THE ROBERT AP HUW MANUSCRIPT

AN EXPLORATION OF ITS POSSIBLE SOLUTIONS

5

METRE

PETER GREENHILL

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INTRODUCTION

A thorough investigation of metre is necessary in the attempt to recover the music, mainly because the tablature proper gives no immediate, direct indication of the duration of the notes. Whereas it is clear that the notes immediately damped by covering-fingering should normally be played as quickly as possible (else there would be no need for this method of damping), there is no direct indication in the tablature of the durations of most of the notes. The rhythmic notations which occur sporadically above the lines of tablature could be expected to easily supply the necessary information if they were accurate. But, very unfortunately for us, the notations do not have a consistent relationship with the segments of tablature which are below each of them, and so, as will be detailed, they have to dismissed as inaccurate.

We are, then, left with no simple and immediate symbol-system for the representation of note-values. It is true that a few pieces display such a great deal of regularity in their tablature texts that it is quite simple to add barring and to ascribe speculative time-signatures and note-values which 'work' musically. This approach would be justifiable if it could be demonstrated that note-values had been open to free performance interpretation in the living tradition, since this would explain why the tablature was never developed to include note-values. Certainly it is unusual that music should be recorded in the late sixteenth century in a form that lacked note-values.

But on the other hand it may have been that the musical idiom was so strict, so formalized and so established that the tablature was an entirely adequate guide to the traditional

performer. If we choose to presume that the tablature was inadequate then we can go no further than to present renditions of small parts of the text in the hope of grasping some impressions of what the music may have sounded like. This is unnecessary and unsatisfactory.

All the manifest evidence is for the existence of standardization in every dimension of the idiom, and especially in the area of metre as will be demonstrated. So it would be perverse to assume that there was no standardization of note-values and rhythm, and that these were not strictly determined by musical context. The tablature supplies the context, and we have every reason to suppose that the tablature was effective in transmitting everything necessary for the performance of a piece.

So it becomes necessary for us to establish all possible principles whereby the tablature could have supplied note-duration, and this entails discovering the precise details of the unique but standard metrical system employed, for it is the metre which supplies much of the context - the framework - within which note-durations existed.

The discovery of the metrical principles at work in the text is a complex and lengthly task because the metrical system had been developed to an extraordinarily intricate degree, but I hope that the length of the analysis presented here is justified by the incredibly wide-ranging ramifications of the system, for these reach far beyond the recovery of this particular music. The harmonic basis of this metrical system is not simply another example of the regional folk polyphony which has survived into modern times here and there in Europe - it is not polyphony, and it is not even closely related to polyphony. It is a sophisticated system of full vertical or perpendicular harmony,

which is fundamentally instrumental not vocal in nature.

If it had been that such a complex system had evolved and then lapsed in a geographical location which was remote from other areas of harmony development, then for us its direct significance would be limited to that place and to that period. But of course this system was used in an area which was at least adjacent to, and in some respects within, the main area of harmony development. Indeed it may have been that at some period *cerdd dant* had been central to the development of chordal harmony.

It is an uncomfortable situation that we have not inherited historical accounts of the relationships between *cerdd dant* and what has been taught as the 'mainstream' of Western European art music. Two important quotes illustrate the wider significance of this problem: Peter Crossley-Holland (1942, p. 162):-

> ... there was a developed system of homophony in existence in the Middle Ages, emphatically not engendered by polyphony, but the outcome of another system of music showing great creative maturity. A considerable modification of the text-book views of musical history - wherever they occur - is necessary.

and Gustave Reese (p. 391):-

> If the contents of the MS were as ancient as has been claimed, that fact would revolutionize both our notions concerning the development of music in medieval Europe and the general belief that the concept of harmony as a system governing musical combinations from the vertical standpoint did not make itself felt with any radically great strength until the seventeenth century.

Research on the MS. has, therefore, a tremendous responsibility that goes far beyond the resurrection of a regional music. The harmony and the metre of this music are crucial in coming to an understanding of the general history of music, and these aspects warrant great attention.

But, as ever in this work, the primary aim is to move towards the full recovery of the music, in this case by restoring to each part of the text its conceptual metrical context.

This entails relating each part of the text to a hierarchy of metrical units and locating the points at which a regularly recurring measured pulse occurs as the foundation of the hierarchy. The establishment of such pulses is of course a crucial step towards uncovering the information on rhythms which the tablature on the face of it lacks but which we need in order to perform the music. Together with Part 4 of this work: TECHNIQUE, this investigation of metre makes possible the precision about rhythms supplied in Parts 6 and 8.

The establishment of pulses can also contribute to the restoration of all the many abbreviated passages in the text, for truly the text is a heavily compressed transcription of the musical pieces and needs to be expanded. A guide to the exact sequencing of all the pieces' passages - the order of playing - that results is provided in the Appendix.

Much of the detail of phrasing which we so desperately need in order to interpret the music can be gleaned from considering the melodic content of the text (and vertical barring) in conjunction with measure.

As past contributors to the subject of metre have concentrated mainly on presenting the material on metre and discussing the very important issue of its provenance rather than investigating the metre of the music text, it is simplest in this account to refer directly to the primary sources, particularly the music text of the MS. itself, and not through a context of the literature of contributions. The bibliography provided at the end of this dissertation includes the main literature on metre.

Regarding past contributions, it is important at this point to clearly state that the metrical system does not simply consist of, within a piece, the alternation of merely two chords in set patterns, nor is it based on tonic-dominant harmony. The reality is very different.

Concerning the harmony, it should be understood that throughout this work the letter-symbols of the tablature are understood to represent not only strings but also note-pitches (all natural except B-flat for the rounded 'b' symbol). It is on this basis that such harmonic analysis as is necessary for the identification of metres has been performed. Harmonic analysis is not a direction discussed in detail here, however, since the task at hand is the examination of metre.

The first step is to examine the terms used for metrical concepts, prior to identifying the application of the concepts in the music text.

I. THE TERMINOLOGY OF METRE

The Hierarchy of Metrical Terms

There are three main expositions of the theory of metre, Peniarth 62: pp. 8-9, and two passages in Peniarth 147: p. 199 and p. 200, all printed in T. Gwynn Jones (1922, pp. 143-4):-

> Petwar mesur ar hugein y sydh ag yr pedwar ar
> hugein y gwnaethpwyt pedwar difr ar hugain, ag o
> dri achaws y gwnaethpwyt.
> 1. Cyntaf yw y wneuthur Cerdhi.
> 2. Yr Ail yw y adnabot Cerdhi.
> 3. Trydydh y gadw Cerdhae 'nghof.
> Pa ryw vesur yw gwydhor Titr ne drwsgwl?
> - Os Trwsgwl, rhaid yw bod 1111 Tyn. a OOOO
> cyweirdant.
>
> pa ryw dhifr y mae Gostec Ieuan ap y Gof
> yn dyuot ohoni?
> - o Vacamwn hir 11OO1111.
> A Gostec Dd dhu Athro ar Corfiniwr 1 *8*(?) hossigni.
> Beth ydyw y mesur, ai ar dhau, ai ar *dri*(?) y cytgenir.
> O dhau, o vn, y maer Caniad a elwir Pibae Morvydh
> o ba ryw vesur y mae'n dyvod?
> o Drwsgwl Bach ar y hen Vragod Gyweir or un difr
> caniad yw hwnw.
> Puroriaeth a elwir Ceinihogwerth yssydh yn dyuot
> o vesur a elwir Ysgwiri
> y Gwineu Llawen ysydh yn dyvod o dhifr Hatr Bach.

[There are 24 measures (i.e. in this particular canon) and from the 24 were made the 24 *difr*, and they (the *difr*) were made for three reasons:-

1. The first is to make pieces (*cerddi*).

2. The second is to recognize pieces.

3. The third is to keep pieces in memory.

What sort of measure is the rudiment Titr or Trwsgwl?

If it is Trwsgwl, it is necessary to have 1111 *tyniadau* and OOOO *cyweirdannau*.

From what *difr* does Gosteg Ieuan ap y Gof come from? - from Macymwn Hir 11OO1111. (This is the notation for Macymwn Byr)

And Gosteg Dafydd Ddu Athro? - from Corfiniwr 1(1OO1O11) *hossigni* (? notated).

What is a measure played together on two or on three? (? what is a piece composed of two or three measures?) - The *caniad* called Pibau Morfudd is of two and of one. From what measure is it *yn dyfod* (? divided)? - From Trwsgwl Bach on the old Bragod Gywair from the same *difr* that is a *caniad*.

Melody which is known as a penny's worth is divided from a measure called Ysgwirin y Gwineu Llawen which is divided from the *difr* Hatr Bach.]

Pa sawl gwaith y dyly cwlwm cydgerdd vod mewn
cwlwm ney ganiad? O bydd byr y mesyr dwywaith
ag o bydd hir y messyr pedair gwaith
heb mwy na llai
ag o bydd mwy na llai cam vesyr yw
wyth o dyniadau a chywir dane a safan bob un
yn y lle y gilydd heb na mwy na llai

[How many times should there be a *cwlwm cydgerdd* in a *cwlwm* (*ymryson*) or a *caniad*? - If the measure is short, twice. And if the measure is long, four times. And neither more nor less (than two or four times) else there is false/broken measure.

Eight *tyniadau* and *cyweirdannau* stand each one in place of its companion, neither more nor less.]

... ag velly y mae yn dangos vod mewn kwlm a

chaniad
gywair dannau
a thynniadau o honynt.
A rai sydd gedyrn
Rhai sydd weiniaid
1111 cyweirdant gwan a wna vn kadarn
ar vn modd am y tynniadau kedyrn
ac or rhai hynny i gwnair y pynkiau
ac or pynkiau i gwnair y messurau
ac or messurai i gwnair
y proffidiau gostegion, keinciau klymau a chaniadau.[1]

[... and so there are revealed to be, in a *cwlm* and a *caniad*, *cyweirdannau* and *tyniadau* of them (the twenty-four measures). And some are weak/minor; some are strong/major. Four minor *cyweirdannau* make one major one (i.e. one major *cyweirdant*), and in the same way with the minor *tyniadau*. And from these are made the *pynciau*. And from the *pynciau* are made the *mesurau*. And from the *mesurau* are made the *profiadau*, *gostegion*, *ceinciau*, *clymau* and *caniadau* (i.e. pieces of each compositional type).]

There are, then, several conceptual levels described here. Arranging them in descending order of size, they are:

1. The level of the *cerdd* (piece), at which the compositional types exist.
2. The level of the *mesur*/*difr*/*cwlwm cytgerdd*.
3. The level of the *pwnc*.
4. The level of the major *cyweirdannau*/*tyniadau*.
5. The level of the minor *cyweirdannau*/*tyniadau*.

But this is not the complete scheme of the hierarchy, since we know that in practice there was the section level inbetween 1. and 2., since a *cerdd* is made up of many

[1] Jones, pp. 143-4.

numbered sections, each of which in turn is made up of several cycles of measure. There seems to have been no proper term for 'section', which was usually made up of *cainc* and *diwedd*, and in practice '*cainc*', which properly refers to part of a section, was loosely used for this level. We may well suppose that there were other levels below 5., for rhythmic phenomena, note-duration etc., but we seem to have little if any vocabulary for such low levels. '*Acen*' is perhaps one such word.

The complete scheme can thus be represented:-

1. Piece level.

2. Section level. Usually a dozen or so sections to a piece.

3. Measure level. Often there are several cycles of these in each section. The same measure may be repeated, or different ones used consecutively - it appears that as many as four different measures could be used in a section. There is a tendency for successive sections of a piece to use the same measures in the same order. The standard was for a measure, or a concatenation of two or more different measures, to be used three times to make up a section (irrespective of how the section may have been divided between *cainc* and *diwedd*).

4. *Pwnc* level. It is not clear in what quantity these were used to form a measure. The only subdivision that we have at about

this level results from the 'punctuation' of the notations of measures, discussed below. It results in the suggestion that there would tend to be about four of these in a measure, but sometimes two, and often more than four. The passage:-

> wyth o dyniadau a chywir dane a safan bob un
> yn y lle y gilydd heb na mwy na llai

states that eight digits was an important grouping, so perhaps this was the length of the standard *pwnc*, in which case it would be common to have two *pynciau* to a measure.

5. The level of the major *cyweirdannau*/*tyniadau*. This is probably the level at which the notations of measures manifest as *cyweirdannau* and *tyniadau*, (in the most common notation as '1's and 'O's). It is convenient to call the latter the 'digit level', whether it is in fact the major or minor level. There tend most commonly to be four or eight of these digits in what is suggested to be a *pwnc*. The measure of 'Pwnc ar ol pob profiad' in the text is unclear, but it appears to contain more than four digits. If the length of a *pwnc* was variable, this would explain why the number of digits that it contains was not specified in the passage. Whatever about the *pwnc* level, we know exactly how many digits each measure contains, and 16 is the commonest number.

6. The level of the minor *cyweirdannau*/*tyniadau*. We know from the above contemporary account that there were four of these in the major level. But what were they? Much of this investigation of metre will concern itself with this question, and it will be concluded that they are regular pulses characteristically marked by successive chords played by the lower hand.

7. Possible further subdivisions of time. This level falls outside the scope of this

volume on metre, and is examined in detail in Part 6: RHYTHM.

Mesur

(L. mesura <mensura; ME. measure, mesour, mesure; OF. mesure). In a musical context this word is generally understood to have been used to describe 'music based on rhythmic modes or mensurations; proportion, ratio; also, from the medieval idea that both vertical intervals and chronological duration of notes were a matter of musical proportion, synonymous with music, especially with the rhythm, beat, or metre of music' (Carter, p. 267). It is clear from many of its notices in poetry below that the word carried these general meanings. Its use in these ways is clear evidence that measured proportion was an important aesthetic, in fact probably the paramount one.

But further, in the *cerdd dant* context '*mesur*' was used chiefly in a highly specific and technical sense to describe a set pattern of metrical units which were harmonically differentiated from one another. Properly, each of the many patterns or measures was named and notated (in two forms of metrical notation), and in this sense a measure was an abstract concept of musical theory, and was catalogued as such. Measure in general was also explained in relationship to other metrical concepts in theoretical exposition.

It is also evident that measure was the main level at which the metre of a piece was conceived, for the names of the measures are used in the catalogues of pieces to record their metrical characteristics. The metrical characteristics were less significant than the compositional characteristics: the measures of a piece (*cerdd*) are not always added after the title of a piece, whereas the compositional type always forms part of the title. Only where two pieces share the same title is the measure

included in the title to differentiate the two pieces. In this sense 'measure' is used in a practical, implemented sense.

Another technical use of the word, which was certainly closely related, was for the various metres of *cerdd dafod*. This makes it difficult to separate out notices in poems of the term used in a *cerdd dant* sense from those used in a *cerdd dafod* sense, so intertwined were the two arts. Here are the notices in poems which are most likely to relate to the *cerdd dant* senses. (The other sources for the use of measure will be examined in II.)

Maelor gerdd Bencerdd bynciau, -- uddedig
Ar ddidwyll vesurau;

Och, gwn byth, yn iach gân bur
A bid masw wybod mesur. Wiliam Cynwal

Claddwyd brig miwsig mesur,
Cleddyf cerdd, cael addef cur. Wiliam Cynwal

Gwyddai draw, gweiddi a drig,
Gadw mesur gyda miwsig. Wiliam Cynwal

Medrai 'rioed, mydrwr ydoedd,
Mwys ar air a mesur oedd. Wiliam Cynwal

Holl geinciau mesurau serch DG P.CXLIII

Coffr y brud wyd, cyff ir, brau,
Cost maes erw, cist mesurai. (see Miles p. 175)

Pob mesur difyr dwfwn
Nutmeg a sinsir a'r consinswm (Miles p. 533)

Am bob mesur ystyr wastad,
A phob celfydd newydd naddaid.

