

FOLKWAYS FX 6116

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THE LYREBIRD

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FOLKWAYS RECORDS FX 6116

A DOCUMENTARY STUDY OF ITS SONG

Recorded in Australia by K. C. Halafoff and Peter Bruce | Commentary by K. C. Halafoff | Read by Peter Bruce



FOLKWAYS FX 6116

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THE LYREBIRD:

A DOCUMENTARY STUDY OF ITS SONG

Recorded in Australia by K. C. Halafoff and P. Bruce

Notes by K. C. Halafoff, Member, Royal Australasian Ornithologists' Union



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INTRODUCTION & BACKGROUND

The Australian Lyrebird (*Menura novaehollandia*) is the world's most accomplished mocking bird, capable of imitating perfectly not only all the birds' voices, but also any other sound which the bird considers worth reproducing. A male bird's repertoire consists regularly of about two dozen (or more) calls of different birds plus the Lyrebird's own items which alone amount to another dozen or so.

The *Menura novaehollandia* inhabit the alpine regions of eastern Australia, extending from Southern Victoria well up into New South Wales and Queensland, where the other smaller Lyrebird species - *Menura alberti* - lives in secluded regions of tropical rain forests. Not long ago the Lyrebirds were introduced in Tasmania, where now they seem to thrive.

Zoologically the Lyrebirds do not belong to songbirds (Passerinae); they are a genera in themselves, the only distant relative being the West Australian Noisy Scrub bird which has not got the Lyrebirds' musical talent. As far as it is known at present the life span of a Lyrebird is about 21 years.

The Lyrebird is the size of a small turkey, coloured in discreet shades of brown, grey and purplish black; its legs are large and powerful - this leg can lift or shift a small log or a quite substantial stone. It is a ground bird which feeds on insects which it digs from the soft forest soil. It can fly and glide, but its short round wings are not suitable for long flights. The female tail is long and fully webbed. The young males have a tail hardly distinguishable from the female's but between five and seven years of age they gradually acquire the adult tail. The process is rather gradual; at first, new feathers begin to grow with fine filaments at the extremities, and they are in turn replaced by fully finely filamental feathers, twelve in number. Two of these are narrow curved-up "feelers" and two wide glorious lyrate feathers, coloured orange and white, complete the gorgeous beauty of the tail. The filamentary feathers are

white underneath, and when a performing Lyrebird spreads its tail fan-wise and lowers it over its head it has the appearance of a shimmering silvery curtain. The Albert Lyrebirds are of a brighter russet colour, but they lack the main adornment of the southern species - the lyrate feathers.

Like many other birds, the Lyrebird is a territorial bird; each pair has a territory of their own amounting to 4 to 5 acres. The chicks live in the parent's territory till they fully mature. The female bird lays only one egg per year, and she alone attends to all domestic duties - nest building, hatching of the chick and feeding it; the glorious spouse does not take any part in this feminine labour.

The Lyrebird romance takes place during the Australian winter; it starts in June, and by the first week in July the single egg is laid. The building of the large domed nest is a long affair and may be commenced as early as April. Incubation takes six weeks, and during another six to seven weeks the chick is fed by the mother bird in the nest. This feeding continues after it has left the nest late in September until it is able to fend for itself.

Despite the low fecundity - one egg per year - the Lyrebird's managed to survive - and even thrive in the regions where they are not threatened by animals of prey - mostly because of their extreme intelligence, alertness and speed of their running.

The Lyrebirds are naturally very shy, but in places like Sherbrooke Forest near Melbourne, which is visited every day by numerous tourists, foreign and domestic, anxious to see the Lyrebirds, they grew accustomed to human presence. It even seems that they like to perform in front of human audiences, provided the public keeps quiet and stationery. Some of them, grown in areas most frequented by visitors, have become so tame that there was no difficulty in making them speak into microphones like a T. V. announcer. In practice however a certain distance had to be kept for the fear of overloading the recording equipment with the sometimes deafening volume of the song - especially when a friendly bird would decide to honor the

patient observers by an ear-splitting serenade at three feet distance. Obviously with the best intention to please.

The only really difficult item to record was the rarely heard courting song as it is being sung while both birds, male and his bride, are on the move, with female leading. To follow them would mean to record along with the song the cracking of sticks and dry dead leaves scattered over the forest floor. Luckily, the female bird was one of the tame ones, and the morsels of her favourite food thrown in strategic directions when she was about to depart always caused the pair to return into the microphone range.

