

PREFACE

The Hebrew Bible that has been handed down to us contains musical notation. It is written in symbols called the te'amim, which represent a method of writing music that has been forgotten with the years. If the method could be rediscovered, it would enable us to reconstruct the ancient melodies that are written here. Since the musical notation dates to no later than 350 AD, the melodies would most likely be the original tunes used in the temple, and thus the songs written by King David, King Solomon, the Sons of Korah, etc.

There are several problems with the reconstruction, however. The first problem is that many Christian scholars disagree with the fact that the symbols represent music at all. The answer to their objections is several fold: First, all the Jews believe they are music. Second, they have names that in Hebrew translate very often with musical meaning. Third, if they are not music, what are they? No disagreeing scholar has ever been able to answer that question. This objection is thus easily overcome, by simply ignoring it.

The second problem is the remote antiquity of the system. Not only written music, but also the whole way we process the idea of writing it down has changed at least three times in the last 2000 years. Reconstructing the system was impossible, until archeological discoveries of the mid twentieth century made it possible to recognize the original theory.

The third problem is the simple fact that musical sound has changed drastically just in the last 500 years, let alone the last 2500. There have been three previous attempts at reconstructing the system, and each has sounded like the music that was "modern" at the time of reconstruction. In fact, the Jews today have six systems of interpreting the notation, each derived from the musical sound of an area in which they live(d). The Jews know that none of these are correct, but feel the ancient system is too remote to determine with any certainty. Happily, archeology has removed this difficulty as well. The Abyssian Coptic Church (the ancient church of a part of Ethiopia) claims to have preserved the melodies of the psalms in other songs, and recent reconstructions of ancient Egyptian, Sumerian, and Hittite songs give us new

insight into the sound of this music. Also, major new breakthroughs in ancient Greek, and Persian music give us the terminology and teachings we need to know what to look for in the music of Israel.

The technical details of the reconstruction are given in a more scholarly study with a 5-line title. This study is a following of my research in the early 1990's and a statement of how to read the music of the Bible and thus reconstruct the melodies aimed at the non-technical reader.

THE TE'AMIM

The symbols in question are of two types: The following symbols are inserted below the Hebrew text, and occur one to a word: / | L / ^ Y \ > S 7 (These are the nearest available typewriter keys). Some of the symbols inserted above the line are (these are the ones that can be typed) < . \ \$ 9 + : . P. There are 15 in all. They are inserted here and there seemingly at random. One additional symbol | is inserted within the line.

The upper symbol names include go away from, peak, howl, squat, scatter, hang, triple, scatter, rise and fall. With names like this, it is almost a foregone conclusion that the upper symbols are ornaments, like used in Baroque music. Indeed, many of the names describe the roles of such symbols in the 17th century, and their random occurrence suggests just that. It is known that a system of ornaments was used in the 3rd and 4th century AD in Greece, and in fact, inspired Gregorian chant notation, which in turn gave way to modern notes. But which notational symbols stands for which musical action?

The lower symbols have names such as end, middle, crazy trumpet, trip, fall, invert, gift, pile up, howl, pause, change (translating from the Hebrew).

THE LOWER NOTES

The three previous attempts at reconstruction of the musical system are:

1. The Massoretes themselves. The people who recorded and preserved the text of the Hebrew Bible for 700 years after the fall

of Jerusalem attempted the first system. It is universally accepted to be incorrect.

2. Johannes Reuchlin in 1518 AD. A loyal Jew who based a system on the “new” mensural hymn of his day. The music sounds quite a bit like Lutheran hymns (which evolved at the same time).

3. Suzanne Haik-Vantoura. A French organist who died just at the end of the twentieth century. Her system sounds much like the French organ music of Gounod, Messaien, etc.

Haik-Vantoura failed, as did the others before her, because she lacked the archeology to do the job properly. However, it is to her that we owe two major breakthroughs. First, is the use of modern mathematics-based decoding theory developed by military intelligence in the two world wars. Second, is the amazing guess that the lower te’amim each represent a note of the scale, and that precisely one note is assigned to each accented syllable, and therefore to each word.

Once she said it, it seemed so obvious, it was hard to imagine that everyone had missed it for all these centuries. It is well known that, as traditional hymn texts count each syllable, Hebrew poetry counts each word, and each word has one accent, regardless how many syllables prefixes (like prepositions) and suffixes (like pronouns and plurals) might add to it. Psalms are routinely 4+4 words in paired lines, or 4+3 in paired lines.

