

©

*Anal.*

# A JOURNAL

OF

## AMERICAN ETHNOLOGY AND ARCHÆOLOGY

EDITOR

*Scire*  
J. WALTER FEWKES

VOL. I.

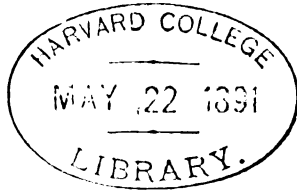


BOSTON AND NEW YORK  
HOUGHTON, MIFFLIN AND COMPANY

*The Riverside Press, Cambridge*

1891

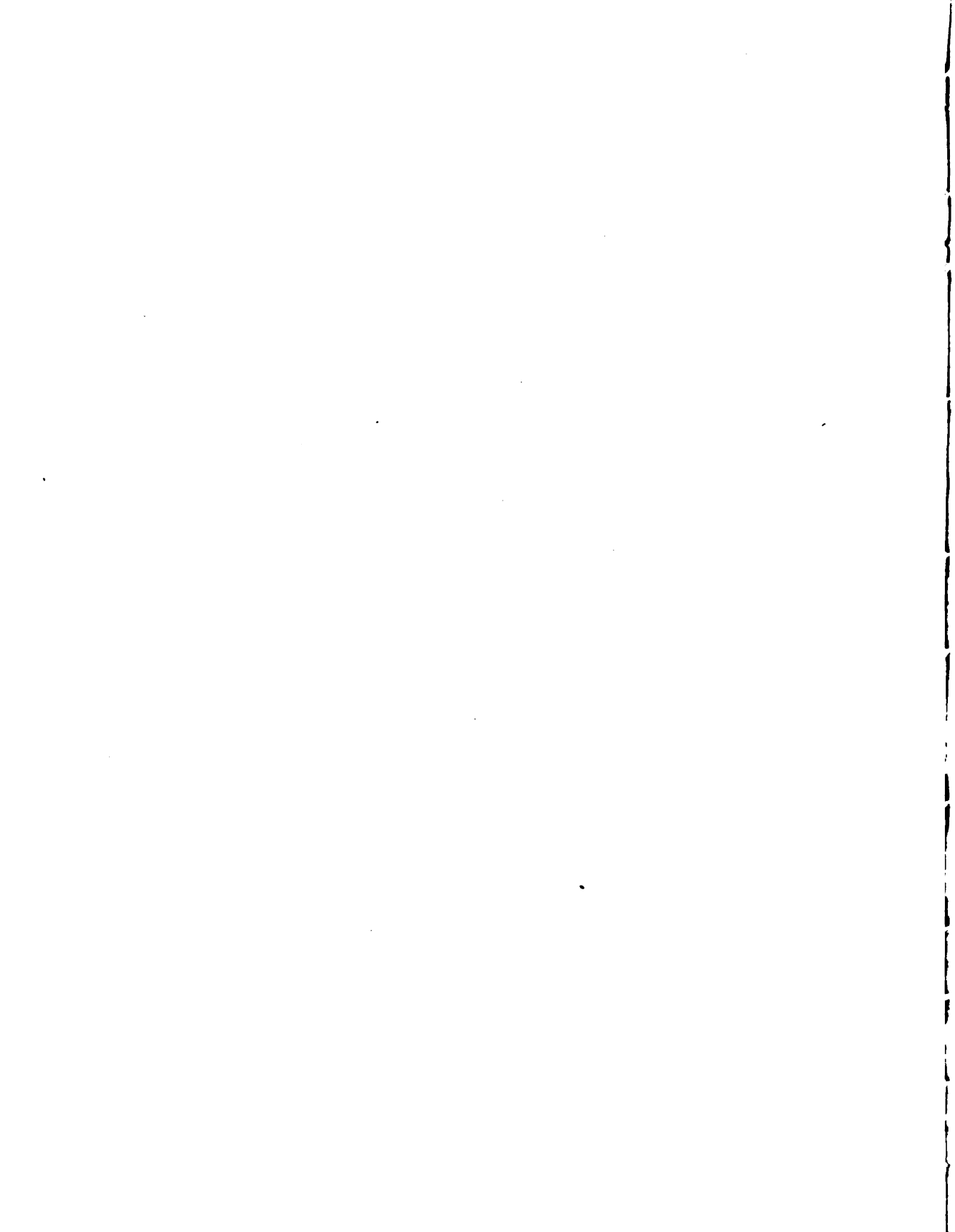
~~Sci 3120.100~~  
Sci 3120.100



*The Riverside Press, Cambridge, Mass., U. S. A.*  
Electrotyped and Printed by H. O. Houghton & Company.