Ni ŵyr Owain arwain oriau -- y mesur
Na musig, na chlymau; (Miles p. 239)

Garw dôn a ŵyr gario dug,
Na ŵyr fesur ar fusig, Syr Robert Powel

Mesur pybyrwaith miwsig
Mwyn, clywais fry mewn clos frig. Huw Ceiriog

Cerddor wyd, cywirddewr iawn,
Cofiwr pob mesur cyfiawn, Huw Ceiriog

Y crwth lle bu'r mesur cry,
Carodd osod cerdd Iesu. Gruffudd Gryg

Adlais lon o dlos lannerch
Odlau a mesurau serch Dafydd ap Gwilym

Dywed pa fesur dwywaith
Y sydd ar awen o saith Rhys Goch Eryri

Torres braich twr Eos brig,
Torred mesur, troed musig; Dafydd ap Edmwnd

Rhif mesur glwys, pwys, heb hyn
Yw'r duwiolwaith ar delyn. Wiliam Llŷn

Ni wyr gerdd ddiwyr ddiwyd vessuraidd. Dafydd Benwyn

Difr

This unexplained term is peculiar to *cerdd dant*. It must certainly be related to 'division', and it appears from usage to have been very close in meaning to '*mesur*'. Probably the two were sometimes used interchangeably. '*Mesur*' was by far the more common term. There could be a difference in meaning, however, as in the passage quoted above from Peniarth 62. Here it appears that '*mesur*' is used in the abstract theoretical sense, and that '*divr*' is used in some implemented sense; either in the pieces titled '*kwlm divr ...*' or the *clymau cytgerdd* pieces, or it may be that these pieces were one and the same.

'*Difr*' is seldom used in expositions and there are very few notices in poems.

> Drud awdur di-rwd ydoedd,
> Diofer iawn i'r difr oedd. Wiliam Cynwal
>
> Dwys gwiw ddydd dysgodd iddynt,
> Da fu'r gŵr ar y difr gynt. Wiliam Cynwal

Pwnc

This term may be related to 'point, puncta', in the sense of a pricked note or a form of musical composition, but it is clear that it was used in the sense of a metrical unit that was a component of a *mesur*. On p. 56 of the MS. is a passage: *pwngk ar ol pob profiad*, which unfortunately does not lend itself to analysis in terms of metre, and so if a *pwnc* was of standard length then we do not have the measure of its length.

Notices of *pynciau* in poems make use of the word as a convenient partner to '*pencerdd*' in *cynghanedd gytsain*.

Mae eisiau pynciau pencerdd,
A gown ffwr, ac awen fferf. (Miles p. 213)

Prif geinciau pynciau y pencerdd -- mi a'i gwn,
Mi ganaf fy nghytgerdd; Robert ap Huw

Maelor gerdd Bencerdd bynciau, -- uddedig
Ar ddidwyll vesurau;

Croyw gywydd yn nydd a nos,
Croywach no phynciau'r Eos; Gruffudd Hiraethog

Pob prifgainc, i'r dalfainc dos.
Pwy'n croywi pynciau'r Eos? Lewis Môn

Da y cân, dieuog gerdd,
Diau bynciau dau bencerdd. Gruffudd Fychan

Mae'n ei chôb o'i mewn chwebys,
Ac y mae pwngc ymhob bys; Wiliam Llŷn

O untant i wythtant oedd,
Pan y caid, pynciau ydoedd; Wiliam Llŷn

Profiadau, caniadau
Rhyw bynciau cyfnewidiog; Edmwnd Prys

Cainc

In addition to its use as a compositional type, this term is used for a component of compositions (see Greenhill). In the case of some types of composition - certainly the *cwlm cytgerdd* - a *cainc* forms the entirety of a section of a piece, and so here the term is used in a metrical rather than a compositional sense. Some of the following notices may refer to its use in a metrical sense.

Cwympo i'w gwlad campau glân
Cainc o henwaed cun Cynan.

I chwarae dawns uwch oerwynt
Wrth y gainc a rotho gwynt. Gruffudd Hiraethog

Cerddor llawen gainc hirddydd,
Canu er difyrru'r dydd. Gruffudd Hiraethog

Ni chais droi, llais lluosog,
Man ar y gainc mwy no'r gog.

Aml o osgerdd melys-gainc
Aur-bibau cerdd ar bob cainc.

A thannau rhawn, waith iawn rhwydd
Ar eur-gloch gaingc yr Arglwydd.

Nid oes a wypo'n iaith
O gwybydd gaink nai gobaith. Iolo Goch

Cadarn ar bob cainc ydoedd,
Cof ar ddysg, cyfarwydd oedd. Wiliam Cynwal

Mae'n salach cainc ar fainc fawr,
Mae'n waeth cywydd mewn iaith cerddawr; Wiliam Cynwal

Bar gwlad o waith, briglwyd iôr,
Bongainc, ac athro Bangor. Wiliam Cynwal

Ar odde dringo'r oeddwn
Ergan cerdd ar geinciau hwm.

Pob gorffwysiad, caniad cainc,
Pupur hafgoed, pob prifgainc Wiliam Cynwal

Prif geinciau pynciau y pencerdd -- mi a'i gwn,
Mi ganaf fy nghytgerdd; Robert ap Huw

Pob caniad mad mydr angerdd,
Pob cainc o'r organ, pob cerdd, Dafydd ap Gwilym

Dysgais ryw baradwys gainc
â'r dwylo mau ar dâl mainc;
A'r dysgiad, diwygiad dyn,
Eurai dalm ar y delyn.
Llyma'r gainc ar y fainc fau
O blith oed yn blethiadau. Dafydd ap Gwilym

Ac erddigan gan y gainc
Garuaidd, medd gwŷr ieuainc. Dafydd ap Gwilym

Gwiw loywglaer ddyn golygon,
Ac yn cael canu'r gainc hon. Dafydd ap Gwilym

Cathl wynfyd coeth lawenferch,
Canghenddring, cain(c) sawdring serch.

Holl geinciau mesurau serch

Nid oes erddigan gan gainc,
Gwir yw, lle bo gwŷr ieuainc, Iolo Goch

Dysgodd gainc ar y fainc fer:
'Pleidiodd Ifan y pader'. (Miles p. 155)

Gofyn a wnae gefn y nos,
Gan kowydd gan gaingk eos Guto'r Glyn

Ef a ŵyr profiad fal ei bader,
Profiadau, ceinciau Wiliam Cwncwer. Lewis Glyn Cothi

Os Ieuan a gân y gainc,
Llawen fydd y llu ieuainc. Guto'r Glyn

Llais mwyn glangais mewn glyngoed,
Cainc hydd cwn, cân cywydd coed. Edward Maelor

Pob prifgainc, i'r dalfainc dos.
Pwy'n croywi pynciau'r eos? Lewis Môn

II. FORMS OF METRICAL NOTATION

There are two forms in which the measures are notated: numbers and letters, as:-

1 1 O O 1 O 1 1 1 1 O O 1 O 1 1

and

K K T T K T K K K K T T K T K K

where K stands for one *cyweirdant*, and T stands for one *tyniad*.

The first of these notations is by far the most commonly used, and is the only one used in the music text. It is sometimes referred to now as the 'binary' or 'digital' notation because of its appearance, and I will use this form of metrical notation as a standard. In this form of notation alone, each particular measure has properly two styles of notation, depending on whether the measure is notated for the *telyn* or the *crwth* (there are no metrical notations extant for the *timpan*). The above quotes are of the measure *korffiniwr* as expressed for the *telyn*. Expressed for the *crwth* this measure is, in the 'digital' notation:-

O O 1 1 O 1 O O O O 1 1 O 1 O O

which is to say each unit is substituted by the contrasting symbol: 1 and O are exchanged throughout. I will use the *telyn* style as standard when expressing the pattern of a measure. The Peniarth 62 passage quoted above quotes the measure *trwsgwl*, which is apparently the first half of *trwsgwl mawr*, in *crwth* notation; and from this it appears that a *cyweirdant* remained the term used for a '1' in *telyn* notation and a 'O' in *crwth* notation. This conflicts with the enigmatic statement in Peniarth 155:76 etc. that a *tyniad* in the roll of the *crythor* is a *cyweirdant* in the roll of a *telynior*. In the section on the *cwlm cytgerdd* form in Part 7: REPERTORY, it is concluded that the

symbols are exchanged but not the terms.

The digital form of notation is often 'punctuated' by the insertion of period marks: '.' or colons: ':' or closing brackets: ')'. The first two are interchangeable and are clearly used as punctuation marks, the last may have a parenthetic quality and possibly the parts enclosed by it may be optional or constitute addenda. All three are used inconsistently, but it is clear from a close study of their use that they are an optional sophistication of the basic notation to indicate the subdivision of a measure into metrically significant components, which are probably the *pynciau* noticed above.

Examples of all three may be found on p. 107 of the MS. There are also insignificant variants of these marks, such as a slash, and a column of three dots, as on p. 109.

Both forms of notation are used mainly in conjunction with the titles of measures or pieces, providing entire quotes of a measure. But the first of them - the digital notation - is used in conjunction with the music text to indicate individual *cyweirdannau* and *tyniadau* and small groups of them. The locations of these are: 61.6; 62.1-3,5,6; 63.1-5, 64.6; 89.2-5; 97.3-4. They constitute a distinct system, separate from the system of rhythmic notation discussed below, and the two must not be confused despite the fact that both occupy the top rows of lines.

Elsewhere in the music text, the digital notation is used to provide the entire pattern of measures. There are isolated examples at 15.1; 66.6; 69.3; 99.2. There is a systematic run at 30.4 - 34.5. At 23.1-28.2 there is another systematic run which in fact does not relate to the text it accompanies. This is an important point not only for interpretation but also for the provenance of the music, since it casts doubt on the depth of

Robert's experience of the music.

It is a major area of contradiction of the internal logic of the bulk of the text. Here are both the names and the digital notations of three-quarters of the measures as listed by Robert p. 107 and as listed in Peniarth 62:20 in the hand of Sir Thomas Wiliems, Trefriw, - an earlier MS. Of Robert's two lists, that on p. 107 bears the closest resemblance to Peniarth 62:20.

The problem here is that the names and digital notations pp. 23-28 do not match the tablature that they accompany - somebody has misidentified the *ceinciau* intabulated as measures. One would not expect the original author to have made such a fundamental error of principle - the person responsible must have been unfamiliar with what had been intabulated here and he must have also been uninformed as to the basis of the theory of the music.

Although these mistakes have remained uncorrected, their author must have realised that something was wrong because he checked himself on p. 28 and did not complete the last quarter of the operation, no doubt prompted by the pre-existence of a note on p. 28, which contradicted what he was engaged upon. Presumably the editor here was Robert, not a predecessor. It was certainly someone working from a source related to the other lists of measures mentioned above, as all three lists are in the same order. The original author of the text had been working, pp. 32-34, from a very different list - his measures are ordered entirely differently within the list. Despite this, very interestingly, his list more closely resembles Pen. 62:20 in the actual structure of the measures themselves than do either the pp. 23-28 additions or the p. 107 list.

For example:- in Peniarth 62:20 *corditulach* is given as: 1OO11OOO1OO111;

p. 25 addition: *kordia tytlach* lacks the last O above;

p. 107: *kor dia tutlach* lacks the first O and adds an extra 1 at the end;

whereas p. 33 *korditutlach* is identical to Peniarth 62:20 in its digital notation.

The pp. 32-34 list presents itself as a usefully standard set of measures to adopt as a canon, because it is successfully interwoven with the music text and because it receives considerable corroboration from various other sources. For example, currently, in total, 26 sources supply the same notation for *korditutlach* as does p. 33; only four supply other notations, of which only one agrees with p. 107 and none with p. 25.

However, we also need to keep account of a great number of other measures, for the reality of the situation is that there is a vast corpus of manuscript material on measures and their notations.[2] It would be a huge task of textual criticism to attempt to derive the substance of traditions of measures, so large and divergent are the sources, but it is probably helpful here to give a brief overview of the situation.

It appears that composers did not feel restricted to any particular canon of measures, with the result that the number in existence was continually growing. The catalogues that contain smaller numbers of them may have focussed on those that came into

[2] Some typescripts of these were printed in T. Gwyn Jones, pp. 143-153. A very much wider range was collected and collated by Miles, pp. 580-609, including the evolving of stemmata for them. Even this huge collection is not definitive apparently, as I am informed that Peter Crossley-Holland, Bethan Miles and Daniel Huws are currently assembling a catalogue of more manuscripts relating to measures.

use early, and probably it took many centuries of accretion before the repertory of measures reached the maturity and complexity shown by our sources. The very substantial direct and inferential evidence for this is discussed in detail in Part 1: METHODOLOGY AND PROVENANCE.

Concerning the origins of measures, in the main canon of 24 measures there may indeed, as is expressed in the traditional 'historical' accounts, have been a non-Welsh ingredient in their provenance. In the context of all the evidence of cultural links between Wales and Ireland, we should expect that in the passage in Peniarth 62:

Llyma eu henweu hwynt yn iaith Iwerdhon yr amser hwnnw

and in that in Peniarth 147:198:

Val y mae y henway rag llaw yn y jaith werddonig

that by the language of Ireland was meant Old Norse, not Irish. Note particularly that it was with Dublin that there was most contact, and that 'Gwyddelig' was a term commonly used to describe all Norsemen.

Indeed a casual inspection reveals a Norse dimension to the naming of some of the measures. *Karsi* is an Old Norse personal name. *Hattr*, *hattur*, *hattar*, *hættir*, as in the measure 'Hattur Bach' (also spelt hatr, hattyr, hittr, etc.), is Old Norse for 'manner', 'way', 'form', but in a more specialized sense for 'poetic form', measure, metre'. *Teitr* is Old Norse for 'glad', 'cheerful', 'merry' and may well be the origin of the metre 'Tityr Bach' (also spelt teitr, titr, tuttyr, tyttyr, tvtyr, titer, etc.). *Rynat*, to talk, to converse, to pry into, may connect with 'Rhiniart'; and *alvara*, seriousness or affection, with 'Alfarch'. Other Old Norse words may form elements of

several measures: *maki*, a match; *muna*, to remember, *vinn* / *vann*, to work, to labour; *korr* (Norn), to sing low to children. The meanings of all these words have relevance to metre and music, so it looks as if a proper scholarly investigation would pay dividends. Outside this canon, one measure is dedicated to a Henrhi Gefynrhudd who is credited with having been in Ireland, alongside Karsi Wyddel.

It is a useful fact that it is only outside the canon of 24 measures that the names occur of musicians and *athrawon* who can be traced as understood to post-date the 11th/12th century, so the detail of measure nomenclature is consistent with the traditional history.

To sum up, the entire corpus of material on measure appears to include an early 'snapshot' inventory (of 24 measures) and a large subsequent accumulation. Yet the evidence is that many of the 24 were seldom used in composition, so the 'snapshot' may not, originally, have reflected actual usage but an attempt to encourage more adventurous usage. Whatever be the provenance of individual measures, it is necessary for us here to take account of all of them in focussing on actual practice in its relationship to the pieces in the text.