This record was prepared from original tape recordings taken over a period of several years in Sherbrooke Forest. Only the technically very best recordings were selected from a huge file of accumulated tapes, which were mercilessly sifted to eliminate sequences marred by wind, distant traffic and insects' noises, and to select the most characteristic performances for each kind of song. This disc does not present the Lyrebird as a mimic; this would have been interesting only to those few who know the original calls which the Lyrebird imitates; instead, this disc is intended to give a summary of all up-to-date findings about the purely musical value of the Lyrebird song. The congested spoken commentary gives only the most important information about the presented musical material. After making the listener familiar with several types of this song, it takes him into a kind of sound laboratory where every notes of the greatly slowed-down song disclose the infinitely complex structure of each analysed item. After the visit to that Lyrebird's "musical kitchen", the listener is taken back to the birds' natural habitat where a lovely duet sung in the magnificent setting of sub-alpine Australian forest gives a finishing touch to this collection of the Lyrebird's enchanting music.

A FEW WORDS ABOUT ACOUSTICS

Just how much of a bird's song do we hear? A few decades ago the question would be considered silly; but with the advent of modern means - retarded replay, sound spectrographs and oscilloscopes we now knew the answer: hardly more than half, and often even much less.

We miss many sounds in the bird's song due to two limitations inherent in our hearing apparatus. The first is the "time perception smear" - the failure of our ear to discern individual notes in a stream of sounds when their rate exceeds ten per second.

The bird song's tempo is a manifold of our prestissimo, and we have no hope of catching up with, say, a wood thrush who emits 200 sounds in a second. Even with such a seemingly slow song as the blackbird's we hear only one-third of the total number of notes actually uttered by the bird.

The other limitation concerns high-pitched notes. Our ear at its best reacts to frequencies up to 20 KC/sec., but a limit of 14-16 KC/sec is more common; elderly persons have a cut-off at about 10 KC/sec. But the bird songs contain sometimes much higher frequencies which are completely inaudible to us - up to 50 KC/sec. However, these frequencies are only harmonics; the range of basic tones in bird song does not exceed 12 KC/sec and thus the birds' melodies fall within the limits of our average hearing range; the Lyrebird's song in particular ranges from 100 c. p. s. to 7000 c. p. s. What we miss in bird song is due only to the high speed of it.

To get the whole content of the song correctly, the obvious course is to slow it down sufficiently to make every individual note distinct, and also to lower its pitch so as to bring the whole of it within the limits of the piano note scale more familiar to us. Fortunately, both tricks can be done simultaneously by simply retarding the replay of a recorded song. As the frequency of the sound is proportional to the playing speed, halving the speed means lowering the pitch by exactly one octave. Consequently, if the slowing-down factor is a multiple of 2, the key of the melody would remain the same, and the song may be written down in the original tonality and later transposed to the normal pitch. (All the note scores in this leaflet were computed that way, and then checked against the sound spectrograms of original tapes for pitch and duration of notes.)

THE SECRET OF MELODIOUSNESS

The main cause of the harmonious impression invariably gained when listening to the Lyrebird's song is the fact that all its imitated items are tonally closely related to the key of the Lyrebird's "stanza" melody, and consequently the tonalities of adjoining episodes never clash. In other words, having geared each imitated musical episode to the general tonality of the original song, the Lyrebird has at its disposal several dozen musical phrases whose order it can change at will, being certain that each time they will fit perfectly together wherever they are placed. The cleverness of that scheme is indeed remarkable and in practice it works very smoothly, as no wrong modulation can ever occur.

Whether the Lyrebird actually transposes the imitated calls into the key of its choice (as some birds are known to do) is hard to ascertain; but even if it simply picks up those calls which fit readily into the tonal scheme on the song, it must be credited with a very fine ear for pitch as we understand it.

The melodious impression of the song is further enhanced by the Lyrebird's preference for those intervals which sound most harmonious to us - octave and perfect fifth. Glissandos stretched over one or two octaves are frequent in the song, and the interval of the tremolos concluding the "stanza" melody is a perfect fifth. Other consonant intervals like the third and the sixth are also frequently used in the "leaps" of the melody.

THE BIRD'S MUSICAL SCALE

The collection of a couple of dozen different bird calls in the Lyrebird's song plus several original themes provides a fair amount of material for study of the bird's idea of tonalities. Though the majority of the bird's melodies seem to fit well into our equal temperament scale, the study of sound spectrograms made from the bird songs discloses some deviations from our musical scale, so that the bird song could be expressed more correctly in a quarter-tone note scale. However it seems remarkable that the length of musical intervals dictated by the laws of harmony seems to be observed by the birds, and it is probably this affinity with our own music which makes the bird song so pleasant to our ear.

