

LESSON 3. EARS, HABITS & SOUND / FINGER PATTERNS.

3.1 Harmony

Hearing the chord changes.

No new chords or progressions are presented in this lesson, but you should continue to work on MEMORISING and TRANSPOSING the material from lessons 1 and 2.

You will learn from experience that the progressions covered in the first two lessons are in CONSTANT use and to help you to memorise the sound try taping them and play them over and over again until the sounds are familiar. Better still you should analyse some popular jazz themes, identify the chord sequences and familiarising yourself with them by listening to tapes of the sequences. You can find the correct chords from the many published jazz 'lead sheets'. You will immediately find many examples of these sequence types.

Also when you listen to records of the songs you have analysed, see if you can HEAR the chords changing? Then when you play the themes yourself be CONSCIOUS of where the chord changes.

Get into the habit of studying each song before you play it, or before you listen to it. If you can see how it goes 'on paper' you will hear the changes much more easily when you play or listen.

Initially when you start to play jazz songs you will be playing the melody that you know, together, perhaps, with some 'embellishments', maybe remembered from your favourite records.

But later when creative spontaneity creeps in you will find that the chord changes become important 'landmarks' which tell you where abouts you are in the song. Familiarisation with the feel of a song and its chords is an essential prerequisite for improvisation. As we mentioned in lesson 2.1 the chord sequence is the VEHICLE FOR IMPROVISATION.

But we are getting ahead of ourselves; at this stage you should be listening to as much jazz as possible, absorbing the sounds and trying to hear the chord progressions. Don't worry if, initially, you have difficulty 'hearing' the sounds; the ear thrives on practice and eventually it will become more discriminating. The only people with 'dud' ears are those who don't listen!

3.2 Acoustics.

The tempered scale & the ear.

Musical instruments produce their tones through controlled vibrations of strings or columns of air, the vibrations being initiated by a plectrum, hammer or bow in the case of the strings or pressurised air passing over the human lip, a sharp edge or a piece of reed for wind instruments.

The PITCH of the tone produced will change as the length of the string or air column changes. The shorter the length the higher the tone.

The string or air column will naturally vibrate NOT ONLY over its full length BUT ALSO over half its length and in thirds, quarters and fifths etc. These are SIMPLE NATURAL ratios and the vibrations produce simple natural sounds. Thus, when a note sounds, IN ADDITION to the fundamental note, OVERTONES are also heard. The overtones give an agreeable QUALITY to the tone. The natural ratios we can hear when middle C is sounded are --

Fundamental	C	full string	256 vibrations per second.
first octave	C	half	512
	G	third	768
second octave	C	quarter	1024
	E	fifth	1280
	G	sixth	1536
	Bb	seventh	1792

See Ex.1. for a complete list.

These are the natural overtones we tend to hear every time a string is plucked or a note blown, although it is only the first few 'harmonics' that are audible. The ongoing attraction of vibrating strings and air columns for musical instruments lies in the TONE QUALITY produced because of these overtones.

The first six of these natural, simple ratio, overtones, or HARMONICS, are present in the major chord so this could be a obvious explanation as to why the major chord sounds pleasant on the ear. This 'beauty' of nature's simple ratios was first discovered by Pythagoras in ancient Greece and musicians have been preoccupied with the source of music's attractiveness and elegance ever since.

However, we must add that 'natural' harmony cannot completely account for the harmonic principles developed in this course. For a start it is difficult to derive the whole of the major scale from harmonics, the 7th harmonic, for example, is Bb!?

It is more likely that the origin of our major scale comes from the particularly harmonious sound of the 5th.

Men and women singing together would certainly establish the unison sound of the octave, which is fundamental to all music and all cultures. In more primitive societies where 'single line' melody is practised the octave can be subdivided into any number steps and any size of interval. We have previously mentioned the different 'modes' that were in use in older music and many different scales are in use in other cultures today. However, once COMBINATIONS of notes sounded together are introduced into music the importance of the pleasant sounding 5th becomes imperative.

We can speculate by imagining a single stringed instrument, tuned to, say C, being supplemented by an F string a 5th below, and a G string a 5th above. The C string would sound good played together with either of the other two strings, although the G and the F together would have to be avoided. If we extend this principle, the note sounding best with the G would be its 5th, a D, then its 5th an A, then an E, then a B. By adding 5ths in this way each string would sound good played with each string on either side of it, and we have now the C, D, E, F, G, A, B of the major scale.