III. CONTENDERS FOR THE INDICATION OF THE METRICAL FOOT

In order to attempt a reconstruction of the music, it is necessary to gain an understanding of the metrical system employed in the composition of the music. Much has been published concerning the concept of measure, but this has mainly focussed on its vertical or harmonic dimension, not on its linear, metrical significance. No clear picture has yet emerged of fundamental issues such as: how long was a digital component of the measures, were these 'digits' all of equal length, what could they contain, what was the significance of the measures, how do they relate to metre in other music, and what was their origin.

The most important unresolved issue here for the practical reconstruction of the music is the identification of metrical feet, by which I mean relatively short metrical units based on accentual stress - some form of musical pulse.

In theory there would be three potential possibilities for identifying metrical feet in the text:

1) the rhythmic notation

2) the vertical 'barring' written in the text.

3)'pulses' inferred from characteristics of the text which by repetition may imply periodicity, such as written chords in the lower part.

As these three seldom coincide it is possible to treat them as separate potential indicators of metrical feet, and I will briefly discuss each of them in turn.

Rhythmic notation

The system of rhythmic notation, sometimes called the 'fencing', offers the promise of being a potential significator not only of rhythm but also of metre, in that it should be possible to group together the symbols of the notation to form metrical feet.

The system makes its first appearance on p. 56 and is used sporadically thereafter. Commentators have not attempted to demonstrate its authenticity and integrity as part of the tablature, but have accepted it as a potential guide - albeit a poor one - to the rhythm and metre of the music. I hold that this has not only been unwise, but that this has been a mistake, and that an inevitable *impasse* in interpretation has resulted. I conclude that the rhythmic notation is not an integral part of the source tablature, nor does it even constitute a conflation of competent material and knowledge, but that it actually constitutes contamination of the substance of the musical tradition.

This is a crucially important issue; not only for interpretation but also for our understanding of the provenance of the music. Accordingly I will go into the details of the issue.

This feature, like the measures pp. 23-28 described above (p. 22), constitutes a major area of anomaly and contradiction of the internal logic of the bulk of the text. Most aspects of the tablature are applied throughout the text in an apparently very coherent and consistent way, as analysis of repetitions and variations reveals. One small exception to this is the spasmodic and quite rare distribution of short digital notations discussed above (p. 22). These are perhaps circumspect - they may have been

subsequent, uninformed additions.

But the fencing (56.1 sporadically to 101.1) is in a different category, because it is not the application of a system which appears elsewhere in related material, unlike the digital notations. Like the basis of the (Gregorian) tablature itself it is a borrowing from outside the vernacular tradition. I think that it represents a second layer - a naive attempt at interpretation of rhythm, on the part of Robert, in order to provide what he must have felt, quite reasonably, the original tablature lacked.

I have concluded this mainly on the basis of an analysis of the distribution of the fencing, but first I will make some general comments.

The fencing creates a general impression of what I can best describe as scrappiness to the eye, unlike the meticulous neatness and consistency of the tablature proper. For example, the last 6 columns of 56.3 where the fencing is misaligned with the tablature. Also illustrated here is evidence of hesitancy - the three columns of fencing adjacent to the last column of fencing (above 56.3.21-22) have incomplete horizontal bars below the complete ones. On the same line, the fencing to the top left of 'bis' (at 56.3.11-12) is an example of quick or light writing. This is all in contrast to the firmness and confidence of the tablature script proper.

Also some of the fencing, perhaps all of it, was squeezed in. The fencing often touches the horizontal ruled lines above, that separate the lines of tablature from one another (e.g. 57.2). In one case (90.6) the fencing overwrites the horizontal line above it. Note that in 60.2, where the tablature invades the ruled line below it, the line has been scratched out and

'detoured' to avoid an overwrite (at 60.2.7).

These observations lead to the hypothesis that the availability of space in the original graphic layout determined the distribution of subsequent fencing; that the fencing is sporadic simply because there was not room for it to be continuous. This is what we should expect if the rhythmic notation was indeed squeezed in, as an afterthought, to an existing graphic layout which initially was spatially successful and economic. This is testable, and here is an analysis of the distribution.

Firstly, I will state that it is not possible to predict from the internal substance of the tablature proper whether a particular piece or passage will carry fencing or not. What then can its occurrence be associated with?

There are 70 pages which contain 6 or less lines of text, and of these 18 contain fencing. There are 16 pages which contain 7 or more lines of text, and of these none contain fencing. This strong association yields two possibilities:-

1) the decision to fence segments determined the no. of lines of text on a page, in which case the reason for the decision to fence so sporadically would remain obscure.

2) the no. of lines of text on a page determined the decision to fence, which would establish that the fencing was a subsequent layer. Indeed it can be demonstrated that this was so, by analysis of the positioning of the fencing within each line, column by column.

The total no. of fenced columns is 538. Of these, 508 consist of 3 or less symbols in the upper part, such as ``

d.

c.

and the remaining 30 consist of 4 or more symbols, such as ``
d.
d.
c.
The ratio here is 16.9:1 .

The total no. of unfenced columns in these same lines is 215. Of these 171 consist of 3 or less symbols, and the remaining 44 consist of 4 or more symbols. The ratio here is 3.9:1 .

This is to say that, in a line which contains fencing, it is more than four times more probable that the fencing will occur above a column of tablature with 3 or less symbols, that is, where there was ample room for it to be subsequently inserted. The magnitude of this association, given the considerable population size is conclusive: the Chi square test of association gives χ^2 = 36.76, which is significant at the 1% level.

I also conclude that it was Robert who made the insertions - if it had been a predecessor then Robert would of course have been tempted to enlarge the layout because those fences that do occur above 4 or more symbols are often very cramped (e.g. 90.6.7, 94.5.13).

Furthermore, I suspect that Robert was a naive interpreter of the rhythm. There is a lack of consistency in the way in which the fencing is applied. An example of this is at 56.3 where the phrase 56.3.7-12 is echoed in the tablature 56.3.13-18, but the fencing is different. This cannot be explained by interpreting that the fencing was of the relative type, because the fencing at the beginning of both phrases is identical, suggesting the fencing was intended to be of the absolute type. Also, very significantly, the fencing can appear to contradict the concept of measure as implemented in the text.

This is not, on its own, conclusive evidence that Robert was

naive because it may have been the fencing symbol system that he did not understand, rather than the tablature system. But when taken in conjunction with the uncorrected mistakes concerning the measures inserted pp. 23-28 outlined before (at pp. 22-3), and frequent miscellaneous contradictions to the internal logic of the tablature which were undetected by him (particularly the registration errors of lower part against upper), it does not seem credible that he had an informed understanding of the material he was dealing with.

This of course has significant methodological repercussions, and a strong bearing on our understanding of the historical context. The significance for the examination of metre here is that it is necessary to disregard the rhythmic notation, and instead to give priority to the concept of measure as implemented in the text.

Vertical barring

The vertical barring in the text really draws the eye to it at first because it promises to provide the kind of information that we so desperately need in respect of metre and phrasing. But the problem is that it is used inconsistently. There are many pairs of similar and identical passages written out in full in the text, but often the barring does not correspond: e.g. 93.2.10 to 93.3.9 is duplicated at 88.4. The differences in barring are that in 88 the passage is preceded by a bar-line, in 93 it is not, and in 93 the 3rd column of the passage has a long bar-line, in 88 it does not.

It would be very helpful to us if the barring neatly delimited each digital component of the measures, but it does not do this: e.g. 67.4: the first bar-line occurs after the third digital unit.

Even a long bar-line is not immune from vanishing: e.g. the long one 93.2 has vanished at 96.3.

It may have been that the barring was, like the fencing, added by Robert on his own initiative and perhaps naively. But it is my experience that there is meaningful significance to the presence of a bar-line: i.e. most of the inconsistencies are apparently errors of omission, not of transposition or addition. I think that in using bar-lines as some form of guide to metrical feet, one would only be making a mistake by attaching significance to the absence of a bar-line.

So although we can gain some insight into metrical feet from the barring, it is too haphazard in its implementation to constitute an absolute indicator.

Inferred 'pulses'

What then, if instead of relying on the barring, we assign metrical feet to each written chord in the lower part? Will this not give us the firm metrical basis we need for reconstruction?

In my view the written bass chords option presents problems which are insuperable. As will become apparent in the following investigation of measure, the number of these in each section of a piece can be very variable. A simple example is provided by 29.1, - *cainc* V and *cainc* VI of Cwlwm Makmwn Byr. Here where we have two written chords to each digital unit of the measure, where elsewhere the *ceinciau* are made from one written chord, it would be necessary to expand these *ceinciau* to twice the length of the other twenty-two *ceinciau*. Whilst possible, this is uncomfortable from the point of balance. It would be easier to accept were they the first or last two *ceinciau* of the piece, but even then a change of metre would threaten to upset the co-ordination of any accompanying activity (it is argued elsewhere these pieces were used to accompany vocal delivery), and it would create difficulty for anyone scanning the piece by measure (which certainly was done).

In this example the metre would be doubled in these sections from a count of 8 to a count of 16. At least 16 is a round and even number, but there are often examples where the result would not be this simple. In 15.1 and 15.2 for example there are 31 written bass chords to the measure of 16 digits. One modern writer has actually transcribed this as 31 crotchets. Now I suppose a 31-beat cycle is possible, as the pattern does remain constant throughout the piece. But in Kaniad Tro Tant, where a 14-digit measure contains 31 written bass chords for its first 12

sections, in the 13th it contains about 34.

Now such a metrical arrangement, apart from being bizarre, would render the measures meaningless. Knowing the measure of a piece would be of no help whatsoever to either performer or auditor; if the digits were of variable lengths according to no system, in fact idiosyncratic, it would not have been possible for anyone to identify where the digits begin or end. Yet the importance that was laid on knowing these measures cannot be emphasized too strongly: they were central to composition, performance and auditing.

IV. THE IDENTIFICATION OF DIGITS

The remaining contender for the identification of metrical feet is the *cyweirdant/tyniad* system of the measures - the 1's and O's of the main form of notation. These components are referred to here as 'digits' since the original vocabulary seems to lack a single term to describe them.

These digits must be expected to provide the metrical feet we need to reconstruct the music, not only because we have ruled out the other contenders, but because of the enormous emphasis that was placed upon them in the tradition. To clarify this approach, let us explore a simple example of the significance of digits by taking them as the indicators of metrical feet.

Taking again the last example discussed (on p. 34): 15.1 and 15.2, it would be then that the last digit (15.2.7) would rank equal to all the other digits, occupying about the same length as each of the other digits. So if one wrote the other chords as crotchets, this last chord would need to be written as a minim. This would be comfortable as a close of the cycle. Thus a 16-digit measure would occupy 32 pulses. If a listener or student knew the measure then he would be able to predict or anticipate the beginning of the next cycle. It would become possible to use the measure as a co-ordinating factor. Thus the expressed significance of the measures would be accounted for in musical terms.

Now taking this option is methodologically sound because you are ascribing a consistent meaning to a symbol (in this case a digit) rather than treating it as flexible in meaning. If one thought a particular symbol had many meanings, one would need to explain how it is that several different symbols were not devised to cover the different meanings.

So let us now turn to the initial problems that this option appears to present. The measures of some of the pieces in the text are given, either in the MS. or elsewhere, but it has never been discovered exactly how the system of measure was applied and implemented in the composition of these pieces. For some of the pieces, especially the *clymau cytgerdd*, there is an immediately apparent correspondence between the digits of the relevant measures and the nature of the chords contained in some columns of text; and contributors such as Ellis (1991, pp. 18-26) have particularly focussed on the *clymau cytgerdd* to illustrate measure. However, for many of the other pieces the connection between measure and text is not immediately apparent but complex or even obscure, and there has been no published attempt at a thorough reconciliation.

Furthermore, there are many pieces in the text for which the measures are not given in any sources that have so far been collated or typescripted, although ascriptions of measures to these pieces have been published, the greatest number of them by Polin (1982, pp. 85-9).

For both classes of piece, amongst contributors' ascriptions of measures there has been little consensus and little explanation of the methods used to derive these ascriptions.

It would seem that the great difficulty here has been that many pieces do not present an immediate and strong impression of any known measure being used consistently throughout them. Despite this, the detailed analysis of those pieces for which the measures are known, which could expand our understanding of the concept of measure, has not been undertaken. The great obstacle here

will have been the apparent irregularity of metre in many pieces, and the solution entails a close examination of every piece. This needs to be done by taking the pieces not in order of appearance in the text but in order of metrical complexity.

The problem of apparent irregularity of metre

When one casually compares the text to the measures as illustrated in their 'digital' notations and as explained in related treatises, the text appears in the main to be metrically irregular. Yet the treatises tell us that it was important to strictly observe the measures, so it seems that this apparent irregularity of metre is a problem which needs to be resolved.

I propose to illustrate the problem and its resolution with reference to primarily one piece which is drawn from the group of pieces in the MS. for which we have, on the face of it, no firm information regarding measure. In order to do this, I shall draw on what can be gleaned about the practical implementation of the concept of measure, as illustrated in those pieces for which we do have information about measure. For from the study of such pieces it is possible to deduce a series of clear principles for composition according to measure.

The piece is Kaniad Kynrhig Benkerdd (pp. 46-50). From its title as given in the MS., we do not know from any source what measure or measures, if any, this piece is based upon. The structure of the piece is, beginning with section I (46.4 and 46.5) up to the words "bis dechre", (the beginning twice) at 46.5.5; so repeat the beginning of this section which is up to, I can say from experience, the scroll mark at 46.4.18, then continue with the remainder of 46.5 - the 'diwedd' (ending). This pattern continues unchanged usually for the remaining 11 sections.

For the lower hand, the piece is based on the chords:

(f|)		(e|)
c|	and	c|
a|		g|
ff		dd/cc

The f| and e| are introduced at 47.3, and what was dd is replaced by cc at 49.1. From experience I hold that the dd is an interesting copyist's error, and should be read as cc.

Also from experience I hold that the first chord above would be harmonically classified as a *cyweirdant* chord, and the second as a *tyniad* one. This is not to say that the chords actually constitute in themselves *cyweirdannau* and *tyniadau*, just that they can be classified as belonging to the one or the other harmonic group.

Here is the scheme of each section, using 1 for the first chord and O for the second:-

		total
I	1O11O1OO11OO11O1O111O11O1OO11OO1O1O1O11	39
II	1O11O1OO11OO11O1O111O11O1OO11OO1O1O1O11	39
III	1O1O11O1O1OO1O11O1OO11O1O111O1O11O1O1OO1O11O1OO1O1O1O11	55
IV	1O1O11O1O1OO1O11O1OO11O1O111O1O11O1O1OO1O11O1OO1O1O1O11	55
V	1O1O11OO1O1OO1O11O1OO11O1O111O1O11OO1O1OO1O11O1OO1O1O1O11	57
VI	1O1O11O1O1OO1O11O1OO11O1O111O1O11O1O1OO1O11O1OO1O1O1O11	55
VII	1O1O11O1O1OO1O11O1OO11O1O111O1O11O1O1OO1O11O1OO1O1O1O11	55
VIII	1O1O11OO1O1OO1O11O1OO11O1O111O1O11OO1O1OO1O11O1OO1O1O1O11	57
IX	11O1O11OO1O1OO1O11O1OO11O1O1111O1O11OO1O1OO1O11O1OO1O1O1O11	59
X	11O1O11OO1O1OO1O11O1OO11O1O1111O1O11OO1O1OO1O11O1OO1O1O1O11	59
XI	11O1O11OO1O1OO1O11O1OO11O1O1111O1O11OO1O1OO1O11O1OO1O1O1O11	59
XII	1111O1O111O11111111O1O111O11O1O1O1O11	38

This is a metrist's nightmare, partly because these sequences of digits are not random - there clearly are faint patterns and echoes here and there. But this is not the kind of

regularity that is implied by the measures. (See in particular the list of these in the MS. itself from 32.4 to 34.5.) For example, if the digital notation refers to a chord in the sense that a digit actually corresponds to a written chord, then this piece is clearly not based on any measures. This raises two problems: a) what then are the measures referring to? and b) what is the reader to do in order to ascribe metrical units to this piece?