THE MASTERY OF THE REPRODUCTION

There seems to be nothing too difficult for the Lyrebird's wonderful vocal apparatus; not only can it furnish a "true copy" of any bird call, but the sounds seemingly impossible to produce within a bird's throat like the "swish" of the wings of a flock of parrots in flight, or a sound of a movie camera motor running, are given with the utmost realism. The Lyrebird's imitation is quite unlike the "rough approximation" of the human voice by talking parrots: when at its best, it is a real reflection of the original.

To understand fully the difficulties of attaining such a high degree of high fidelity reproduction, it should be remembered that a musical sound usually consists of a basic note and its harmonics whose frequencies are multiples of the frequency of the basic note. These harmonics account for the timbre of the sound; for instance a violin would sound like a flute if its higher harmonics are cut off by a steep filter. Moreover the same note sounded on different instruments will have a different "halo" of harmonics. Similarly, different birds' calls of the same tonal value also vary considerably in harmonic content.

It follows that to imitate faithfully a bird call, the Lyrebird has to reproduce not only its basic notes but also their harmonics, each in its correct volume - otherwise the imitation would not sound true to the original.

With a mechanical noises things are even more complex, as in a noise the frequencies are mixed at random - there is nothing resembling a regular ratio. The Lyrebird's ability to reproduce correctly that disorderly mess of frequencies seems indeed to be on the verge of the unbelievable and the view held by some ornithologists that the mocking birds are capable of analyzing the frequencies of imitated sound seems to be the only plausible explanation.

THE LYREBIRD AS A COMPOSER

The fact that a bird can compose is not novel: the continental Blackbird, for instance, is a reputed composer who elaborates on his phrases in a drive for perfection and later combines them together into a sustained song. But while the Blackbird's song may be compared to a melody written for a single instrument, the Lyrebird's song containing dozens of episodes of different timbres actually amounts to an orchestra administered on solo lines, and in this respect it comes surprisingly close to such works as Prokofiev's "Peter and the Wolf" or Stravinsky's "Soldier's Tale" - especially to "Soldier's March" and "Little Concert" of Stravinsky's work, while the courting song vies with Pierre Boulet's "Le Marteau sans maître".

Another similarity to modern music is the Lyrebird's use of recapitulations and bridge passages. When it suits the course of the song, the Lyrebird uses only a fragment of a melody to interconnect two episodes, or gives an episode in an abridged version: so the "stanza" may be used without tremolos usually concluding it, or the tremolos may be used alone. How close this construction comes to the structure of modern composition can be judged from the following comparison of a portion of a Lyrebird song with Stravinsky's "Symphonies for Wind Instruments." To make it easier to follow, the musical episodes in both cases will be marked by letters:

"Symphonies for Wind Instruments" (according to E. W. White)

- Content:
- A - Bell motif.
 - B - Chorale.
 - C - Two popular tunes (A) and (B).
 - D - Pastoral.
 - E - Quicker bell motif.
 - F - Savage dance.
- Composition:
1. Introduction - Short references to A, B and F.
 2. Tunes C in full.
 3. Bridge passage (A plus B) followed by D.
 4. Bridge passage (B plus A) followed by shortened D.
 5. Similar passage (B plus A) followed by Slowed-down C.
 6. Bridge passage (A plus B) followed by shortened C.
 7. E, followed by B and F.
 8. Bridge passage (B plus E) followed by shortened F.
 9. Echo of E.
 10. Coda: Choral B.

Compare it now with the portion of Lyrebird's song:

- Content:
- A - Rosella.
 - B - Grey Thrush.
 - C - Stanza and tremolos.
 - D - Black Cockatoo
 - E - Pilot Bird.
 - F - Kookaburra.
 - G - Whip-Bird.
 - H - Butcher-bird.
 - I - Percussion.
- Composition:
1. Introduction - short references to A, B and D.
 2. Main theme C in full.
 3. Exposition of new themes E, F and G.
 4. Bridge passage followed by recapitulation of B and G (shortened).
 5. Full re-exposition of C.
 6. Bridge passage - recapitulation of E and A, followed by H.
 7. Bridge passage - shortened C (tremolos only).
 8. Exposition of I (percussion).
 9. Bridge passage - recapitulation of E, I, F and D.
 10. Coda: Stanza C in full.