We don't know for certain the origin of the major scale but we do know the importance of 5ths when notes are sounded together.

If we extend the series of 5ths we end up with an interesting result --

F C G D A E B F# C#/Db Ab Eb Bb F

.....we end up back at F!

This sequence, often called the CIRCLE OF 5ths, is of considerable importance for harmony, and for the improviser, as we will see later in lesson 8.

The frequency of notes derived from 5ths in this way is shown in Ex.1. Unfortunately there is a small problem with the arithmetic!

The natural ratio of 5ths, the 3 / 2 ratio, does not result in an exact match of the F's in terms of vibrations per second. The error is significant, a quarter of a semitone, and would sound sharp to a trained ear.

Our conclusion is that the 'natural' intervals, whether derived from 5ths or harmonics, do not divide the octave into the 12 equal semitones of our system of study. There is an error which is small but intriguing.

The 12 equal semitones, and the whole of the structure of keys derived from them, originated as recently as 1750 when pianos started to be tuned to this TEMPERED SCALE, The big advantage of the tempered scale is that EVERY KEY SOUNDS THE SAME. This makes modulation possible without offending the ear and the prospects for the development of harmony are transformed.

Ex.1 shows the frequency figures for the notes of the major scale derived from harmonics, from

natural fifths and the corresponding figures for the tempered scale. Although the differences maybe small there clearly are differences. The science of acoustics does not neatly reflect our established musical usage! Arithmetic can't explain music!

When tuned to natural frequencies the semitones are unequal, these different intervals of early period music could account for the different characteristics which used to be attributed to the different keys. It also emphasises the fact the major scale is one of many possibilities and our music sounds 'in tune' simply because we have become familiar with the sound; we have become 'CONDITIONED'.

The point we wish to stress is that the ear is wonderfully flexible and TRAINABLE and will adjust to systems of tuning relatively easily. WHAT SOUNDS RIGHT IS RIGHT. We accept the sound of the tempered major scale, our ear has adapted to this man made artefact quite easily. We will see, in lesson 9 when we start looking at the BLUES, that other different tonalities can also be assimilated quite readily through FAMILIARISATION.

We should add, for those of you who cannot hear 'wrong' notes, that you will find, after a time, after familiarisation, the right and wrong sounds will become obvious. The ear can be developed and training methods will be covered later in lesson 6.

3.3 Melody. *Appoggiaturas.*

We now want to introduce an important development into our melodic work by discussing some 'unessential' notes. These unessential notes are often referred to as 'embellishments' or DECORATION. All the possible forms of decoration will not be explained at this stage, because the effects we want to produce are attained by LIMITING the material. It is SIMPLICITY which maximises impact. Jazz is not about complexity, or more correctly jazz rhythms are complex but they are produced by simple means. We will come back to this later but at this stage we want to stress simplicity in melody.

An APPOGGIATURA is a melodic pattern produced when we approach the I or III or V of a chord from a note which is not part of the chord.

We can do this in 2 ways –

- from BELOW the chord note, in which case the non chord note is always at an interval of a SEMITONE below. See Ex.2 for C major.
- from ABOVE the chord note, in which case the interval is sometimes a tone and sometimes a semitone. See Ex.3.

The 'rule' here is that the upper appoggiatura should FOLLOW THE LINE OF THE SCALE OF THE KEY. Thus, the upper appoggiatura to the root and 5th of the C major chord (in the key of C) will be a TONE above, i.e. D and A, while the upper appoggiatura to the 3rd of the chord will be a SEMITONE above i.e. F. but where the 3rd of the C major chord is found in the key of G, the upper appoggiatura would be a tone away i.e. F sharp.

We can now construct some exercises using the new technique. See Ex.4 to 8.

Listen to how the use of these unessential notes makes the continuity more fluid and versatile, imparting a greater expressive quality and forward urge.

BOTH forms of appoggiatura can be used before the chord note. See Ex.9 and 10.

This procedure increases the feeling of delay in arriving at the chord note, thus creating a certain degree of tension and 'modernity'. You can hear that quite interesting effects can be obtained from simple chords when double appoggiaturas are used.

The trick here is that quite DRAMATIC EFFECTS can be achieved by SIMPLE 'RULES' of approaches to chord notes.

We are now ready to study some typical passages incorporating the material presented up to now. See Ex.11 to 23.