## CONTENTS AND LIST OF ILLUSTRATIONS.

	PAGE
I. A FEW SUMMER CEREMONIALS AT ZUÑI PUEBLO . . . . .	1
Gnomon used to determine Time of Ceremonials . . . . .	4
Her-pah-ti-nah . . . . .	8
Shrine under White Boulder . . . . .	8
Offering of the Priesthood of the Bow, from the Shrine of Ah-ai-u-ta . . . . .	11
Shrine near Pin-a-ua . . . . .	12
Place of casting Stones . . . . .	14
Du-me-chim-chee . . . . .	17
Koy-e-a-ma-shi . . . . .	22
Lar-sho-wah-wey . . . . .	25
Kō-kō . . . . .	27
Kor-kōk-shi . . . . .	29
Meat-ta-tash-a . . . . .	36
Hay-a-ma-she-que . . . . .	38
Dance of the Clowns with Sticks . . . . .	40
Ar-toish-ley . . . . .	42
Zuñi Women firing Pottery . . . . .	61
Tablet worn on the Head by a Dancer in the Ham-po-ney . . . . .	62
II. ZUÑI MELODIES . . . . .	63
III. RECONNOISSANCE OF RUINS IN OR NEAR THE ZUÑI RESERVATION . . . . .	93
Map showing the Position of the more Important Ruins near Zuñi . . . . .	94
Excavated Rooms in Northeastern Portion of Hal-o-na-wan . . . . .	104
Hesh-o-ta-thlu-al-la . . . . .	111
Plan of Pipkin's Ruin . . . . .	115
Ruin on Inscription Rock . . . . .	118
Plan of Larger Ruin at Ar-che-o-tek-o-pa . . . . .	122
Chambers at Ar-che-o-tek-o-pa . . . . .	124
Mode of insertion of Floor Beams at Ar-che-o-tek-o-pa . . . . .	125
Window? at Ar-che-o-tek-o-pa . . . . .	125
Montzeimer's Tower . . . . .	127
Plan of Hesh-o-ta-uth-la . . . . .	133



○

**Hemenway Southwestern Archaeological Expedition**

---

II.

ZUÑI MELODIES

By BENJAMIN IVES GILMAN



## II.

### ZUÑI MELODIES.

---

THE following record of melodies of the Zuñi Indians has been made from phonographic cylinders which Dr. J. Walter Fewkes, of the Hemenway Archæological Expedition, exposed to the singing of various members of the Zuñi tribe during his visit to the pueblo in the summer of 1890. The songs thus obtained are, it is safe to conclude, examples of a traditional music of the race. They are given on the cylinders with many repetitions, the different renditions, sometimes even of whole songs, being alike in surprisingly minute particulars.

The music secured in this permanent form has been listened to attentively through the phonograph and taken down from the hearing with the aid of a harmonium. (Mason & Hamlin, Boston.) This instrument being tuned to concert pitch in the equally tempered scale embodies a series of tones separated by the twelfth part of an octave ranging several octaves up and down from  $c'' = 536$  vibrations. Into this scale of fixed pitch it has been sought to make as good a translation as possible of these phonographic copies of Zuñi songs, taking for each of their notes that one on the harmonium which seemed the nearest. (The black keys have been indicated throughout by sharps.) The records which follow are therefore to be regarded as an approximation to the actual course of pitch in these primitive melodies, which, were there no aberration in the phonographic reproduction, nor failure to select the nearest semitone on the harmonium, would everywhere be correct to within a quarter tone.