The close resemblance between those two compositions is obvious.

The fact that the Lyrebird's composition, though deliberate, is always improvised (there is no set pattern of episodes as in a Blackbird's song) makes it an even greater achievement. Few composers were capable of producing successful improvisations at any time. That the greater part of the musical material of the song consists of mimicked items does not detract from the Lyrebird's status as a composer. Many famous musicians - Bach, Debussy, Stravinsky, to name just a few - used borrowed melodies, sometimes to the extent of literal quotations.

There were times when long and complex preparations - installation of microphones and of a transmission station in the heart of Sherbrooke Forest - were necessary to broadcast a single Lyrebird's song to the world over the radio, as had been done in 1931. Nowadays, a complete summary of up-to-date knowledge about the Lyrebird's music is available in the form of a LP record, reproducing with full fidelity this wonderful song which, by its content embracing dozens of calls of forest birds and by its emotional value may be truly named, "The Symphony of the Australian Forest."

NOTE SCORES OF THE ORIGINAL LYREBIRD'S ITEMS

The image displays four musical staves representing different Lyrebird items. The first staff, titled 'CALLS', is in 3/8 time with a tempo of 1920, featuring a melody with dynamics like *fff* and *pp*, and a 'da capo' marking. The second staff, titled 'CYMBALS', is in 3/8 time with a tempo of 1200, showing a rhythmic pattern with dynamics like *mf* and *p*, and a 'da capo' marking. The third staff, titled 'RICOCHETTING STICK', is in 3/8 time with a tempo of 1200, showing a rhythmic pattern with dynamics like *mf* and *p*. The fourth staff, titled 'CLICKS', is in 3/8 time with a tempo of 700, showing a rhythmic pattern with dynamics like *fff* and a 'da capo' marking.

TRANSCRIPTION

SIDE 1 - EXPLANATION AND DEMONSTRATION

BAND 1 INTRODUCTION

These are lyrebirds calling from their mounds in the fervor of a dance amidst the Sherbrooke Forest near Melbourne. The lyrebird has always been recognized as the greatest mimic in the world, but recent studies have proved it to be a skilled musician and composer, as well. Nearly all kinds of musical notation can be found in the lyrebirds' songs: sustained and staccato notes, upward and downward glissandos, tremolos, syncopation, single and double beats. Even a complex arpeggio is used as a call. The volume ranges from the faintest pianissimo to the really deafening fortissimo of the call and of the so-called stanzas. The range of the lyrebird's voice mounts to nearly five octaves, from approximately one hundred to seven thousand cycles per second. The whole song is always sung in a definite key, Eb. All the original and imitated items are geared to that key. The composition has a mosaic-like structure, built on the stanza melody in the case of the song on the mound or the branch, and on the kookaburra chorus in the case of courting songs. Both his own items and those he mimics are given in a constantly changing order, each item geared tonally to the preceding one, giving the impression of coherence and novelty despite the reappearance of the majority of the items in the course of a song. The composition strikingly resembles Stravinsky's symphonies for wind instruments and The Soldier's Tale. The lyrebird's song contains not only melodic items, but also its own percussive sound effects. The dance music consists of calls alternating with a series of cymbal-like clashes and beats, similar to the sound of a ricocheting stick. Peculiar oil can type clicks are used as the introduction to a song or as a herald to its approaching end. The

courting song is very different from his ordinary song and contains many peculiar sounds: shrill trills, sharp staccato notes, and especially a strange clashing sound like a money bag being shaken. This song is so unlike the other lyrebird songs that it sounds as if it were a song by a bird from a different species altogether.

The morning song is sung on the branch before the bird descends to the ground for feeding. It usually contains only melodic material with no percussion. The time signature of the imitated items is naturally changeable, but all the lyrebird's original percussion items are strictly rhythmic, most of them being in march time, 2/4 or 4/4. The lyrebird belongs to a select group of birds which are capable of emitting up to three sounds of different timbre simultaneously, which it does in some of the items of the songs. When it imitates two simultaneously chirping birds of other species, it does it by the clever trick of emitting the call of the second bird in the intervals of the calls of the first one.

BAND 2 SONG: MATURE BIRD

Now let us start at the different lyrebird songs at normal tempo, beginning with the song on the mound. The male bird builds a number of mounds of earth among ferns to serve as dancing platforms. Each is about four feet in diameter and is kept finely raked over by bits of stick and leaves. From the top of one of these mounds, under the white umbrella of his tail, which is raised pen-wide right up and over the bird's head, Spotty, the best known bird in Sherbrook Forest, sings his ecstatic and sonorous song.

