

Methods of Recording Bird Calls.

By H. Brewster Jones.

I have examined records in the Adelaide Public Library and University Library, and Miss Gertrude Cowell was good enough to make copies of some records in the British Museum, from which I find that there are various methods in use for the recording of bird calls. There are some calls, of course, which are almost impossible to record. For recording the actual musical sounds, or, to use a more technical term, the vocalizations of the birds, it seems to me that no better system than the old music notation exists, although several others have been experimented with. One of the most complete of these is that of Mr. Saunders, who, in "The Auk," Vol. 32, p. 178, makes some suggestions "for better methods of recording and studying bird songs," and gives examples of his twelve-line staff. In comparing Mr. Saunders's twelve-line staff with the five-line staff we use in music Mr. Robert Thomas Moore argues as follows:—"It is a more cumbersome one, because it requires twelve lines instead of five to record a simple song, and for a song of great range, as the Hermit Thrush's, it would require thirty-six lines, whereas the whole of that master song, ascending and descending over the confines of three octaves, can be neatly recorded by the old method on a staff of five lines." This requires leger lines and ottava sign 8va. as well. I cannot help agreeing with Mr. Moore as to the neatness and utility of the five-line staff, but am aware that Mr. Saunders's graph has some scientific advantages. Most bird-call students attempt to give the pitch, time, intensity, and quality of the calls recorded. The staff will give the pitch; the time signature coupled with the metronome sign will give the time; and dynamic signs and terms will give the intensity. It is when we come to the quality of a call that we are in difficulties. The word "quality" has been accepted in musical circles as the equivalent of either timbre or resonance when applied to a musical sound. It is the best word therefore to cover those various characteristics which differentiate one

bird's call from another apart from their difference in pitch, time, and intensity.

—Popular and Scientific Records.—

I think the recording of bird calls might conveniently be divided into two categories, viz., popular and scientific.

A popular record would be a rough impression of the musical notation with or without a collection of syllables or words which when repeated would help a budding ornithological student to identify the subject of his search, e.g., the expression "Bob Bob Whitehead" when coupled with one of the calls of the Grey Shrike-Thrush (*Colluricincla harmonica*).

A scientific record would be one which was as musically and phonetically perfect as possible. I mean by this that it should be an accurate record of the pitch, time, intensity, and quality of the call. Data such as the following should also be included:— Date; time of day; weather conditions, including direction of the wind in relation to position of bird and observer; distance of observer from bird; actions of bird when calling; contour of ground immediately surrounding the observer, whether open country or thickly wooded; height of bird from ground when calling; whether flying or stationary; possible cause of call if any; actual duration of call, taken preferably with stop watch; if call be one of alarm or warning an observation of the other bird or birds for which the alarm is made; if bird in flight when calling, state whether flight is migratory, local, e.g., from tree to tree, or homewards as in the case of birds which have been foraging at a distance from their nesting quarters; in cases 1 and 3 give approximate distance of audibility of call as bird disappears; in local call state whether call is heard in flight only or when stationary as well; whether the call is given before, during, or after feeding.

State shyness or otherwise of bird when conscious of being observed; give melodic, harmonic, or rhythmic relation between two or more birds calling simultaneously or immediately following each other. In the case of a bird which mimics, state whether trained or untrained. When phonetic system does not cover exact consonant or vowel, describe as being between the two consonants or two vowels nearest. When call is repeated, give length of rest between repetitions; give number of times call is repeated if consecutively. Of course, quality should include all helpful descriptions, such as sound of tearing calico of the Cockatoo, grinding scissors of the Restless Flycatcher (*Seisura inquieta*), etc.

Include the sex of the bird and state whether juvenile or adult; give the number of times call has been taken to verify it if the

bird is not an extemporizer, in which case fundamental phrases which are repeated with ornamental variations should be verified by more than one record being taken.

Actions of the bird should include visible movement of the mandibles, throat, hind neck, chest, and breast.

To arrive at distance of audibility two or more records should be taken, the final one after having moved away from the bird until the call is almost inaudible, stepping the distance in yards and keeping record of first distance and final distance.