There certainly are fundamental problems here, and it is necessary to examine the implementation of measure in the music text in far greater detail. It is essential to proceed by addressing parts of the text in order of complexity, starting with the simplest parts like the *clymau cytgerdd* and moving towards the more complex problems such as Kaniad Kynrhig Benkerdd, all the while learning more about the relationship of measure to the text so that the most complex parts can be unravelled.

Whatever the precise function of these pieces in performance, they provide a clear illustration of the relationship between measure and text in a way which has been clear to all commentators. Several principles emerge.

Firstly, in general the I digits employ different strings from the O digits. Despite the many alternative views on the appropriate tuning for these pieces, we can say that this will be because to some extent the different strings sound different notes, since no commentator has suggested that the strings were tuned in such a way that a continuous drone results, this no doubt because there would be little point in shifting the strings plucked. On the scheme adopted in this work (see Part 3: TUNING) the notes involved are clear, and from these pieces we have examples of the harmonic relationships between *cyweirdant* and *tyniad*. For the purpose of this examination of metre, the important point is that the two are harmonically differentiated from one another, and so elsewhere in the text we can look for groupings of segments of text that are similarly differentiated (as we already have tried for Kaniad Kynrhig Benkerdd).

Stating the principle conservatively, we can say:

Principle: a digit indicates something about the harmonic nature of a written chord.

The second principle can be gleaned from the majority of sections of each of these pieces. For example Kwlwm Makmwn Byr (28.5 to 30.4). In 30.4 the chords:

e|	e|	f|	f|	e|	e|	e|	e|
c|	c|	d|	d|	c|	c|	c|	c|
g|	g|	b|	b|	g|	g|	g|	g|

are clearly in the same sequence as the digits:

1	1	O	O	1	1	1	1

at the end of the line.

Principle: a digit can correspond to one written chord.

Continuing with what is displayed by this piece, in the section marked V beginning 29.1 and ending 29.2, the part of this measure represented by O O clearly corresponds to the section

d| d| d| d|
b| c| b| c|

Principle: a digit can correspond to two written chords, i.e. to a metrical unit with some substantial horizontal/linear length to it.

Principle: a digit can correspond to a varying number of written chords within the same piece.

Note here that whereas the d| is harmonically consistent with the chords
b|
occupying the O position in other sections, which are usually f|, the d| is <u>not</u>
d| c|
b|
harmonically consistent.

Principle: the metrical unit that corresponds to a digit should begin with a chord which is harmonically related to the nature of the specific digit.

Principle: the metrical unit can contain a subsequent modification of the harmony indicated by the specific digit.

These clear principles are well sufficient for us to move out from the *clymau cytgerdd* and make some substantial inroads

into the *gostegion* and the *caniadau*. In particular, the principle that a digit can correspond to two written chords applies to ostinato figures which are widespread in the *gostegion* and the *caniadau*.

But it will be clear from the principles established above that it is not possible to simply take a section of text and immediately declare its measure from studying its chord changes. The principles allow for too much latitude in the application of measure. How can we know when it is one chord that corresponds to a digit and when it is two? How can we tell when a chord change signals the beginning of the next digit and when it is merely a modification within a digit? It will be obvious from these uncertainties that we have to disregard the ascriptions of digits by previous commentators where they have ignored the range of alternatives presented by these principles. We would also do well to ignore any declaration of a piece as irregular or as not based on any measure.

The way forwards from the *clymau cytgerdd* has to be to continue to use all the information about the measures used by particular pieces, to find out how often and in what circumstances the principles are used in the *gostegion* and the *caniadau*, and what other principles may be used.

The other allocated pieces

For most of the *gosteg* and the *caniad* pieces, measures are allocated. We are informed which measures are used, usually by name and sometimes by digital notation. However, as with the *clymau cytgerdd*, the specific digits are not allocated to the text so it is necessary to undertake this task.

The sources for the allocations are principally the music text of the MS. and the large catalogues of pieces in other MSS. Collations and printed texts of most of these are in Miles. My opinion of the catalogues is that they originate at least partly within the musical tradition and that they are not wholly the product of retrospective antiquarian reconstruction, and that we can have some confidence in their allocations (at least where their allocations display confidence).

The following table summarises the allocations. I give the spellings of measures as used in the MS. pp. 23-34 rather than those of the sources. Closely related titles with information on measure which may be significant are given in square brackets. '---' denotes no information.

gosteg dafydd athro	korffiniwr (MS p. 17; Peniarth 62, p. 8; Gwysaney 28:68)
gosteg yr halen	---
yr osteg fawr	macmwn byr (Peniarth 62, p. 8; Gwysaney 28:68)
gosteg lwyteg	---
kaniad y gwyn bibydd	tityr bach (Panton 56:62; Panton 56:55)
kaniad ystafell	korffiniwr (Panton 56:56; Panton 56:78)

kaniad kydwgan	---
kaniad bach ar y go gower	korffiniwr and tityr (Panton 56:64); korffiniwr and tityr bach (Panton 56:55); korffiniwr (Gwysaney 28:68)
kaniad kynrhrig benkerdd	--- [but 'can. Cyn. Barnad Cynwrig bencerdd 12 k. corffiniwr' (Panton 6:55); 'caniad k. Mar. Cynf. Ben o waith Rhys B. Corff.' (Panton 56:62)]
kaniad llywelyn ap ifan ...	--- [but 'Mar. Lln. ap Ieuan ap y Gof Trwsgl Mr. neu Tr. bach' (Panton 56:64); 'kaniad barnad llwelyn ap y ifan ap y go A mesvr hwn yw tityr bach' (Gwysaney 28:67v); 'can. mar. Lln ap Ieuan ap y gof Trwsgl' (Panton 56:55); 'Marw. Lln. Trwscl' (Panton 56:75); 'C. Mar. Lln. ap Ieuan ap Gof Trwsgl' (Panton 56:78)]
kaniad suwsana	trwsgwl and macmwn byr (Panton 56:55); 'Cwest y 6 cyntaf a Thr.yr ail M. yr 8 a 9. Trwsgl ac yn ddau ddiwethaf Macymwn byrr.' (Panton 56:63)
kaniad y wefl	fflamgwr gwrgan (Panton 56:63; Panton 56:55) + notation (MS p. 66)
kaniad tro tant	korfinfaen (MS p. 69)
kaniad san silin	---

kaniad marwnad ifan y go	trwsgwl mawr or tityr bach (Panton 56:64); trwsgwl (Panton 56:55; Panton 56:78)
y kaniad krych ...	---
kaniad hun wenllian	trwsgwl (Panton 56:55; Panton 56:75; Panton 56:78); '2 y 6. y 9. ar deg y pedwar o'r mesur disgwili y tynniadau' (Panton 56:63); sporadic notation 89.2-5.
kaniad pibau morfydd	trwsgl mawr (Panton 56:55); trwsgwl mawr or trwsgl bach '... or un difr caniad yw hwnw.' (Peniarth 62, p. 8); 'drw fydd II ni bydd' (Panton 56:63)
kaniad llywelyn dylynior	makmwn byr and hatur (Panton 56:55) + ' y ddau mar un ar y pump' (Panton 56:62); sporadic notation 97.3-4, 99.2. [also 'C. Lln. moel delynior corffiniwr' (Panton 56:78)]

For several of the pieces to which measures are allocated, it is a simple operation to allocate the digits to the music text using the principles already established. Henceforth all allocations will be marked on the copies of the pieces in the appendix, and the remainder of this chapter should be read in conjunction with those. The first column of a digit is marked by a '1' or a 'O' immediately above, according to whether the digit is classified as *cyweirdant* or *tyniad*. Portions of text to which digits are not firmly allocated are left blank, but in most cases speculative allocations can be made. These portions tend to be

unaddressable with formulas.

Gosteg Dafydd Athro:- *korffiniwr* as given at the foot of p. 17, with three cycles to each section. Note that 15.2.7, although just a single column, constitutes the final '1' digit of the measure whereas the preceding digits are represented by two columns in the lower part. Note also that in sections II-VI the sixth digit, which usually yields an initial B-D chord in the lower part, is written as a C-C chord; i.e. a '1' has been substituted for a 'O', and in sections II-III a 'O' has been substituted for a '1' in the seventh and eighth digits of the first cycle. Here the need to repeat melodic figures has taken precedence over maintaining the integrity of the measure. This causes us to formulate another principle:

Principle: occasionally an established measure can be modified, without altering the length of the measure.

Such modified digits are marked in parentheses on the appended copy of the text.

Yr Osteg Fawr:- *mak mwn byr* throughout, with three cycles to each section. Here it is clear that two chords in the lower part constitute a digit, and that generally the second chord of each pair is a repeat of the first. At 20.1.6, 20.2.6, 20.2.10 etc. the second chord is a 'borrowing' from the other harmonic group, but true to principle the first chord of these pairs is in keeping with the harmony of the measure. We should add this 'borrowing' to the modification principle.

Principle: the metrical unit can contain a subsequent modification of the harmony indicated by the specific digit, even to the point of it being drawn from the harmonic group of the other digit.

Kaniad y Gwyn Bibydd:- *tityr bach* throughout, again with two columns in the lower part for each digit, with one half-cycle to most sections. Note that at 37.5.1-8 there is an anomaly where the chord sequence is broken. Rather than formulating a principle that a measure can be broken in this way, we can identify that the text is abbreviated; the legend 'hwn' above a cross gives the key to the playing sequence: 37.5.1-4, 37.5.1-4, 37.5.5-8, 37.5.5-8, and the measure is maintained. This is an example of an important point that the allocation of digits can give insight into the correct playing sequence of the text.

Kaniad Tro Tant:- *korfinfaen*, with one cycle to each section. Again with two columns in the lower part for each digit except for the last two digits of each section, where seven columns appear instead of four, and the last section, where six columns appear instead of four. Let us leave this as an anomaly for the present because it does not lead to a clear principle at this stage. Let us seek a clearer example of this sort - in Kaniad y Wefl.

Kaniad y Wefl:- *fflamgwr gwrgan* throughout. This allocation necessitates the formulation of one more clear principle. First let us clarify the playing sequence: the section 66.1.1 to the 'bis' at 66.1.13 is played twice, then the following section to 'bis or groes dechre' (twice from the cross beginning) at 66.2.6, then the beginning of that section again, i.e. from the cross at 66.1.13 to the scroll mark at 66.1.19, then the section following 'bis or groes dechre' 66.2.6 up to the decorated border at 66.2.15. At the bottom of the page is the notation 1 O 1 1 1 O 1 1 O O 1 1 O O 1 1

which Lewis Morris to the right has correctly identified as Flamgwr gwr(g)an. Note carefully the identification on the appended copy of the text the points at which the units specified by each digit begin. Note that at 66.1 the last digit of the first group of four digits refers, in the lower part, to

$$\begin{array}{ccc} \underline{a} & f| & \underline{\underline{g}} \\ a| & d| & g|. \end{array}$$

Principle: a digit can correspond to three written chords.

Note that at 67.2 at the end of the line the O refers to $\begin{array}{c} \underline{f|} \\ d| \\ b| \end{array}$ and $\begin{array}{c} \underline{g} \\ g| \\ . \end{array}$

The $\begin{array}{c} \underline{g} \\ g| \end{array}$ harmonically belongs more properly, throughout this piece, to the units identified by 1 rather than by O. This is another example of the borrowing principle we encountered in Yr Osteg Fawr.

Armed with the principle that a digit can correspond to as many as three written chords, we can return to the anomalies in Kaniad Tro Tant and say that they may not be anomalies but examples of three and perhaps even four columns in the lower part constituting digits.

Kaniad Bach ar y Go Gower:- *korffiniwr* and *tityr bach*, with one cycle of each to each section. *Korffiniwr* for the first part of each section. Note that the expansions of chords indicated by a diagonal line connecting the lowest letter of a chord in the lower part to the succeeding single letter, as at 44.1.3-4, involve three columns to a digit; otherwise the *korffiniwr* parts are two columns to a digit. *Korffiniwr* cannot be allocated to the last part of sections, but we can continue with *tityr bach*, although a small residue remains at the end of sections, which is obscure at this point.

Kaniad Suwsana:- *trwsgwl mawr* and *mak mwn byr*. The allocation of these measures to the piece by Panton 56:55 is unambiguous, but that by Panton 56:63 is uncertain, as shown by the use of the word '*cwest*'- quest: 'Cwest y 6 cyntaf a Thr. yr ail M. yr 8 a 9. Trwsgl ac yn ddau ddiwethaf Macymwn byrr.' The sense of this may be: try (playing or classifying, we do not know which) the first six sections as trwsgwl (mawr?), the next as M(akmwn byr), and the eighth and ninth sections as trwsgl (mawr?) and the last two as Makmwn byr. Panton 56:55 indicates 12 sections in total, but we only have 6 in the text. Not suprisingly, then, for this piece it is difficult to allocate the digits. As *trwsgwl mawr* and *mak mwn byr* do not readily fit any of the sections, examination of this whole piece is deferred to the following section on unallocated pieces.

Kaniad Ystafell:- *korffiniwr*, with one cycle at the beginning of each section. This measure can readily be allocated to the first part of section I, up to 38.1.14. The remainder of the section remains unallocated at this point. Sections II-III follow section I. Section IV follows these, but the seventh and eighth digits contain more material than in earlier sections, with the result that each digit contains four chords or single notes in the lower part. We have not met with this principle before, but the evidence is clear enough, and we will meet with many instances of it in other pieces where four full chords are used, so we must formulate the principle:

Principle: a digit can correspond to four written chords.

As with other instances of more than one written chord, here borrowings from the other harmonic group are used, but the

principle that the first chord in each digit is drawn from the appropriate group is again upheld. Sections V-VI follow in the same way. Sections VII-IX contain even more material in the seventh digit - adding up to six chords. Unlike the use of four chords this is not characteristic of the use of measure elsewhere, so rather than formulating this as a principle it is best to classify it as an anomaly. The first part of section X is rather obscure, but there is just about enough resemblance to earlier sections to accept that the measure is the same, although the beginnings of some of the digits are very speculative. The beginnings of sections XI and XII are unambiguously in the measure, that of section XII being especially clear as each digit contains the same number of columns. Often the measure of a piece is most clearly apparent in the closing sections.