In cases where the heard pitch is evidently different from any semitone on the instrument the method adopted has been to find those two adjacent notes (or sequences) with each of which, played simultaneously with the phonographic reproduction, the latter can be made to blend in perception. The record is then made of the semitone which absorbs the phonographic sound most easily, a dash being written over or under it to indicate that the heard pitch is higher or lower than the written. For sequences of notes the words "sharped" and "flatted" have a like meaning.

The absolute pitch and time of the music to which a phonographic cylinder has been exposed will not be reproduced by it unless at every point of the piece it moves at the same rapidity in exposure and reproduction. If the rate of revolution be constant in the exposure, any constant rapidity used in the reproduction will correctly give the melody, or sequence of intervals, although not in general at the original pitch. In the phonograph moved by electrical power (which was the form of instrument used in reproducing this music) a uniform speed is sought to be attained by an apparatus like a steam-engine governor. The phonograph used by Dr. Fewkes in taking down the melodies at Zuñi was worked by a treadle, and was fitted, for the same purpose, with a species of fly-wheel. In order directly to answer the question as to how accurately these two kinds of phonograph reproduce sequences of pitch, a special set of experiments has been made by Dr. Fewkes and the writer of which an account is given below. The conclusion to which they point is that, while the electrical phonograph can reproduce a melody committed to it without any noticeable variation in pitch, the reproduction by electro-motor of a melody received in a treadle machine, even worked with care, is subject throughout to a wavering of intonation which results sometimes in an aberration of fully a quarter tone. These aberrations are temporary, and do not take the form of any continued flattening or sharpening from the original pitch. The following records may, therefore, even supposing the nearest harmonium note always to have been chosen, occasionally vary between a quarter and a half tone from the song



as sung at Zuñi. While it has been thought best in noting the songs to indicate with all practicable care the pitch given by the phonograph, this margin of possible error is to be kept in mind in any critical study of the melodic peculiarities they exhibit. The internal evidence of the melodies points, it may be remarked, to a restriction of this phonographic aberration within narrow limits. In several of them, musical periods of considerable length are repeated without any noticeable alteration in pitch. It is much more likely that such a record is a true account of an intonation preserved than that it is a distorted version of a change of intonation which just that distortion happens to neutralize.

All things considered, it may be reasonably inferred that, apart from errors in the work, the following records give a very fairly accurate report of these melodic sequences as they came from Zuñi lips.

Doubtless also the melodies are here written, for the most part, at a pitch approximately the same as that used by the singers. To accomplish this latter result the phonograph was set, in hearing the music, to run at a speed which delivers about eighty accents a minute in pieces where the emphasis falls on every other one of notes held an equal time. This is at least among European peoples the commonest rate of musical utterance, that called *moderato* time. For the period elapsing in this case between two accents, or  $\frac{1}{80}$  of a minute, the sign  $\text{J}$  has been employed throughout all the following records unless otherwise indicated. The other signs of time have the same significance as in our music. To avoid the multiplication of bars emphasis has in all cases been denoted by accents over the notes. The division of the melodies into phrases by repetition has been indicated by wider spaces between the notes, rests being introduced in the case of any actual interruption in the course of sound.

The fact may be worthy of mention that before listening to these songs the writer had never heard any primitive music, and during their study purposely refrained from consulting any of the records of Indian melodies which have already been made by other investigators.

It is believed that in these studies of Zuñi melodies the phonograph

has for the first time lent its aid to investigations into primitive music. The apparatus proves to be a means by which the actual sound itself of which a music consists may, even in many of its more delicate characteristics, be stored up by the traveler in a form permanently accessible to observation. Our exacter knowledge of primitive music has hitherto been obtained in part through an examination of primitive musical instruments, and in part through the comparatively rare opportunities which trained musicians have enjoyed to hear it in actual performance. The former gives us a knowledge only of scale systems, while actual performances are never within the control of the hearer for the interruption and indefinite repetition which a closer study demands. By the aid of the phonograph what would appear to be a very accurate reproduction of the music to which it has been exposed can be brought to the ears of any observer to be examined at his leisure. It can be interrupted at any point, repeated indefinitely, and even within certain limits magnified, as it were, for more accurate appreciation of changes in pitch, by increasing the duration of the notes. A collection of phonographic cylinders like that obtained by Dr. Fewkes forms a permanent museum of primitive music, of which the specimens are comparable, in fidelity of reproduction and convenience for study, to casts or photographs of sculpture or painting.