To arrive at the actual intensity of a call the contour of the land, if it be undulating, must be recorded accurately; for if a hillside with a parabolic depression were the background of the bird, its call would be greatly intensified to the listener.

Relative altitude of bird and listener is also of importance on a windy day, because of the bending of air waves affecting their intensity. Temperatures varying at different altitudes with consequent rarefaction have also to be recorded if we are to arrive at actual intensity.

In future field work I propose using a similar form to the following:—

—Record of Bird-call.—

- Popular Name.—White-throated Tree-creeper.
- Scientific Name.—*Climacteris leucophaea*.
- Sex.—?
- Pitch of Call
- Time of Call
- Intensity of Call
- } Musical example is given here.
- Quality: Liquid Velvety Quality.—Flute-like in timbre.
- Syllabic Notation.—Nil.
- Actual Duration.—Not taken.
- Number of Repetitions.—Five or six, then after rest resumed.
- Melodic Relation to Other Calls.—Nil.
- Harmonic Relation to Other Calls.—Nil.
- Rhythmic Relation to Other Calls.—Nil.
- Range of Audibility—Distance.—50 feet, p.; 150 feet, pp.; 200 feet, almost inaudible.
- Action of Bird.—Creeping up tree, searching for food, and flying.
- Action of Bird's Throat or Breast.—Not visible.
- Cause of Call.—Contentment.
- Migratory.—Homeward or Local Flight.—Local from tree-top to tree-base.
- Shyness.
- Mimic.
- Altitude, Actual.—?

Altitude, Relative of Bird and Observer.—(See special note at bottom.)

Locality.—Near junction of Echunga, Ambleside, and Paechtown Roads.

Wooded or Open.—Thick Wattle and Gum likely to cause refraction of sound at 100 feet and over.

Contour of Ground.—Undulating, but not providing background for bird.

Wind.—Light breeze blowing towards bird.

Weather Conditions.—Misty rain, which had just ceased.

Time of Day.—1 p.m.

Date.—23/11/25.

Note.—At 200 feet I had mounted a hill considerably higher than the bird. According to the formula, "the intensity of sound varies inversely as the square of the distance," even if there had been no breeze, the call should have been almost inaudible at 100 feet; instead of which I could hear it at 200 feet—attributable, I think, to our relative altitudes.

Terms of description such as the following help to convey an idea of the character of a call, but need carefully verifying to test their correctness:—

The cackle of the Spur-winged Plover.

The scream of the Channel-bill Cuckoo.

The scream of the Red-tailed Black Cockatoo.

The chattering of the New Holland Honey-eater.

The croaking of the Grey Coots.

The laugh of the Giant Kingfisher.

The tolling of the Bell-Miner.

The crack of the Coachwhip-Bird.

The cooee of the Curlew.

The cluck of the Emu.

The honk of the Magpie-Goose.

The monotone of the Grass-Bird.

The carolling of the Magpie.

The moaning of the Mallee Fowl.

The hiss and gurgle of the Ostrich.

The boom of the Bittern, the gabble of the Geese, the gobble of the Turkey, the coo of the Dove, the chirrup or chirp of certain birds and insects, the cheep of the young bird, the caw of the Crow, the croak of a Frog or Raven, the cluck of the Hen or Goose, and the quack of the Duck are terms which have been incorporated into our language.

—Syllabic Notation.—

Garstang, in his "Song of the Birds," proposes to build up a science of bird-song in all its branches. He makes a special plea for his syllabic notation, which one of his reviewers facetiously terms Czecko-Slovakian poetry.

I am not in a position to comment upon the accuracy of his syllabic notation, but what strikes me as surprising is that, taking as an example the song of the Thrush (on pages 81 to 89), in which he gives his rendering of fifteen different syllabic utterances, and comparing it with the record of the same bird's song by C. A. Witchell in his "Cries and Call Notes of Wild Birds" (page 19), in which he gives eleven examples, I find only one utterance—"Tewy"—which is common to both records, and even this is spelt differently.

To make further comparison, let me mention the example of Dr. Macgillivray quoted by R. Hall on page 298 of "Useful Birds of South Australia," where there are ten distinct syllabic notations, only one of which coincides with Garstang, although differently spelt, and none with Witchell.