Kaniad Marwnad Ifan y Go:- *trwsgwl mawr* or *tityr bach*. Two sources allocate *trwsgwl*, whereas one states *trwsgwl mawr* or *tityr bach*. Any attempt to allocate the digits of *trwsgwl mawr* runs into great difficulties because the chord changes in the text do not match the measure, no matter how many chords are counted to the digit. It is true that most sections relate quite strongly to *trwsgwl mawr* as they are amenable to a pattern:

O 1 O O 1 O 1 1 O 1 O O 1 O 1 1

but this differs from *trwsgwl mawr* in the second, sixth and tenth digits. We have met with the modification of the tenth digit before, in Kaniad Suwsana and Kaniad Llewelyn ap Ifan ab y Go, but here there are a lot of modifications to accept. It is far easier to classify the piece as *tityr bach*, by counting more chords to the digit, and this fits more sections, so I have marked up the text as *tityr bach*, with one full cycle to each of sections VI-XII and to section XVII, and two cycles to sections

XIII-XVI. The ends of sections I-V contain an extra sequence of 1's which appear to be hypermetric. The other sections are straightforward once one emends apparent registration errors between upper and lower parts (as at 73.5.11-12, where the lower part should probably be shifted to 73.5.13 on the example of 74.4.5).

Also the last digit of the last section appears to begin at 76.4.12 on a chord drawn from the other harmonic class, contradicting the principle of the harmonic congruity of the first chord of a digit. This is comparable to what we have encountered on the last digit of Kaniad Tro Tant, so it appears to be a special feature of ending pieces - a deliberate, cultivated exception to the principle. Accordingly I mark both these digits as '1' in keeping with what is the harmonic centre of gravity of both digits as a whole.

Kaniad Hun Wenllian:- *trwsgwl*. This allocation presents similar problems to the ascription of the same measure to Kaniad Marwnad Ifan y go, and it is best to postpone tackling this piece to the following section on pieces for which there is no measure allocated.

Kaniad Pibau Morfydd:- *trwsgwl mawr* or *trwsgwl bach*. The ascription of the digits of *trwsgwl mawr* fails. The notation of *trwsgwl bach* is not in the extant catalogues of measures, and to add to the difficulty this large and complex piece definitely does not display a regular pattern of chord changes throughout. But a fairly clear pattern does emerge for many passages, especially in the later sections again, which, counting two chords to the digit, would be expressed:

O O O O 1 1 1 1 O O O O 1 1 1 1

If one counted four written chords to the digit, this would be the same as *tityr bach*, but as that measure bears a different name, it seems most likely that the measure has two written chords to the digit, and that it was called trwsgl bach because it must have been conceived as comprising just eight digits thus: O O O O 1 1 1 1 rather than the sixteen of *trwsgl mawr*. I have marked up the music text as the harmony of the passages require, using the O O O O 1 1 1 1 passages as the core and moving out from them paying as much regard as possible to the relationship of other passages to them, using the scheme of the features which are common to different sections: barring, repeats etc. The result is that the earlier sections, and particularly the first, are irregular.

This warrants discussion. Whereas it is good method to eschew classifying pieces as irregular where possible, we should not feel uncomfortable where it is unavoidable, since there may be many good reasons as to why the text appears irregular. The MS. text or the original transcription may be defective, a piece may have been corrupted in aural transmission (in the case of this piece possibly over centuries) or it may have been designed as irregular by the composer in the first place. Certainly the compilers of the catalogues were confronted with this situation, as they drew attention to irregularities in particular pieces and in general commented that sometimes the *cyweirdannau* are *tyniadau* and *vice versa*.

But what is most important for the present purpose of reconstructing the music is that we are able to use the application of measure to accurately determine the proportions of passages relative to one another, to uncover a musical pulse which can provide the basis for timing in performance. In short,

we need to know for as much of the text as possible where each digit begins and ends more than we need to know whether each digit is a *cyweirdant* or a *tyniad*. So it is important to address those parts of the text which are irregular.

Kaniad Llywelyn Dylynior:- *fflamgwr gwrgan*, not *mak mwn byr* and *hattur* as ascribed by one MS. *Mak mwn byr* fits the chord sequences of the beginnings of all sections except the first, but does not continue into the remainder of the sections. *Hattur bach* does not fit the remainder either. Yet the piece does display a very strong continuity in the chord sequences between sections, so rather than classify the piece as irregular, it is worth looking for a measure that does accomodate the text. The piece is very similar to Kaniad y Wefl, in fact the similarity here goes far beyond that between any other pair of pieces. Throughout both pieces there is a correspondence in the way in which variations are formed and in actual melody and harmony. The pieces share long segments of text: those at 67.2.1-11 and 101.4.14-5.8, 67.2.16-3.7 and 101.5.13-6.6, and 66.5.1-6 and 101.3.4-9, classified as intermediate formulas X, XI and XVI respectively in Greenhill. So it is necessary to examine the metre of Kaniad Llywelyn Dylynior in the way in which we have accepted the metre of Kaniad y Wefl as clearly *fflamgwr gwrgan*, and actually the core of the metre is revealed to be *fflamgwr gwrgan* as well, to a count of two chords to the digit again. The appended copy of the piece is accordingly marked, with some irregularities, notably in the first section (as was the case with Kaniad Pibau Morfydd). The ascription of *mak mwn byr* and *hattur* may have been an attempt at rationalisation; it is certainly at odds with the ascription of *fflamgwr gwrgan* to Kaniad y Wefl.

This brings us to the end of the examination of pieces which have measures ascribed to them. At this point I will make some general comments about what has emerged in this investigation of the implementation of measure. We are accustomed to using lists of chord sequences in some music, and a first glance at the digital notations for the measures calls these to mind. But the principles that have been deduced here demonstrate that the system of measure was actually much more complex than this. Although the measure determines what sort of a chord is to be used at the beginning of a digital unit, there are apparently many possibilities for the remaining chords, and even the number of these was not fixed if we take the text at face value. These are not particularly familiar concepts, but then we have no real reason to expect them to be.

Here is a recapitulation of the principles which have emerged, where measure is implemented strictly in the parts of pieces which are regular:

- A digit indicates something about the harmonic nature of a written chord.
- A digit can correspond to one, two, three or four written chords.
- A digit can correspond to a varying number of written chords within the same piece.
- The metrical unit that corresponds to a digit should begin with a chord which is harmonically related to the nature of the specific digit.
- The metrical unit can contain a subsequent modification of the harmony indicated by the specific digit, even to the point of it being drawn from the harmonic group of the <u>other</u> digit.

- Occasionally, an already established measure can be modified, without altering the length of the measure.

The Unallocated Pieces

The *gosteg* and *caniad* pieces (and parts of pieces) for which no source appears to offer the measures are:-

gosteg yr halen

gosteg lwyteg

kaniad ystafell: the later part of each section.

kaniad kydwgan

kaniad bach ar y go gower: the end of sections.

kaniad kynrhig benkerdd

kaniad llywelyn ap ifan ... V-XVI

kaniad suwsana (*trwsgl* and *mak mwn byr* having failed)

kaniad san silin

y kaniad krych ar y bragod gower

kaniad hun wenllian (*trwsgl* having failed)

Having taken so much care to uncover the principles of measure, we might be tempted to use this knowledge to just dive into these pieces and allocate digits. We have learnt much about the use of these principles, particularly that a count of two written chords to the digit is most common. But because the principles are so complex and offer alternatives to each other, alone they are not sufficient for the assignment of digits with certainty. Instead all the possible indicators of measures and the positioning of digits have to be used very carefully in conjunction with one another.

There are many such indicators. In addition to the barring discussed before and to the ways in which the sections of a piece relate to each other, there are several techniques available for extrapolating from what we know of the pieces that have already been allocated the digits of their ascribed measures, and also from what we know of how measures were used in

the repertory in general. The development of these techniques involves a huge amount of work and their implementation a considerable amount of more work, but without exploiting them it is not possible to have much confidence in the allocation of digits to pieces for which the measures are not given. The methods make use of melodic formulas, ostinato patterns and the frequency of usage of the particular measures.

Melodic formulas

One technique involves the identification of segments of text which are duplicated between pieces - melodic formulas. These are both common and widespread and their locations are given in Greenhill. They provide us with one method of extrapolating from the allocated to the unallocated pieces, for we should expect that if a digit is represented by a particular segment of text in one part of the MS, then the same digit would be represented where the same segment of text recurs elsewhere in the text. We would be able to say whether the digit is likely to be a '1' or a '0' and where it begins and ends.

This is a very valuable method. It is not infallible because we have no absolute guarantee that the same segment would not have been viewed differently in different contexts, but it is sound method to extrapolate digits on this basis where we have no reason to suppose that the segment would be viewed differently. In fact we are already in a position to test the efficacy of this approach on the pieces that we have been able to allocate digits to on the basis of the records of their measures. These are linked by such formulas as Open IV, Inter VII, Close IA, Close IB, and Close VII. They provide important confirmation of the ground already covered.

For example the segment 66.1.10-13 and following in Kaniad y Wefl has been allocated the fourth digit of *fflamgwr gwrgan*, a '1'; the same segment at 72.6.6-9 and following in Kaniad Marwnad Ifan y Go has been allocated the fourth digit of *tityr bach*, also a '1'; and the same segment at 91.2.1-4 and following in Kaniad Pibau Morfydd has also been allocated a '1' in the context of allocating a core measure of *trwsgwl bach*. A very closely related

segment at 54.7.16-19 and following in Kaniad Suwsana has also been allocated a '1'. These are all examples of Close IA, but the same correspondences are to be found in the other formulas. Close IA alone will allow us important access to the measures of the later parts of Kaniad Llywelyn ap Ifan, to Kaniad Krych and to Kaniad Hun Wenllian: all parts of the text yet to be allocated digits. We may be confident that the text of these pieces contain '1' digits at certain key points in their measures.

Ostinato figures

These are described in Part 4: TECHNIQUE, pp. 119-120. Their significance here is that where they occur in pieces for which we are given the details of measure, each digit is represented by a consistent number of columns in the lower part. Here is a table of the sections of *gostegion* and *caniadau* that contain ostinato figures in the lower part. The sections that contain them are marked '*' and those that do not are marked '.'

```
                          1 2 3 4 5 6 7 8 9 10  12  14  16
                                              11  13  15  17
gosteg dafydd athro       * * * * * * * * * *
gosteg yr halen           . . * * * * * * * * *
yr osteg fawr             . . . . . . . . . . . . . .
gosteg lwyteg             .
kaniad y gwyn bibydd      * * * * * * * * * * * * *
kaniad ystafell           . . . . . . . . . . * *
kaniad kydwgan            . . . . . . . . . . . .
kaniad bach ar y go gower . . . . . . . . . . . *
kaniad kynrhig benkerdd   . . . . . . . . . . . *
kaniad llywelyn ap ifan ... * * * * . . . . . . . . . . . . .
kaniad suwsana            * * . . . .
kaniad y wefl             . . . . . . . . . . . . . .
kaniad tro tant           . . . . . . . . . . . . . *
kaniad san silin          . . . . . . . . . . . . .
kaniad marwnad ifan y go  . . . . . . . . . . . . . . . . . *
y kaniad krych ...        . . . . . . . . . . . .
kaniad hun wenllian       . . . . . . . * . . . .
kaniad pibau morfydd      . . . . . . . . . . . . . . .
kaniad llywelyn dylynior  . . . . . . . . . . . . . . . .
                          1 2 3 4 5 6 7 8 9 10  12  14  16
                                              11  13  15  17
```

11 of the 19 pieces contain ostinato figures. It will be noticed that many of these pieces are ones for which we have information about their measures, and in these the passages with ostinato figures show the measure particularly clearly. For example the last section of Kaniad Bach ar y Go Gower shows the digits of its measure - *korffiniwr* - very clearly with a regular two columns in the lower part to each digit. The other sections of the piece show the measure less clearly (not that they are irregular) since expansions of some chords lead to some digits

being represented by three columns rather than two. So if we did not know what measure this piece was on, we would be able to spot it most easily in this last section.

Hence with the pieces that remain to have digits allocated, it is best to address any sections with ostinato patterns first, and then the other sections can be related to the ostinato patterns.

Frequency of usage of measures

Another technique is based upon the relative frequencies with which the measures were used in the repertory in general, and the order in which they are used within sections. This method is very necessary because quite simply there are so many measures (over fifty in fact) that the probability of one 'fitting' by chance is a danger. So it is necessary to compile a list of the measures sorted by frequency of usage, using the information from the large number of catalogues of pieces which we have. It is important to update the list each time the measures are identified of a piece in the text which were not otherwise specified. The degree of confidence one can have in a 'fit' will relate to how high up the list the measure is.

Here are the more frequently used measures, listed according to frequency of recorded usage, with the best attested digital notation, expressed here for the *telyn*.

Tityr bach	58	0 0 1 1:0 0 1 1
Korffiniwr	56	1 1 0 0 1 0 1 1:1 1 0 0 1 0 1 1
Mak mwn byr	38	1 1 0 0 1 1 1 1
Trwsgwl mawr	34	0 0 0 0 1 1 1 1 0 0 0 0 1 0 1 1
Fflamgwr gwrgan	32	1 0 1 1.1 0 1 1.0 0 1 1.0 0 1 1
Mak mwn hir	18	1 1 1 1 0 0 0 0 1 0 1 0 1 1 1 1 0 0 0 0 1 0 1 1
Korfinfaen	13	1 0 1 1 0 1 1:1 0 1 1 0 1 1
Alban hyfaidd/ Alban rhydderch	10	1 0 1 1 0 1 0 0 0 1 0 0 1 0 1 1
Hattur bach	8	0 0 1 0 1 1:0 0 1 0 1 1
Ysgwirin	8	1 0 1 1:1 0 1 1
Mak y mynfaen	7	0 0 1 1 0 0 0 0 1 1 0 0 1 1 1 1

Trwsgl trwynki	5	O 1 O O 1 O 1 1
Kor di tutlach	5	1 O O 1 1 O O O 1 O O 1 1 1
Korwrgog	5	1 O O 1 O 1 1 O 1 1
Korsgoloff	4	1 1 O 1 1 O O 1 O 1 1
Karsi	4	1 O O O 1 O 1 1:1 O O O 1 O 1 1
Wnsach	3	1 1 1 1 O O O 1
Brath yn ysgol	3	1 O 1 1 O 1 O O 1 O 1 1 1 1 O O 1 O 1 1
Bryt odidog	3	O O 1 O.O O 1 O.1 1 O 1.1 1 O 1
Koraldan	3	1 1 1 O 1 O O 1 O O O 1 etc.

: = division into 2 identical halves.

. = division into repeated sections.

Often pieces were based on stringing together two to four measures within each section, and here most commonly the short measure *tityr bach* was used as an adjunct to the main measure or measures. If allowance is made for this, *korffiniwr* becomes by far the most common measure that formed the heart of a piece.

Sometimes after a series of sections on one measure or one concatenation of measures, following sections would use different measures.

Most of the above measures can be meaningfully divided into 4-digit elements, so that the frequencies of usage of these elements can be calculated. From the above table the main ones are:-

1 O 1 1 286

O O 1 1 187

1 1 O O 157

1 1 1 1 122

O O O O 111

O 1 O O 28 ...

The bias in distribution here is sufficiently marked to be useful in identifying parts of measures in short segments of text. Also it is interesting that these 4-digit patterns relate closely to those of the 4-bar double-tonic grounds of the early hornpipes (see Ward). Can it be that the *cerdd dant* digit is the equivalent of the hornpipe bar?

Note that the sources for measures are numerous and contain many inconsistencies between one another in respect of the spelling of the names of measures, the digital notations themselves and also the ascriptions of measures to individual pieces. Because of this it is best to concentrate on the upper ends of the distributions, and use all the above figures as a rough guide only. Also this list is not likely to be definitive because the identification of new primary sources continues.