The music of the Zuñians here recorded is purely melodic and vocal: it would be interesting to see whether the phonograph could be employed with like success in collecting specimens of instrumental and concerted compositions.

EXPERIMENTS TO DETERMINE THE ACCURACY WITH WHICH THE PHONOGRAPH REPRODUCES MELODY. — In order to ascertain to what extent the accompanying records may be suspected of deviating, through phonographic aberration, from the songs as originally sung at Zuñi, a cylinder was placed on a treadle phonograph in all respects like that used by Dr. Fewkes at the Pueblo, and an inscription made of a succession of about one hundred and twenty-five notes played on the harmonium above mentioned. The cylinder was then transferred to the electric phonograph used in writing down the songs, and the reproduction compared with the same succession of notes again played on the harmonium.

The phonographic copy proved to adhere in general very closely to the harmonium

notes, no prolonged flattening or sharpening being noticeable. The principal imperfections in the reproduction were of two kinds, which it was difficult clearly to distinguish: a rapid pulsation of intensity, and a slight wavering or tremulousness of intonation appearing in exceptional cases to involve a deviation from the harmonium of perhaps a quarter tone. Furthermore, in two cases the phonographic pitch suddenly rose a full semitone above that of the harmonium, returning to coincidence with it in the course of a very few notes. These deviations were accompanied by a quickening in the time of the music, and were evidently caused by a momentary remission in treading due to the fatigue of the operator. A second inscription taken with the treadle phonograph and heard by the electro-motor gave similar and possibly slightly more correct results.

It became an interesting matter to determine how far the use of the electro-motor as the means of inscription as well as the means of reproduction would improve a phonographic copy of music. To this end an inscription was made by electro-motor of the following notes of the harmonium,  $c'$   $e'$   $g'$   $c''$   $e''$   $g''$   $g'$   $G$   $c$ , each held during fifteen or twenty seconds. Reproduced by electro-motor, although some unevenness of tone, both pulsation and wavering, could be detected and seemed to follow the revolutions of the cylinder (140 per minute), it was considerably less than in the case of the inscriptions from the treadle machine. The degree of accuracy of the reproduction was sought to be determined by the following device.

It was found that if the screw regulating the supply of electricity to the motor were turned through about 300 degrees, the quickening of the revolution of the cylinder would raise the pitch of the first note of the series from  $c'$  to  $c'^{\#}$  of the harmonium. It was further found that if having tuned the phonograph as accurately as possible to  $c'$ , the screw were turned through about  $75^{\circ}$  the instrument would give a note which notwithstanding its wavering could be recognized as higher than  $c'$ . If, as is supposably the case, the pitch of a phonograph inscription gradually changes as the screw regulating its electrical supply is turned, the sharpening corresponding to this turn of  $75^{\circ}$  was a quarter of a semitone or an eighth of a tone. The succeeding notes of the series were then sounded, and found in every case to be perceptibly higher than the corresponding harmonium note. In reporting none of them, we can therefore argue, has the phonograph flattened as much as the eighth of a tone. The first note of the series was then tuned as accurately as possible to  $c'^{\#}$ , and an opposite motion of the screw of likewise about  $75^{\circ}$  was found to produce a note perceptibly lower than  $c'^{\#}$ . Each of the other notes of the series proved now to be perceptibly lower than the corresponding harmonium note. The phonograph, we can again argue, has not sharpened in reproducing any of these, as much as the eighth of a tone. Several repetitions of these experiments led to the same results. It may be inferred, therefore, that the amount by which a phonographic reproduction of melody by electro-motor will vary from its original will in general be less than this minute interval of the eighth part of a tempered tone.