When playing these exercises we should mention again the importance of accentuation. How we choose to accentuate a note, as well as which note is chosen, has an important effect on the overall sound. This is sometimes referred to as 'interpretation' and the effect manifests itself in a feeling of motion, or dynamics. Tonguing, attack, volume, timbre are all part of musical DYNAMICS. Dynamics cover both volume and intensity and are fundamental to the jazz idiom, adding a new dimension to the mix of rhythm, melody, harmony and form which are present in all music.

Ex.11 to 23 should be practised carefully and MEMORISED and you should experiment with the dynamics of the examples.

Let's reiterate that this course focuses on aural perception, it is not about sight reading but about improvising. Sight reading the exercises will interfere with the essential 'listening to the sounds', your consciousness will be dominated by your eyes not your ears –

READING MAKES YOUR EAR LAZY!

Every time you play you must listen to the note patterns you produce, you are trying to FIND something which sounds good. Thus, once you are familiar with the notes of the exercise, or notes of a song, TURN THE PAGE OVER and play it from memory and ask yourself - does it sound right, does it sound like jazz?

All the exercises and songs that you play should also be ANALYSED and you should attempt TRANSPOSITION as well. Transposition will be much MUCH EASIER if you have memorised the sounds and not simply read the notes from the staff.

An analysis of Ex.22 is shown, as an example, in Ex.24. The analysis involves locating the chord notes first and then understanding the unessential notes in terms of the rules we have outlined above. What SOUNDS great will be seen as simply the application of the material we have presented.

Ex.25. is another example for practising the co-ordination of melodic material and chords.

Note, by the way, that many of the exercises given in these lessons, although appearing to be decorations of one particular chord, COULD be used with different chords. This is because notes are common to two or more chords, and so, in many cases, the same melodic phrases can 'fit' more than one chord. See Ex.26.

'Fitting' the SAME rhythmic pattern to DIFFERENT chords may also involve note modifications. This idea is an important part of a jazz player's armoury; familiar patterns may have to be ADJUSTED to blend and complement the chord sequence. But once again we are getting ahead of ourselves the first priority is familiarisation with the patterns of jazz!

3.4 Absorbing Material.

Sound / finger patterns.

Now that we are well into lesson 3 it may be appropriate to review where we are getting to and what should be happening as you accumulate a developing skill. Lesson 2.4 mentioned the processes which should be at work.

When you try to play jazz we have stressed the importance of the EAR. But not everyone who has a good ear can improvise. There is a much more subtle influence at work which is connected with HABIT. In the last lesson we mentioned that it is necessary for the fingering patterns that we are accustomed to using, to coincide with the kind of sound we wish to produce. In reality, improvisation is a very complex co-ordination process, involving synchronisation of SOUNDS in the mind with FINGER patterns on the instrument, all in the required idiom.

The key is that through habit we instinctively, and subconsciously, 'know' that 'THIS SOUND' comes from 'THESE FINGER POSITIONS' –

EVENTUALLY YOU WILL SIMPLY 'THINK' THE SOUND AND 'AUTOMATICALLY' YOUR
FINGERS WILL MOVE TO THE CORRECT INSTRUMENT POSITION!

We have described the reaction of the body as 'finger position because most instruments are

played with hands and fingers. But the process could also involve lips and embouchure or hands and mallets or hands and bows or whatever part of the body is involved in producing sound on your particular instrument. Perhaps a better description would be sound / 'muscle' pattern. But whatever muscles are involved the habit process involved is the same; muscles are trained to respond to sounds in the head.

Applied to our learning problem, this mechanism will mean that ALL our practised exercises will become 'available', through HABIT, for subconscious projection. The material will be 'available' not only in its original form but also it can be REORGANISED in various ways, giving us a MUCH BIGGER and MORE VARIED resource than might originally have been thought. Thus –

- any of the exercises can be split at the bar, or even the half bar, and combined with material from other exercises. See Ex.27.
- the rhythmic structure of any exercise can be displaced to produce a new rhythm. See Ex.28.
- the procedures above can be varied, producing endless possibilities. See Ex.29.
- the original exercise can have its rhythm taken away and a completely new rhythm added. See Ex.30.

By means of these devices of COMBINATION, RECOMBINATION and DISPLACEMENT it is possible to produce a great many patterns of a kind which are similar in idiom but varied in detail.

The material you have absorbed can be recalled subconsciously for use in a massive variety of ways.

Thus, after you have done sufficient work on the construction and practice of patterns, you will find that they can be projected at the subconscious level during performance. This means that the mind will perform these activities on its own, without you having to attend to all the details. Believe it or not this is what actually happens –

- you simply hear the sounds from your exercises or records in your mind
- you 'want' to play and produce music in the jazz idiom
- automatically the sound / finger mechanisms respond!