As the Thrush is an extemporizer the dissimilarity of consonants and vowels in these three records may be explained. I hardly think this covers it, however, for there are certain similarities of sound in the calls which suggest to me that some of the bird's utterances are common to each record, and their syllabic vagueness is the cause of the confusion.

I know there is a tendency when listening to a bird-call to allow the first word or syllable which comes to the mind to fit the call, and by constant repetition to become convinced that it is the only one to fit the call. This is very similar to our habit of subconsciously repeating a phrase over and over again in our mind when listening to the ticking of a clock. When by a sort of cumulative psychological shock we become conscious of the phrase, we feel that the clock has been always repeating it, and unless we smash the beastly thing it will go on saying it for ever. I think that this curious illusion, which is so easily created in our mind by bird or clock, is due to the fact that neither of them really pronounce syllables according to our pronunciation, unless taught to do so—I mean the bird—and that our imagination is brought into play to the detriment of our scientific analysis.

I do not mean that it is not a considerable help to use syllabic impressions of a bird's utterance. In my small experience some of the local ones I have heard get remarkably near the call; but those who have made a deep study of it, such as Garstang, occasionally admit that their syllabic notation is an imperfect

medium, and I am sure that Mr. Sutton, who has made this a special study, will agree with my contention.

While I am dealing with syllabic notation I must mention one very extravagant claim that Garstang makes for it. He writes:—"A Linnet or Warbler emits . . . the sounds of a whole toy orchestra, shifting from liquid notes to the clang of a bell or the roll of an elfin drum, from the plucking of strings to the tinkling of cymbals and clinking of castanets."

This may be an exaggerated description, but if so, his claim which follows, that syllabic notation will imitate it all, is a much greater exaggeration.

I do not mean that it is not a considerable help to use syllables to describe quality, but that they must have the aid of musical notation when possible, and references to orchestral instruments and any other sounds with which we are familiar to help us conjure up the quality of the call in our mind. E.g., Simeon Pease Cheney describes an Owl as calling tal-oo with the illuminating remark "I can best describe it as a sliding tremolo—a trickling down like water over pebbles."

The value of syllabic notation would be considerably increased if the international phonetic alphabet were universally adopted. I despair of being able to pronounce or understand a string of consonants unless with some recognized formulae for their pronunciation, such as exists in spoken languages, to help me. Perhaps if we were to ransack the main European alphabets and add a little Welsh we might secure an alphabet which would meet the requirements of bird-call recording!

—Vowels in Syllabic Notation.—

At present we find vowels placed above musical notes without any guide to their pronunciation.

We are all doing this in our records, and surely it is the highest time we adopted a more accurate phonetic system.

It is quite possible that the fear of having odd syllables wrongly pronounced is the reason that many recorders have resorted to the clumsy expediency of using a word which will receive the right pronunciation in one particular, but which fails to fit the call of the bird in other ways.

When an "o" is used, how are we to be certain which pronunciation is intended out of the following six:—not, note, prove, dove, for, and wolf? And with the diphthong "oo," is it a long "oo" as in moon or a short "oo" as in foot? We probably would not confuse its use as in flood or floor, but the two former require differentiating. For instance, Leach gives "Quook-quoók" for the Topknot Pigeon and "Doo-doo" for the Peaceful Dove.

Are these short or long "oos"? . If we see "ea" how are we to know if it is a proper or improper diphthong, and so whether it is to be "e-ya" as in ocean or "ee" as in clean.

Is the "ow" in Witchell's call of the Thrush "ow" as in bow to bend or as in bow the violin bow. "Ou," which is worse still, might be pronounced "ou" as in found, "u" as in cousin, "oo" as in group, "ore" as in pour, or "o" as in though. Some people still pronounce route "rowt," which gives it five different pronunciations.