This conclusion was corroborated by an inscription taken from a specially tuned harmonium (the invention of the late Alexander J. Ellis, F. R. S.), called the Harmonical, made for the writer by Messrs. Moore & Moore of London. In several octaves of this instrument there are notes tuned a trifle less than an eighth of a tone apart; the exact interval being that called the comma, or  $\frac{1}{53}$ . In the phonographic reproduction of these notes, alternated first slowly and then rapidly, they were plainly distinguishable notwithstanding the usual uncertainty in their intonation. It is an interesting fact, and one which suggests a possible use for the phonograph (especially if a perfectible instrument) as a ready means for the demonstration of many acoustic phenomena, that the *difference tones* of the perfect major third (ratio 4 : 5) and of the chord of the natural seventh (ratio 4 : 5 : 6 : 7), both of which combinations of notes are given on the Harmonical, were very distinctly perceptible in their phonographic reproduction. Also very distinctly noticeable was the difference in beauty between this latter chord with the natural seventh and that formed with the  $b^b$  of our scale, about a quarter tone higher.

The possibility of producing with electric power when applied to the instrument called the Siren a rapidity of revolution sufficiently uniform to give a note of steady pitch has already been demonstrated by Helmholtz. In his "Lehre von den Tonempfindungen" (Beilage I.) he describes an electro-motor of his own invention, which produced Siren notes comparable in constancy with those of the best organ pipes. It is to be hoped that it may eventually be found possible to eliminate from the phonograph the uncertainty of intonation which as yet takes away something of its value as an apparatus for the investigation of primitive music.

According to the indications of the above experiments, the degree of accuracy which may fairly be claimed in the case of the present records of Zuffi melody has not been overstated in the text.

I. SONG OF THE RABBIT-HUNT.

$\text{♩} = 80. f$  throughout.

Three staves of musical notation in bass clef, featuring a series of eighth and sixteenth notes with various accidentals (sharps and naturals) and slurs. The music is written in a key with one sharp (F#).

II. DU-ME-CHIM-CHEE.

Three staves of musical notation in bass clef. The first staff begins with a tempo marking of  $\text{♩} = 80. f$  and includes dynamic markings of *Flatted* and *Sharped*. The second staff ends with a *dim.* marking. The third staff includes dynamic markings of *m*, *p*, and *mp*.

## III. SACRED DANCE OF THE KO-KO.

$\text{♩} = 80.$

*f* *f* *p*

1 *pp* *f* *D.S.* 2 *pp*

## IV. HAY-A-MA-SHE-QUE.

$\text{♩} = 80.$  *f* throughout.

$\text{♩} = 100.$

$\text{♩} = 80.$

$\text{♩} = 100.$

$\text{♩} = 80.$

Sharped . . . . .

*Slow.*  $\text{♩} = 80.$  **V. HAM-PO-NEY.**

*dim.*





## ZUNI MELODIES.



VI. KLAR-HEY-WEY.

*f* *Slow.*  $\text{♩} = 80.$

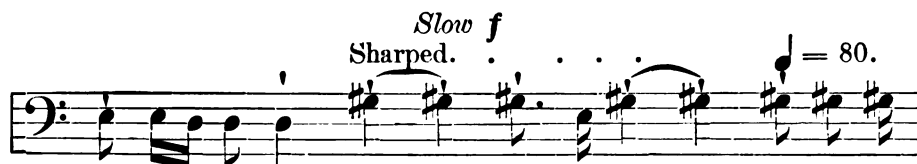
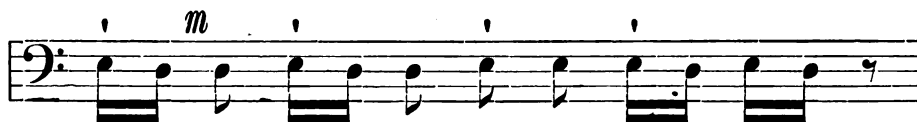
*dim.*