And then, too, it was clear that the names of the symbols above the line describe alterations of a tone (rise, fall, scatter, etc.). That itself implies that the note to be altered must be specified. There is an ancient tradition that 7 notes, as 7 colors, are 7 manifestations of God; it is likely they would have been written at the same time as the words, and exactly one assigned to each word. The layout even matched the positioning of note names on Galpin’s tablet (see below).

Now all that was necessary was to determine which of the 10 lower symbols (in the psalms. 13 or so in the whole Bible.) represented which note of the scale.

But which scale? Vantoura wrongly assumed the scale to use was an amalgam of folk music scales. The correct procedure was to turn not to the music of contemporary folk societies, but to archeology.

Francis Galpin in 1936 published results from decoding the music in an Assyrian tablet dated to 850 BC. He noted a 9-note scale matching ours, but with an additional note corresponding to a sharpened 4th. That is: F G A B \flat B C D E F. Since this scale is from a culture contemporary to the Israelite monarchy, theirs is likely similar. Limited work on old Hurrian, Hittite, Sumerian, and Egyptian yield a totally consistent result.

Ancient Greek musical theory needs to be seriously looked at. After all, the upper markings are similar to 300 AD Greek church music notation, and many Israelites had lived in the Greek-speaking world since Alexander conquered the Holy Land in 300 BC. The Greeks had many musical books, but until quite recently only one book was taught, and modern research has proved it was not definitive.

This Greek theory had to do with how a scale is constructed. A scale is composed of two “tetrachords”, or half scales of four notes each. The lowest and highest notes are to be separated by a perfect fourth (C-F or G-C in our scale) and two notes in-between are to be chosen from a list of four alternatives. Thus there are 6 tetrachords, choose any one for each of the two in the scale and you have chosen the notes to which your harp must be tuned.

The error in the book that was used by our culture until very recently (in fact, until rock music’s altered scales came in) was that the author of this particular one book went further. He claimed that there were only 7 worthwhile scales to use (mathematically, there are 36). Because his book was the only book taught, these 7 scales became the 7 “modes” of Gregorian chant, and then, to make harmony work out, they were limited in Bach’s time to 2, eventually called the major and minor keys.

The fact of tetrachord dominance over mode is the key element in determining the Biblical scale.

Vantoura’s great idea of using military decoding techniques was the right next step. In fact, she spent over 40 years making frequency tables of recurring lines of notes, the first step in the method. However, if she had used tetrachord dominance, she could have had the tables done in less than an hour. There is only ONE regularly recurring sequence of 4 notes. It is | L / ^ whose names are rest, middle, tripping, and gift. The sequence occurs

both forward and backward throughout the whole Bible, and also occurs with / missing.

She was not the first to identify the two stable notes | and ^ . Many scholars had assumed, correctly, that | was the final note and ^ the next important, since almost all successive pairs of lines end with that combination, and almost every psalm ends with | . The names match, as well. Rest is the last note of a song, and middle, continuing to trip away make sense as names for passing notes, and gift sounds like a great place to get to in the middle of a song.

Assuming we're correct, we have one tetrachord, and an idea that the scale names of Israel describe a journey up and down the harp strings. (The Hebrew word for song is SHIR, for journey is SHUR.)

But which note goes to which symbol?

THE TRUMPET

Israel is the only culture of the ancient world to choose the trumpet as the priestly instrument. The Egyptians use a rattle type instrument called the sistrum; the Assyrians use the harp; many other pagan nations use the flute. We can go even further. Israel invented the trumpet. The first time the word trumpet occurs in any language, in any culture, is in Exodus 19:13, where God blows on the mountain. (In Hebrew) God plays the trumpet and uses the earth as His instrument! Since God provided a ram as a substitute sacrifice for Isaac, the ram's horn (which is a trumpet musically) became the trumpet of choice for Israel, and the priests later played trumpets of silver.

If we assume that the trumpet defined the scale, our problem of assigning notes suddenly vanishes. On the piano, all the major keys sound the same. But it wasn't always that way. As little as 300 years ago, the key of F sounded very different from the key of E. That is why old music is called Sonata in F, or whatever; the listeners are warned to expect a certain sound. The trumpet plays what may be called a "natural" scale. The piano was tuned to a C trumpet, and all the other keys sounded more or less "wrong".

It was JS Bach who figured out how to round off the errors to make all the keys sound the same. If you don't believe this, try singing the note E as a pianist or guitarist switches chords from C

to E. You will find your voice getting higher and lower as the chords change. You are putting back the "natural" scales' relative error. (The fact that you do this automatically is why the scale is "natural".)

The upshot of this is that in the TRUMPET scale, there is only ONE perfect fourth, and it is between G and C. (All the other fourths are off.)