The allocation of measures and digits

A brief outline of the allocation of measures and digits to each remaining piece follows, and again in the appended copy of the text the 1's and O's are marked. It must be understood that the scale of the allocation operation here is enormous - it is a huge jigsaw puzzle where all the pieces interlock - and whereas it has been possible to give the detail of the methods used, and of the result (in the appended copy of the text), it is quite impractical to give the detail of the fitting together of the pieces of the puzzle. The entire operation has been spread over many years and has involved much iteration (much of the operation is synthetical). Nevertheless, it is possible to investigate the validity of any part of the operation by referring to the details already given on the melodic formulas and the frequency list, and studying the inter-relationships between the passages and sections of each piece, particularly in relation to the ostinato passages listed above (p. 62).

Gosteg yr Halen:- *mak mwn byr* throughout, with three cycles to each section. Apart from the first two sections, ostinato patterns make possible the identification of this popular measure to a standard count of two written columns in the lower part. The result of this identification is that we can say the piece is entirely regular throughout.

Gosteg Lwyteg:- *mak mwn byr* to a count of one written chord per digit, with three cycles of the measure to the section. No other count results in a recorded measure. Regular for the only recorded section.

Kaniad Ystafell - the later part of each section:- irregular with some probable use of *hattur* bach. The identification of

korffiniwr with the first part of each section means that in sections XI-XII the text continuing has to be read as O O 1 O 1 1 O O up to 41.2.1 and 41.5.17. This in turn makes it very probable that the end passage has to be read as 1 O 1 1 to complete what may be *hattur bach*, although there is a lot of text here for four digits so there may be a hypermetric coda here as well. Sections I-X continue not with *hattur bach*, but with O O 1 1 O O 1 O 1 1 which is not a recorded measure. Presumably this lack of regularity in the later part of sections will be why our records show only *korffiniwr* without *hattur bach*.

Kaniad Kydwgan:- irregular. The piece features the gradual and asymmetrical expansion of segments of few columns of text into many columns in subsequent sections. Thus the first half of the *cainc* in the first section has 11 columns, and this has become 32 by the last section. Although some other pieces display a tendency towards expansion, only this piece is so dominated by it that the concept of an equality of metrical length being maintained over the sections is untenable. Clearly this was the composer's intention, rather than the product of faulty transmission, so we may learn more about the general implementation of measure from what this piece does not display than from what it does display. The appended copy is marked at the significant metrical points which are common to sections (note that the first two sections lack counterparts to some of the points). It is not only fruitless to search for a recorded measure in the patterns of this piece, it would probably be a mistake to conceive of the patterns as measures in the first place.

Kaniad Bach ar y Go Gower - the end of sections:- regular

with some possible use of *tityr bach*, else the measure is an unrecorded one. The identification of *korffiniwr* with the first part of each section means that the text continuing has to be read as O O 1 1 O O up to the end of the repeat at 44.2.15. In turn this makes it likely that the following passage at 44.3.1-6 would be 1 1 to make up *tityr bach*. The remainder: 44.3.7-19, by analogy with Kaniad Ystafell 38.2.21-3.10 (transposed down three strings), may be read as 1 1 or longer (and will be a hypermetric coda if indeed the preceding passage is *tityr bach*).

Kaniad Kynrhig Benkerdd:- regular on *korffiniwr*, with one cycle to each section. The ostinato pattern for most of the last section reveals *korffiniwr* to a standard count of two written columns in the lower part. No other count yields a recorded measure. The counterparts to each digit can be traced back through all of the earlier sections, counting two, three and four chords to the digit, with the first chord, true to principle, always being drawn from the appropriate harmonic group. Thus this piece with its superficially erratic and irregular chord sequences as set out earlier is found to be entirely regular and conformist throughout. And realistically we can dismiss the possibility of this happening due to mere chance, not only because of the high frequency with which this measure was used, but because the actual pattern of the measure is an idiosyncratic one, and therefore readily identifiable or refutable.

This kind of result is fairly usual, but in the case of this piece there is interesting support for the allocation from other sources. We should consider a piece with a similar but longer title, given as 'can. Cyn. Barnad Cynwrig bencerdd 12 k. corffiniwr' in Panton 56:55 and as 'caniad k. Mar. Cynf. Ben o waith Rhys B. Corff.' in Panton 56:62. In the first of these

catalogues are contained 32 pieces, of which at least 9 are in the MS., and in the second 30 pieces, of which again at least 9 are in the MS. - an unusually high proportion. In neither of these sources is the short title 'kaniad kynrhig benkerdd' listed. It would seem quite probable then, independent of the conclusion derived here about the measure of the piece in the MS., that the piece in these catalogues is the same as that in the MS. This is to say that in the MS. the title may have involved the brief omission of the word 'marwnad', thereby neglecting that the dedication was elegiac.

This probability is strengthened by the correspondence in the number of 'ceinciau' in the first catalogue and the number of sections of the piece in the MS. - 12. Such correspondence is usual for pieces from the MS. catalogued in this source, and although 12 was a quite common number of sections for a piece to have, most have other numbers. So the allocation here of *korffiniwr* to the piece in the MS. receives quite strong corroboration from these other sources - in both catalogues the measure is given as simply 'korffiniwr'.

Kaniad Llewelyn ap Ifan ab y Go:- irregular. *Trwsgwl mawr* fits section I except at 50.5.23 where the tenth digit of this measure appears harmonically as a 1 not a O. Sections II-IV follow section I. For sections V-XVI the modified version of *trwsgwl mawr* of the earlier sections is not maintained, and instead the sections are of differing lengths, so it is necessary to categorize the piece as irregular. The appended copy is marked with the points that present the greatest continuity between sections whilst satisfying the allocations of digits for formulas established in other pieces. The result entails considering parts

of sections V-VI and IX-XVI as hypermetric interpolations marked below as '[ ]':

V-VI	[1 1 O O]1 1 O O 1 O 1 1
VII-VIII	1 1 O O 1 O 1 1
IX-XII	1 1 O O[1 O 1 O]1 O 1 1
XIII-XVI	[O O]1 1 O O 1 O 1 1

Sections VII-VIII present the core here; they are regular on *korffiniwr*, using mainly a standard count of two written chords to the digit, both sections together comprising one cycle of the measure. At 52.5.4/5 the context reveals an omission of 52.2.7-9.

It is well possible that, as we have seen with Kaniad Kynrhig Bencerdd, '*marwnad*' has been omitted from the title of this piece in the MS, in which case the discrepancies amongst sources as to the measure of Kaniad Marwnad Llywelyn ab Ifan ab y Gof, and a bias towards *trwsgwl* of one form or another, would be explained.

Kaniad Suwsana:- irregular. The use of melodic formulas, especially where sections I-II bear a close relationship to the earlier sections of Kaniad Llywelyn ab Ifan, enable enough to be deduced about the digits in this piece to say that the piece is highly irregular: it does not have a recorded measure as a core and there is very little continuity between sections. The appended copy is marked tentatively with digits.

Kaniad San Silin:- regular throughout on *mak mwn byr* and *tityr bach*, with two cycles and one cycle respectively to each section. The allocation of the beginning of the last digit to 71.5.10 rather than to 71.5.11 follows the same principle as that for Kaniad Tro Tant and Kaniad Marwnad Ifan ab y Go, and probably a counterpart chord in the lower part has been omitted at 69.6.13.

Y Kaniad Krych ar y Bragod Gower:- regular throughout on *korffiniwr* and an unrecorded measure which is the obverse of *korffiniwr*. Each section consists of the full cycle of *korffiniwr* followed by its obverse and then by a half-cycle of *korffiniwr* thus:

full cycle 1 1 O O 1 O 1 1 1 1 O O 1 O 1 1

obverse O O 1 1 O 1 O O O O 1 1 O 1 O O

half-cycle 1 1 O O 1 O 1 1

Discounting expansions, the count is two chords to the digit apart from parts of section VIII which are one chord, and from Close IA which is three.

Kaniad Hun Wenllian:- regular on *trwsgwl trwynki* for the

cainc of some sections, otherwise on various metres which are best regarded as modifications of *trwsgwl trwynki* rather than as unrecorded measures in their own right. The *cainc* of section VIII is partly in an ostinato pattern and the section can be analysed as:

first half of *cainc*: O 1 O O 1 O 1 1 O 1 O O 1 O 1 1

second half of *cainc*: O 1 O O 1 O 1 1 O 1 O O 1 O 1 1

diwedd: 1 O 1 O 1 1

The same measures apply to sections XI-XII. Sections III-VII, IX-X in the *cainc* have the same number of digits, but the harmonic status of many of them is changed. In addition to this, in sections III-VI some of the groupings of what are four digits elsewhere appear to have only have three digits, so these sections are quantitatively as well as harmonically irregular. The sense of some of this is caught by Panton 56:63 - '2 y 6 y 9. ar deg y pedwar o'r mesur disgwili y tynniadau', that in these sections the tyniadau do not occur where they are to be expected, and that this is to be looked for. Sections I-II do not strongly relate to the following sections and appear to be on unrecorded measures.

The piece has, therefore, to be classified as irregular. Now it is striking that amongst the pieces for which we have records of measures, all those that have been revealed to be really irregular are recorded as involving *trwsgwl* of one sort or another:- Kaniad (Marwnad) Llywelyn ap Ifan, Kaniad Suwsana, Kaniad Marwnad Ifan ab y Go, Kaniad Hun Wenllian and Kaniad Pibau Morfydd. This must be significant, and it has to be concluded that 'trwsgl' ('clumsy'/'awkward') was used to describe the metre of many, if not all, irregular pieces. Further, it may be right to conclude that the class could be subdivided into groups of

pieces: one group in which the pieces would have had the expressed digits of *trwsgwl mawr* as a core, or at the least, about 16 digits to the cycle, and another, *trwsgl bach* with about 8 digits to the cycle. On the account of Peniarth MS. 62, p. 8, the 8-digit cycle was rudimentary:-

> Pa ryw vesur yw gwydhor Titr ne drwsgwl?
> - Os Trwsgwl, rhaid yw bod 1111 Tyn. a OOOO
> cyweirdant.

and it may have been that such a simple pattern over as many as 8 digits (*tityr bach* has 4) was proscribed, hence '*trwsgwl*', because it was too rudimentary.

Although the records of all measures display discrepancies in their notations, those of *trwsgwl*, *trwsgwl mawr*, *trwsgwl hir* and *trwsgwl bach* are particularly variable. In fact there is a well-understood precedent for the word being used to describe metrical irregularity - in versification, where a previously acceptable form of *cynghanedd* became proscribed and was subsequently termed '*cynghanedd sain drosgl*'. It would probably be a mistake to conclude that in *cerdd dant* irregularity in the measure was proscribed, indeed the inclusion of *trwsgwl mawr* in the main canon of the 24 measures may be an enshrinement of irregularity as a principle, and the music text has shown us that it was common enough amongst esteemed pieces.

It has been important, then, for us not to be misled into forcing these fundamentally irregular pieces towards regular patterning, but to have relied on extrapolation through melodic formulas and the inter-relatedness of sections and passages.

At this point the updated frequency table of measures is:-

Tityr bach	60	O O 1 1:O O 1 1
Korffiniwr	59	1 1 O O 1 O 1 1:1 1 O O 1 O 1 1
Mak mwn byr	41	1 1 O O 1 1 1 1
Fflamgwr gwrgan	33	1 O 1 1.1 O 1 1.O O 1 1.O O 1 1
Mak mwn hir	18	1 1 1 1 O O O O 1 O 1 O 1 1 1 1 O O O O 1 O 1 1
Korfinfaen	13	1 O 1 1 O 1 1:1 O 1 1 O 1 1
Alban hyfaidd/		
Alban rhydderch	10	1 O 1 1 O 1 O O O 1 O O 1 O 1 1
Hattur bach	9	O O 1 O 1 1:O O 1 O 1 1
Ysgwirin	8	1 O 1 1:1 O 1 1
Mak y mynfaen	7	O O 1 1 O O O O 1 1 O O 1 1 1 1
Kor dia tutlach	5	1 O O 1 1 O O O 1 O O 1 1 1
Korwrgog	5	1 O O 1 O 1 1 O 1 1
Korsgoloff	4	1 1 O 1 1 O O 1 O 1 1
Karsi	4	1 O O O 1 O 1 1:1 O O O 1 O 1 1
Wnsach	3	1 1 1 1 O O O 1
Brath yn ysgol	3	1 O 1 1 O 1 O O 1 O 1 1 1 1 O O 1 O 1 1
Bryt odidog	3	O O 1 O.O O 1 O.1 1 O 1.1 1 O 1
Koraldan	3	1 1 1 O 1 O O 1 O O O 1 etc.

with *trwsgwl* forms of one sort or another totalling 39, the implication being that about 12% of pieces were irregular.

Profiadau and other short pieces.

The *profiadau* in the text display neither the length, nor the homogeneity, nor the heavy formal structuring of the *caniad* and *gosteg* pieces, and so they cannot provide such strong evidence of measures repeated throughout each piece. Nevertheless, we have some reason to suppose that the *profiadau* in the text were based on measure, since for one of this class of composition notations are recorded: those of *korffiniwr* and *trwsgwl trwynki* for Profiad Athro Grythor (not in the MS. text) according to Hafod 24:802. Also there are sporadic, fragmentary notations of digits in the text of some *profiadau* (at 61.6; 62.1-3,5,6; 63.1-5; 64.6).

But it remains difficult to assign digits with confidence, and for the most part there are alternative interpretations possible. The appended copy is marked up only where inter-relationships within the music text make a single interpretation necessary.

Named measures emerge in some pieces. One cycle of *korffiniwr* at the beginning of Profiad y Botwm, another within Profiad Brido ar Uwch Gower, three cycles of *klwm ddafydd bach* / *odid am gwypo* (O 1 O 1 O 1 O O 1 O 1 O 1 O 1 1 in BL 836:108, Gwysaney 28:68r and Peniarth 60:42) at the beginning of Profiad Fforchog, and two cycles of *henrhi gefynrhudd* (1 O 1 1 O O 1 O 1 1 in Peniarth 62:21) within Profiad Brido ar Is Gower. Outside of these passages there are many areas where digits can be allocated, which do not constitute recorded measures. This will probably be often due to the brevity of the passages.

In one case - Profiad Chwith Ifan ab Go - an entirely different system of metre from the ordinary measure system is in operation. At the beginning of this piece, for the first five or

six lines, we are confronted with passages which are not resolvable into the *cyweirdant/tyniad* conception of harmony, since the harmony is not based on any division of the scale into two categories in the first place. Instead the harmony is more progressive, and is actually very akin to that of the later Classical period in European music. To discover the metre of the piece it is necessary to turn away from measure and concentrate on the text directly, particularly its apparent phrasing. This reveals a metrical structure of units of six written chords in the lower part, which is particularly obvious in line 1 and line 3.

Such a count of six to a metrical unit contrasts sharply with the usual four and the less common two found elsewhere, but there are small parts of large pieces, especially in Kaniad Pibau Morfudd, where groupings of six chords suggest that such a count may have been adopted briefly (presumably for variety) in an established context of a count of four. These are not associated with true chordal progressions.