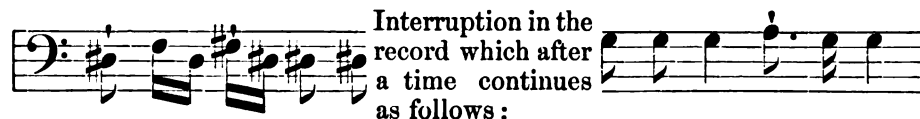
*m*

*dim.*

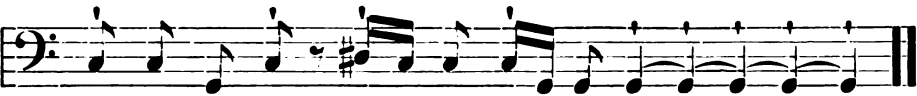
*m*

The musical score consists of seven staves of music in bass clef. The first staff begins with a dynamic marking of *f* and a tempo marking of *Slow.*, with a quarter note equal to 80 beats per minute. The second staff features a *dim.* marking. The third staff has a *m* marking. The fourth staff starts with a *dim.* marking. The fifth staff has a *m* marking. The sixth and seventh staves continue the melodic line with various rhythmic patterns and dynamics.





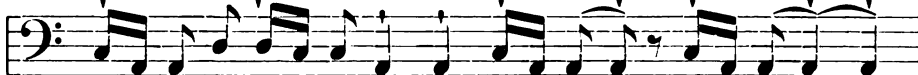




VII. O-TO-NA-WEY.





  
 Flatted. . . . .

$\text{♩} = 100.$   $\text{♩} = 80.$  Sharped . . . . .  


*ppp* *p*  

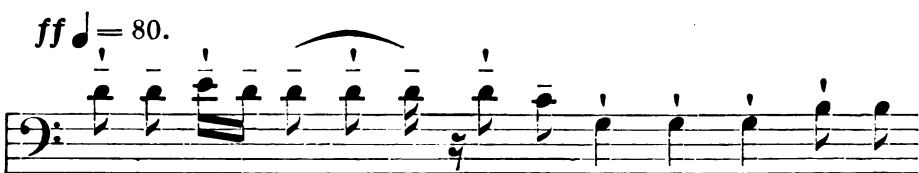

VIII. KOR-KÖK-SHI.

$\text{♩} = 80.$   


$\text{♩} = 100.$  *f*  






ZUNI MELODIES.

First musical staff in bass clef, featuring a melodic line with a dynamic marking of *sf* (sforzando) above the notes.

Second musical staff in bass clef, featuring a melodic line with a dynamic marking of *p* (piano) above the notes. Below the staff, the text "Flatted. . . . ." is written.

Third musical staff in bass clef, featuring a melodic line with dynamic markings of *ppp* (pianissimo) and *ff* (fortissimo) above the notes, and the word "Sharped." above the final notes.

Fourth musical staff in bass clef, featuring a melodic line with several sharp signs (#) above the notes.

Fifth musical staff in bass clef, featuring a melodic line with various note values and rests.

Sixth musical staff in bass clef, featuring a melodic line with a dynamic marking of "Flatted. . . ." below the staff.

Seventh musical staff in bass clef, featuring a melodic line with various note values and rests.

Eighth musical staff in bass clef, featuring a melodic line with various note values and rests.



IX. SHI-VO-LA.

CYLINDER A.

$\text{♩} = 80.$





The song is now repeated from \* sharpened somewhat less than a semitone and with identical accent and time up to the Coda which is somewhat different and is followed by another repetition from *sf* a second Coda sharpening B and ending on C. The song immediately continues as follows :



After the repetition from  $\text{f}$ : repeat from \* \* flatting almost a semitone.

CYLINDER B.

$\text{♩} = 80.$   
\* \* \* *f*

The first staff of music is in bass clef. It begins with a tempo marking of quarter note = 80. The music starts with a forte (*f*) dynamic. The melody consists of a series of eighth and sixteenth notes, many of which are beamed together. There are several accidentals (sharps and flats) throughout the piece.