—Consonants in Syllabic Notation.—

No plosive or applosive consonant can be heard without its appended vowel. But a vowel which is explosively attacked or applosively terminated does not necessarily commence or finish with a definite consonant. It is in such a case that we are misled by imagining a consonant when there is none uttered. The Magpie-Lark (*Grallina cyanolēuca*) is credited with calling "Pee-wee" or "Peewit." I have never heard the plosive "p"; I have only heard a sort of glide which resembles "ph" in "phew." I am not so sure, however, that this bird does not sometimes end in an applosive "t." The curious double sound in this bird's call may be due to its bronchial anterior apertures varying in size, shape, or power of muscular contraction. The vowel which most nearly approaches to this sound is the French "u" prolonged. As the piping call of the Crimson Rosella (*Platycercus elegans*) rises in pitch, it has an almost definite consonant p attack, but I have never heard it give a pure plosive "p."

Some applosives may be produced by the closing of the bird's larynx or "rima glottidis." The Rufous-breasted Whistler (*Pachycephala rufiventris*), who is credited with calling "Chung," certainly closes his call with something resembling an "ng," which may be produced in the above way.

Syllabic notation has one great value. However incorrect it may be phonetically, it usually gives a fair representation of the rhythm of a call; e.g., "Peter Peter," conveys the rhythmic value of one of the calls of Jacky Winter (*Microeca fascians*) despite the fact that the "p" may be only a half-plosive and half-fricative consonant.

These mixture consonants will no doubt require careful analysis before signs can be adopted to express them. The Purple-crowned Lorikeet (*Glossopsitta porphyrocephala*) is another case in point, with his shrill, piercing cry due partly to its high-pitched tremolo, expressed with the German "r," and partly to its sibilation.

—Onomatopoeic Names.—

Onomatopoeic names are naturally lacking in value unless we know how to pronounce them, in connection with which I have noticed a New Zealand example which stresses my point that an international phonetic pronunciation is required. J. C. Anderson writes, "If the name 'Kēa' be onomatopoeic, as seems almost certain, it should be spelt 'Kia' not 'Kea.'" In the case of Brolga or Buralga, the native name for our only Crane, we must have phonetic accuracy for it to be of value. I noticed that Mr. Tindale has collected two similar names from the Ngalakan and Rembarunga tribes in the North, viz., Bodorulka and Bodolko. I imagine they are onomatopoeic.

Garstang mentions the Cuckoo, Corn-Crākē, Jay, Chiff-Chaff, and Twiste among English birds, and the Hoopoe, Bobilink, Chickadee, and More-Pork as Continental, American, and Colonial examples. More-Pork is more accurate than Mo-Poke, but neither is perfectly phonetic:

I should not be surprised if investigation would prove that the aboriginal names are more accurate as phonetic examples than some others; and is it not possible that an aboriginal example of an onomatopoeic name of an extinct bird may be in existence, from which we might discover some of the characteristics of its call of which we are ignorant?

Mr. Tindale, who has given us such illuminating notes on the Birds of Groote Eylandt, has collected a delightfully euphonious example in "Tararakuku" for the Bar-shouldered Dove (*Geopelia humeralis*). Mr. Tindale says the natives found it hard to differentiate between the calls of this bird and the Peaceful Dove (*G. placida*). As the calls of the two birds are evidently similar the explanation for the difference in rhythmic value between the two words "Tararakuku" and "Collywob," one of our local names for the latter, may be that the r's in the former are so soft as to make "tarara" almost one syllable in effect. Mr. Tindale has pronounced the word to me, and this is the impression I have received.

Miss Gertrude Cowell has noticed that the three-note call of the Peaceful Dove gradually merges into two notes as the call is repeated; which would explain the rhythm of the syllables "Doo-doo" as shown in Leach.