However, the very short piece Y Ddigan y Droell does display groups of six chords in conjunction with progressions, and unlike Profiad Chwith Ifan ab y Go the count of six is maintained throughout the piece. Each of the groups of six is delineated by barring (except that beginning at 57.1.9, but here the C is emphatic without a *plethiad byr*, and certainly there should be a vertical bar before it). The scheme of the whole piece emerges as eccentric: seven bars (or 'lines'?) each made up of six beats (and the bars can be further subdivided into 2 + 4 beats). The bars are combined: 2 + 2 + 3 to create the piece.

The situation is, then, that there was an established system

of chordal progression, associated with a metrical system quite extraneous to the measure system, where what we would probably describe as a bar had six beats, not four or two. Indeed it is shown in Part 8: VERSE (pp.92-93, 120-121) that the seldom-used poetic measure *Rhupunt Byr* requires just such a metre if it is to be delivered in a compact manner which is at all similar to that of the other poetic measures.

The other two very short pieces - Cainc Ruffydd ab Adda ab Dafydd and Cainc Dafydd Broffwyd - are within the *cyweirdant/tyniad* harmonic system. They are too short to be addressable through extrapolation by formulas, but quite straightforwardly they appear to be in unnamed measures, both eight digits long.

V. THE FRAMEWORK OF PULSE

Having accomplished the allocation of digits to most of the music text with certainty, it now becomes possible to use this information as an essential, practical guide to the musical reconstruction of the text. We have located the exact points at which major metrical divisions occur, marked on the appended copy of the text.

Can we deduce that these points were isochronous, that these chords in the lower part were basically evenly spaced in time? This is a crucial question in reconstruction. I have argued in Part 6: RHYTHM that there was a regular pulse to the music, and this conclusion gains weight from the reconstruction of accompanied vocal performance detailed in Part 8: VERSE. Here I will discuss the contribution to this conclusion which arises from this investigation of measure.

It is obvious from the shapings of the notations of the measures - the ways in which they are usually built up from units of four digits - that each digit in a measure is of equal value irrespective of its harmonic classification - whether it be a *cyweirdant* or a *tyniad*. That this is so is confirmed by the grammars when they speak of a *cyweirdant* or a *tyniad* in the sense of them being interchangeable or substituting for one another. The text confirms this: often the pattern of the fingering of strings is repeated throughout successive digits irrespective of their harmonic classification, whilst small shifts of the hand bring about the transposition of the same pattern to different but usually adjacent strings (e.g. 17.3-4).

Furthermore, in pieces that are irregular in that some sections contain 'substitutions' of *tyniad* digits for *cyweirdant*

digits and *vice versa*, it is clear from the fingering patterns within the digits, that each digit is of equal time-value - it cannot be that the *tyniad* digits are longer or shorter than the *cyweirdant* ones, else this would be reflected in the patterns. Gosteg Dafydd Athro, very simple in the detail of its fingering patterns, illustrates this very clearly indeed. Here the digits must be isochronous in theory, whether or not expressive *rubato* overlaid this metrical regularity.

Indeed it appears as if this isochronicity will have been universal, so strong is the homogeneity within pieces and between pieces. Therefore it must make metrical sense to bar, in the modern sense, digital units, and it must make musical sense that at least the first chord in the lower part following our bar-line provides a musical pulse.

So that no doubt remains over this crucially important point, let us explore the consequences of presuming that the composer was free to vary the length of the digital units of his composition. If the digits were of varying lengths, then in theory it would only be possible to detect the division between two of them harmonically. But because we have established that a digit from, say, the *cyweirdant* harmonic category can contain a chord from the *tyniad* category (as long as it is not the first chord of the digit), it would not be possible in practice to detect the division in this way. If the listener detects a shift in the harmony, this could be due either to the commencement of a new digit or the continuation of the digit that commenced a little while before. The listener cannot know which, so he would be lost with no means of discovering or verifying the measure. And this does matter; it would be an absurd position to be in as we are told that the measures were designed in order to provide a

structure that was recognizable to everyone, and the digits were counted.

So if the harmony alone was an insufficient cue for this counting, then it must have been used in conjunction with timing, which is to say that the digits must provide a count of equal units in time.

The need for the digits to be of equal length is clearer in cases where there are successive digits from one harmonic group e.g. four consecutive *cyweirdannau*. Here timing alone would be the only possible cue for counting.

This concept is a familiar one in music from two areas of sources which may have been directly related to the *cerdd dant* tradition, which allows us to adopt this proposition of equal units with confidence: *piobaireachd* and English hornpipes.

Although in modern times the *piobaireachd* repertory has been presented in a style that makes much of expressive *rubato* which almost obscures the metre, it appears that this has not always been the case. Earlier styles were probably generally very much more even in their timing. Also, the first published book on *piobaireachd*, by Joseph MacDonald, contains passages which strongly echo the counting of the components of the measures:

> ... for it was by the four Fingers of the Left hand that all their Time was measured & regulated ...
>
> They were sure to have no odd Number in any piece they designed to be regular. Their Adagios when regular, commonly consisted of 4 Quarters. In each Quarter there were Such a number of Fingers (which we Count as Bars) 2,4, or 8 as the Quarter was Long or short; or the Bar was Subdivided into

> more Fingers, according to their Length; & thus they Counted upon their 4 Fingers & measured by their Ear, & when the Finger & Ear Corresponded all was well.
> The ordinar Length of a Pipe Adagio being 16 Fingers, computed about 16 Bars, 4 in each Quarter, The regularity preservd (only by the Help of this Rule) in all their Compositions, being truly Surprising.[3]

This account accords with the digits of the measures, in the counting, in the cycle of 16 - the most common number of digits for measures to contain, and in the subdivision of the cycle into units of 4 (as discussed above on p. 22, some notations of measures are punctuated in this way, and the music text often divides cycles of 16 in this way in practice).

The significant point here is that Joseph MacDonald was prepared to equate fingers with bars, and *piobaireachd* is still played and analysed according to this equivalence today despite the *rubato*. The strong implication is that the components of the measures should also be equated with barring.

Early hornpipes from Northern England can be best analysed as a four-bar variation form, on a restricted number of implied double-tonic grounds.[4] If the roots of the implied chords are expressed as 1 for the tonic and O for the supertonic, patterns such as 1 O 1 1 emerge, used in distributions which bear an unmistakable resemblance to the frequencies of 4-digit subdivisions of the measures given above (p. 65) in the analysis of measures in practice. Here the inescapable conclusion is that we have a corpus of music which is related both by its proximity to

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[3] See Campbell pp. 13-4, and Cannon (1994) pp. 64-5.
[4] See Ward pp. 146-7.

Wales and by the use of the double-tonic, which was using a simplified version of the *cerdd dant* measures in the form of 4-bar patterns. Again it is clear that the components of the measures must have been related to what we would call bars.

VI. THE SUBDIVISION OF THE DIGITAL UNIT

At this point we have arrived at an understanding of the text at the digit level, which provides a firm position from which to move down into the subdivision of the digital unit at the next level below: the level of the minor *cyweirdannau*/*tyniadau*. We know from the Grammars that there were four of these to each digital unit (four *cyweirdant gwan* make one *cyweirdant cadarn*; and in the same way with the *tyniadau cedeirn*).

Let us first focus on the use of four in general in the metre of *cerdd dant*. The number of sections in a piece was commonly twelve: a multiple of four. And as we have seen, groups of four digits were often important in measure. From punctuations of digital notations and from the music text, it is clear that groups of three and two were also formed, but groups of four were most common. From this we can speculate that the tradition had a fondness in general for four-square symmetry. This is echoed in *piobaireachd* and the hornpipes, where counts of four are also particularly meaningful. It should come as no surprise then that the digital unit was itself subdivided into four.

It must be that with this subdivision of the digital unit we are looking at something akin to what we would call four beats to the bar. We need now to look within the digital units throughout the text to detect three pulses following each of the pulses that we have located at the beginning of each digit.

This is simply done in those parts of the text where there are four written chords (or occupied columns) in the lower part. These we can take as marking all the four pulses, for it would surely be perverse for us to assume that any of these were syncopated against the beat.

Where there are three written chords, experience of the full contexts, taking into account the melodic and harmonic aspects of the text, suggests strongly that the chords should generally occupy the first three pulses.

Where there are two written chords, experience suggests that the second should occupy the third pulse - the pulse that divides the digital unit into equal halves.

It remains to identify the pulses which are not occupied by pluckings of the lower hand. Often strong contenders can be found in the upper part, especially where there are *plethiad* movements. For example, in the last section of Yr Osteg Fawr, the accent of the *plethiadau* of *takiad fforchog* at 22.3.3,6 & 9 will presumably fall on the fourth pulse of each of these first three digits, for we have no reason to suppose the accent would be tucked in just before or after the pulse. The single notes at 22.3.11 and 13 are less clearcut since their harmonic context is very complex: they may 'resolve' the seconds they follow, in which case the resolution may be quicker than would result from the notes being played on the pulse. Generally we must be on firm ground when *plethiad* movements are present, but it would be unwise to formulate any rule that single notes were played on the pulse. In Part 6: RHYTHM, it is deduced that as a rule *krychiad* movements were not played on the pulse.

Very commonly in a digital unit, there are pulses which are unoccupied by any plucking of the upper hand, as for example the second pulse of the first three digits of 22.3. In this sense the framework of the music is clearly not 'saturated' with notes, but spacious enough to permit rests or sustains so that great variety can be exercised in the placement of groups of notes. This is a great feature of variation formation in *piobaireachd*.

One great uncertainty arises from implementing this scheme of four pulses to every digital unit in the text, which suggests that the scheme may have been standard but not universal. There are several pieces which do not exceed two written chords in the lower part to a digit and which have such an economy of notes in the upper part that they appear as if two not four pulses could accommodate each and every one of their digits. If four pulses are ascribed to them then in performance these pieces would be very spacious indeed. It would not be methodologically sound to reject the given scheme of four digits on such an argument based on musical appreciation, but there are two other arguments - strong ones - for a two-pulse scheme.

Firstly, an explanation needs to be arrived at of the enigmatic passage in the Grammars:-

> Pa sawl gwaith y dyly cwlwm cydgerdd vod mewn
> cwlwm ney ganiad? O bydd byr y mesyr dwywaith
> ag o bydd hir y messyr pedair gwaith
> heb mwy na llai
> ag o bydd mwy na llai cam vesyr yw

[How many times should there be a *cwlwm cydgerdd* in a *cwlwm* (*ymryson*) or a *caniad*? - If the measure is short, twice. And if the measure is long, four times. And neither more nor less (than two or four times) else there is false/broken measure.]

This seems straightforward enough, but if by *cwlwm cytgerdd* is meant a metrical length equal to that of a section of the pieces titled the same in the MS, i.e. one cycle of measure, then the passage is not in accordance with practice: three not two or four cycles of measure is the commonest number for a *caniad* to

contain. The passage cannot mean this, and by *cwlwm cytgerdd* something else must be meant. Very possibly the term properly describes a chord in the sense that a chord is a knotting-together of sounds, and it would be easy to see how this term would have come to be used to describe these pieces in the text which are little more than chord-sequences.

On this explanation a *cwlwm ymryson* and a *caniad* would be built up either on a short measure of pairs of chords or on a long measure of groups of four chords. This is to say that any particular measure may have had two standard applications: one with two chords and one with four chords to the digit. (We meet with a rather similar situation in some *piobaireachd*, where some 16- and 32-bar pieces share a common patterning.)

Secondly, an anomaly in the relationship between two of the *gostegion* needs resolution. Gosteg Dafydd Athro and Yr Osteg Fawr both have just two occupied columns in the lower part, but only the former is sufficiently economic in its upper part to warrant being considered as having a count of just two pulses to the digit. Now Gosteg Dafydd Athro contains three cycles of the 16-digit measure *korffiniwr* to each of its ten sections, so it totals 16 x 3 x 10 = 480 digits. Yr Osteg Fawr contains three cycles of the 8-digit measure *makymyn byr* to each of its 13 sections, so it totals 8 x 3 x 13 = 312 digits only. Now it cannot be that Gosteg Dafydd Athro was longer than Yr Osteg Fawr (=the big gosteg, of the four), so it must have been that indeed the digits of Gosteg Dafydd Athro were each shorter than those of Yr Osteg Fawr.

In view of all of the above, it is safe to assign a count of two pulses to the digit in pieces such as Gosteg Dafydd Athro. The other pieces are Gosteg yr Halen, Gosteg Lwyteg, Kaniad y

Gwyn Bibydd, and possibly Kaniad Tro Tant (apart from its last section). It is notable that none of these pieces contain expansions of chords in the lower part (where a diagonal line connects the lowest letter of a chord to the succeeding single letter for the string above), and perhaps that feature was confined to the four pulses scheme.

One more great uncertainty arises which is not so easily resolved. Are the pulses for which no chord is written in the lower part indeed rests of the lower hand, or is the lower part abbreviated, as is so often the case in the early notation of music?[5] In Part 4: TECHNIQUE (pp. 120-124) the problem of asymmetry posed by expansions of chords is introduced. It is suggested there that the solution to the problem is to presume that in passages containing expansions of some of the chords, all the chords should be repeated in performance, so that a rhythmic asymmetry is avoided. Almost invariably, the adoption here of the standard two or four pulses to the digit means that a pulse is available to be occupied by the repeat, irrespective of whether the repeat is part of an expansion or just a simple repeat without modification.

Also discussed in Part 4 (pp. 123-4) is the worrying apparent under-employment of the lower hand relative to the upper, which suggests that abbreviation may have been used generally throughout the text and not just in the parts that contain expansions. This initial impression of sparseness becomes very much more strongly marked with the adoption here of schemes of regular numbers of pulses to the digit, especially in those

[5] Indeed it could be said that we are unusually fortunate to have <u>any</u> notation of the lower part. No doubt its presence here is a result of the harmonic basis of the genre.

pieces with four pulses to the digit.

The result is that when the most compressed rhythmic scheme that can be used is applied to the text, the lower part is still extraordinarily empty, and this is particularly marked with horsehair strings. In fact this becomes a very odd feature indeed when one considers that the lower part would be played by the performer's dominant hand.

As ever, it would not be sound method to resort solely to our musical judgement in making any decision, and there is a lack of hard evidence from the text (apart from that offered by the expansions) that the lower part was abbreviated. There again, if a method of abbreviation is consistently implemented, it will of course leave no trace in a text unless some symbol is used to indicate its use. We have no repeat marks for chords, but perhaps the simplicity of the metre at this level as described in the grammars was understood by all who were familiar with the music and so the marking of repeated chords would have been an unnecessary labour. Certainly the interpretation of the '*cwlwm cytgerdd*' passage as two or four chords to the digit would leave no doubt that the lower part is abbreviated.

What does seem to decide the issue is the *crwth* : principally a bowed instrument on which a rest is a clear cessation of sound. Now for many of the pulses that are empty in the lower part, there are single notes, chords or *plethiadau* in the upper part, and performing these would be problematic on the *crwth*. It was probably not possible on the crwth to have rests in the lower part whilst continuing to bow notes in the upper part, as the bridge would almost certainly have always been straight. But if it were possible, then the effect of so many pronounced

rests would be unprecedented in music and really quite absurd. The natural tendency on such an instrument is to alternate the upstroke and the downstroke of the bow on the pulses, producing a continuous succession of chords metrically grouped into multiples of two - exactly what all the evidence is pointing towards.