Repeat from \* \* \* *m*

The second staff continues the melody. It features a repeat sign with three asterisks (\* \* \*) above it, indicating a repeat from a previous section. The dynamic marking is mezzo-forte (*m*). The notation includes various note values and accidentals.

*p*

The third staff continues the melody with a piano (*p*) dynamic marking. The notation shows a continuation of the melodic line with various note values and accidentals.

*m*

The fourth staff continues the melody with a mezzo-forte (*m*) dynamic marking. The notation includes various note values and accidentals.

*p*

The fifth staff continues the melody with a piano (*p*) dynamic marking. The notation shows a continuation of the melodic line with various note values and accidentals.

*V*, *pp*

The sixth and final staff of music on this page continues the melody. It features a dynamic marking of *V* (likely fortissimo) and *pp* (pianissimo). The notation includes various note values and accidentals.

Repeat from \* \* \* very slightly sharpened, then as follows :

Flatted throughout. *f*

Repeat from \* \* \* sharpening about a semitone. Record stops at V.

## NOTES.

CYLINDER I. *Song of the Rabbit-Hunt.* The cylinder contains a repetition of this song eight and a half times, in a very sonorous voice. The emphasis is very strongly marked, and the time very true. During the first performance of the melody the note written E gradually moves upward toward F. In the second, this sharpening takes place almost at once. In the third or fourth, both the C<sup>#</sup> and G<sup>#</sup> have followed the E a quarter tone upward. From this point on, the pitch remains without perceptible change to the end of the cylinder.

CYLINDER II. *Du-me-chim-chee.* This song is given three times on the cylinder. The differences are inconsiderable: a slight sharpening or flattening of whole periods; a slight divergence in movement in the opening period; and the repetition of the third period before passing on to the fourth. The fifth and sixth periods, with their faint and monotonous repetitions of one note, or transitions of thirds, form what we may term a coda to the piece. The form of this song, commencing with high forte passages, and working down to a pianissimo coda at a low pitch, is that of almost all of this music. In more elaborate songs, as we shall see, a slow succession of notes at a medium pitch form an introduction to the main body of the melody.

If we suppose all of this song, after the first two periods, to be unintentionally flattened about a semitone, its correct performance will strike the following notes, B C<sup>#</sup> D<sup>#</sup> F<sup>#</sup> G<sup>#</sup> B, forming the pentatonic scale of alternate tones and minor thirds, found in Chinese and much other primitive music. But this fact must not be taken as proof that the Zuñi race is in possession of this widespread pentatonic scale. It is rather a sign that simpler habitudes of melodic invention have a certain tendency to bring forth such an interval order. For the different songs here given embody other and very different scales as well. The *Kō-kō* Dance, for instance, taken just as sung, embodies a pentatonic scale of a semitone, two tones, a minor third, and a major third; or, if we consider the singer to have really meant D<sup>#</sup> by his D, we have a tetratonic scale of a tone, two minor thirds, and a major third. The song *Ham-po-ney* uses every semitone but two within a range of two octaves. In *Klar-hey-wey* the scale of the first theme covers a major sixth, with four tones and a semitone; the second theme completes this to an octave, making a hexatonic scale of a semitone, four tones, and a minor third. The evidence of these songs is, in short, that Zuñi music is subject to no restrictions of scale. What we have in these melodies is the musical growths out of which scales are elaborated, and not compositions undertaken in conformity to norms of interval order already fixed in the consciousness of the singers. In this archaic stage of the art, scales are not formed, but forming.

CYLINDER III. *Sacred Dance of the Kō-kō.* The cylinder repeats this song as

indicated in the record. No difference in pitch between the two renditions was noticeable, even with attentive listening. The singer has a very loud and piercing voice. This is the only melody among the songs which is at once captivating to European ears. The alternations of double and triple time are very artistically used, and produce a very graceful effect. Up to the coda, the melody may be viewed as written in our key of E $\flat$ .