THIS IS NOT MAGIC IT IS JUST HARD WORK!

It is, in fact, the only way anybody who has ever played jazz has learned to do it. It is because the jazzman's skill is based on habit that he finds it very difficult to articulate how he does it 'I jes blows, man!'

So if you want to do it you need to work. The following practice programme is suggested for ALL material THROUGHOUT the course. Remember our comment in lesson 1.4 that the exercises we present should be treated as additional material. We hope that your priority material will be the jazz songs that you enjoy. We may seem to repeat these instructions frequently but make no apologies –

LISTEN to the sound of the exercises and your songs by playing, by humming and by singing

- ANALYSE all your songs and exercises.
- MEMORISE all your songs and exercises.
- TRANSPOSE all your songs and exercises.
- BUILD PHRASES by combination, recombination and displacement of material from all sources.

3.5 Rhythm.

Syncopation, rhythmic phrase building d repetition.

The first rhythmic development in jazz was to move from the stiff 'two beat' music of the parade march and ragtime and superimpose the more 'relaxed' feel of four to the bar. Four to the bar allows more rhythmic flexibility because the four beats are almost invariably differentiated. A

variety of different accents can be introduced which are not possible with a two to the bar meter. The normal accentuation of western music would be on the first beat of the bar and the third giving a typical - ONE two THREE four - 'feel'.

A second early development in jazz was simple syncopation which further 'lightened' the emphasis to – one TWO three FOUR. When a jazzman claps to accompany his music the claps will be on the OFF BEATS two and four which immediately imparts a different flavour to the rhythm.

Ex.31 contains bar patterns with SYNCOPATION and tied notes INSIDE the bar. These patterns should be studied and reproduced by tapping them out on any source of sound. The rhythms introduce typical jazz syncopation and they get OFF THE BEAT by two complementary techniques –

- by ANTICIPATING the beat, as at A
- or by DELAYING until the beat has passed, as at B.

These devices are FUNDAMENTAL TO JAZZ RHYTHM, so work hard at familiarising yourself with the way they go. Find tunes that contain these rhythms and try to 'feel' how the rhythm gets off the - ONE two THREE four, beat. Again a SIMPLE anticipation or delay can have very INTERESTING effects.

Jazz is a DOTTED RHYTHM MUSIC.

The principles outlined in 3.4 above apply particularly to RHYTHMIC PHRASE BUILDING. The combination, recombination and displacement of 'absorbed' material into improvised jazz phrases is a key part of this course.

In order to develop a 'feeling' for how rhythmic groups or phrases can be built it is necessary to do some experimental work. The bar rhythms in Ex.31. should be redistributed in various ways

–

- repetition of 1 and 2 bar patterns
- combining, recombining and displacing patterns to give 4 bar continuities.

See Ex.32 to 35 and endless other possibilities.

Perhaps now is a good time to note the importance of REPETITION in rhythmic phrases. We can list some essential functions of repetition –

- we have mentioned that jazz is DANCE music and repetition is used to maintain regularity in dance movements
- repetition is also necessary, in any music, to define a pattern for subsequent variation development and contrast. This applies to melodic, harmonic and rhythmic themes, they are all established in our consciousness through repetition
- repetition of the off beat patterns and cross rhythms in jazz is also used to create TENSION by delaying the final resolution back to the solid four four foundation. There is a parallel here to the creating of exciting tension by delaying harmonic resolution in chord progressions. Chord progressions can be thought of as devices for creating tension and release. This TENSION and RELEASE is the most fundamental characteristic of ALL music.
- rhythmic repetition is a powerful technique for building up INTENSITY. Repetition can have HYPNOTIC effect, long exploited by the blues singers and the churches in the American south. We should remember that the blues and church music were major influences on early jazz.

There are obvious examples of the use of repetition in structure –

- the traditional AAB form of the blues involve a repeated first 4 bars before a contrasting 4 bar 'release'.
- ragtime and marches are often elaborate repetitions of rhythm and theme with a contrasting 'trio' section. The pattern of classic ragtime is, AABBACCDD, with a repeated

statement, a repeated development , a return repeat and a repeated trio and repeated final strain.

- the most common format of the popular song is an A A B A, 32 bar sequence, with three repeats of the A section juxtaposed with a contrasting 'middle eight' bars.