—The Bronchi-tracheal Syrinx.—

As we have no "syringscope" as an equivalent to the laryngoscope, we cannot study the actions which take place in a bird's syrinx as we do in the human voice-box during vocal performance. As the average bird has no

epiglottis it would seem, however, that "syringoscopy" might be within the realm of possibility with a well-trained bird, whose trachea was short and straight. There is bound to be considerable conjecture as to the parts played by the various membranes and muscles surrounding and adjoining the Tympanum in producing the bird's call or song. I understand the tympanum to be that portion of the syrinx which is surrounded by the internal and external tympanic membranes which, as their names imply, form the main resonating media for the sound as it emanates from the vibrating membranes at the anterior apertures of the bronchi and the upstanding Septum. The majority of the song-birds, with the possible exception of the Parrot, have this semi-lunar membrane—termed the Septum by the *Encyclopaedia Britannica*—rising on a cartilagenous and osseous frame in the middle line immediately above and between the anterior apertures of the bronchi. The anterior margin of this septum being elastic and free to vibrate forms a portion of what might be termed the Reed of the syrinx. The degree of elasticity of these various membranes, combined with the freedom of movement allowed by the modification of the rings which form the arches from which the external tympanic membranes are stretched, are two most necessary factors in enabling a bird to produce its varied quality of tone. Its pitch must be dependent upon the muscular tension of the membranes, the length of the column of air in the trachea, and the air pressure of the exhaling breath.

I am going to compare a man with a trombone to a bird with its lungs, air sacs, and vocal mechanism—which includes syrinx, trachea, and neck and mouth cavities.

- (1) The man with the trombone has a wind instrument; so has the bird.
- (2) The man with the trombone has the power of lengthening his instrument; so has the bird.
- (3) The man with the trombone has the muscles of his arm with which to lengthen his tube; so has the bird its intrinsic and extrinsic muscles with which to lengthen its trachea.
- (4) The man with the trombone cannot shorten the original length of his instrument; neither can the bird shorten his.
- (5) The man with the trombone can obtain the finest variation of pitch; so can the bird.
- (6) The man with the trombone can execute a portamento; so can the bird.

- (7) The man with the trombone has his lungs to provide air pressure; so has the bird.
- (8) The man with the trombone has the dermal reed formed by his lips; so has the bird the dermal reed formed by its tympanic and its septum membranes.
- (9) The man with the trombone has the mouthpiece, tube, and bell of his instrument; so has the bird its tympanum, trachea, and cavity enclosed by the neck and mandibles.

—Syrinx with Convoluted Trachea.—

Dr. Morgan recently drew my attention to the model of a female Painted Snipe (*Rostratula australis*) in the Museum, with its convoluted trachea.

With respect to this bird's call A. J. North mentions Dr. Macgillivray's suggestion that a call like the booming of a Bittern, which he heard the night before he found the specimen, was the call of the female Painted Snipe. If this suggestion be correct, the length of the trachea may explain the booming of the call.

North, writing on our Trumpet-Bird (*Phonygammus keraudrenii*) manucode, says, "The males utter a very loud and deep guttural note." Writing of the trachea he goes on to say, "On these extraordinary convolutions of the trachea, lying beneath the skin and extending on to the pectoral or abdominal muscles, depend to a large extent the loud and prolonged notes of the males of their genera.

E. B. writes of the Crane (*Grus commanensis*):—"The Crane's power of uttering the sonorous and peculiar trumpet-like notes . . . is commonly and perhaps correctly ascribed to the formation of its trachea, which on quitting the lower end of the neck passes backward between the branches of the furcula and is received into a hollow space, formed by the bony walls of the carina or keel of the sternum. Herein it makes three turns, and then runs upwards and backwards to the lungs. The Crane emits its cries both during flight and while on the ground. In the latter case the neck and bill are uplifted and the mouth kept open during the utterance of the blast." I find that the remarkable South American bird, The Trumpeter (*Psophia*), has a somewhat similar windpipe, which runs down the breast and belly immediately under the skin to within an inch of the anus, whence it returns in a similar way to the front of the sternum, and then enters the thorax. The structure of the syrinx is stated by Trail to be "quite unique." But he gives no details of it. Also, I can find no reference to its call.

Another example is the Whooper, or Whistling Swan (*Cygnus ferus* or *musicus*). Chambers's Encyclopaedia writes:—"The

names Whooper or Whistling Swan are derived from the voice. Like all Swans of the Northern Hemisphere, except the common Swan, this one has a large cavity in the interior of the breast-bone, in which the windpipe coils before passing to the lungs.