The next question is whether the trumpets were tuned to C, or flat or sharp to it. No Israeli trumpets have survived, but they look about the right size for C. A few homemade flutes have made it, and they are tuned just slightly flat to our C. There will be a further check later, when we compare the whole scale to the size of Levitical singer's throat.

So, | is either flat G or flat C, ^ is the other, L and / are some kind of A and B.

Several of us (the Messianic Project, a recording group led by Messianic Jews with whom I worked for several years) tried the transcribed songs with the various combinations. Hands down, the only one that sounded remotely like worship was | L / ^ means G A Bb C. But that means, that Israeli music is in the "key" of G-minor.

Comparing the lesser occurring combinations of notes to these (and using the tricks in the next section), obtained the following scale as likely: S | L / ^ \ > ./ 7 means: F G A Bb C D E-Eb (halfway between) F. Every transcription worked (I tried the first two lines of every psalm. We ultimately recorded Ps. 117 and Ps. 150 – it's a round, and used those two and Ps. 134 and 136 for worship, as they have the closest sound to modern). The list of notes exactly fits the male singing range, and the transcriptions sound like the melodies of the Abyssinian Coptic church. The scale on C also makes the trumpet length an overtone of the earth's magnetic field, and it is known that the ancients had the technology to measure it, and that some of them cared about it.

One note was still unplaced. And one trumpet note was missing. When I matched Y to B-natural, I got another surprise – there was Galpin's sharp fourth! Y is called "wheel of the morning". The meaning is that it is a new beginning – since the "wheel" is what, according to ancient astronomy, causes the

morning star to rise. The note is used to Psalm 1, for instance, and changes the key from G-minor to G-major.

THE ANCIENT DECODING KEY

I could never have finished the matching without more information. The last 3 notes to be assigned, S / and 7, occur too seldom to be certain of anything, and Y was a wild card.

In 1946, a cache of ancient texts was discovered in Nag Hammadi in Egypt. One of the texts was a lost “Gospel to the Egyptians”. (The reader should not be upset to learn that there were many “uninspired” gospels that did not make it into Scripture. Early Christians wrote books too.) In this gospel, there is a “mantra” that supposedly is what God uttered to make the “hidden invisible mystery come forth”. The mantra is composed of each of the 7 Greek vowels repeated 22 times, in the following order: iEoueaO. (E and O indicate eta and omega)

We know from Plato that the Egyptians sang the scale to vowels, but we do not know the order of the vowels used. Suppose this was it? Could the scale of the Hebrews have been notated as a shortcut for Greek vowels?

They could have not used consonants. To this day, Hebrews count ...10, 11, 12, 13, 14, 9+6, 16, 17, 18... The problem is that 15, if they wrote it using letters of the alphabet for numbers, which is what they do, would spell YH, the name of God. They would never have used letters for notes, like we do ABCDEFG, for fear of spelling something dreadful when a melody was written.

They had to do the writing in a Greek country. New testament Greek was pitch inflected, like Chinese. It was a major problem that Jews living in the Greek speaking countries could not sing the psalms in Greek translation correctly because the Greek pronunciation kept obliging them to follow the wrong melodies. (This theory is due to Gudrun Endberg in 1966. and is the only theory ever advanced by anyone as to why the marks were invented in the first place.)

If we move the date for the invention of the writing back to 200 BC, instead of 300 AD, as we had thought, it solves two other problems. First, we now know why the Massorettes forgot the system – it had been too long, and they were Hebrews, not Greeks.

Second, we now know why they notated the scale in letters – that was how it was done in Greek at that time.

But how do we know that this is the order? It is trivial to check it. Greek i simplifies to |, Greek E is written like H and so becomes L when non-essential lines are dropped, o becomes a quick compressed stroke /, u is written like Y, and when turned upside down is ^ (this symbol is also traditional, as it notates the hand symbol used for this note by the musicians painted in Egyptian tombs), e is the quick stroke \, the Greek a is written like a fish symbol, simplifying to <, and O, which is written like two uu stuck together, has the first u become . and the second /. The repetition at the lower octave used the capital O, called omega, and it simplifies to the real character which I notate by S. The problem was solved.

But now a new one came up. Could these be the long lost vowels in the name of Yahweh? They come close: IeoueaO in sound is Ye-whe-ao, which would fit. The vowels were lost after 400 BC. They certainly are the vowels in “Jesus the Alpha and Omega” in Greek. Moses must have had some reason to think that Pharaoh would acknowledge him if he knew God’s name – maybe this is it. Could the Egyptians have modeled their scale note names on the vibrations of the earth that they heard when God blew on Sinai? There is a curious American Indian legend that suggests that the cowboy word “Yahoo” entered the language because indians in Washington State heard that cry ringing in the heavens “when the sky came close to the earth”. The sky trumpets in the Iliad, and there is a Norse legend about the trumpet opening the barrier between heaven and earth. It’s very tempting to believe that this IS the song the earth plays at the presence of the Almighty, but we cannot prove it.