CYLINDER IV. *Hay-a-ma-she-que*. This song is given on the cylinder but once. The record closely follows the phonograph notes. The first four periods are four somewhat different melodies; the fifth and sixth periods are a repetition of the second; then the fourth is repeated as a seventh period, and the song closes with a coda.

CYLINDER V. *Ham-po-ney*. In this song the full form of introduction, melodic repetition, and coda, is presented, though the introduction consists of but two notes. The melody may be described as the development of the element of musical form made up of the first eight notes after the introduction. The piece consists of six repetitions of this, the original statement of it being followed by an elaborate interlude, having the character of a coda; this ended, the theme returns, is developed, given a third time, and again differently developed; the fourth return of the theme follows, but gives place at once to an interlude of coda form; on this ensues a fifth return of the theme, following the general outline of its second presentation; the sixth joins upon this, as the third does upon the second, and is identical with the third, except for semitone differences of pitch at the start; a coda different in form from either of the interludes follows, and closes the piece.

CYLINDER VI. *Klar-hey-wey*. The song as written fills the cylinder. The written pitch seems to follow the song very closely. The introduction has here become more elaborate, corresponding to the more elaborate structure of the song. This consists of two parts, each made up of the repeated statement of two themes, the four themes being quite different. In the first part, the introduction is followed by the statement of the two themes, in immediate succession, followed by an interlude; thereupon they present themselves again in immediate succession unchanged, except for slight variations in pitch. An interlude of somewhat different form follows, and is succeeded by a new introduction, almost identical with the first. The two themes are then repeated as before, with no change but slight variation of pitch; the song then breaking off abruptly, without any coda. In the first interlude, the short rests are evidently pauses to catch breath. The second part begins by an introduction different from that of the first; its two themes then follow in immediate succession, followed by an interlude, and are identically repeated. They are then presented a third and a fourth time, almost exactly identical in pitch and movement, a different interlude intervening. A still different interlude follows, after which the themes reappear identically for a fifth time, and the song ends with a coda.

CYLINDER VII. *O-to-na-wey*. This song consists of an introduction, a theme,



which is repeated almost identically, but for a slight change at the end, and a coda. The indecision of the singer between the minor and major third, which is so striking a feature of all this music, is interestingly brought out in this song.

CYLINDER VIII. *Kor-kök-shi*. The same general structure of an introduction, themes repeated, with or without interludes, and a coda. But in this song, the first theme does not recur, although the second might perhaps be called a development of it. The time of the first theme is peculiar; for two accents in common time, it is in triple time for two more (although the first of these measures has only five eighth notes), and then goes on in common time. This first part of the theme is also noticeable as a repetition of the same sequence of pitch at the interval of the fourth below. It suggests the repetition at the fifth above (the inversion of the fourth below) of fugal structure and modern modulation.

CYLINDERS IX. (*a* and *b*). *Shi-vo-la*. After the three notes of introduction, this song begins as a lusty, roaring staccato. In the repeat from \*, the reason for attacking the melody at that point about a semitone higher is evidently that the transition is from B, and is made, as is natural, through an octave. The remarkable melody which both in this and the next cylinder occupies the place of coda deserves notice on many accounts. Although this Zufi music may be said to embody a stage in the development of the art before the appearance of scales, yet just as *Du-me-chim-chee* may be viewed as composed exactly to cover a Mongolian pentatonic scale, so this melody is composed just within the major diatonic scale which has become the standard in Europe during the last three centuries, and uses every step of it but one. Nevertheless, in its structure, beginning high and loud, and ending with low and soft repercussion, with a transition of a third, and repeating the latter portion of the melody for a close, it is of the general type of the other music here recorded, and is presumably of like origin.

In the second cylinder, specially noticeable is the exactitude of the repetitions, which permits of their mention only, without any extension of the record.

The capital importance which specimens of primitive music like these possess as data for the student of the growth of the art has not been more than suggested in these notes. The writer desires to express the heartiest acknowledgments to Mrs. Hemenway and Dr. Fewkes for their permission to make the present study of a small part of the phonographic material brought back from the Zufi Pueblo.

CAMBRIDGE, MASS., *January*, 1891.