Dr. Morgan has pointed out to me that in Australia we have two other examples: the Native Companion (*Antigone australasiana*) and the Magpie Goose (*Anseranas semipalmata*). The former has been given the onomatopoetic title "buralga" by the natives, so J. Sutton informs me. I should like to know if this denotes a low call. The call of the Magpie Goose has been described as a "honk," but this does not define its pitch.

—Staccatissimo or Shock Attack.—

The Brown Tree-creeper (*Climacteris picumna*) has one of the most powerful calls I have heard. There is a ring in its quality which I have heard in no other bird. If this bird is capable of a muscular action in the larynx similar to that constriction of our ventricular bands, or false vocal cords used in the coup de glotte, or "shock of the glottis," attack, it might explain the force of the attack. It sounds to me as if the shortness of its notes, which are a fortissimo staccatissimo, is one important factor in the obtaining of the brilliant ring. Also I should like to know if the Tree-creeper's exhalation muscles are stronger than those of our average birds. Dr. Morgan has explained to me that birds inhale automatically, but require a muscular effort to exhale. I have attempted to find an explanation in this fact for the remarkable vocal power of such a small animal as a bird. Man, requiring a muscular effort to inhale, has developed extraordinary powers: e.g., Sandow could break a chain placed around his chest by inhaling. Is it not possible that continued compulsory effort in the opposite direction may have developed phenomenal powers in some birds?

The Spotted Pardalote (*Pardalotus punctatus*) has a brilliant staccato ringing note, which is probably produced in a similar way. (See printed call.) The first note is ventriloquial, and I am not sure that the Tree-creeper's staccato notes are not also.

I have heard the Tree-creeper's call when it sounded as if it came from all over a large valley, and I have heard a similar effect on a hillside when I was between the bird and the hill, in which place the phenomena could hardly be explained by deflection as it might have been in the valley.

I have been led all over the place by the first note of the Pardalote, not by the low last note, which I hardly think is ventriloquial.

The ventriloquial notes of the Crested Bell-Bird (*Oreoica gutturalis*) are nearly all staccato, but whether the suddenness of the attack has any bearing on the ventriloquial result I do not know. I have noticed that in most cases when I have been joined with one or more companions we have each imagined the call of the Pardalote to come from a different direction—due maybe to the different angles we were standing in relation to the bird or the sound.

—Trill and Tremolo.—

I have not heard many birds trill. Many of the birds that are said to trill merely repeat the same note very rapidly, which is a tremolo. The White-shouldered Caterpillar-eater (*Campephaga tricolor*) occasionally trills, but its regular call when not speeded up is a series of notes with an acciaccatura to each note.

The acciaccatura when it is at the distance of a tone or semitone from the note it crushes into, supplies the material for a trill, but the trill is not established. We are merely given two notes of different time value repeated alternately. A trill requires the two notes to be of equal duration.

The Nightingale as I heard it in Europe has the most exquisite trill: gramophone records which I have heard since fail to record its trill at any length, due possibly to the performer being a captive.

The tremolo, as used for the violin or other bowed instruments, may be applied to many calls. Such a tremolo being the rapid reiteration of one note can best be imitated by the vibration of the uvula whilst whistling. What might be termed a "sliding tremolo" can be executed in this manner on a portamento from one note to another as in the case of the Fan-tailed Cuckoo. (See call 1, page 161).

—Whispered Calls.—

A juvenile Frogmouth (*Podargus strigoides*) at Mr. Provis's; of Murray Bridge, which was calling for food, made a sound which I can only compare to the whispered resonance of our back cavity of the neck. In fact, I should like to venture a guess that the vocal membranes of this bird's syrinx were not sufficiently developed to generate a sound, and that the sound was produced merely by the air passing some resonating cavity on its passage out.

The adult Scrub Robin (*Drymodes brunneopygia*) has one call which is little more than a whisper, and I would describe it as a long-drawn-out German "ch" with an Italian "er" whispered. This call has a certain resonance which may have been produced in a similar manner to that of the Frogmouth.

—Melancholy Calls—.

Messrs. Gillies and Hall raise the question as to whether a melancholy call denotes a melancholy bird.

They deny the assumption.