I got two more surprise confirmations that the scale is correct:

1. Egyptian writing has a lot of superfluous vowels in it. I tried transcribing the superfluous vowels on the same decoding system, and got workable music every time. It doesn’t sound like worship; it sounds pagan, but it does work. In one curious case, I transcribed hieroglyphic superfluous vowels accompanying each member of a three-part ensemble drawn on the walls of a tomb. I got lovely, ancient sounding three-part harmony!

2. Traveling holy men in the Bhojpuri region of India use exactly the same system to chant their “prophecies”. I tried transcribing the songs of the Biblical prophets based on their system, and the results work well. Curiously, the note > is used by their shepherds to chant throughout the night. It resonates perfectly in the male voice and keeps them in touch with the villagers. This note >, is King David’s “complaining note”, and David was a shepherd.

One additional check is that if the scale is numbered in Roman numerals, and finger positions are used to indicate the notes (as was common for choir directors to do in the ancient world), the fingers held up for each note (thumb equals 5), trace the pictures fairly well.

By the way, the finished scale journey is from “howling” in pain, we are “changed” to “pile up” our complaints to God, then His “chariot”, brings us to His “gift”, from which point we “trip”, on to His “consolation” and into His “rest”, where we “pause”.

We sing, do, re, mi, fa, sol, la, ti, do in nonsense syllables.

The Hebrews sing howl, pile up, change, chariot, gift, trip, consolation, rest, pause.

And the earth, of course, sings the name of God.

THE UPPER SYMBOLS

We have reached the conclusion that the lower symbols were added about 200 BC, and are alphabetic in nature. The upper symbols were added 200 AD or later, since this style of writing music is documented in the ancient world only after that date. It is reasonable to conclude that the lower notes were enough to guide the non-Hebrew speaking Jews in the correct melodies, and the Massorettes found it necessary to expand the system only after it was clear that Jerusalem had fallen, and now the Jews would have no one to keep the tradition orally. This is why they are less complete.

I have no key for the upper symbols. Vantoura thought that they would look like the notes they represented. This seemed reasonable, since the Greek system of 300 AD did that and also gave rise to modern notation. However, it posed two phenomenal problems.

First, most of the symbols don’t look like notes. It is a stretch to get them to work as notes in ways that agree with the traditional names for each.

Second, in order to use the note theory, we need to know which direction of the scale was perceived by the Hebrews as “up” and which as “down”. The reader may have noticed that when the Hebrew scale was stated, it was going “down”, while our do, re, mi... went “up”.

It should come as no surprise that the words may be different from culture to culture. I have given many music lessons to young children, and they often confuse “up” and “down”, thinking that “up” should be the longer piano strings, which of course make “lower” notes. The ancient mathematics texts from Egypt compute pyramid slope as run over rise, the exact opposite of our method.

Only a couple of the te’amim demand a knowledge of up-down, but those two are consistent with what we have already observed. The Hebrew order of the scale is opposite ours. We will speak of up and down in OUR terms, not theirs.

It seemed reasonable to me that the upper te’amim, being “ornaments”, should be a complete system of some sort. That is, if one of the names meant “two notes down”, there should also be a “one note down” symbol, and a symbol for “two notes up”. Several of the names go as far as two notes, either up or down, either held or quick, and one name clearly indicated up and then back down. But which was which?

The answer to the upper structure is not terribly critical. After all, it did not concern the singers in the time Jesus was on earth. Then too, the word “te’amim” means “tastes”, and was most probably left to the original performer, until there were no more performers, then SOMETHING had to be written down. But I still wanted a complete system.

After trying several alternatives, I settled on a system dependent on the hand signs. Such signs were used everywhere in the ancient world; they are shown in Egyptian tombs and prescribed by the popes in the 5th century. After trying several alternatives, and having seen how the lower te’amim symbols lie across the hand signs for the Roman numerals, I noted that ALL the symbols were consistent only with the following system:

The upper hand symbols are pictures of the position of the hand indicating: Fingers of the hand pointed toward the choir means go down. Fingers pointed parallel to the singers means go up. The number of fingers means how many notes. If the thumb is extended upwards, it means long notes. If the thumb is kept folded, the notes are quick. This covered everything except the separate symbol for all four notes.

The remaining symbol | inserted in the line is clearly a breath pause.

