and that interpretation must always and necessarily be to some extent speculative.

Direct, literal transcription results in coherent music. The analysis of the tonalities of the pieces presented in Chapter VI

is a statement about musicality as well as technicalities. With some twenty-five years experience of playing all the pieces exclusively in this tuning I can say that the tonalities establish a certain standard of musicality which is transparently accessible to modern ears. In short, this interpretation has musical appeal, and this will have had some influence on the many transcribers and performers who, for various reasons, have often selected this tuning for particular pieces. This interpretation also has appeal for the performer of course, because the daunting prospect of resetting the harp to different keys and *scordatura* tunings is removed. For the art in general (and for its promotion), more than ever hinges on the interpretation of tuning now that the possibilities have been expanded to include no gross retuning. It is not only the correct identification of the notes that is at stake here, but how palatable a prospect the music is to potential performers and audiences.

Many issues - such as the nature and details of the *cyweiriau* - remain unresolved, but it appears that none of these relate directly to the purposes at hand: reconstruction and transcription. But because they have previously been understood to relate to transcription I shall here discuss such tentative conclusions as I have been able to come to on these issues.

The nature of the *cyweiriau*. By 1676 Gwilym Puw was using 'cywair' in the sense of different tunings for the *telyn*, but it has to be, of course, that 'cywair' would have only come to mean 'key' as different keys developed or were introduced into Wales. We need to know exactly when and where this happened, but it

would be incorrect to argue that because in modern times 'cywair' means 'key' it must be that the use of different keys is as old as the use of *cyweiriau* terms. My conclusions on this are that the concept of key had no place in the old *cerdd dant*, and that although it may well have been that the Welsh language needed a word for key in music generally before the demise of the old *cerdd dant*, it would not have needed such a word for the specific field of the old *cerdd dant*. It would be odd anyway for a vernacular word to have evolved for 'key' before modern times, as a loanword should be expected (early MSS. use 'kliff' for the letter name of a note, 'not' for its Guidonian name, etc.).

My conclusion is that the *cyweiriau* system basically operated within the single tuning indicated by the tablature, but was capable of operating also in some compositions that used F-sharp or B-natural, none of which happen to be in the music text. So I read Hafod 3 p. 233 as correct in indicating that the *gogywair* used B-flat. As to why the *gogywair* alone should be named here, perhaps important chords in the *gogywair* were based on B-flat. I suspect this is the case with *tro'r tant*: that the term draws attention to the significant use of the string which can be turned, but not necessarily to the actual inflecting of it. And indeed Caniad Tro Tant in the music text is unusual and distinctive in using B-flat as a constituent of its *cyweirdant* chords and not its *tyniad* chords. From this it would follow that if indeed Panton 56 should be taken as identifying *b-durum* with *tro'r tant*, then Panton 56 would be wrong. I think it is wrong; that the author is trying to identify the sense of *tro'r tant*

with what in reality 'dyrchafael y tant' indicated - the sharpening of a string from its usual and radical pitch. It would be an easy misinterpretation to make.

The conclusion that the *cyweiriau* system operated normally within one tuning on the *telyn* does not prohibit a strong relationship between it and tuning in general. If indeed the *cyweiriau* system was a system of chordal modulation, something so complex is not going to have been arrived at in any abstract and theoretical way, but only by playing music and experimenting with it on stringed instruments. It is bound to have been, in its early origins, absolutely bound up with tuning, but probably at a time before the *telyn* was used. The *cyweirdant/tyniad* system must have been evolved on an early instrument - probably an end-stopped lyre. It is to the tuning of early instruments - the *crwth*, the *timpan* and various forms of lyre - and not to the *telyn* that one must look in order to discover the full detail of the *cyweiriau*, and there is no immediate prospect of achieving this. Fortunately this is not a barrier to recovering the music in the Robert ap Huw manuscript.

A final point to be made is that the music produced by this literal interpretation exhibits a very great range of tonal contrast and diversity. The composers evidently enjoyed exploiting the very wide palette of harmony that was available to them, supporting melodic lines of various modalities and pitched at a wide range of heights. The breadth of the parameters that were available here was sufficient to develop a large repertory of really long pieces. We would do well to reflect on just how

much diversity was achievable through the very sophisticated use of all the potential of a simple, small, single-strung diatonic harp, without needing to resort to any gross retuning or any use of accidentals. In this respect the music really is a great credit to the inventiveness of the tradition that produced it.

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