Accordingly in reconstruction I adopt the 'abbreviation' option: that generally where a pulse is not marked in the text by a strike of the lower hand, a repeat of the last written column is to be performed. I except the last pulse of closes where this last pulse does not have a strike of the upper hand and so does not require a bowing mark for the *crwth*, notably those of Closes I A, III, IV, VI, VII amongst the formulas. Confirmation of this holding of the last notes of passages over two pulses can be gleaned from Close II A in Gosteg Dafydd Athro. Here the recurring cadence at the end of every half-*cainc* and *diwedd* has its last pulse (the point following 15.1.7) empty of text; now this breaks the ostinato pattern in the lower part of the piece, and surely there can be no strike here else it would be of the g| that the ostinato requires and it would be written. It seems that the c chord is indeed held over for this last pulse.

For those, if any, who do not choose to follow this option, it is a simple matter to identify these chords in the reconstructions by referring to the text. But I will repeat here that it is necessary, methodologically, to account for the performance of all features of the music on the *crwth*.

This method of reconstructing the lower part is simple enough to implement, but of course it does rely on the correct identification of the locations of these pulses unmarked by written chords. It means that the correct allocation of digits to the text is even more vitally important than it otherwise would be,

and in the parts of the text where this is uncertain the positioning of unwritten repeats of written chords must be understood to also be uncertain.

One complication is that there may be some instances of expansions of chords where there is no pulse available for the second chord to occupy. One possible example is the d| at 77.4.7 and following. The digit here at 77.4.5-8 has no more than four columns, but the contents of the last column in other contexts would occupy the third, not the fourth pulse. If these do indeed occupy the third here, then the d| would need to be squeezed inbetween the second and the third pulse. The same applies to the relatives of Close II A at 54.6.24 etc. Because this issue relates to the subdivision of pulses it is discussed in Part 6: RHYTHM.

It remains to devise a means of referring to the points at which all these metrical units begin. The beginning of a digital unit and the following pulses within the digital unit will be referred to as main beats 1, 2, 3, 4 in the main (long) application of measure, and as main beats 1, 2 in the rarer short application. Distinct from these pulses, it is necessary to identify certain points in time between pulses, and these will be referred to as medial beats b, c, d. This terminology is used throughout Part 6: RHYTHM and Part 8: VERSE, where time-values are derived for the notes of the upper part and the syllables of verse texts.

VII. PHRASING

The location of digits not only provides a basis for examining the subdivision of digits but also a basis for uncovering the phrasing, which of course is so terribly important in the musical interpretation of this unfamiliar idiom. (Interpretation of the music is a problem which of course is distinct from the problem of interpretation of the tablature, and it is important not to confuse the two.)

It is clear from the ways in which digits relate to the upper part of the text, that measures largely determined the phrasing. The most frequently recurring example involves the first six digits of the eight-digit half-cycles of *korffiniwr*. Kaniad Kynrhig Benkerdd opens with a short passage at 46.4.1-6, followed by a vertical bar and then by a restatement (in the upper part) of the opening passage but transposed down one string. Two short passages follow, again delineated by vertical bars: the first is a restatement of the second half of the opening passage, and the second is a restatement of the second half of the following passage, thus *ABCDBD*. This pattern relates to the measure thus:

1 1 O O 1 O ...

A B C D B D ...

With such a convergence of indicators:- measure, vertical barring, melodic material and indeed metrical logic - it must be that the phrasing here is *AB*,*CD*,*B*,*D*,. The implication for phrasing in general here is that phrases will tend to end at the points within measures where there is a change in the harmonic status of the digits (i.e. a switch from '1' to 'O' and *vice versa*). Of course phrases will also tend to end at the

significant divisions of a measure such as the midpoint of measures where the halves are identical. So for *korffiniwr* the whole phrasing may often be:

11,OO,1,O,11.11,OO,1,O,11.

which is to say that *korffiniwr* lends itself particularly to combinations of 1- and 2-digit phrases. *Mak mwn byr*, in contrast, is suited to 2- and 4-digit phrases:

11,OO,1111.

and *alfarch* to 8-digit phrases:

OOOOOOOO,11111111.

A useful illustration of this principle is provided by Gosteg Dafydd Athro. This piece is made up, in the *ceinciau*, of mainly 1-digit motifs, which can be accommodated by the standard form of its measure *korffiniwr*. But in sections II-VI the adoption of 2-digit motifs requires the modification of the measure thus:

11,OO,11,OO,11,OO,... and later: 11,OO,11,11,11,OO,...

which resembles *mak mwn byr*.

The use of *korffiniwr* in Kaniad Kynrhig to create the phrasing pattern of 6 digits by the formulaic expansion of an initial motif of 2 digits is widespread in the text. It occurs, sometimes with modifications, in all the other sections of Kaniad Kynrhig, and it is really the basis of the piece. The same is true of Kaniad Bach ar y Go Gower. Elsewhere, it occurs in Gosteg Dafydd Athro section VII; Kaniad Ystafell I-IX, XII; and Y Kaniad Krych ar y Bragod Gower II-III, VIII, XII.

It is very interesting that many *piobaireachd* pieces share the basis of this *ABCDBD* expansion technique, except that the half-phrases *B* and *D* precede the full phrases, thus: *BDABCD*. The similarity is so striking that it may be correct to count a

piobaireachd half-phrase, usually written as a single bar, as a digit.

The principle illustrated here can be applied to much of the text, since the identification of digits within the text provides the context of the phrasing. Much further and finer detail of phrasing emerges as the music takes on a more clearly defined shape when in Part 6: RHYTHM is deduced.

VIII. CONCLUSION

We are presented, then, with a complex framework of metrical concepts, particularly variegated at the measure level, which was fully supported by richness of terminology. This whole system was not the product of purely abstract theory, since we have seen that it was applied to the composition of the pieces in the text to a degree which has previously been unsuspected. But it should not surprise us that the text has revealed that it was normal for compositions to conform to the requirements of metre, since the catalogues of the repertory are often sufficiently detailed for us to know that it was exceptional for pieces to depart from measure.

This study of the application of the theory to the compositions intabulated has provided the reference points - the divisions between one digital unit and the next - whereby nearly all the segments of text can be brought into relationship with one another so that we can understand their relative lengths; so that we can literally 'measure' them.

It will be noticed that the proportions derived here differ markedly from those arrived at by earlier contributors. In each of the complex pieces there is hardly one line of music which coincides in its proportions with any earlier transcriptions or performances. This reflects the fact that the measures of these pieces are not apparent without an understanding of the principles by which the composers implemented measure. When the correct measure is unidentified, distortion is inevitable.

The proportions derived here also impact strongly on the overall balance of the music. Within many of the pieces there can now be seen to be a great variety in the density of notes per

digit: some digits are tightly-packed with notes, others are relatively empty. These sparser digits must be played no shorter than the densely-packed ones of course, and so they necessarily pull the music towards the dignified spaciousness of *largo*. All earlier reconstructions have entirely lacked this as, unwittingly, the sparser digits have been compressed in relation to the densely-packed ones, so that a fairly brisk overall flow of notes has been achieved. It can now be seen that the virtuosic appeal of the music will have been overstated, whilst the proportional elegance which should be supplied by the correct balances of phrasing and of formal structure will have been masked.

There is also significance beyond these practical advances towards the recovery of the music, emerging from the very evident maturity of the metrical system. It has been becoming clearer and clearer in this dissertation that the system entailed a flexibility, a complexity, and a breadth of application that goes far beyond the realms of either a newly-fledged experimental advance or the recent imposition of a rationalised theory of music.

It is of course important that we be alert to the real possibility that the traditional history of the measures was a late invention to confer a false antiquity on the heritage, to bolster up a flagging tradition or to inflate national pride. We may suppose that there would have been increasing advantage to be gained from this from about the mid-fifteenth century onwards, as the musical tradition came to be in decline and approached its demise.

But if indeed the traditional history was a late invention, it would be a strangely elaborate one, for the details are many,

no one account of the traditional history is unconnected in its content to the others, and ultimately the lineage of *athrawon* connects them all to the sixteenth century. Because of this it would be very hard to try to identify any point where fact would leave off and fiction begin.

The gloss to Gosteg yr Halen concerning Arthur has the boldness that we are accustomed to with counterfeit history, in this case from Arthurian romance (which was in ever-increasing general currency from the late eleventh century onwards). But when we come to the traditional accounts that concern metre, even the 'Glyn Achlach' account itself does not offer the strength of statement that one would expect of fictitious history, since it does not purport to provide the origin of the system of measure, only the adoption of particular measures into a new canon.

Also it does not seem possible to identify contradictions in the accounts; in particular the 'Glyn Achlach' account of the measures contains no personages who are elsewhere credited as having flourished subsequent to the twelfth century.

The 'Glyn Achlach' and 'Caerwys' accounts do not look plausible as entirely retrospective manufactures of the fifteenth or sixteenth centuries. Looking instead, then, at these accounts from the context in which they are subsequently placed, the 'Glyn Achlach' account is actually very plausible as an expression of Irish cultural independence from Canterbury, for the council was implicitly held under the auspices of Murchertach Ó Bríen, the same who attended the council of Rathbreasail in 1110 in which Armagh, not Canterbury, was made supreme over the re-organised Church in Ireland.

The plausibility of the 'Caerwys' account is reviewed in

Part 1: METHODOLOGY & PROVENANCE. Putting it briefly here, the establishment that the 'Statute' includes sixteenth century material only demonstrates that in its sixteenth century form it was designed primarily for contemporary legal use rather than for historical study. Whether or not there were earlier documents of which it was a redaction, no argument can be made here that its content could not have been based on an accurate oral tradition.

The most immediate issue that confronts us is the enormity of the repertory: over three hundred pieces that there are extant written records of, and normally pieces were very long. How long must it have taken to accumulate such a huge corpus of compositions that conform to this single metrical system?

There are other questions. Whilst measures are named in Welsh and Old Norse, how is it that the key term in the terminology of metre - *mesur* - is a loan-word of ultimately Latin origin? (The same is true of *caniad* - one of the key terms in form). Indeed, it is actually strange that the sixteenth century compilers appear to be immersed in this musical tradition almost to the exclusion of the existence of other traditions. They do not give the impression that the system was a regional one, confined to Wales,[6] or the invention of any particular time or place, but that, to them, it was just rather universal. For example, the way in which the term '*cerdd dant*' is used to denote this music suggests that it was thought that the music of

[6] The only mention, in all the material, of music peculiar to Wales is that in the royal Commission for the 1567/8 Caerwys Eisteddfod:- '... and calling to you such expert men in the said facultie of the *Welshe* musick, ...'. But this does not tell us much since the faculty included the composition of *cerdd dafod* in Welsh whereas the commission was written in English and it was to be executed in a place which as part of the county of Flint had been under the rule of the Justice of Chester since the Edwardian Settlement.

stringed instruments was solely in this binary harmonic form, and always had been.

This outlook is often exasperating for us. In particular, ultimately all the terminology is explained with reference to the *cyweirdant* and *tyniad* concepts, but these are never explained, and this gives the impression that the compilers were so familiar with these concepts that it would have been inconceivable that the reader could have no experience or understanding of them; and yet that is exactly the position we start from.

Giraldus Cambrensis's description of the string music he experienced has often been approached as an indicator of whatever music it was, but never really as a description of the *cerdd dant* that we are here becoming familiar with. It is obviously worthwhile to take this approach, since it is really very likely that the metrical system we have been exploring is what he experienced. Of course this does not entail positing that any of the intabulated pieces be that antique.

The system is very distinctive, based on the interplay between the contrasting harmonies of *cyweirdannau* and *tyniadau* bound together into the long and complex patterns of the measures. Further, it is notable that all the commonly-used measures (see the table on p. 75) end on a *cyweirdant*, in fact usually two successive *cyweirdannau*. Therefore we can arrive at an operational definition, at least, of '*cyweirdant*' as a metrical unit which contains harmony judged suitable for the closing of the measures of a particular piece. And also it was usual for measures to begin with a *cyweirdant*. (Those which do not were those most commonly-used as adjuncts to other measures, so that concatenations of two or more measures would normally begin with a *cyweirdant*.)

Each of these points has some counterpart in Giraldus's description. The purpose of *mesur* could well be described as the maintenance of order and proportion through long, complex cycles and Giraldus seems to be describing just such an effect by '... musica servatur proportio ...'. The contrast between two different types of harmony is caught by his use of '*diatessaron*' and '*diapente*', a pair of terms which is certainly not technically equivalent to *cyweirdant/tyniad* but is amenable to being pressed into service here, especially as it contains the hint of a shift between adjacent notes, which of course so permeates the *cyweirdant/tyniad* system. An awareness of the importance of the harmonic consonance of the opening and closing of passages or cycles seems to have led Giraldus to refer to the use of B-*fa* at these points. As Weller (p. 22) suggests, Giraldus may well have been using 'B-*fa*' not in a literal sense but as a metaphor for the 'rounding-out' of harmony, and if so he would have been describing a similar effect to what was produced by the placement of *cyweirdannau* at the openings and closures of the measures.

These correspondences are not specific enough to conclusively prove that the metrical system was in use as early as the twelfth century, but they are very persuasive when taken together with all the other indications, particularly the aptness of Giraldus's descriptions of playing technique (discussed in Part 4: TECHNIQUE, pp. 110-1).

We do have good reason to expect that the system would have been in force at an early time. It is established that most of the metres and ornaments of *cerdd dafod* were in use over a very long period. Although the preservation of these techniques may

have been aided significantly by writing - they may lend themselves to the written record perhaps more easily than do the measures of *cerdd dant* - there cannot have been very different factors controlling the development of the two arts:- after all they were sisters, sharing the same institutions.

Furthermore, we should expect much of the content of the music, especially the formulas, to have endured over a long period down to the sixteenth century, since this is one of the results of strict metre: that a musical or poetic work should be rendered impervious to corruption in transmission. One of the reasons given in the 'Glyn Achlach' account for the making of the 24 *difr* was to keep pieces in memory.

Factors of this sort may well have been more important in *cerdd dant*, where composition was undertaken rarely and was not apparently linked to payment (as far as we know payment was linked to performance only), than in *cerdd dafod* where payment was, for the poet, mainly for composition. A poem was always related to 'current affairs' and therefore subject to redundancy, whereas a *cerdd dant* piece, apart from any dedication it may have entailed, was an abstract work in the sense that its content was unrelated to any particular time. The composer of a *cerdd dant* piece must surely have had greater ambitions for its longevity, and the piece's transmitters would have understood and respected those ambitions. This is of course evidenced by the scale of the MS. text and the catalogues etc.

So here the music we are gaining insight into may be of great antiquity, and a successful reconstruction of it would surely reflect this in terms of effective communication even to our ears, so remote though they be from the culture of that

antiquity. We are now in a position to start looking into what it is that the music communicates, and how effectively, since the firm foundations of a reconstruction are supplied here by the precise details of the reconstructed order of reading the text and of the relative proportions of the segments of text.

An extravagance of predominantly symmetrical architecture is revealed, so closely tied to form that dynamic expressiveness cannot eclipse the form. The form clearly communicated is that of the interplay of complimentary harmonies within each cycle of measure and of incremental repetition throughout successive variation cycles (each comprised of a concatenation of measures).

The nature of these aesthetics in combination with the sheer scale of the main pieces results, surely, in a music with a dignity great enough to match a pedigree of centuries of high esteem. But its impact is dependent on the listener being prepared to engage with the details of the form throughout these long pieces. Perhaps this always was a problem - Giraldus declared that to some, fastidious things can appear tedious.

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