PERFORMANCE

Rhythm has always been held, by all authorities on ancient music, to follow the natural spoken rhythm of the words. That is why there was no need for a way to write it down. When transcribing into modern music, I adjust the held notes to fit the timing that is currently used.

I have notes change on the accented beats. The other option would be to have the note govern the entire word. But in Hebrew, the accented syllable is almost never the first, and often not the second. Allowing the note to change early would give the music a syncopated quality that is inconsistent with the Abyssinian Coptic examples.

All the published material about use of instruments, congregational singing, response singing on the psalms is not changed by any of this research. This research covers only melodies and implied harmonies.

The chord structure that is used by modern worship music IS (I repeat IS) consistent with the Hebrew culture. Most people would think that it is not. They would cite the fact that the music of Greece is known NOT to have chords, and, in fact, chords were introduced into music only about 500 years ago. But recall, I found 3-part music, with correct chords, in the Egyptian tomb transcription, which showed three instruments playing together. That music suggests that they did not have the third of the chord as a defining element, but they had the root and the fifth. The third appears to have played no structural harmonic role, but behaves like a passing tone in traditional harmonic theory. Furthermore, I have not yet covered all the names of all the notes.

L is also called “crazy trumpet”. Although all the notes of the scale occur on a 4-ft. long trumpet, they occur at too high a range to be useful in lengthy performance. In practice, the trumpeting Levites of Israel used trumpets of different size, and took advantage of the fact that the “crazy” or non-standard trumpet played different notes in the low range, than the basic 4-ft. trumpet. This is why there were so many trumpeters in Israel. Modern trumpets have valves, which allow changing the effective sounding length of the instruments. But valves were only invented about 200 years ago. Until then, symphonic trumpeters had to carry “plug in pipes” to change the size of their trumpets for different lines of the song. That is why brass music is still written in several different keys. That way, the performer didn’t have to figure out what new notes to play, as the trumpet length, and hence, the note, changed. The composer made the change for him – because of the key change, the desired note appeared on the line of the staff where it WOULD have been had the change of sounding length not occurred.

The basic trumpet, would, by nature, play G, Bb, D, and high F. The “crazy trumpet” A,C,Eb-E (the note changed when the lips were tightened due to emotional response to “complaining”). Two trumpets outline the basic chords. G-minor, C-minor, A-minor, Bb, F, with G-major taking the place of G-minor when Y was involved. We transposed down into E-minor, based on modern voice ranges, when we recorded, and used as our basic chords: E-minor, D, and A-minor.

A TRANSCRIPTION

The longer study contains 18 pages of transcriptions as well as the complete transcription key, and is available in draft form only, as a tiff file or hard copy, mostly hand written. It is impossible to set the entire study in computer format, even with the new 16 bit fonts now available, for various reasons.

I provide here the details of the transcription of Psalm 117:

First, here is phonetic transcription of the Hebrew, with the te-‘amim added above and below the line, as the Hebrew appears:

Hallelu et-adonai kal goim shabchuhu kal ha-umim. Ki gavar alinu|
 L \ ^ | | L >

Chasdu ve'emet Adonai leolam Halleluia.
 | L | |

Now, here is the same, only with a English translation made to match the rhythm of the Hebrew, with the te'amim translated also:

4-note-turn

Halleluia, praise the Lord all people; sing His praises nations of the
 (G) A Bb C G

2-note-turn 4---note-----turn

earth. For steadfast is His love, and His mercy shall endure
 G A Eb pause G A

evermore, halleluia.
 G G

Note: 4-note turn-is my name for base note-up-base-down. The up is \, the down.. The two note turn is ~, and consists of the upper then the lower note around the base note, without using the base note. I follow Vantoura in the obvious provision of the initial G if it is not supplied, and the obvious maintaining a note until it changes. It is equally likely the first Halle- was shouted, not sung, and so needed no note; however, other psalms are not so easily explained without this assumption.

Now, here are the words again, but with all the upper symbols turned to notes, and chords added, and bar lines for 4-4 time added as /. The ornaments are in underlined:

Gm F /Gm / Cm// Gm /Cm
 Halleluia,/praise the Lord all/people//singHis praises/nations of the
 G G A A Bb Bb Bb Bb Bb C D C Bb C G G G G*

/Gm / /Gm Cm/Fm / /Gm /D
 /Earth./For/steadfast/is His lo/ve, and His/mercy shall en/dure
 G A BbG Eb F F F / Eb D G G G G A

/ /Gm /
 ever/more/hallelu/ia
 .AA A G G G* G

At the two G*, we sang F, because it sounded natural.