In the case of the Cuckoos, Pallid Cuckoo (*Cuculus pallidus*), Fan-tailed Cuckoo (*Cacomantis flabelliformis*), Narrow-billed Bronze Cuckoo (*Chalcites basalis*), Bronze Cuckoo (*Lamprococcyx plagosus*), and Black-eared Cuckoo (*Mesocallius osculans*), we may at least claim that all of these have slightly melancholy calls; and they are at least birds without a home! I have not heard the "frightful scream" of the Channel-billed Cuckoo, but on the authority of Gould its call consists of "awful notes." The name "Semitone Bird," which has been applied to the Pallid Cuckoo, is somewhat of a misnomer: Instead of "Semitone" he should be called "Enharmonic Bird," for the whole compass of his call, which has inspired the name "Semitone" is only three semitones, whereas he touches several smaller intervals which we should term enharmonic, using the term in its Greek sense. Mr. Hall gives the compass of the Pallid Cuckoo as seven semitones, but I am inclined to doubt the accuracy of his record, for during the period of four years I have been listening I have never heard a call of greater compass than four semitones. (See page 161, calls 1 a and c.) This does not apply to call 2, which is not recorded by Mr. Hall.

The Southern Stone-Plover (Curlew) (*Burhinus magnirostris*) is probably one of our most melancholy-sounding birds.

—Calls of Anxiety.—

I have heard a pair of Blackbirds call in a frantic manner when I held a young bird in my hand, and as their calling and shrieking were of no avail, they seemed to adopt the ruse of disappearing into a bush and calling very softly; much as the domestic hen clucks to keep her chickens near her. When I put the young one on the ground it listened for a moment, then darted to the bush to join its parents.

I have heard a Blue-Wren (*Melurus cyaneus*) call its young very softly in a clucking sort of way. It was behind a bush and warned the young, which was approaching me. The little bird quickly ran and disappeared in the direction of the call. In both cases the call was soft and low in pitch. Miss Josephine Heysen has heard a similar call from the Mountain Thrush (*Oreocincla lunulata*) when she has walked between a pair and divided them. The call has always resulted in the mate rejoining the caller.

The Ostrich is said to have a short staccato note which always calls the young when there is danger.

The cluck of the hen, I understand, is also given when the chicken is about to be hatched; apropos of which Dr. Clarke, in describing the Egyptian mode of hatching eggs in ovens, mentions, that "on the eighteenth day, an Arab enters the ovens, stooping and treading upon stones so placed that he may walk among the eggs, clucking like a hen, and continues this curious mimicry till the whole are hatched."

—The Printed Calls.—

In setting down the printed calls shown on pages 160 and 161 I have nowhere shown a smaller interval than a semitone; so that each call can be tried over on the piano. The call of the Pallid Cuckoo therefore is, the nearest notes obtainable on the piano; but as the average ear does not usually detect a smaller interval than a semitone; the musical impression may be close enough to the original for one to recognize it by. The adult Cuckoo has at least three different calls, the two main ones of which I have given, labelling them 1 and 2. Their variations I have labelled a, b, c, etc., c being given in conjunction with a call of the Crimson Rosella (*P. elegans*).

This is a case of perfect rhythmic, harmonic, and melodic relation between two calls of different species. I heard these two calls given for some minutes in the relation shown. I do not intend to suggest that the synchronising of the calls was conscious or intentional. It may have been, or it may have been a coincidence. I have heard one Cuckoo call both a and d, but I could not verify its sex.

Call a, with its varied endings, was taken at Tanunda, September, 1922, and I find the following note among my records:—

"From sunrise till sunset, and even later, the clear semi-staccato upward call of the Pallid Cuckoo could be heard. At times it came as a faint echo from the country, at others a friendly call from the centre of the town. The bird did not appear to be a scrap shy. In one instance I stood within a dozen yards of one sitting on the goalpost of the local sports ground. The bird sang its call a score of times or more, varying the ending slightly, by the omission of the final one or two notes. The call from the sixth note rises in quarter tones."

Call i of the Fan-tailed Cuckoo (*Cacomantis flabelliformis*) can be imitated by whistling the call and allowing the uvula to vibrate. The phonetic sign for this is a German "r."