Don't forget the main sub component of all these structures is the 4 bar section which we will return to in the next lesson.

3.6 Advice.

Progress & motivation.

You will be aware that the material in this course is very condensed and demanding and we should explain. There is an immense amount to do in these first three lessons but you must be prepared to work at your own pace, it is no good rushing things or becoming demoralised by the sheer quantity of material or the speed of your progress. PROGRESS results from steady accumulation over an EXTENDED period of time. Remember that there will always be days when you doubt your progress, when one step backwards appears to be the rule. But if you work STEADILY and CONSCIENTIOUSLY you are bound to progress.

EVERY time you play your instrument you will progress. If things go well you will gain in confidence, if things go badly you will have learned to be patient! An-hour-on your instrument is NEVER wasted.

The best way to think of your practice efforts is as an !INVESTMENT but remember progress will tend to come in FITS AND STARTS.

INITIATIVE is also fundamental to the student improviser. You should think carefully for yourself, think about the implications of what we say in these lessons. We can point you in the right direction and tell you about the results of study and practice but it is only you that can do the work!

Creative spontaneity can only be achieved by SELF DEVELOPMENT.

We suggest the main reason for success or failure in music is MOTIVATION. Too frequently we hear of excuses due to lack of 'aptitude' or 'ability', but we believe music is inherent in everyone and anyone can develop an ability - if he or she so wishes. This is born out, not only by experience but also, increasingly, by scientifically conducted research. The motivation to practice is the key to ability.

Two things are certain; whatever your level of ability, every time you practice you will improve, and, secondly, if you stick at it you will be able to improvise jazz!

3.7 Written work.

Build a 16 bar section on the following specification –

Harmony –	1st 8 bars	I VIm IV IIm V
	2nd 8 bars	I IIIIm IV IIm V I
Rhythm –	This should be drawn from the material supplied to date, or, it can be created freely.	
Melody –	This should contain plenty of appoggiaturas and double appoggiaturas.	
Accentuation –	Suggests for accents should be added.	
Key –	Eb major.	

NB. The written work assignments in the course have a double purpose. They not only consolidate the material from the lessons, but they also indicate the METHOD OF THINKING during the actual process of improvisation. The harmonic and rhythmic schemes should always be present in the mind as a kind of skeleton structure on which the melodic material rides.

Ex.1. Acoustics.

Frequencies of notes = vibrations per second.

Natural harmonics & 3/2 ratio of the 5th & 5/4 ratio of the 3rd.

Full string	-----	256 C
Half string	----- -----	512 C
Thirds	----- ----- -----	768 G or 384
Fifths	----- ----- ----- -----	1280 E or 320

Harmonics		Simple Ratios	Natural 5ths using the 3 / 2 ratio	
C	256	1	F	<u>170.6</u> 341
C	512 / 2	<u>256</u>	C	256 258
G	768	<u>384</u> 3/2	G	384 384
C	1024 / 4	256	D	576 / 2 288
E	1280	<u>320</u> 5/4	A	864 432
G	1536	384	E	1296 /4 324
Bb	1792	448	B	1944 488
C	2048 / 8	256	F#	2916 / 8 364.5
D	2304	<u>288</u> 9/8	C# / Db	4374 547
E	2560	320	Ab	8561 / 16 410
F#	2816	352	Eb	9841.5 / 32 367.6
G	3072	384	Bb	14762.25 461
Ab	3328	416	F	22143.375 / 64 346
Bb	3584	448		
B	3840	<u>480</u> 15/8		i.e. 346 - 341.3 = 4.7 sharp ! A quarter of a semitone!!!
C	4096 / 16	256		
C#	4352	272	C scale	D Scale
D	4608	288	C = 256	
Eb	4864	304	D = 288 (9/8)	D = 288
E	5120	320	E = 320 (5/4)	E = 324 (9/8) = 4 sharp !!!!!
F	5376	<u>336</u> 4/3		
F#	5632	352		
	5888	368		
G	6144	384		
	6400	400		
Ab	6656	416		
A	6912	432 5/3		
Bb	7168	448		

The major scales derived:			
	ex 5ths.	ex harmonics	TEMPERED
C	<u>512</u>	512	<u>512</u>
B	488	480	483
A	432		431
G	<u>384</u>	384	<u>384</u>
F	341		342
E	324	320	323
D	288	288	287
C	<u>256</u>	256	<u>256</u>

TEMPERED ex equal 5.546% intervals
12th root of 2 = 1.05946
= 12 equal semitones.