BAND 3 - SONG: YOUNG BIRD

Each item is clear-cut and polished in this musical masterpiece. But listen how a young bird using the same items fails to achieve the same degree of coherence, because of too much abbreviation.

BAND 4 - DANCE MUSIC

The dance music consists exclusively of the lyrebird's original items. Here is a male bird performing its jumping dance, three jumps with the wings beaten against the body with each jump, to the accompaniment of the so-called ricocheting stick item preceded and followed by double calls and cymbal-like clashing sounds.

BAND 5 - COURTING SONG

The courting song is sung by a male bird to a female who is scratching for food. Both are on the move, and the male, following the lady, now and then lifts his short wings. Notice the abundance of kookaburra laughter and peculiar percussion effects in this song.

BAND 6 - MESSAGE RECEPTION

A strange chatter accompanies the reception of a message from another lyrebird far away. The bird appears to be receiving a telepathic message. Only its head is jerked in all directions, as if trying to catch the mysterious signal.

BAND 7 - FEEDING CHATTER

Whilst digging for worms and other crustacea, the lyrebird makes a low muttering to itself. This feeding chatter is the most fragmentary of its songs. It somewhat resembles the courting song, but lacks its coherence and sonority.

SIDE 2 - ANALYSIS

BAND 1 - CALLS, CYMBALS, STICKS

Now let us analyze some of the items in the song by slowing them down four times, which lowers the pitch of the songs by two octaves. Surprisingly enough, the call -- which the ear interprets rather as the call with a peculiar silvery timbre -- proves to be a complex arpeggio-like seven note melody consisting of staccato sounds only. The cymbal item proves to consist of two partly overlapping downward glissandi started by a single beat. One is slow, immediately following the beat, and the other, much faster,

starts later and finishes simultaneously with the first. The item is concluded by a repeated staccato note. The ricocheting stick item is a series of syncopated beats, all the beats (except the first one) being double ones. These three series of sounds following one another are in fact the musical accompaniment to the lyrebird dance. Here they are given at first in the normal tempo.

Here you hear them slowed down four times, that is, two octaves lower. Cymbals ... calls ... sticks. The call has a total duration of only one-fifth of a second. It is so rapid it requires an even greater slowing down in order to hear every note of it distinctly. Here the call is repeated at 1/8th of the original speed, which means three octaves lower than its normal pitch.

BAND 2 - OIL CAN CLICKS

Here are the oil can clicks, usually used as an introduction to the song on the mound, and sometimes heralding the approaching end of the performance.

Slowed down, these clicks sound like this.

BAND 3 - STANZA MELODY

The lyrebird's beautiful stanza melody, with ascending tremolos at the end, is heard like this.

When slowed down, its structure can be heard. Notice the combination of single notes with glissandi and the intervals of tremolo notes, which is a perfect fifth.

BAND 4 - VARIATIONS IN STANZA MELODY

Occasionally variations of this stanza can be heard. In place of the usual three tremolos, the bird has added five tremolos in this instance.

Slowing it down produces ...

BAND 5 - MULTIPLE CALLS FROM ONE BIRD

The bird's mimicking or imitative ability is so great, that not only are individual calls reproduced faithfully, but sometimes, as in this case, a whole flock of rosellas can be heard from the one throat.

And slowing it down produces ...

BAND 6 - GROUP SINGING

When two lyrebirds are singing close together, each bird sings its own song, but from time to time they may join their voices in perfect unison and finish a particular item together. In our first example, a whip bird call is sung in unison by two birds.

On another occasion, the call and stick items are brought in synchronism.

BAND 7 - IMITATION

To finish this analysis, here is a lyrebird imitating two scrub wrens, with a sonorous call of the grey thrush interrupting the duet at one instance.

Here's how a clever trick conveys to the ear the impression of simultaneous imitation. Not only do the wrens' voices not actually overlap, but the chirruping stops completely before the third bird's call is heard, and is resumed after a fraction of a second.

BAND 8 - CONCLUSION

It seems incredible now that we might not have been able to listen to this superb musician had not the human greediness been checked in time. During the last century, hundreds of lyrebirds were shot for their beautiful tails, which were then in great demand, and their extinction was very near, especially as they have a low rate of reproduction, only one egg a year. Today, strictly protected by law and admired by visitors, they are thriving again, and the forests resound with their song, song such as this beautiful concluding duet, typical of the sounds to be heard in Sherbrooke forest.