Call 1, J, of the Narrow-billed Bronzed Cuckoo (*Chalcites basilis*), referred to by Mr. Sutton in Volume VIII, Part 1, as "See you," is usually repeated *ad nauseam* varied slightly by the change of pitch and speed, as in K, or with additional notes at the end, as in L; all the variations being given with a strong portamento, using the term as applied to singing.

Call 1, J, has been given at exactly the same pitch by the Starling (*S. vulgaris*); but, as Mr. Sutton points out, there is a longer interval between each repetition with this bird.

Call G, of the Bronze Cuckoo (*Lamprococcyx plagosus*) is a memory sketch, as I have mislaid the only record I have taken. I heard the bird at Bridgewater, and, as Mr. Sutton said at the time, it sounded like a man whistling for his dog. There is a portamento from the G to the E.

Calls A- and B, page 160, give opening phrases of the call of the Crested Bell-Bird (*Oreoica gutturalis*). When Mr. Sutton and I first heard the call CC we were standing at a distance of fifteen or twenty feet from the bird. We both imagined its call was coming from a different direction. I attribute this partly to the fact that we were standing at different angles, although at the same distance from the bird.

The low note A in call E, which finally emerged from the call as it was repeated at a constantly rising pitch, was absent at the commencement, although we were so close to the bird. In fact, the call CC was so faint at first that, although I was watching the bird through field-glasses, I could not believe it came from it; especially as there was no apparent movement of the mandibles. As the call sounded nearer and developed into call E, the bird gradually opened its beak, and the low A became the loudest note of the call—louder than the upper G sharp, which was sounded with it. This is the only occasion on which I heard the upper note sounded with the lower; but that may be due to the fact that I have never been so near before. I have heard the full call repeated about a dozen times and gradually sounding nearer, without varying in pitch.

Calls H of the Boobook Owl (*Ninox boobook*) were given at 11 p.m. in Stringy-bark Trees above my head at Bridgewater. The six bars of these calls, given by two birds which seemed to answer each other, have a repeat sign to show that they were given more than once. With the exception of a break of about five minutes at the end of bar 4 the calls followed each other without appreciable pause, and each bar was repeated many times. Bird X had a different quality to that of Bird Y, and although they were at the same pitch in bar 2 all the calls with

which the term "mo-poke" is associated sounded an octave apart. Bird X seemed to call "eg org," whilst Bird Y gave something approaching "mo-pok"—"e" as in egg, "o" as in or. Bar 2 varied in speed. There is a curious resemblance between this part of the call and the opening of the call of the Tawny Frogmouth (*Podargus strigoides*), the identity of the calls of which have been so often confused.

Calls J, K, and L, I understand, are given by both the Yellow-tailed and Spotted Pardalotes (*P. xanthopygius* and *punctatus*). The short second note in call L is not heard unless the bird is near. It is a soft staccato note with almost a catch in it. I have shown the answering calls of two Tawny-crowned Honey-eaters (*G. melanops*) in call M. There is an altogether delightful quality in this bird's song which calls for poetic utterance rather than cold technical analysis.

(A) PALLID CUCKOO *Cuculus pallidus*
 call ① $\text{♩} = 144$

(B) $\text{♩} = 120$

(C) $\text{♩} = 72$

(D) call ② Pallid Cuckoo
 $\text{♩} = 132$

Crimson Rosella *Platyercus elegans*
 $\text{♩} = 72$

(E) $\text{♩} = 132$

(F) BRONZE-CUCKOO *Lamprocyax flagellatus*
 $\text{♩} = 120$

(H) BLACK-EARED CUCKOO *Mesocitius ocellatus*
 $\text{♩} = 84$

(I) FAN-TAILED CUCKOO *cacomenitis flabelliformis*
 $\text{♩} = 98$

(J) NARROW-BILLED BRONZE CUCKOO *Chalcites basalis*
 call ① $\text{♩} = 60$

(K) $\text{♩} = 120$

(L) $\text{♩} = 184$

(M) call ② $\text{♩} = 192$

(N) $\text{♩} = 192$

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